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Making Heredity Matter: Samuel Butler's Idea of Unconscious Memory

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Abstract. Butler's idea of evolution was developed over the publication of four books, several articles and essays between 1863 and 1890. These publications, although never achieving the success expected by Butler, proposed a psychological elaboration of evolution (robustly enforced by Lamarck's philosophy), called 'unconscious memory'. This was strongly in contrast with the materialistic approach suggested by Darwin's natural selection. Starting with a historical introduction, this paper aspires to ascertain the logic, meaning and significance of Butler's idea of 'unconscious memory' in the post-Darwinian physiological and psychological Pan-European discussion. Particular attention is devoted to demonstrating that Butler was not only a populariser of science but also an active protagonist in the late Victorian psychological debate.

Keywords: Samuel Butler, Psychological evolution, Ewald Hering, Charles Darwin, Lamarckism, Unconscious memory

Introduction

On the 2nd December 1882, Samuel Butler delivered a lecture entitled 'On Memory as a Key to the Phenomena of Heredity' at the Working Men's College in London. In the lecture, Butler tried to explain to his fellow citizens the importance of rethinking evolution in a Lamarckian way. In 1882, circumstances had led to Butler's voice not being given much credence within the British scientific community. Butler was, therefore, directing his attention to the general public with the aim of persuading the public to the revolutionary potential of his ideas con-

cerning Lamarckism, memory and heredity. Most significantly, the ideas that Butler championed were topics that were being widely discussed across Europe; however, in England where the faith in Darwin's theory of natural selection still remained strong, this 'new science' was initially met with reserve. Lamarck's work was well known in Britain since the 1830s and the publication of Charles Lyell's *Principles of Geology* (1830–1833). But after the publication of Darwin's *Origin* (1859), Lamarck's theory of evolution started to be ignored mostly because of its emphasis on the will of the individual in the evolutionary process.

In his lecture, Butler sought to explain the role that memory played in heredity. He was aware that the question of exactly how inheritance occurred was still unanswered and he believed that an elaboration of Lamarck's concept of the inheritance of acquired characteristics would have provided a solution to the matter. However, to substantiate his claims, and perhaps to detract from his audiences doubt about either the scientific credibility of Lamarck's ideas, or of his own credentials to speak on this matter, Butler gave an account of his own research in the context of the work performed by European psychologists and neurologists. Butler insisted, in particular, in showing a similarity between his work and that of the German physiologist Ewald Hering. In the late nineteenth century, Hering was becoming well-known across Europe for his research on heredity and memory, colour theory and binocular vision. An extract from the lecture stated:

> We say it is a phenomenon of heredity that chickens should be laid as eggs in the first instance and clergymen born as babies, but, beyond the fact that we know heredity extremely well to look at and to do business with, we say that we know nothing about it. I have for some years maintained this to be a mistake and have urged, in company with Professor Hering, of Prague, and others, that the connection between memory and heredity is so close that there is no reason for regarding the two as generically different, though for convenience sake it may be well to specify them by different names (Jones, 1930, p. 57).

This highlights the central point of this article which aims to re-examine the role of Butler in the late Victorian scientific scene: in his work Butler was not simply popularising European science. Instead, he tried to be an active protagonist in the debate by looking at evolution from a psychological perspective.

Butler's idea of evolution was developed over the publication of four books, several articles and essays between 1863 and 1890. Although none of these publications achieved the status or recognition that he had hoped for, in them he proposed a psychological elaboration of evolution (robustly enforced by Lamarck's philosophy), called 'unconscious memory'. Butler's 'unconscious memory' was in stark contrast to the materialistic approach suggested by Darwin's natural selection, and, Butler argued, it had more scientific backing than the theory of pangenesis that Darwin had suggested as a potential physiological explanation of the mechanisms of heredity.

The reasons for Butler's dismissal of Darwin's ideas were both personal and methodological. On the personal side, Butler had engaged with Darwin in a bitter quarrel over different interpretations of evolution. The quarrel started after the publication of Butler's second scientific book, *Evolution Old and New* which was published in March 1879, and it continued until Darwin's death in 1882. The main consequence of the quarrel was the total isolation of Butler and his ideas from the British Darwinian community. At the heart of the quarrel lay a simple misunderstanding created by the forgotten acknowledgment of Butler's *Evolution Old and New*. This was to be found in the English translation of the bibliography of Erasmus Darwin by E. Krause entitled, *Life of Erasmus Darwin (1879) with a preface by Charles Darwin (Barlow, 170)*. Several studies have explored the importance of the quarrel focusing on both its public and private dimensions (Barlow, 1958, pp. 167–221; Jones, 1911; Paradis, 2004, pp. 307–331). However, it is important to emphasise that the quarrel between Butler and Darwin was more than an *ad-hominem* attack (Irvine, 1955, pp. 220–224) upon a forgotten citation (Pauly, 1982, p. 161).

For Butler evolution was a matter of Lamarckian designed memory. But for Darwin, there was little space for any blueprint in biology. As Janet Brown argues, 'pangenesis was the highly abstract notion that every tissue, cell and living part of an organism produced minute, unseen gemmules (or what he sometimes called granules or germs) which carried inheritable characteristics and were transmitted to the offspring via the reproductive process' (Browne, 2002, p. 275). In 1868, Darwin, in *The variation of animals and plants under domestication,* was careful to explain that each part of an organism produced only gemmules about itself and not about the organism as a whole (Darwin, 1868, p. 374). Individual gemmules did not have the complete designed (biological) map of the whole creature.

