The Missing Link, Samuel Butler and the Theory of Evolution:

Design, Physiology and Psychology of the Unconscious in Victorian Britain

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The battle is one of greater importance than appears at first sight. It is a battle between teleology and non-teleology, between the purposiveness and the non-purposiveness of the organs in animal and vegetable bodies. According to Erasmus Darwin, Lamarck, and Paley, organs are purposive; according to Mr. Darwin and his followers, they are not purposive. But the main arguments against the system of Dr. Erasmus Darwin are arguments which, so far as they have any weight, tell against evolution generally. Now that these have been disposed of, and the prejudice against evolution has been overcome, it will be seen that there is nothing to be said against the system of Dr. Darwin and Lamarck which does not tell with far greater force against that of Mr. Charles Darwin and Mr. Wallace.

Samuel Butler, *Unconscious Memory*, pp. 185-186.

This Abstract, which I now publish, must necessarily be imperfect. I cannot here give references and authorities for my several statements; and I must trust to the reader reposing some confidence in my accuracy. No doubt errors will have crept in, though I hope I have always been cautious in trusting to good authorities alone. I can here give only the general conclusions at which I have arrived, with a few facts in illustration, but which, I hope, in most cases will suffice. No one can feel more sensible than I do of the necessity of hereafter publishing in detail all the facts, with references, on which my conclusions have been grounded; and I hope in a future work to do this. For I am well aware that scarcely a single point is discussed in this volume on which facts cannot be adduced, often apparently leading to conclusions directly opposite to those at which I have arrived. A fair result can be obtained only by fully stating and balancing the facts and arguments on both sides of each question; and this cannot possibly be here done.

Charles Darwin, *On The Origin of Species*, p.4.

CONTENTS

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ABSTRACT

This thesis argues that Samuel Butler's evolutionary work represented one of the most eccentric and enlightening alternatives to 'natural selection'. In his scientific research, the English writer used 'memory' as a justification of the process of heredity. This represented, at the turn of the twentieth-century, a shift from the mechanical approach to natural selection to an idea of evolution based on a psychophysiological process.

First, my work addresses the methodological difficulties that occur in placing Butler's work within the late Victorian debate. Neither the Victorians themselves, nor subsequent scholars, have known what to make of Butler, most usually attempting to place him in the category of literature whilst ignoring the substance of his scientific work. Looking at the reception of Butler's ideas in England and Europe, and critically discussing the problem of Butler's identity in the context of contemporary scholarship, I create a new picture of Butler as a Victorian amateur 'scientist'.

Second, this research discusses Butler's popularisation of science, looking at his use of language, style and form in his fictional and non-fictional works. It also discusses Butler's work of translation and his popularisation of European scientific hypotheses within the British 'marketplace' of science.

Third and finally, this work explores Butler's hypothesis of unconscious memory in relation to similar cases in Europe. Looking at the French and German psychophysiological debate, it places Butler's evolutionary work in a pan-European context.

Overall, this thesis attempts to create a three-dimensional intellectual image of Butler as writer and participant in science, and in doing so finds that Butler is a problem case who tests the edges of scholarship in history and literature of nineteenth-century science.

> Man is a walking tool-box, manufactory, workshop and bazaar worked from behind the scenes by someone or something that we never see. We are so used to never seeing more than the tools, and these work so smoothly, that we call them the workman himself, making much the same mistake as though we should call the saw the carpenter. The only workman of whom we know anything at all is the one that runs ourselves and even this is not perceivable by any of our gross palpable senses. The senses seem to be the link between mind and matter - never forgetting that we can never have either mind or matter pure and without alloy of the other.
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> Samuel Butler, *The Notebooks of Samuel Butler*[1]

INTRODUCTION:

Reconstructing the missing link

The *Oxford English Dictionary* defines the missing link as: 'a thing that is needed in order to complete a series, provide continuity, or gain complete knowledge' or 'a hypothetical fossil form intermediate between two living forms, especially between humans and apes'. Historically speaking, the metaphor of the missing link has been widely used in nineteenth-century natural history. There, it became a common sense, a sort of myth, which involved meaning in biology, anthropology, philosophy and psychology. As learned in school, any history has its own question and the history of Victorian natural science is not out of this tradition.

In the last two decades, historians of science and literary scholars, interested in the relationship between literature and natural science, have focused their research upon finding the missing link between Victorian biology (e.g. evolution, physiology, medical psychology) and its cultural reception.[2] Their research has examined the Victorian periodicals to assess the story of the reception of Darwinian evolution in England, Europe and the world, and to trace of the development of biology in psychology, literature and philosophy. In sum, they have searched for a new missing link in the history of Victorian biology.

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[1] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 86.

[2] George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction*; *Gillian Beer, Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*; Adrian J. Desmond and James Moore, *Darwin* and George Levine, *Darwin The Writer*.

Victorian natural history was founded on a major question which obsessed many generations of biologists, philosophers and men of culture. This question concerned the evolutionary relationship between humans and apes. From politicians to bishops, and from editors to writers, any example of nineteenth-century narrative involved the enquiry: are we descendant from apes, angels or are we humans? An anecdote illustrating this question is evident in the history of the London Zoo. In 1842 Queen Victoria had the chance to visit the Zoo for the first time and while observing the animals she became impressed by the Orangutan. During the visit she declared 'the Orang Outang is too wonderful.. he is frightfully, and painfully, and disagreeably human'. Queen Victoria, like many others, was impressed by the incredible resemblance between the two species. [3]

At the time, the possibility of considering the Orangutan as the link between animals and humans was far from being scientifically accepted. In the same period the young Charles Darwin was coming to the same conclusion. However, the naturalist was not sure about the implications of this hypothesis. Between 1838 and 1842, Darwin wrote in his notebook: 'Man in his arrogance thinks himself a great work, worthy the interposition of a great deity. More humble and I believe true to consider him created from animals'.[4]

After the publication of the *Origin of Species* the situation changed. As suggested by Gillan Beer, both Darwin and Huxley declared that any 'link' was missing in the hypothesis of evolution.[5] In their works, the two naturalists denied the possibility of considering the missing links part of their hypothesis. They were, instead, confident that natural selection and (after it) sexual selection were the scientific answers to the questions upon the origin of the human being.

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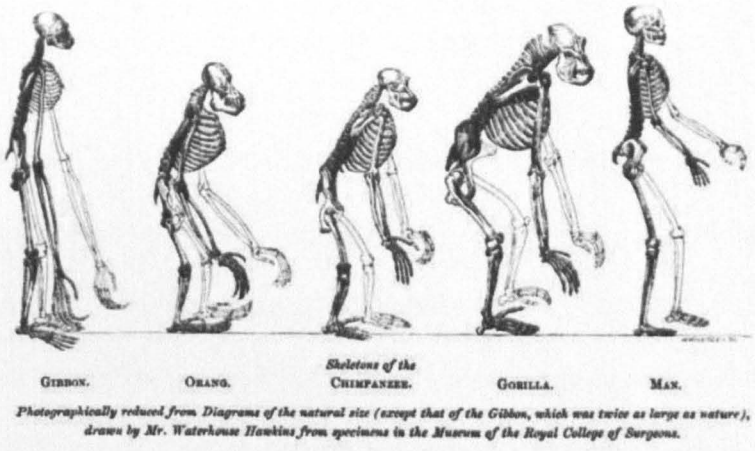
[3] See Steve Jones, *The Darwin Archipelago, The Naturalist's Career Beyond Origin of Species*, pp. 1-10.
[4] Darwin wrote these words in 1838. See James Rachels, *Created From Animals The Moral Implications of Darwinism*, pp. 1-6, esp. 1.
[5] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, p. 118.



Photographically reduced from Diagrams of the natural size (except that of the Gibbon, which was twice as large as nature), drawn by Mr. Waterhouse Hawkins from specimens in the Museum of the Royal College of Surgeons. [5]

In talking about the missing link, historians of evolution have to refer back beyond the nineteenth-century, to the originally static pre-evolutionary concept of the great chain of being. Originally proposed by ancient Greek philosophers (Plato and Aristotle in particular), it became scientifically relevant in the modern period thanks to the work of the naturalists Carl Linnaeus and Charles Bonnet. They proposed a deist idea that all existence is linked, from the lowest dirt, through the living kingdoms to angels and finally to God.