Butler used the word 'unconscious' in relation to evolution for the first time in 1872 in the novel *Erewhon*. This term subsequently became the label adopted by the writer to describe his evolutionary idea. Butler's main books on science, *Life and Habit* (1878) and *Unconscious Memory* (1881), hypothesised that there was a substantial overlap between the concept of memory and heredity to reintroduce causality into the evolutionary process. Butler's idea of 'unconscious memory', rested on a process of biological reproduction and preservation of information from one generation to the other.

This was explained as a substantial chemical continuity between memory and heredity. This continuity was conceived in Butler's *Luck or Cunning?* (1886) by employing a new interpretation of the Lamarckian concept of inheritance of acquired characteristics in relation to Dmitri Mendeleev's law. A similar hypothesis was developed independently in France by Théodule Ribot and also in Germany by Ewald Hering.

Samuel Butler has historically been considered by academics as a novelist with an interest in science. Butler was a novelist, yes, but he also spent more than thirty years of his life fighting against the orthodoxy of Victorian science in order to explain to his fellow countrymen his vision of evolution. The place of Butler's science in contemporary Victorian studies is still very complex. Literary scholars such as Gillian Beer and Sally Shuttleworth consider Butler's work predominately as a form of 'literature and science' without any relevant influence upon the scientific debate (Beer, 2007; Shuttleworth, 2007). As an example, Shuttleworth's 'Evolutionary Psychology and *The way of all Flesh*' explores the psychological meaning of Butler's most well-known novel looking at questions regarding personal identity and continuity of personality (Shuttleworth, 2007, pp. 147–148). Shuttleworth's essay emphasises the importance of looking at the theory presented in *Life and Habit* only through Butler's fiction, because fiction is the only place where Butler's science can be taken seriously (Shuttleworth, 2007, pp. 151–155). A similar reading of Butler's work is proposed by Beer in the essay 'Butler, Memory and the future'. Here, Butler's final novel *Erewhon Revisited* is used to demonstrate the importance of Butler's theory of memory and heredity (Beer, 2007, pp. 51–55).

Historians of science are slowly starting to show Butler's place in the Victorian scientific scene. The works of Paradis (2007), Fyfe and Lightman (2007) and Forsdyke (2006, 2009) exemplified the importance of Butler's scientific view of evolution. Moreover, the scientific work of Butler is now becoming increasingly recognised as forming a contribution to the Victorian marketplace of science although only in the

form of a popularisation (Lightman, 2007b, pp. 113–143). Lightman, in the essay 'A conspiracy of One: Butler, Natural Theology, and Victorian Popularization' illustrates Butler's importance as a populariser but mostly limits his influence to the popular sphere (Lightman, 2007b, pp. 118–120). Lightman's essay also does not place much significance in Butler's scientific idea. He suggests that Butler's Lamarckism was used to exercise criticism over Darwin and other Darwinian professionals (Lightman, 2007b, pp. 131–133) and 'represented a threat to the emerging scientific professionalization of Darwin's era' (Lightman, 2007b, p. 138).

This argument has been expanded upon by David Gillott's recent book: *Samuel Butler Against the Professionals* (2015). Gillott offers an overview of the problematic relationship between Butler and other professionals by tracing the history of Butler's life through an analysis of the evolution of Butler's epistemological knowledge. Gillott uses the Darwin-Butler relationship and associated quarrel in order to show how Butler moved from believing in the professional objectivity of knowledge to considering professionals as individuals interested only in their personal careers (Gillott, 2015, pp. 49–81).

A different reading of Butler's science is provided by the introduction of Laura Otis's *Organic Memory* (1994), where Butler's work is discussed alongside that of European psychologists and physiologists including Ewald Hering and Théodule Ribot. Otis's work confirms the link between Butler and other European scientists. The same argument is also, again, marginally suggested by Schacter's history of psychology where Butler and Hering are presented as forgotten pioneers of the history of discipline (Schacter, 2001, pp 110–112).

The central aim of this article is to re-examine the role of Butler in the late Victorian scientific scene. Butler was not simply a populariser of European science. Instead, he tried to be an active protagonist in the debate by looking at evolution from a psychological perspective. A re-evaluation of Butler's scientific writing then becomes necessary. In particular, Butler's scientific writings need to be taken seriously as they can also help us to understand the science of the mind. Influenced by Lamarck, Hering and Ribot, Butler sought to bring these important ideas, which were influential and widely accepted in Europe, to Britain. However his complex relationship with Darwin and other Victorian scientists undermined his attempt to do so.

The analysis of Butler's work will be examined in relation to the existing critical scholarship on the history of nineteenth century European psychology. Psychology was a branch of philosophy until the

1870s, when it started to develop as an independent scientific discipline in Europe. Thus far, this has mostly been treated as a consequence of Darwin's hypothesis of evolution (Richards, 1989, 1993, 2002; Otis, 1994). Although frequently linked with natural selection, psychology also developed along other scientific paths in both theory and practice across Europe. In respect of the practical aspect of the rise of psychology, the history of science offers an extensive literature. For instance, Laura Otis' recent publication *Muller's Lab* (2007), Simon Schaffer's pamphlet *From Physics to Anthropology and Back Again* (1994) and Mandler's *A History of Modern Experimental Psychology* (2007) offer an historical view of the rise of nineteenth century laboratories, although limiting their analyses to national cases. The work of Kurt Danziger, including 'The positivist repudiation of Wundt' (1979) and *Constructing the Subject* (1994), also offers a constructivist example of the intellectual history of psychological research from the nineteenth century (especially in Germany) to the emergence of contemporary psychology. The main aim of Danziger is to consider the psychological methodology as a kind of social and cultural practice rather than as a simple matter of technique. However, in all of this literature, the aspect that is missing is the European dimension of the debate and the consequent role of psychology in the cultural and philosophical debate before the rise of laboratories.

As exemplified by Rabinbach's *The Human Motor* (1992) the study of the historical, political and cultural developments of nineteenth century science can only be conducted within a wider-European perspective. Therefore, the rise of psychology and the history of its pioneers offer one of the best examples for understanding European science and culture between the 1860s and the turn of the twentieth century.

Butler's Scientific Writing: The European Connections

Samuel Butler's work on evolution was based on a large critical review of the main nineteenth century scientific texts. Between 1863 and 1890 Butler read, translated, and popularised in his work a great deal of English, French and German evolutionary literature. Beer explains in *Darwin's Plots* that in the Victorian period scientific language and narratives were moving 'rapidly and freely to and fro between scientists and non-scientists' (Beer, 2000, p. 5). However, in the Victorian period there was also a clear distinction between practitioners and popularisers. As Lightman has explained, the Victorian populariser was often not a

practitioner and his/her work was 'mainly focused on writing about nature' (Lightman, 2007a, p. 13). Paul White's book on Huxley also looks at the establishment of professionalism in the 1870s stressing the need to distinguish the creation of scientific knowledge from its popularisation (White, 2003, pp. 51–58). There is, therefore, as suggested by Lightman a distinction to make between the Victorian practitioner who produced scientific knowledge and the populariser whose main job was to entertain the masses talking about science (Lightman, 2007a, pp. 35–37).

In *Life and Habit*, Butler made a controversial statement about the production of scientific knowledge: 'I say that the term ''scientific'' should be applied (only that they would not like it) to the nice sensible people who know what's what rather than to the discovering class' (Butler, 1910a, p. 35). Therefore, for Butler making science was not simply a question of conducting experiments or collecting specimens in remote locations. Instead, it was possible to produce new scientific knowledge simply via knowing and reflecting on the ideas of others.

Samuel Butler made this way of producing scientific literature his personal writing style (especially in his biological volumes). He read, commented on and critiqued Darwinian and non-Darwinian literature and tried, especially in *Evolution Old and New* (1879), to link the present Darwinian science with the Lamarckism of the past. Butler tried to show how certain ideas proposed by Darwin owed a deep debt to the work of the previous generation of naturalists, especially Lamarck. However, he also tried to look at how evolution was currently discussed across Europe with a particular focus on the notion of memory.

In 1878, with the publication of *Life and Habit,* Butler recognised that the first naturalist to identify a link between memory and heredity was Lamarck in his 1809 work, *Philosophie Zoologique* (i.e. the concept of 'inheritance'). Butler's use of Lamarck was due to his desire to propose 'the re-introduction of teleology into organic life' (Jones, p. 66). However, Butler's intention in resurrecting Lamarck's philosophy was not just instrumental to his criticism of Darwin's natural selection. Butler's aim was also to complement Darwinism with Lamarckism via a historical examination of the two ideas.

Lamarck's *Philosophie Zoologique* (1809), proposed a hypothesis of evolution (called *transformisme*) where the idea of transformation implied a designed evolution of living species. Lamarck's philosophy was primarily progressive although it did involve some divergences (Jablonka and Lamb, 1999, p. 3). Butler accepted Lamarck's idea that in nature there is no extinction, and evolution determines the passage from

simple to complex forms of life based on a continuous reproduction of an 'inheritance of acquired characteristics'. Lamarckian evolution was based on a process of adaptation of the organism to its environment. This adaptation was explained by the naturalist via a process of use and disuse of certain characteristics (Lamarck, 1914, p. 113).

In *Zoological Philosophy*, Lamarck located the source of vital stimulation within the nervous system. Following the eighteenth-century physiological tradition, Lamarck considered the nervous fluids as the principle link existing between living things and the environments (Jordanova, 1984, p. 76). In the *Histoire Naturelle des Animaux sans Vertebres* (1815), Lamarck even identified an organic component, a fluid, to determine the functions of the living body (Corsi, 1998, p. 189).

In *The Politics of Evolution* (1989), Adrian Desmond explained that Lamarck's work influenced the early nineteenth century scientific debate in England (but also in wider-Europe) and further shaped the medical and biological background of the next generation of scientists. However, it is important to observe that after the publication of the *Origin*, Lamarck's work started to be dismissed by many in Britain. Butler's scientific work and desire to resurrect Lamarckian ideas therefore becomes a primary example with which to understand the importance of Lamarck's idea of 'inheritance' in Europe. In particular, in *Unconscious Memory* and *Luck, or Cunning?,* Butler explained how Lamarck's hypothesis of inheritance developed in both physiology and philosophy across the continent. Butler recognised traces of Lamarckism in the research of Ewald Hering in Germany, Théodule Ribot in France and William Benjamin Carpenter, Herbert Spencer and George Romanes in England.