The idea of all living things being linked through some sort of a transmutation process anticipated Darwin's hypothesis of evolution. In France the work of Jean-Baptiste Lamarck (1744- 1829) envisioned that life was constantly generated in the form of the simplest creatures, and then strive towards complexity and perfection (i.e. humans) through a series of lower forms. In Lamarck's view, lower animals were simply newcomers on the evolutionary scene.

The term 'Missing Link' was first used in a scientific context in England by Charles Lyell in the third edition of the *Elements of Geology* (1851). Here the geologist introduced the missing link in relation to missing parts of the geological column. However, the missing link was popularized in its present meaning only in 1863 in the introduction of Lyell's *Geological Evidences of the Antiquity of Man* (1863). There Lyell wrote:

> It would also account for the fact, that when we have to intercalate a new set of fossiliferous strata between two groups previously known, the newly discovered fossils

[6] Frontispiece of T.H. Huxley, *Man's Place in Nature*.

> serve to fill up gaps between specific or generic types previously familiar to us, supplying often the missing links of the chain, which, if transmutation is accepted, must once have been continuous.[7]

After the publication of Darwin's *Origin of Species*, the idea of lower animals representing earlier stages in evolution became an important argument used by evolutionists and men of culture. Thanks to the popularization of science and its diffusion through Victorian periodicals, every Victorian became aware about the new role of nature in the humankind. This re-shaping of man's place in nature developed in different cultural forms such as caricature, exhibitions, public lectures, science on display and various forms of criticism from the middle class imagination[8] (Figure 1- *Fun Magazine*[9]). Additionally, it became a topic of discussions, devotions and criticisms by scientists, writers, philosophers and by anyone with a genuine interest in science.

[10]

In the 1860s Lyell's *Geological Evidences of the Antiquity of Man* became one of the most famous books in the UK. The volume dealt with three scientific issues that had become prominent in the preceding decade: the age of the human race, the existence of ice ages,

[7] Charles Lyell, *Geological Evidences of the Antiquity of Man*, pp. 414-415.
[8] *Gillian Beer, Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction,* pp. 3-21.
[9] Fun was a Victorian weekly magazine, first published on September 21st, 1861.
[10] An example of Darwin's ironical caricature. First published in Fun, Nov 1872. Original caption: That Troubles Our Monkey Again - female descendant of Marine Ascidian: "Darwin, say what you like about man; but I wish you would leave my emotions alone".

and Charles Darwin's theory of evolution by natural selection.[11] The volume radically changed Victorian opinions about archaeology and helped the establishment of prehistoric archaeology as a new scientific discipline.[12]

By that time, it was generally thought that the end of the last glacial period marked the first appearance of humanity. Lyell drew on new findings in his *Geological Evidences of the Antiquity of Man* to put the origin of human beings much further back in the deep geological past.[13] In this volume, the geologist declared that the missing link and the huge gap between man and beast could be bridged however remaining a profound philosophical mystery.

Lyell's vivid writing influenced the public and scientific imagination. The volume *Principles of Geology* influenced Darwin and Huxley's work significantly thanks to Lyell's popularization of James Hutton's concepts of uniformitarianism. In literature, Lyell's hypothesis inspired the work of, for instance, Jules Verne's *Journey to the Centre of the Earth* and Louis Figuier's 1867 second edition of *La Terre Avant le Déluge* (Earth before the Flood). However, no concrete understanding of the missing link was discovered at the time.

[11] A. Bowdoin Van Riper, *Men Among the Mammoths*, pp. 139-141.
[12] *Ibid.*, p. 214.
[13] *Ibid.*, p. 208.

 [14]

Outside the United Kingdom, the hypothesis of the missing link was also demonstrated by Ernst Haeckel's famous figure of the human pedigree presented in the book *Anthropogenie oder Entwicklungsgeschichte des Menschen* (1874). In Haeckel's hypothesis the vertebrates were seen as forming a sort of evolutionary sequence, the various classes were distinct; the undiscovered intermediate forms being called 'missing links'.[15]

The idea of a missing link between humans and so-called lower animals remained lodged in the public imagination. As a consequence of this, new disciplines emerged during the late Victorian period in order to provide a better understanding of humankind. Human anthropology, psychology and evolutionary philosophy were all subjects linked to the question of evolutionary man.

In particular, the search for a fossil showing transitional traits between apes and humans became the mission of many scientists in the late nineteenth-century. They dug mountains and explored the globe seeking for evidence of any type. This approach was almost a fruitless activity, however until the Dutch geologist Eugène Dubois found a skullcap on the banks of Solo River in Java in 1891.

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[14] The modern theory of the decent of man, by Ernst Haeckel, published in *Anthropogenie oder Entwicklungsgeschichte des Menschen* (The Evolution of Man 1874). The figure shows the human pedigree as a Great Chain of Being, illustrated by modern and fossil species.

[15] Ernst Haeckel, *The Evolution of Man* – Vol. 1, p. 216.

 [16]

The discovery was an ape-like skull able to lodge a brain estimated at around 1000 cc, a capacity between the brain of a chimpanzee and that of an adult man. The shape of the skull was also different from any found so far. Its molar was larger than any modern human tooth. There was also a femur with a knee angle showing that Java man (as this species became known) had walked upright.[17] It acquired the name *Pithecanthropus erectus* (erect ape-man), and it was the first human evolutionary fossil.[18] The discovery opened up different controversies. The skull was hailed by many as the missing link, helping to set the term as primarily used for human fossils.

In 1895, after a long period of research in the field, Eugène Dubois returned to Europe in order to convince his colleagues that he had indeed found a missing link. Although most anthropologists were intrigued, they did not always agree with Dubois' interpretations. After that, Dubois refused others access to his fossils, until he was forced to do so in 1923.

The history of the missing link represented an important aspect regarding the rise of human palaeontology in the late Victorian period. However, outside the field of natural history the metaphor of the missing link became an important part of Victorian and

[16] Reproduction of the original fossils of *Pithecanthropus erectus* (now *Homo erectus*) found in Java in 1891.

[17] Carl C. Lewin, Garniss H. Swisher III and Roger Curtis, *Java Man: How two Geologists' Dramatic Discoveries Changed our Understanding of the Evolutionary Path to Modern Humans*.

[18] It must be said that although the Java man was found after Neanderthal skulls (which were discovered in Engis Caves, Belgium, in 1829 by Philippe-Charles Schmerling), it was the oldest hominid remain ever found.

European culture. First of all, the nineteenth-century itself has been seen as the missing link between a pre-industrial society and a modern industrialized nation which radically changed social structures, re-shaping philosophically and scientifically the role of men and women within it.

The missing link also became a cultural trend of the period. Scientists, novelists and men and women of culture were involved in its research. They produced narratives in which humankind became an uncertain and indeterminate concept. The metaphor traveled all across the western culture. It was used by the German philosopher Nietzsche in *Thus Spoke Zarathustra* (1883-1885) where he declared, clearly influenced by Darwin's work, that the 'Man is a rope stretched between the animal and the Superman- a rope over an abyss. A dangerous crossing, a dangerous wayfaring, a dangerous looking-back, a dangerous trembling and halting'.[19]

Investigators of the nineteenth-century also sought a link between the epistemological and metaphysical study of the human mind and the medical-psychological conception of the brain. At the beginning of the century, philosophers were still talking about the mind in terms of *a priori* knowledge (Kant), tabula rasa (Locke) and skepticism (Hume). In their work they still considered humankind in a subordinated position and part of a larger plan of existence.[20] After the nineteenth-century, the study of the human brain and mind became experimental in the field of medical physiology and psychology, leaving the old epistemology to one side. This methodological transition occurred through a series of middle points.

The transition from a metaphysical conception of the mind to the scientific study of the brain implied an evolution of methodologies and approaches. Similar to the naturalists, psychologists and physiologists proposed new hypotheses which had to be demonstrated in laboratories using specific new methodologies. Especially around the turn of the century,

[19] Friedrich Wilhelm Nietzsche, *Thus Spoke Zarathustra a Book for All and None*, p. 8.
[20] Bertrand Russell, *History of Western Philosophy*, pp 604-659 and 701-719.

these practitioners claimed a revolution in the understanding of the human brain. They tried to abandon any form of metaphysical analysis to become scientists instead, making their research experimental.