Ewald Hering (1834–1918) is the key protagonist of Butler's popularisation of Lamarckian ideas. From 1880 and the publication of ''Unconscious Memory'', Butler cited and discussed Hering's work in all of his scientific books or essays. Educated as a physicist in Leipzig, Hering subsequently worked as a physiologist at the University of Vienna between 1865 and 1870, in Prague between 1870 and 1895, and again in Leipzig between 1895 and 1908 (Baumann, 1992; Turner, 1993 1994; Janko, 1995). As a physiologist, Hering became known in Europe largely due to his research into colour vision and spatial perception. Nonetheless, he was also the first scientist in Germany to promote the idea of organic memory as a biological hypothesis and to conduct experiments on it (Otis, 1994, pp. 20–39).

Hering worked at the heart of a dynamic debate, and conducted different types of research. In Vienna, he challenged physiologist Her-

mann von Helmholtz's colour-vision theory. In the same university, he conducted research on respiration and, in 1868, with psychoanalyst Josef Breuer (1842–1925), demonstrated the role of the 'vagus' nerve in the regulation of breathing. However, Hering's work was also influenced by the philosophies of Kant, Goethe (scientific theory of colours), Schelling and Fichte, alongside the arguably more scientific work of other physiologists like Johannes Muller and Haeckel. As a result, his approach to the subject was partly philosophical and partly scientific.

In 1870, Hering presented a lecture entitled *Das Gedächtniss als allgemeine Funktion der organisirter Substanz* (Memory as a Universal Function of Organised Matter), at the University of Prague. The lecture rapidly became one of the most frequently quoted texts in the field. It gave rise to a series of translations and was largely used among European physiologists. In Britain, the first reference to Hering and the notion of Memory and Heredity was published by Ray Lankester in *Nature* in 1876 under the title of: 'Perigenesis v. pangenesis – Haeckel's new theory of heredity'. Lankester briefly mentioned the name of Hering but without providing a full account of his idea (Lankester, 1876, p.237). The first full account of Hering's work was, then, provided by Butler in 1880 in *Unconscious Memory* where the paper was translated and published as an integral part of the book (Butler, 1920, pp. 63–86).

Hering's paper identified memory as a fundamental reproductive capability of living matter. The main scientific hypothesis enclosed in Hering's lecture was the necessity to link materialistic science (physiology) with the philosophy of the mind (psychology). Hering's study focused on memory linked to the body, moving it into the realms of physiological processes. It involved scientific concepts such as reproduction, conservation changes, and memory as hereditary but also philosophical problems. A quote from Hering's lecture exemplifies this point:

> The word ''memory'' is often understood as though it meant nothing more than our faculty of intentionally reproducing ideas or series of ideas. But when the figures and events of bygone days rise up again unbidden in our minds, is not this also an act of recollection or memory? We have a perfect right to extend our conception of memory so as to make it embrace involuntary reproductions, of sensations, ideas, perceptions, and efforts; but we find, on having done so, that we have so far enlarged her boundaries that she proves to be an ultimate and original power, the

> source, and at the same time the unifying bond, of our whole conscious life (Butler, 1920, p. 68).

Hering located the origin of human memory, and that of animals and plants, in the reflexes and instincts of primitive ancestors (Otis, 1994, p. 13). Consequently, memory was incorporated into the research of the human nervous system. Thus, memory became, in Hering's work, part of a new physiological interpretation of the human body in which the brain and the nervous system were considered as the base for the new medicine of the human body. Memory also became the key for heredity by explaining the continuity between generations without a drastic denial of its philosophical importance. Hering seems to focus particularly on this point at the end of the lecture where he declares without any further doubts:

> The most sublime ideas, though never so immortalised in speech or letters, are yet nothing for heads that are out of harmony with them; they must be not only heard, but reproduced; and both speech and writing would be in vain were there not an inheritance of inward and outward brain development, growing in correspondence with the inheritance of ideas that are handed down from age to age, and did not an enhanced capacity for their reproduction on the part of each succeeding generation accompany the thoughts that have been preserved in writing. Man's conscious memory comes to an end at death, but the unconscious memory of Nature is true and ineradicable: whoever succeeds in stamping upon her the impress of his work, she will remember him to the end of time (Butler, 1920, pp. 85–86).

At the same time as Hering, Lamarckism was also discussed in France. In his scientific writing, Butler cited the works of important French Lamarckian biologists such as Yves Delage (1854–1920), Felix Le Dantec (1869–1917), Jean-Louis de Lanessan (1843–1919), and Armand de Quatrefages (1810–1892). They all conducted research very close to Lamarckian ideas. They considered Darwin's work as a simple development of Lamarck's evolutionist paradigm (Barsanti, 2005, pp. 306–307). Even more controversially, Lanessan in his 1883 book *Le Transformisme* negated any originality to Darwin's work (de Lanessan, 1883, p. 23).

In *Life and Habit,* in particular, Butler largely refers to the work of another French scientist: Théodule Ribot. After his appointment as Professor at the *College de France* in 1880s, Ribot opened the first laboratory of experimental psychology in the country. He defined

memory and heredity along the same lines as Hering. However, in contrast to the German tradition, which was based mostly on empirical research, Ribot divided his time between empirical research and promoting psychology to both scientists and the general public.