An example of this was the research done by the Darwinian George Romanes who began to consider the process of evolution as a biochemical change in the brain. In publications such as *Mental Evolution in Animals* (1883) and *Mental Evolution in Man* (1888), Romanes developed the hypothesis of mental evolution as the establishment of a substantial chemical continuity between memory (called organic memory) and heredity. This continuity was conceived by employing a new interpretation of the Lamarckian concept of inheritance of acquired characteristics in relation to Dmitri Mendeleev's law, demarcating (in theory and practice) the roots of modern biochemistry of the human body.[21] Although the term 'biochemistry' is commonly believed to have been first proposed in 1903 by the German chemist Carl Neuberg, it was actually used by both German and British psychophysiologists from 1882. Neither precisely science nor philosophy, the study of mental evolution – the missing link between the mind and brain- was a major area of Victorian science.

[21] In *Animal Intelligence*, Romanes pointed out that 'there must be a psychological, no less than a physiological, continuity extending throughout the length and breadth of the animal kingdom', in turn moving evolution from the materialism of natural selection to the study of psychology and medical physiology. As an example, from 1874-1876, Romanes worked in the physiological laboratory at University College, London (UCL). There, he conducted biochemical experiments on the jelly fish nervous system.

Samuel Butler as the missing link[22]

Actively working from the 1870s to the end of the century Samuel Butler was the elusive link between two generations of scientists. At the beginning of his career, science was still a gentlemanly and amateur matter. By the end of his career, it had became, instead, a field of expertise. Like many others of his generation, Butler found himself caught between two dissimilar eras of science. Neither a man of pure science, nor a philosopher, Butler worked among these groups sharing languages, methodology and becoming, at the end, an outsider. At the time of his death he had no institutional or academic affiliation to secure his reputation. The general aim of this thesis is to give an account of Samuel Butler as an amateur scientist.

According to recent histories of science, Victorian science demarcated the rise of specialism and expertise but it also represented the return, around the end of the century, to a metaphysical investigation of evolution. The return to philosophy was an aim of the work of many amateur scientists who saw in the extreme materialism of Darwinian evolution a false interpretation of nature. These amateur scientists were the missing links in between the two extremes of the century. Thanks to their work, historians of science can now understand how Victorian science developed through the whole century.

Although Samuel Butler can be seen as an amateur scientist, his research was intended to be more than a cultural interpretation of evolution. In his publications he tried to link the outcome of Darwin's science with the philosophical remembrance of Lamarckism. As he noted in 1885, Butler developed his scientific research according to three major themes:

> 1. 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

[22] Samuel Butler appears to be a missing link in two respects. Firstly, the author is the missing link between two generations of scientists (pre- and post-Darwinian evolutionists). Secondly, he can also be considered the missing link between the Darwinian revolution and the philosophical remembrance of Lamarck.

> hybrids and the principles underlying longevity - all of which follow as a matter of course. This was Life and Habit. [1877.]
> 2. The re-introduction of teleology into organic life which, to me, seems hardly (if at all) less important than the Life and Habit theory. This was Evolution Old and New. [1879.]
> 3. An attempt to suggest an explanation of the physics of memory. I was alarmed by the suggestion and fathered it upon Professor Hering who never, that I can see, meant to say anything of the kind, but I forced my view on him, as it were, by taking hold of a sentence or two in his lecture, on Memory as a Universal Function of Organised Matter and thus connected memory with vibrations. This was Unconscious Memory. [1880.][23]

In Butler's work the idea of evolution became the starting point for a larger project which involved biology, teleology, physiology and above all medical psychology. Disagreeing with Darwin's natural selection - which treated evolution as something purely mechanical - Butler tried to re-introduce design (i.e. philosophy) in the shape of a neo-Lamarckian philosophy of evolution. The methodology adopted by the writer was to compare Darwinian science with similar theories in contemporary European science but also to look back to earlier generations of evolutionists (e.g. Buffon, Lamarck and Erasmus Darwin).

However, his work was not limited to these aspects. As a *post scriptum* of the previous note the writer declared 'What I want to do now [1885] is to connect vibrations not only with memory but with the physical constitution of that body in which the memory resides, thus adopting Newland's law (sometimes called Mendelejeff's law) that there is only one substance, and that the characteristics of the vibrations going on within it at any given time will determine whether it will appear to us as (say) hydrogen, or sodium'.[24]

The opening up of evolution to the field of bio-chemistry (used as a justification of the act of vibration[25]) demarcated the second important aspect of Butler's work: the psychophysiological study of the human brain. Another extract from Butler's notebooks is useful in introducing the second element of his work. As a conclusion of the section regarding his contribution to evolution the writer wrote:

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[23] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p.66.
[24] *Ibid.*, p. 66.
[25] The term 'vibration' was adopted by Butler in order to describe the biochemical mechanics used by the human brain for memorising information. The author introduced the concept of vibration in 1886 with the writing of *Luck or Cunning?*.

> I would make not only the mind, but the body of the organism to depend on the characteristics of the vibrations going on within it. The same vibrations which remind the chicken that it wants iron for its blood actually turn the pre-existing matter in the egg into the required material. According to this view the form and characteristics of the elements are as much the living expositions of certain vibrations - are as much our manner of perceiving that the vibrations going on in that part of the one universal substance are such and such - as the colour yellow is our perception that a substance is being struck by vibrations of light, so many to the second, or as the action of a man walking about is our mode of perceiving that such and such another combination of vibrations is, for the present, going on in the substance which, in consequence, has assumed the shape of the particular man. It is somewhere in this neighbourhood that I look for the connection between organic and inorganic.[26]

In this research my aim is to reconstruct Butler's hypothesis of psychophysiological evolution, presenting it as the missing link between two generations of evolutionists. The first of these generation was that of Charles Darwin, which interpreted evolution in terms of a pure materialist approach called natural selection, adopting it outside any teleological perspective. The science of Darwin and that of his followers considered evolution in the domain of pure matter and analyzed it with observation and empirical investigation. Thomas Huxley, for example, promoted materialism and empirical philosophy in reforming British education; the naturalist decreed the necessity of laboratories and experiments as essential for science teaching and developing scientific subjects into British schools and universities.[27]

A second generation, in the late nineteenth-century and early twentieth century returned to an idea of evolution focused on a metaphysical conceptions of the mind. This return to metaphysics was justified by the study of the human mind which was reformulated as something more complex than a simple machine. The human mind returned to being an object of philosophical interest.

Evidence for this can be seen in the work of philosophers such as James Ward and James Sully around the turn of the century. They developed the study of experimental psychology in UK starting from the philosophical discipline. Both Ward and Sully took

[26] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 67.
[27] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp.2-3.

advantage of Victorian philosophy of evolution as a background for establishing (following the work of many amateur scientists) the study of psychophysiology. In terms of scholarly relevance, late nineteenth-century and early twentieth century psychology has been understood as a study of the phylogenetic development of mentality, subject to threat from degeneration. However, there has been very little study of the birth of the study of psychophysiology, and on the non-evolutionary strand of thinking about the mind as something that could be experimentally externalized and understood. Recent publications such as Robert Richards' *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior* (1989) and *The Meaning of Evolution* (1993), Gregory Radick's *The Simian Tongue* (2007) and Sally Shuttleworth's *Cognition, Evolution, and Behavior* (2010) show how historians have mainly restricted their thought within a Darwinian paradigm.

Conversely, and paradoxically, this scholarship on evolutionary psychology has mostly overlooked a central evolutionary strand in its thinking and practice. There was, instead, a powerful current of thought, originating in France (e.g. Lamarck, Etienne Geoffroy St. Hilaire), and lasting from the nineteenth to the twentieth century, that treated memory as something that physically accrued in the body over generations. This memory was considered as something organically present in all livings creatures providing an explanation for the complex phenomenon of heredity. Such ideas were championed in Victorian Britain by Butler who developed them in essays, novels and books. Butler wrote:

> Memory and heredity are the means of preserving experiences, of building them together, of uniting a mass of often confused detail into homogeneous and consistent mind and matter, but they do not originate. The increment in each generation, at the moment of its being an increment, has nothing to do with memory or heredity, it is due to the chances and changes of this mortal state. [28]

Putting together mind and matter, Butler unified philosophy with physiology, leaving a door open to the development of medical psychology. This conception of memory was often treated as a cul-de-sac by nineteenth-century psycho-psychologists, but in fact these

[28] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p.61.

researchers felt an increasing pull of metaphysics in general, and embodied memory in particular, towards the end of their careers. The work of these people, and in particular that of Butler, is a trend that demands historical explanation rather than scientific effacement.[29]

Returning to the thesis, a specific outcome of this research is the establishment of Butler as one of the pioneers of psychophysiology in England. Using both archival research and a comparative approach, I endeavor to reshape the reception of his scientific writing in England and Europe between 1870 and 1890. Looking at relationships, networks, debates, published and unpublished material (e.g. books, essays, notebooks, letters and notes), I wish to investigate how Butler, instead of being only a populariser of Darwinian evolution, was able to develop his own theory within the British cultural debate of his time.

Butler's main scientific books *Life and Habit* (1878) and *Unconscious Memory* (1881) used the hypothesis of a substantial overlap between the concept of Memory and that of Heredity reintroducing causality into the process of evolution. These books anticipated the conclusion that the role of memory is central in the process of heredity, which became scientifically accepted only in the first decades of the twentieth century. The identities of memory and heredity adopted by Butler were justified by a phenomenon he called 'unconscious memory', which guaranteed the process of reproduction providing information from one generation to the other. The same idea was also developed (independently) in France by Théodule Ribot and in Germany by Ewald Hering, showing how the conclusion of Butler was also shared by others in Europe.

In Darwinian and post-Darwinian debate, Butler becomes the missing link between the 1860-1880 materialistic evolution and the 1880-1910 rise of British psychophysiology. Additionally, he also represents the missing link between historians' concept of experts and

[29] Laura Otis's *Organic Memory* (1994), is an honorable exception to the general trend of scholarship, but focuses more on the literary side of the question.

amateur science, and between science and the public during the late nineteenth-century. My investigation of his scientific opus will be structured as follows:

Chapter 1 provides a description of the present state of the scholarship concerning literature and science in the nineteenth-century. This chapter provides a review of the main methodological positions used by historians of science and literary scholars in understanding the convergences of science and literature in the nineteenth-century. Referring to the work of O'Connor, White, Beer and Levine, the chapter discuss literature and history of science in order to understand the case of Samuel Butler. The chapter also presents the main methodological difficulties for historians of science and literary scholars in analysing Butler's scientific writing inside and outside his own historical context.

Chapter 2 explores Butler's use of different genres in developing his hypothesis of psychophysiological evolution in both nineteenth-century literature and science. This thematic chapter, going from an explanation of Butler's reception in England until his death in 1903, shows the reasons behind Butler's infamy. It analyses the writing of *God the Known and God the Unknown, Life and Habit* and *Erewhon* showing how science was mingled by Butler with literature, theology, psychology and medical physiology. Additionally, the chapter also looks at Butler's polymathic problem of identity. Was Butler a novelist, a scientist, a populariser or a mixture of all of them? The main goal of the chapter is to re-construct Butler's identity starting from the analysis of his writing style.

Chapter 3 looks at the role of Butler's work in Britain between 1870 and 1920 focusing, in particular, on the relationship between him and Darwin. The first part of the chapter deconstructs the complex relationship between Butler and Darwin by looking at their correspondence and networks before and after the quarrel. The second part of the chapter discusses Butler's reception at the turn of the twentieth-century in France and Italy. However, it is important to note that this section is not an epilogue of Butler's career (that

will be presented at the end of chapter 5). It is instead an analysis of the *prima facie* public and academic reception of Butler in two countries, where his ideas had a prominent role in shaping the scientific and literary culture of the period. Overall, the main goal of the chapter is to show how, when and where we can talk about a renaissance of Butler's fame in the first decade of the twentieth-century.

Chapter 4 discusses Butler's popularization of science in the Victorian marketplace of science. The chapter, starting from the demarcation of concepts such as 'marketplace of science' and 'popularization of science' in contemporary history of science, discusses the specific case of Butler. Looking at Butler's texts, networks and writing style, the aim is to understand how Butler can be considered as a Victorian translator and populariser of continental hypothesis of European evolution. The second part of the chapter looks at Butler's research on the alternatives to natural selection, focusing in particular on *Evolution Old and New* and the problem of originality of Darwin's *Origin of Species*. Starting from Butler's history of evolution as expressed in his book of 1879, it looks at Butler's interpretations of evolutionists of past and present.

Chapter 5 investigates Butler's hypothesis of unconscious memory and its role in psychophysiological debate at the turn of the twentieth-century. Starting from a brief historical introduction, it considers how, when and where it developed through his publications. This chapter looks directly at Butler's texts, deconstructing the main characteristic of Butler's unconscious memory by looking at its role in biology (including biochemistry), physiology, psychology and philosophy. Here, particular attention is paid in explicating the links between Butler's work and similar cases in Europe such as Hering and Ribot. At the conclusion of the chapter, there is also an epilogue which focuses on the reception of the Butler-Hering hypothesis of organic memory in twentieth-century science, philosophy and culture. The main goal of the chapter is to provide a comparative description of unconscious memory in relation to three different points. First, I will look at

the hypothesis itself. Second, I will deconstruct the meaning of 'unconscious memory' through the analysis of Butler's examples from the novel *Erewhon* to *Luck or Cunning?*. Third, I will look at the reception of Butler's hypothesis in early twentieth-century scientific culture and in the contemporary philosophical debate.

Chronology of Samuel Butler

1835

Dec. 4th. Samuel Butler born at Langar Rectory, Nottingham. He was son of the Rev. Thomas Butler and grandson of Dr. Samuel Butler, Headmaster of Shrewsbury School from 1798 to 1836, and afterwards Bishop of Lichfield.

1843-4

Spent the winter in Rome and Naples with his family. First encounter with Italian Language and culture.

1846

Butler started school at Allesley.

1848

Went to school at Shrewsbury under Dr. Kennedy.

Went to Italy for the second time with his family.

First heard the music of Handel.

1854

Entered at St. John's College, Cambridge.

1858.

Bracketed 12th in the first class of the Classical Tripos and took his degree.

Went to London and began to prepare for ordination, living among the poor and doing parish work: this led to his doubting the efficacy of infant baptism and hence to his declining to take orders.

1859

Sailed for New Zealand and started sheep-farming in Canterbury Province: while in the colony he wrote much for the *Press* of Christchurch, N.Z.

Charles Darwin published *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*

1862

Dec. 20. 'Darwin on The Origin of Species. A Dialogue,' unsigned but written by Butler, appeared in the New Zealand Journal *The Press*. Followed by correspondence to which Butler contributed also published in *The Press*.

Charles Darwin published *On the various contrivances by which British and foreign orchids are fertilised by insects*

1863

A *First Year in Canterbury Settlement*: made out of his letters home to his family together with two articles reprinted from the *Eagle* (the magazine of St. John's College, Cambridge): MS. lost.

1863

'Darwin among the Machines' a letter signed 'Cellarius' written by Butler, appeared in the *Press.*

1864

Sold out his sheep run and returned to England in company with Charles Paine Pauli. He settled at 15 Clifford's Inn, London, and began life as a painter, studying at Cary's, Heatherley's and the South Kensington Art Schools and exhibited pictures occasionally at the Royal Academy and other exhibitions. While studying art he made the acquaintance of, among others, Charles Gogin, William Ballard and Thomas William Gale Butler.

Family Prayers: a painting by Butler.

1865

'Lucubratio Ebria,' an article, containing variations of the view in 'Darwin among the Machines,' sent by Butler from England, appeared in *The Press.*

The Evidence for the Resurrection of Jesus Christ as contained in the Four Evangelists critically examined: a pamphlet of VIII+48 pp. written in New Zealand: the conclusion arrived at is that the evidence is insufficient to support the belief that Christ died and rose from the dead: MS. Lost.

1868

Charles Darwin published *The Variation of Animals and Plants under Domestication*

1869-70

Butler in Italy for four months, his health having broken down in consequence of over-work.

1870

First meeting with Eliza Mary Ann Savage, from whom he drew Alethea in *The Way of All Flesh.*

Alfred R. Wallace, *Contributions to the theory of natural selection. A series of essays.*

1871

Charles Darwin published *The Descent of Man, and Selection in Relation to Sex*

1872

Publication of *Erewhon or Over the Range*: a Work of Satire and Imagination

Charles Darwin published *The Expression of Emotions in Man and Animals*

St. George Mivart, *On the Genesis of Species*.

1873

Erewhon translated into Dutch.

The Fair Haven: an ironical work, purporting to be "in defence of the miraculous element in our Lord's ministry upon earth, both as against rationalistic impugners and certain orthodox defenders," written under the pseudonym of John Pickard Owen with a memoir of the supposed author by his brother William Bickersteth Owen. This book reproduces - the substance of his pamphlet on the resurrection: MS. at Christchurch, New Zealand.