Ribot's main scholarly interest was to embed 'memory' into physiological research whilst remaining aware of its philosophical roots. It is, therefore, interesting to note the research approach adopted by the French psychologist. Although Ribot was trained in philosophy, he practiced clinical and experimental psychology from 1873 to 1885. As suggested by Gullin, Ribot did not only open up experimental psychology in France but also re-shaped the study of natural science in relation to 'l'anatomie, la physiologie, la pathologie mentale, l'histoire, l'anthropologie' (Guillin, 2004, pp. 165–181). Ribot's research was, therefore, received with interest by the scientific community. Nonetheless, it also attracted the interest of philosophers like Henri Bergson (Otis and Nicolas, 2005; Nicolas and Charvillat, 2001). Otis explains that between the 1880s and 1890s, the neurological journal *Brain* frequently cited Ribot's research and *Le Maladies de la Memoire* became the most quoted neurological publication of the late nineteenth century (Otis, 1994, p. 15).

Memory, as defined by Ribot in the introduction of *Les Maladies de la Mémoire*, was 'Par essence, un fait biologique; par accident un fait psychologique' (Ribot, 1881, p. 1) and made sense only when merged with heredity, instinct and habit (Otis, 1994, pp. 14–18). Indeed, for the French psychologist memory and heredity are intrinsically the same. Ribot's hypothesis criticised the orthodoxy of biology which gave precedent to conscious memory and cut it off from the domains of the unconscious (i.e. memory as a biological phenomenon).

Like Hering, Ribot recognised the potential of Lamarck's idea of'inheritance' and its role in evolution. For Ribot, memory could only be described using a new scientific terminology and it was not made of an 'indefinable' metaphysical substance. It was, instead, a biochemical composition which leaves physical traces and residues. In this way, memory became subject to a process of accumulation ('le capital accumule' (Ribot, 1881, p. 6)) which, citing the work of Henry Maudsley and Joseph Delboef, Ribot called molecular vibration. Memory, for Ribot, required a dynamic association that, through repetition, established a stable primitive anatomical connection (Ribot, 1881, p. 16).

In England, Butler recognised and discussed Lamarckian ideas in the work of William Benjamin Carpenter, Herbert Spencer and George Romanes. In *Life and Habit* Butler discussed in detail Carpenter's

Principles of Mental Physiology (1874). Butler suggested that Carpenter produced one of the first physiological interpretations of the role of the mind in the economy of the body, largely influencing the medical and physiological debate afterward (including himself). Butler recognised only one problem in Carpenter's work: 'The only issue between myself and Dr. Carpenter would appear to be, that Dr. Carpenter, himself an acknowledged leader in the scientific world, restricts the term ''scientific'' to the people who know that they know' (Butler, 1910a, p. 35).

In *Unconscious Memory* Butler discussed Spencer's contribution to the scientific and philosophical debate. Butler recognised Spencer's scientific writing as the cornerstone for a new interpretation of evolution in between Darwinism and Lamarckism. Butler appreciated that Spencer's work (which was also translated into French by Ribot) was purely theoretical and directed to a specialised philosophical audience. It, therefore, deployed a methodology that was very similar to his own.

Butler's opinion of Spencer's work changed over the years. In 1884, Butler partially dismissed Spencer's work declaring 'no writer that I know of except Professor Hering of Prague, […] has shown a comprehension of the fact that these expressions are unexplained so long as ''heredity,'' whereby they explain them, is unexplained; and none of them sees the importance of emphasizing Memory, and making it as it were the keystone of the system.' (Butler, 1884, pp. 228–229) However, in 1889, in the essay 'The Deadlock in Darwinism', Butler recognised that 'The Lamarckian system has all along been maintained by Mr. Herbert Spencer' (Butler, 1908, p. 240). Butler was not able to see 'any important difference in the main position taken by him and Lamarck' (Butler, 1908, p. 240).

Finally, mention should be made of the work of George Romanes. In 1881, Romanes, while taking a position in the Darwin–Butler quarrel in defence of the naturalist, publicly rejected Butler's hypothesis of unconscious evolution in his review of *Unconscious Memory* published in *Nature*. Romanes insisted on showing how Butler's ideas did not have any scientific value because he was not a professional. Romanes wrote on Butler's incompetence: 'To this arena, [science] however, he is in no way adapted, either by mental status or mental equipment' (Romanes, 1881, p. 285). In response, in 1884, Butler published a short essay entitled *Remarks on George Romanes' Mental evolution in Animals*. The aim of the essay was to show that Romanes in *Mental evolution in Animals* (1883) used Lamarckism in a manner similar to *Life and Habit* (Butler, 1884, p. 236). Butler analysed the terminology and examples used by Romanes and discovered a clear overlap between the theory of

mental evolution and his theory of memory as heredity (Butler, 1884, pp. 240–243). For Butler, this would have convinced the scientific community of the validity of his hypothesis of unconscious memory which was, until then, rejected by British biologists as a pseudo-scientific idea.

Consequently, it becomes necessary to question and analyse Butler's scientific writing to see whether he was just popularising the work of others or if he was able, as declared in *Life and Habit,* to advance his own personal vision of evolution just via knowing, analysing and questioning the research of others.