St. George Mivart, *Man and Apes: An Exposition of Structural Resemblances and Differences Bearing upon Questions of Affinity and Origin*

1874

"Mr. Heatherley's Holiday," according to Henry Festing Jones Butler's most important oil painting, exhibited at the Royal Academy Exhibition.

St. George Mivart, *An Examination of Mr. Herbert Spencer's Psychology*

On the 10th June, Butler sailed to Montreal Canada

1875

Charles Darwin published *Movement and Habits of Climbing Plants*

1876

Having invested his money in various companies that failed, one of which had its works in Canada, and having spent much time during the last few years in that country, trying unsuccessfully to save part of his capital, he now returned to London, and during the next ten years experienced serious financial difficulties.

First meeting with Henry Festing Jones.

1877

Publication of *Life and Habit*: *an Essay after a Completer View of Evolution* dedicated to Charles Paine Pauli. Although dated 1878 the book was published on Butler's birthday, 4th December, 1877.

1878

"A Psalm of Montreal" in the *Spectator*: There are probably many MSS. of this poem in existence given by Butler to friends: one, which he gave to H. F. Jones, is in the Fitzwilliam Museum, Cambridge.

A Portrait of Butler, painted in this year by himself, now at St. John's College, Cambridge.

1879

Publication of *Evolution Old and New*: *A Comparison of the Theories of Buffon, Dr. Erasmus Darwin and Lamarck with that of Charles Darwin*: MS Fitzwilliam Museum, Cambridge. *A Clergyman's Doubts* and *God the Known and God the Unknown* appeared in the *Examiner*

Erewhon translated into German.

Charles Darwin published "Preface and 'a preliminary notice'" in Ernst Krause's Erasmus Darwin

1880

Publication of *Unconscious Memory*: *A Comparison between the theory of Dr. Ewald Hering, Professor of Physiology in the University of Prague, and the Philosophy of the Unconscious of Dr. Edward von Hartmann, with translations from both these authors and preliminary chapters bearing upon Life and Habit, Evolution Old and New, and Charles Darwin's Edition of Dr. Krause's Erasmus Darwin.* Ms. Cambridge University Library [MS Add.5977]

A Portrait of Butler, painted in this year by himself, now in Shrewsbury. A third portrait of Butler, painted by himself now at Christchurch, New Zealand.

1881

Publication of Alps and Sanctuaries of Piedmont and the Canton Ticino MS. St John's College Library, Cambridge.

1882

A new edition of *Evolution Old and New*, with a short preface alluding to the recent death of Charles Darwin, an appendix and an index.

1883

Began to compose music as nearly as he could in the style of Handel.

George Romanes, *Mental Evolution in Animals, with a Posthumous Essay on Instinct by Charles Darwin*

1884

Selections from Previous Works with "A Psalm of Montreal" and "Remarks on G. J. Romanes' *Mental Evolution in Animals*."

1885

Death of Miss Savage.

Gavottes, Minuets, Fugues and other short pieces for the piano by Samuel Butler and Henry Festing Jones: MS. with H. F. Jones.

1886

Holbein's *La Danse*: a note on a drawing in the Museum at Basel.

Stood, unsuccessfully, for the Professorship of Fine Arts in the University of Cambridge.

Dec. 29. Death of his father and end of his financial embarrassments.

George Romanes, *Physiological Selection: an Additional Suggestion on the Origin of Species.*

1887

Engaged Alfred Emery Cathie as clerk and general attendant.

Luck or Cunning as the main means of Organic Modification? An attempt to throw additional light upon Charles Darwin's theory of Natural Selection. MS: Bodleian Library, Oxford [MS. Eng. misc. d. 96]

Was entertained at dinner by the Municipio of Varallo-Sesia on the Sacro Monte.

Publication of *Autobiography* of Charles Darwin (Edited by his son Francis Darwin).

Publication of *Life and Letters of Charles Darwin*, (ed. Francis Darwin)

1888

Took up photography.

1888

Ex Voto: an account of the Sacro Monte or New Jerusalem at Varallo-Sesia, with some notice of Tabachetti's remaining work at Crea and illustrations from photographs by the author: MS. at Varallo-Sesia.

Narcissus: a Cantata in the Handelian form, words and music by Samuel Butler and Henry Festing Jones: MS. of the piano score in the British Museum. MS. of the orchestral score with H. F. Jones.

In this and the two following years contributed some articles to the *Universal Review*, most of which were republished after his death as *Essays on Life, Art, and Science* (1904).

1889

Alfred R. Wallace, *Darwinism, an exposition of the theory of natural selection with some of its applications*

1890

Began to study counterpoint with William Smith Rockstro and continued to do so until Rockstro's death in 1895.

1892

The Humour of Homer. A Lecture delivered at the Working Men's College, Great Ormond Street, London, January 30, 1892, reprinted with preface and additional matter from the *Eagle.*

Went to Sicily, the first of many visits, to collect evidence in support of his theory identifying the Scheria and Ithaca of the *Odyssey* with Trapani and the neighbouring Mount Eryx.

1893

'L'Origine Siciliana dell' Odissea.' In *Rassegna della Letteratura Siciliana.* Later translated into English 'On the Trapanese Origin of the Odyssey'

1894

Ex Voto translated into Italian by Cavaliere Angelo Rizzetti.

'Ancora sull' origine dell' Odissea.' Extracted from the *Rassegna della Letteratura Siciliana.*

1895

Went to Greece and the Troad to make up his mind about the topography of the *Iliad.*

1896

The Life and Letters of Dr. Samuel Butler in so far as they illustrate the scholastic, religious and social life of England from 1790-1840: MS. Shrewsbury School

His portrait painted by Charles Gogin, now in the National Portrait Gallery.

1897

The Authoress of the Odyssey, where and when she wrote, who she was, the use she made of the Iliad and how the poem grew under her hands: MS. at Trapani.

1897

Death of Charles Paine Pauli.

1898

The *Iliad* rendered into English prose: MS. at St. John's College, Cambridge.

1899

Shakespeare's Sonnets reconsidered and in part rearranged, with introductory chapters, notes and a reprint of the original 1609 edition: MS. with R. A. Streatfeild.

1900

The *Odyssey* rendered into English prose: MS. at Acireale, Sicily.

1901

Erewhon Revisited twenty years later both by the Original Discoverer of the Country and by his Son: this was a return not only to *Erewhon* but also to the subject of the pamphlet on the resurrection. MS. in the British Museum.

1902

June, 18. Death of Samuel Butler

1903

Alfred R. Wallace, *Man's place in the Universe; a study of the results of scientific research in relation to the unity or plurality of worlds.*

'I am the enfant terrible of literature and science. If I cannot, and I know I cannot, get the literary and scientific big-wigs to give me a shilling, I can, and I know I can, heave bricks into the middle of them'.
Samuel Butler, *The Notebooks of Samuel Butler*[1]

CHAPTER ONE:

Literature, science and scientific writing in the Victorian Era

Writing a research thesis about Samuel Butler's view of Victorian science requires an in depth study of both the literary and scientific debates (and their interconnections) in the second part of the nineteenth century. In this chapter, my aim is to provide an overview of the main methodological approaches used by scholars of history and literature in the last twenty years. This is fundamental to providing a background for understanding the complexity of Butler's work in the Victorian and contemporary debate.

1.1 History of science in cultural and literary terms

During the second half of the Victorian era, scientific authority began to assert itself against the long-standing predominance of humanities. This change of scenery produced a series of complex cultural revolutions. It influenced the development of science and the work of scientists and at the same time gave rise to a new order in cultural and literary fields. Specifically, the rise of scientific authority modified the way of thinking about Victorian science and culture, suggesting a new range of interpretations devoted to its understanding.

Two different types of research have been undertaken in relation to this topic. On the one hand, historians of science have succeeded in establishing evolution and natural science as the most widely discussed scientific and cultural revolution of the second half of

[1] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 183.

the Victorian era.[2] The theory of evolution was ranked by historians alongside the 'Copernican revolution' as one of the new scientific theories which most symbolizes a wholesale change in cultural values.[3] On the other, literary scholars have proposed a different reading of scientific issues through the study of Victorian novels, using them as examples of cultural history.[4]

The cornerstone of both of these debates has been Darwin's theory of evolution. The Darwinian hypothesis of natural selection, as explained in the *Origin of Species* (1859), was one of the most extraordinary examples of a publication which had a far greater impact in its imaginative consequences, in literature, science and society, than its author could have foreseen.