Samuel Butler and the Idea of Unconscious Memory

In Butler's work the word 'unconscious' described mechanical actions of a living body including breathing, blood circulation and embryological reproduction but also 'actions which we have acquired with difficulty and now perform almost unconsciously' such as 'playing a difficult piece of music, reading, talking, walking' (Jones, 1930, p. 53). All of those actions were guaranteed by the presence of a (biological) memory in the human body. Memory, for Butler, was the key aspect of the hereditary process because it could be physically reproduced. This was explained clearly in his notebooks:

> There is the reproduction of an idea which has been produced once already, and there is the reproduction of a living form which has been produced once already. The first reproduction is certainly an effort of memory. It should not therefore surprise us if the second reproduction should turn out to be an effort of memory also. Indeed all forms of reproduction that we can follow are based directly or indirectly upon memory (Jones, 1930, p. 59).

In order to understand, the significance of Butler's theory of memory and heredity, it is important to trace its development. At the beginning of his career, Butler referred to 'unconscious memory' in his novels and short essays. Between 1863 and 1878, Butler engaged with the debate of evolution from a purely philosophical perspective. This is particularly evident in the periodical articles 'Darwin among the Machines' (1863), 'Lucubratio Ebria' (1865), the novel *Erewhon* (1872) and *Life and Habit* (1878). In the 1860s, Butler published two short philosophical articles in the New Zealand periodical *The Press*: 'Darwin among the Machines' and 'Lucubratio Ebria'. In these articles, Butler attempted to explain

Darwin's theory of natural selection in terms of the evolution of machines (Jones, 1930, pp. 42–46). Butler also tried to question the role played by mechanical tools such as notebooks and umbrellas in human evolution (Jones, 1930, pp. 47–53). Butler's articles offered an anthropological reading of Darwin's natural selection in a language full of sarcasm and improbable analogies. In these articles, Butler's intention was not only to teach or question evolution but only to make this new scientific theory accessible to a New Zealand audience.

In the novel *Erewhon* (1872) Butler expanded upon the idea of 'unconscious memory' already proposed in 1863–1865, by producing a 25 page manifesto in which he discussed the difference between conscious and unconscious actions whilst describing organic and inorganic evolution. As Roger Robinson has explained, in the three chapters entitled 'The book of the Machines' Butler wrote his personal eulogy to Darwin's *Origin of Species* taking evolution to its paradoxical extremes (Robinson, 2007, pp. 21–44). The main merit of *Erewhon,* in advancing Butler's position about psychological evolution, is to finally present the potential of 'unconscious memory'. In the novel, 'unconscious memory' is the 'medium' which permits the preservation of life and makes the generation of mechanical life possible.

Six years after the publication of *Erewhon,* Butler returned to 'unconscious memory' by proposing his idea in a different manner. After temporarily leaving his occupation as a novelist, between 1876 and 1877, Butler produced his first philosophical book about unconscious evolution: *Life and Habit*. Butler summarised *Life and Habit*'s theme as: 'The identification of heredity and memory, and the corollaries relating to sports, the reversion to remote ancestors, the phenomena of old age, the causes of the sterility of hybrids, and the principles underlying longevity – all of which follow as a matter of course. This was 'Life and Habit' [1877]' (Jones, 1930, p. 66).

Although the book was presented as a scientific 'publication', by discussing many of the topics that were in vogue during the period, Butler's critical approach can still be considered an example of 'natural philosophy'. It is important to be clear regarding the philosophical nature of the text because this can explain why it was overlooked by the scientific community. *Life and Habit* was based on a critical reflection upon Darwin's natural selection mediated with Lamarck's hypothesis of 'inheritance of acquired characteristics'. However, it also engaged with philosophical topics including metaphysical and epistemological questions: *Life and Habit* aimed to be what Chambers' *Vestiges* had been in the 1840s. *Life and Habit* tried to present an argument that was engaging

for philosophers, scientists and the public audience. However, it also aimed to be, as declared by the writer in the text, 'a valuable adjunct to Darwinism' (Butler, 1910a, p. 33). The 'valuable adjunct' was, indeed, Lamarck's philosophy of evolution. In *Life and Habit*, Lamarck played a key role. Butler himself made this clear declaring in *Luck, or Cunning?* (1887): 'to Lamarck, therefore, I naturally turned, and soon saw that the theory on which I had been insisting in'' Life and Habit'' was in reality an easy corollary on his system'(Butler, 1910b, p. 9).

In *Life and Habit,* Butler also discussed Mivart's *Genesis of Species* (1871), Carpenter's *Mental Physiology* (1874) and Ribot's *Heredity* (1875), especially in relation to the research of Henry Maudsley. Additionally, it was in this work that he provided accounts of Aristotle, Socrates, Plato, Marcus Aurelius and St. Paul in order to establish a strong link between Victorian science and an older metaphysics. Butler's intention was to offer to readers an accessible way to understand everything regarding evolution and not just present the results of scientific research.

The philosophical nature of the book was also illustrated by the examples and terminology Butler used. In *Life and Habit* Butler explained, citing and discussing large portions of Ribot's work (and in some way Lamarck), that humans have two different types of memory: 'intelligence' and 'instinct'. 'Intelligence' is the mode of memory acquired through learning and habits. 'Instinct', by contrast, is a type of memory which exists in our cells and connects any living creature with its own ancestors. In explaining this difference Butler directly cited Ribot's *Heredity*: '"Whereas intelligence is developed slowly by accumulated experience, instinct is perfect from the first'' (''Heredity,'' p. 14)' (Butler, 1910a, p. 198). In *Life and Habit*, Butler's theory of heredity was very close to Ribot's although with one notable difference. If for Ribot memory can only be understood in mechanical terms or as biological accumulation ('le capital accumule'), for Butler there was still something missing. He wrote:

> Obviously the memory of a habit or experience will not commonly be transmitted to offspring in that perfection which is called ''instinct,'' till the habit or experience has been repeated in several generations with more or less uniformity; for otherwise the impression made will not be strong enough to endure through the busy and difficult task of reproduction (Butler, 1910a, p. 198).