It follows that *the Origin* becomes the link between the work done by historians of science and literary scholars showing how the two subjects influence one another. As is widely known, Darwin's book provoked an extensive literature in England and abroad influencing the work of many scientists, novelists and men of culture. However, particularly in the field of literature Darwin's reception involved the crossing of the boundaries of the two disciplines. Published in 1999, Beer's *Open Fields* has been an example of this. The book tracks encounters between science, literature and other forms of emotional experience throwing a different light on the Victorian period in relation to the rise of modernism. The volume also engages with current controversies about the place of science in culture and *vice versa*.

According to Robin Gilmour's book *The Novel in the Victorian age*, 'the supreme literary achievement of the Victorian age is in its prose fiction'.[5] Thus, Gilmour gives to

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[2] By the scientific point of view the beginning of second half of Victorian era can be located within the publication of Darwin's *On the Origin of Species* (1859).

[3] Peter Bowler, *Evolution: The History of an Idea*, pp. XII-XVII.

[4] Ilse Nina Bulhof, *The Language of Science: A Study of the Relationship between Literature and Science in the Perspective of a Hermeneutical Ontology, with a case study of Darwin's The Origin of Species*, pp. 129-161.

[5] Robin Gilmour, *The Novel in the Victorian Age, a Modern Introduction*, p. 1.

Victorian novelists a predominant role over all other categories of writers (e.g. journalists, poets etc). They were the critics of Victorian culture, the storytellers of the century, through the pages of their novel they reflected upon the main events of science, politics, history and culture.

Samuel Butler was in his forty years career one of these writers. According to the recent work of historians of science such as James Paradis, Bernard Lightman and Aileen Fyfe, relating to Victorian periodicals and the marketplace of science, Butler's work has been defined as an example of Victorian popularization of science.[6] However, what is a populariser of science? Unlike scientists, novelists or philosophers, the populariser of science has been a Victorian figure placed somewhere between the scientist and the novelist. Neither in the field of science nor in the field of literature, the populariser did not have a well-defined role as his work involved both literature and science.

From 1870, the rise of the man of science, or 'gentleman of science', using Huxley's nomenclature, became the most important cultural revolution of Victorian science. It changed the way in which science was discussed by the public and, furthermore, it created a gap between scientists and non-scientists. Men of science and men of culture became inevitably involved in a stratification of the society which became definitive by the end of the century.

Before the beginning of this epistemological revolution, as evidenced, scientists, writers and novelists appeared to form part of the same debate. They published articles in the same journals and periodicals and discussed the same arguments. They were the protagonists of the same novels and were the new 'heroes' of the middle-class imagination.

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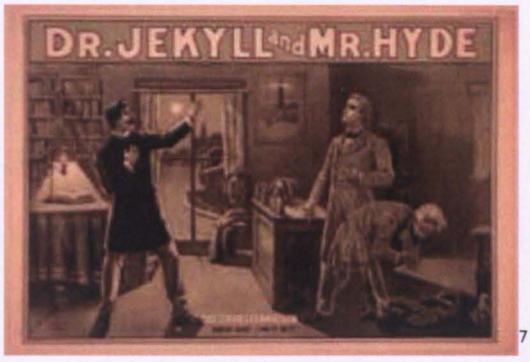
[6] See Aileen Fyfe and Bernard Lightman (eds.) *Science in the Marketplace: Nineteenth-century Sites and Experiences*; Aileen Fyfe, *Science and Salvation: Evangelical Popular Science publishing in Victorian Britain;* Bernard Lightman, *Victorian Popularizer of Science: Designing Nature for new Audiences;* Bernard Lightman (ed.), *Victorian Science in Context*. Butler's popularization of science will be the core argument of chapter four.



[7]

Since the concept of the 'man of science' was proposed by Huxley as an alternative to the Americanism 'scientist',[8] it started a recognisable distinction between the field of science and the one of humanities.

In theoretical terms, Huxley shaped the role of the 'gentlemen of science' as an 'evolution' of the eighteenth century natural philosopher. Through the 'X Club',[9] a group of experts who started to meet in the 1860s, Huxley tried to start a strategic campaign against clerical and theological dominion in order to clean science from any doctrinal 'infection'. Quoting Huxley's own words, the aim of the club was the 'devotion to science, pure and free, untrammelled by religious dogmas'.[10]

Outside this devotional spirit, novelists did not share the spirit of the X Club. They told stories with the intention of popularizing science on the one hand, but with a need to explain social dreams and myths in novels, on the other. Rather than being simple men of science, in the imagination of middle class Victorians they were heroes who were

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[7] Figure 2: A poster which shows the cover page of Robert Louise Stevenson, *The Strange Case of Dr. Jekyll and Mr. Hyde* (1886 edition).

[8] The world scientist was not an American word as Huxley supposed. It was coined in 1830s in Cambridge by William Whewell. See Paul White, *Thomas Huxley, Making the 'Man of Science'*, p. 5.

[9] The X Club was a dining club established by Thomas Huxley on 1864 and run until 1893. The members of the club were George Busk, Edward Frankland, Thomas Archer Hirst, Joseph Dalton Hooker, Thomas Henry Huxley, John Lubbock, Herbert Spencer, William Spottiswoode, and John Tyndall. See Barton Ruth, '"Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X Club, 1851-1864', *Isis*, Vol. 89, No. 3 (1998), pp. 410-444, Barton Ruth, "'An Influential Set of Chaps': The X-Club and Royal Society Politics 1864–85", *The British Journal for the History of Science* 23 (1) (1990), pp. 53–81 and James D. Desmond, "Redefining the X Axis: "Professionals," "Amateurs" and the Making of Mid-Victorian Biology – A Progress Report", *Journal of the History of Biology* 34 (1) (2001), pp. 3–50.

[10] Hooker, J. D. to Darwin, C. R., (7–8 Apr 1865). Darwin Correspondence Project - Letter 4807.

confronted with evil, criminals, time and their own selves. As rightly pointed out by Charlotte Sleigh's *Literature & Science* (2011) the Victorian novel can be considered a new type of technology (metaphorically like a microscope) used in making science (or philosophy or religion) clear to common audiences.[11] It worked outside any field of expertise and shared its knowledge with anyone interested.

In terms of content men of science and novelists appear, in their respective styles of writing, to be the opposite of each other. They were on the same side of the Victorian debate but now speaking two different languages for two different audiences. In particular, novelists and populariser of science although involved with the scientific debate shared only a portion of scientific knowledge.

According to research undertaken on Victorian periodicals, the popularization of science has been revealed by placing the sciences in the wider cultural marketplace, ultimately showing that the creation of new sites and audiences was just as crucial as the growing public interest in science.[12] It seems, the work of the populariser involved more than simple science or literature. The populariser worked in between these two fields creating a new type of literature. Consequently, there is no easy definition for the populariser of science and the case of Samuel Butler is a perfect of example of this problem. Butler's work represents a tension between the methodologies of literature and science. An account of this difficulty is clearly presented in Butler's notebook. There, Butler describes himself as having an 'unnatural' status:

> I am the enfant terrible of literature and science. If I cannot, and I know I cannot, get the literary and scientific big-wigs to give me a shilling, I can, and I know I can, heave bricks into the middle of them.[13]

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[11] Charlotte Sleigh, *Literature & Science*, p. 11.

[12] See Geoffrey Cantor, Gowan Dawson, Graeme Gooday, Richard Noakes, Sally Shuttleworth and Jonathan R. Topham, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*; Geoffrey Cantor and Sally Shuttleworth (eds.) *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals* and the Science Periodicals project - http://www.sciper.org/ .

[13] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 183.

Defining himself as the *enfant terrible*, Butler placed his work between literature and science. This put the writer astride the two disciplines generating some methodological difficulties for historians and literary scholars. These difficulties will be addressed by discussing the main methodologies used by historians of science and literary scholars in the last twenty years in order to understand Butler's scientific work.