Memory, for Butler, was something more than a simple mechanical ability; it was the element which links the physical structure of the brain with its metaphysical nature. For Butler, memory and body were linked

together, as well as memory and heredity. Paraphrasing *Life and Habit,* memory and heredity are the means of preserving experiences and carrying them to the next generation.

Life and Habit did not receive enough attention from Victorian readers and Butler's idea was dismissed as an example of a philosophy of life lacking any serious scientific acumen. In response to this criticism Butler, in 1879, published *Evolution Old and New*, where he attempted to trace the development of evolution before Charles Darwin. Although not enlarging upon Butler's theorisation of unconscious evolution, the book provides an overview of Lamarck's idea of 'inheritance' and its influence on the pre- and post-Darwinian British debate. Butler himself declared in *Luck or Cunning?*: 'I wrote ''Life and Habit'' to show that our mental and bodily acquisitions were mainly stores of memory: I wrote ''Evolution Old and New'' to add that the memory must be a mindful and designing memory' (Butler, 1910b, p. 23). This explains the secondary aim of *Evolution Old and New* which was to present memory as something between 'matter' and 'metaphysics' linking the work of Darwin with Lamarckism and highlighting their differences and similarities.

In 1880 Butler tried to propose the idea of memory as heredity for the second time. With the publication of *Unconscious Memory,* Butler returned to the theory that the scientific community had as yet found unconvincing. It was in this articulation of his conception of the role of memory in evolution that Butler drew from Hering's 1872 lecture: *Das Gedächtniss als allgemeine Funktion der organisirter Substanz*. It can be argued that the book is nothing more than a discussion of Hering's work used by Butler as a justification of his own idea. This is because Hering's writing anticipated Butler's theory using a language and a methodology far better suited to the persuasion of the scientific community. Therefore, Butler decided to dedicate a large part of his *Unconscious Memory* to Hering's work, providing an English translation of the lecture. Speaking of this decision, Butler wrote (referring to Hering and himself):

> If two men so placed, after years of reflection, arrive independently of one another at an identical conclusion as regards the manner in which this machinery must have been invented and perfected, it is natural that each should take a deep interest in the arguments of the other, and be anxious to put them forward with the utmost possible prominence (Butler, 1920, p. 53).

Unconscious Memory presents two main differences to the previous works. Firstly, Butler partially accepted Hering's theory of memory as a form of molecular vibration. The vibration theory was defined as a series of chemical changes that occur in a substance called 'protoplasm' through repetition (Butler, 1920, pp. 55–57). The word 'protoplasm' comes from the Greek *protos* (first) and *plasma* (anything formed). Protoplasm was introduced to the scientific language in 1846 by the German botanist Hugo von Mohl (1805–1872). It was defined as the 'tough, slimy, granular, semi-fluid' substance within plant cells but different from the cell wall, nucleus and sap within the vacuole. In *Unconscious Memory*, Butler explained that protoplasm 'may be, and perhaps is, the *most* living part of an organism, as the most capable of retaining vibrations' (Butler, 1920, p. 279).

The concept of protoplasm became very popular among British biologists. In 1869 Huxley, in a famous pamphlet, defined protoplasm as the 'physical basis of life' (Huxley, 1869, pp 7–24). In 1879, G. J. Allaman wrote in *The Popular Science Monthly*: 'Protoplasm lies at the base of every vital phenomenon. It is, as Huxley has expressed it, 'the physical basis of life;' wherever there is life from its lowest to its highest manifestation there is protoplasm; wherever there is protoplasm there is life' (Allman, 1879, pp. 721–722). However, the science of protoplasm was not certain or precise. Butler, in particular, was not fully convinced by this new theory. He wrote in *Luck or Cunning?*: 'Science has not, I believe, settled all the components of protoplasm, but this is neither here nor there; she has settled what it is in great part, and there is no trusting her not to settle the rest at any moment, even if she has not already done so' (Butler, 1910b, p. 125). The first full account of Protoplasm was, then, only published by the American chemist E. Newton Harvey in the 1938 article: 'Some Physical Properties of Protoplasm'. Harvey described protoplasm as: 'an albuminous substance containing carbon, hydrogen, oxygen and nitrogen in extremely complex molecular combination and capable under proper condition of manifesting certain vital phenomena […]'(Harvey, 1938, p. 68).

In *Unconscious Memory*, Butler also expressed some partial doubts on the vibration theory: 'I am not committed to the vibration theory of memory, though inclined to accept it on a *primâ facie* view. All I am committed to is, that if memory is due to persistence of vibrations, so is heredity; and if memory is not so due, then no more is heredity' (Butler, 1920, p. 62). In saying this, Butler did not reject his Lamarckian view of heredity proposed in 1878. Instead, he suggested that whilst he knew nothing about the vibration theory when he wrote *Life and Habit,* this

new biological advancement did not affect his theory of memory and heredity.