1.1.1 History of science or literature and science?

In recent years, the work of historians of nineteenth-century science such as Peter Bowler, James Moore, Adrian Desmond, Pietro Corsi and Paul White provide examples of critical scholarship focused on understanding science as a sociological cultural product of a specific context. Over the last two decades, many historical studies of science have addressed, through a growing number of biographies and monographs, the need to contextualize the protagonists of the evolutionistic debate in Victorian culture. Examples are many: the monumental David Kohn's *Darwinian Heritage* (1988)[14] gave rise to a number of papers contextualising evolution in England and other countries. Peter Bowler's *Evolution: The History of an Idea* (1989) and *The Eclipse of Darwinism* (1992) discussed evolution outside the simple 'scientific' field. *The Cambridge Companion to Darwin* (2003)[15] explored the idea of Darwin as a philosopher and man of culture, and Browne (2002) and Desmond's and Moore's (1991) biographies[16] of the English naturalist gave an account of Darwin's life outside the scientific context.[17]

Additionally, other studies such as *The Reception of Charles Darwin in Europe* (2009), *The Cambridge Companion to the Origin of Species* (2009) and *What about Darwin? All species of opinion from Scientists, Sage, Friends and Enemies who met, read and*

[14] David Kohn, *The Darwinian Heritage.*
[15] Jonathan Hodge, Gregory Radick (eds.), *The Cambridge Companion to Darwin.*
[16] Adrian J. Desmond and James Moore, *Darwin*; Janet Browne, *Charles Darwin: The Power of Place.*
[17] For a good 'Guide to Further reading' see Jonathan Hodge and Gregory Radick (eds.), *The Cambridge Companion to Darwin*, pp. 421-460.

discussed the naturalist who changed the world (2010), fruitfully discussed the outcomes of Darwin's cause. In doing that, they explain how evolution developed through an *excursus* into related subjects.[18]

What has gone unremarked in all of these cases is that science (i.e. evolution) was also derived from scientists' literary backgrounds and readings (both directly and indirectly). The work of literary scholars such as Beer and Levine has remarked upon this lack of knowledge. In the past twenty years, literary scholars have looked at the relationship between literature and science in the works of historical figures such as Charles Darwin, Thomas Huxley, Alfred Wallace and many of their contemporaries. Although the engagement of literature with science long preceded Victorian novels, it became particularly important after the establishment of the Darwinian theory of evolution. It occurred during a period in which literature and science still shared a common discourse.

In the mid-nineteenth century, literature still shared its language with science and scientists. Many examples are easily traceable: Lyell in his *Principles of Geology* (1830-3) extensively used the *Metamorphoses* of Ovid in explaining his reading of proto-geology. In France, Claude Bernard in his *Experimental Medicine* (1865) cited exhaustively the work of Goethe. Darwin used as a background to his scientific hypothesis the work of Paley, Malthus's *An Essay of the Principle of the Population* (1798) and different ideas from the cultural debate of the time.[19] According to his biographers, during his naturalistic expedition on the Beagle, Darwin took with him many novels and poetical books including *The Poetical Works of John Milton.*[20] The naturalist did it in order to enjoy more his

[18] The natural tendency of all these publication was to give an historical contextualized account of evolution in connection to other subjects. See Peter Bowler, *Evolution: The History of an Idea*, pp. 237-246; Rebecca Stott, 'Darwin's Barnacles: mid-century Victorian natural history and the marine grotesque', in Roger Luckhurst and Josephine McDonagh (eds.), *Transactions and Encounters: Science and Culture in the Nineteenth Century*, pp. 151-182.

[19] These examples are also used by Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, p. 5.

[20] Gillian Beer, 'Darwin and Romanticism', *The Wordsworth Circle* Vol. 41, Issue 1 (2010), pp. 3-9, esp. 5.

inexperienced role as a natural scientist on a trip around the world.[21] Darwin had a genuine passion for reading since his childhood. In his autobiography, he wrote:

> I have said that in one respect my mind has changed during the last twenty or thirty years. Up to the age of thirty, or beyond it, poetry of many kinds, such as the works of Milton, Gray, Byron, Wordsworth, Coleridge, and Shelley, gave me great pleasure, and even as a schoolboy I took intense delight in Shakespeare, especially in the historical plays.[22]

A few paragraphs later Darwin even defined reading novels as a pleasure, he wrote:

> I like all if moderately good, and if they do not end unhappily – against which a law ought to be passed. A novel, according to my taste, does not come into the first class, unless it contains some person whom one can thoroughly love, and if it be a pretty woman all the better.[23]

According to the previous quote, reading was a complementary part of Darwin's education. Indeed, Darwin was, as were many of his colleagues, surrounded by novels and other forms of literature.[24] However, it must be acknowledged that Darwin wrote in his latter years that he lost the taste for great literature, focusing his interest mostly on science.

Literary scholars have approached the hypothesis of considering Charles Darwin as a Romantic writer rather than merely a scientist. They have worked in contrast to classical histories of science, proposing the father of evolution as a figure in between two sides of Victorian culture: science and literature. In particular, Gillian Beer in her *Darwin's Plots* has considered issues posed by Darwin's language, methodology and ideas in relation to George Eliot's and Thomas Hardy's novels.

Starting from a contextualization of Darwin's writing, she has moved onto its cultural outcomes suggesting a reading of the scientist's theory as possessing 'exceptional

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[21] Adrian J. Desmond and James Moore, *Darwin*, pp. 105-116.

[22] Nora Barlow (ed.), *The Autobiography of Charles Darwin 1809-1882. With the Original Omissions Restored*, p. 138, also referred in Gillian Beer, 'Darwin and Romanticism', *The Wordsworth Circle*. (2010). Vol. 41, Iss. 1, p. 4.

[23] Nora Barlow (ed.), *The Autobiography of Charles Darwin 1809-1882. With the Original Omissions Restored.*, pp 138-139.

[24] George Levine, *Darwin and the Novelists: Patterns of Science in Victorian fiction*, pp. 2-23.

hermeneutic potential.'[25] Additionally, in *Darwin's Plots* Beer has also studied the implications of evolutionistic theory on narrative and on the composition of fiction.[26]

More recently, Beer has worked on Darwin's tendency to be influenced by literature in her 'Darwin and Romanticism'.[27] The article points out, whilst discussing different episodes of Darwin's life, how the naturalist used a literary vocabulary in writing his books. 'Darwin and Romanticism', starting from the Darwin's reading notebook, shows to Victorian scholars a new and unexpected side of the naturalist's life: his passion for reading.

The point of Beer's paper is to demonstrate how reading made Darwin's writing Romantic in terms of vocabulary, evocative sentences and desires. This new account treats science as a 'literary' object. Beyond Darwin's autobiography, Beer argues that the privileged role of man in narrative was changed by Darwin's style of writing. However, this point has been already introduced by Beer in *Darwin's Plots.*

There, for instance, Beer has shown how in literature attention was moved from the role of man as protagonist typical of novels since 1850 to a new plot where animals, machines and alternative sciences assumed increasing importance in fiction.[28] According to Beer, Darwin and his natural selection theory demonstrated, in his major narratives, that it was possible to have plots without man – 'both plots previous to man and plots even now regardless of him'.[29]

In summary, the analysis proposed by Beer and her successors has reshaped the role of science and the scientist in the Victorian period especially in relation to novelists and

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[25] *Gillian Beer, Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, p. 8.
[26] *Ibid.*, p. 5.
[27] Gillian Beer, 'Darwin and Romanticism', in *The Wordsworth Circle* Vol. 41, Iss. 1 (2010), pp. 3-7.
[28] Similar conclusion in John Glendening, *The Evolutionary Imagination in Late-Victorian Novels: An Entangled Bank*; James Paradis and Thomas Postlewait, *Victorian Science and Victorian Values: Literary Perspectives.*
[29] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, p. 17.

literature. Not only scientists but novelists, writers, philosophers and men and women of culture were part of this intricate interrelationship. The two-way relationship involved not only the sharing of language but also ideas, metaphors, narrative patterns, and myths, all together in the same discourse upon common scientific themes.[30] Additionally, the hypothesis adopted by Beer proposed the possibility of thinking about Victorianism in term of its complexity. This ramification of topics alongside the interaction between scientists and writers represents a good starting point for mapping out the relationship between literature and science.[31]

This chapter adopts the position, endorsed by contemporary criticism, that science and literature are modes of discussion embedded in a specific cultural and historical context. Putting aside the methodological problems (these will be discussed in the second section), it tries to summarise the Victorian era from both literary and scientific perspectives. This will cover changes in the nature of science, culture and literature. Although it appears impossible to address one single methodological approach in defining a concrete criticism, I will analyse current attempts to treat literature and science together in order to work out a new approach that is both literally and historically consolidated.

Certain points must be clarified in order to provide a framework for understanding the rise of nineteenth-century science and literature. To do this, the idea of the changes which occurred in the Victorian period and their developments in science and fiction must be contextualized. Finally, current scholarship's methodology and the categories of people which it involves must be scrutinised.