Unconscious Memory presented another novelty. In *Life and Habit* Butler defined himself as a member of the general public with the intention of explaining evolution to a popular audience. In 1880, he left the naive spirit of the previous books and placed himself next to Hering, whilst still highlighting his status as a non practitioner of science. He wrote:

> Professor Hering and I, to use a metaphor of his own, are as men who have observed the action of living beings upon the stage of the world, he from the point of view at once of a spectator and of one who has free access to much of what goes on behind the scenes, I from that of a spectator only, with none but the vaguest notion of the actual manner in which the stage machinery is worked (Butler, 1920, p. 53).

In his final and most polemical book, *Luck or Cunning?* (1886), Butler again proposed the Lamarckian mechanism of unconscious memory. He tried to show how Lamarck's theory of memory and heredity was implicit in much of the teaching of Spencer, Romanes and other leading biologists although hidden by the Darwinian shadow.

Luck or Cunning? did not present any significant advancement of Butler's theory of memory as heredity proposed in *Unconscious Memory*. However, Butler returned to the idea of protoplasm and memory. In particular, he accepted a more marked development in the vibration hypothesis of memory given by Hering and only adopted with reserve in *Unconscious Memory*. In the book, Butler also presented a strong objection to 'protoplasm as the only living substance' (Butler, 1910b, p. 127) as suggested by Huxley. Instead, Butler explained that protoplasm could only be accepted as corollary to his memory theory in contrast to the use of protoplasm as a justification of 'the mindless theory of natural selection' (Butler, 1910b, p. 142). Butler was very firm on this point. In his opinion, it was not possible to talk about heredity and protoplasm without Lamarckian design. He declared 'I have said enough to show that in the decade, roughly, between 1870 and 1880 the set of opinion among our leading biologists was strongly against mind' (Butler, 1910b, p. 142).

Unfortunately, the author of *Life and Habit* was not able to see his theory recognised by the scientific community during his lifetime. He remained an outsider or, citing again Romanes' review, he remained, at least to his contemporary English men of science, 'in no way adapted,

either by mental status or mental equipment' to take part in the evolutionary debate (Romanes, 1881, p. 285).

The Afterlife of the Idea of Unconscious Memory

While Butler's ideas made little headway in England, they fared better abroad. In the early twentieth century Butler's science of the mind became recognised through the popularisation of Marcus Hartog (1851–1924) and Eugenio Rignano, as the 'Butler/Hering theory.' Marcus Hartog is central to the new 'understanding' of Butler's science in the early twentieth century. Educated in biology and an expert in natural history, Hartog was one of the major followers of Butler's theory of memory and heredity. His interpretation of Butler's work focused on the assumption that Butler's notion of unconscious memory was not an isolated case in Europe. In his introduction of the 1910 edition of *Unconscious Memory*, Hartog explained how Butler's evolutionary idea was linked to the work of Hering and Ribot, creating a European parallel between those authors. He wrote: '*Unconscious Memory* was largely written to show the relation of Butler's views to Hering's, and contains an exquisitely written translation of the Address' (Butler, 1920, pp. 15–16).

In 1914 Hartog published in the Italian periodical *Scientia* the article 'Samuel Butler et les Recentes theories Biologique de la Memoire' where he defined Butler as one of the most unique spirits of the whole Victorian period (Hartog, 1914, p. 40). He explained that Butler's finest merit was not only that of being able to popularise science to the general audience, but also being an inspiration to science in the twentieth century (Hartog, 1914, p. 55). It is also important to highlight that the article was published in the journal *Scientia* which, at the beginning of the twentieth century, was publishing the 'avant-garde' of the science of the mind.

One of the editors of *Scientia* was the Italian Eugenio Rignano. Engineer, philosopher and writer, Rignano was an exponent of the Italian neo-Lamarckian movement. Rignano published widely on philosophical and scientific topics. His main book *Sulla Trasmissibilità dei Caratteri Acquisiti* (1907) explained the process of inheritance in a manner very similar to that of Hering (and indirectly Butler). However, what is interesting in Rignano's work is how he insisted on the mnemonic process as a concrete possibility in explaining the hereditary mechanism. Similarly, in the review of August Pauly's *Darwinismus und*

Lamarckismus (1907), Rignano explained how the position of Pauly was developed – starting from the big discoveries in the organic memory debate advanced by Hering (Rignano, 1907, p. 195).

The writings of both Hartog and Rignano present an unexpected portrait of Butler's idea of memory and heredity. During his lifetime, Butler's work was neglected and ignored by the British scientific community to whom he tried to communicate it. However, Butler has posthumously been recognised not only as a populariser of Hering's ideas, but also as a contributor to the debate about the mechanisms of evolution. Rignano was not alone in placing Butler's name alongside that of Ribot and Hering as an important figure. At the beginning of the twentieth-century, Butler was instead considered, alongside Théodule-Armand Ribot and Ewald Hering, a relevant figure of the post-Darwinian debate on heredity. In 1923, S. J. Tomekeieff's article: 'The Mnemic Theories of Evolution' (also published in *Scientia*) was correct in defining Butler as the writer 'whose genius is not yet fully appreciated even in his own country' (Tomekeieff, 1923, p. 160). Tomekeieff's quote perfectly summarises the content of this article which, I hope, has shed some light upon the place of Butler in the late nineteenth century pan-European debate about evolution and psychology.

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