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[30] Similar position have been addressed by Robert M. Young, 'Darwin and the Genre of Biography' in George Levine (ed.), *One Culture: Essays in Science and Literature*, pp. 208-214.

[31] This point has been particularly developed in Gillian Beer, 'Lineal Descendants, the Origin's literary progeny' in Michael Ruse and Robert Richards (eds.), *The Cambridge Companion to the 'Origin of Species'*, pp. 275-294.

1.1.2 The Victorian age: science and culture

Before discussing literature and science in the Victorian Era we need to map it out in terms of its complex structure. In this section the idea of Victorian changes, scientific and cultural transformations, will be contextualized as will the new roles and places for science and scientists, and the cultural revolutions produced by the theory of evolution.

According to historians of science, the nineteenth-century was an age of transition, changes and revolutions which transformed Britain through the establishment of different innovations especially in science. Scientists modified the structure and over-structure of a consolidated government and philosophical tradition introducing new social and cultural revolutions. Historical evidences have been provided by the works of Peter J. Bowler and Iwan Rhys Morus' *Making Modern Science* (2005), Morus' *Frankenstein's Children* (1998) and, in a general way, the classic Jan Golinski's *Making Natural Knowledge* (2005). According to these works, the Victorian period changed the face of British culture in different moments and through different scientific initiatives.

In historical terms the first big change started at the beginning of the nineteenth-century. In 1833, Lord Lytton's *England and the English,* in describing the 'view of intellectual spirit of the time', provided a view of life in the early nineteenth-century, structuring it around innovations and changes. Lytton wrote:

> We live in an age of visible transition[..] An age of disquietude and doubts of the removal of time-worn landmarks, and the breaking up of the hereditary elements of society – old opinions, feelings- ancestral customs and institutions are crumbling away, and both the spiritual and temporal worlds are darkened by the shadows of changes[32]

According to Lytton, changes, revolutions and doubts in contrast to old opinions, feelings and ancestral customs, represented the new theoretical solution at the base of the big revolution opened up by Darwinian evolution. In historical terms, the intellectual history of the nineteenth-century has been most consistently understood in terms of the rise of

[32] Standish Mitcham (ed.), Edward Bulwer-Lytton, *England and the English*, p. 318.

science. Indeed, when it is related to any other age of human history, the Victorian era appears to be one of unprecedented scientific discoveries and technological innovations.[33]

Medicine, physics, chemistry, biology, geology, and mathematics underwent fundamental and systematic changes during the nineteenth-century. As many historians have asserted these changes shaped the nature of the modern age, with the consequent establishment of new roles, ideas and problems.[34] On the other hand, the rise of science produced another effect, largely discussed in relation to natural science: the beginning of secularism and the consequent shaping of a new role for scientists and their expertises.[35]

The Victorian age (1837-1901)[36] was also, for England and its inhabitants, an age of cultural revolutions and social change directly related to the advancement of science. Contemporary historians tend to divide this era up: early Victorian (1837-1850), mid-Victorian (1850-1870), and later Victorian (1870-1901). Each relates to a specific series of political and economic changes, scientific innovations and their cultural and social consequences.

This division is also confirmed by the work of historians of science and technology. In the first half of the century science had yet to shape a role for itself. It was in the process of figuring this out through an array of different initiatives. First of all, Victorians tried to introduce science as an *ideology* into a culture in which the humanities conserved their predominance in academia and within the public's opinion.[37]

An example was 'The Great Exhibition of the Works of Industry of all Nations' (1851), a celebration of modern technology and design strongly desired by the Royal Society and members of the royal family. The Great Exhibition was a platform on which

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[33] A similar conclusion is showed in George Basalla, *The Evolution of Technology*, pp. 20-28.

[34] Peter Bowler, *Evolution: The History of an Idea* (London, 1989), pp. 365-422.

[35] *Ibid.*, pp. 218-228.

[36] Some scholars extend the beginning of the period—as defined by a variety of sensibilities and political concerns that have come to be associated with the Victorians—back five years to the passage of the Reform act 1832 or indeed forward to 1914.

[37] See Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 58-62.

countries from all around the world could display their scientific achievements and Great Britain within it sought to prove its own superiority.[38] In the period, science, technology and culture were intimately related and they were seen as a 'simultaneous reciprocal transformation' according to the recent *Engineering Empires* (2005).[39]

Returning to the development of Victorian science, another step was represented by the foundation of institutions directed to the pursuit of scientific knowledge. In the first part of the century the Geological Society (1807), British Association for the Advancement of Science (1831), Entomological Society (1833), Botanical Society (1836), Microscopical Society (1839), Pharmaceutical Society and Chemical Society (1841), Ethnological Society (1843) and, the Institution of Mechanical Engineers (1847) gave to Victorian scientists a place for having meetings and discussions about their hypotheses and studies. During the 1830s, scientific developments, along with the growing interest in natural science and the influence of post-Revolutionary French naturalism, gave rise to a large number of reforms in England particularly within the medical field.[40] The growth of knowledge, both scientific and cultural, brought about a new definition of men of science in terms specialism, active research, experiments with a resulting expansion of scientific methodology into other areas of human knowledge.

The new scientific authority meant rational enquires, careful testing of evidence, rigour in arguments and inductive research. According to these methodological needs, Victorians developed a new role for science and a new mission for 'scientists'.

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[38] Further readings: Herbert L. Sussman, *Victorian Technology: Invention, Innovation, and the Rise of the Machine*, pp. 54-74; Jeffrey A. Auerbach, *The Great Exhibition of 1851: A Nation on Display*; Paul Greenhalgh, *Ephemeral Vistas: The Expositions Universelles, Great Exhibitions and World's Fairs, 1851–1939*; Michael Leapman, *The World for a Shilling: How the Great Exhibition of 1851 Shaped a Nation*.

[39] Ben Marsden and Crosbie Smith (eds.), *Engineering Empires: A Cultural History of Technology in Nineteenth-Century Britain*.

[40] See Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London*, pp. 276-335.

From 1859 and the publication of Darwin's hypothesis of evolution, science opened its doors to the general public.[41] It became culturally, politically and economically relevant developing into the philosophical, literary, medical and social debates.[42] According to Bowler's *The Eclipse of Darwinism*, after the publication of the *Origin of Species,* literature, philosophy, social sciences and popular culture started to shape themselves in an evolutionary perspective.[43] In England and abroad nineteenth-century sociologists, anthropologists, evolutionary philosophers and physiologists were all influenced by natural selection.

The new public role of evolutionary science produced considerable anxiety and excitement in those middle-class intellectuals connected with the establishment of humankind's place in nature and society. In addition, a new politics of gender and new subjects such as social evolutionism (Spencer), economical evolutionism (Marx), eugenics (Galton) and psycho-evolutionism (Hering and Ribot) modified the way of thinking about science, philosophy, literature and culture.[44]

The direct consequence of this multiplicity/variety was that science acquired the role of a *new faith* on two different levels. At the professional level, it acquired, through the restructuring of universities and research, a new politics concerning publications and ideas and a defined role for the scientist, with both obligations and rights.[45] At the amateur level, science became a national hobby for the middle class and a rich working-field for novelists and popularisers of science. The changes produced by the rise of astronomy, natural history

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[41] It must be said that as similar thing happened at the beginning of the nineteenth-century as clearly stated by Ralph O'Connor's *The Earth on Show*. However, Darwin's evolution obtained larger dissemination especially among middle class audience.

[42] Peter J. Bowler and Iwan Rhys Morus, *Making Modern Science: A Historical Survey,* pp. 129-132 and 149-164.

[43] Peter J. Bowler, *The Eclipse of Darwinism: Anti-Darwinian Evolution Theories in the Decades Around 1900,* pp. 15-20.

[44] See Peter Bowler, *Evolution: The History of an Idea*, pp. 232-237 and, in particular referring to psycho-evolution see Laura Otis, *Organic Memory History and the Body in the late Nineteenth and early Twentieth Centuries,* pp. 10-22.

[45] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 51-58.

and geology in the first half of the century and their cultural implications, in the second half, put science and scientists in the centre of a complex debate.

The new public dimension of science opened up a series of issues in relation to the increased level of specialism and expertise. A newly established community advocated the necessity of addressing a rigid corpus of norms and duties proper of any discipline. However, they also left a door open to the public outcome of their ideas. From 1860s, experts and specialization became the key factors of the new Victorian science as addressed by Roy MacLeod's *Government and Expertise.*[46] The rise of expertise modified economy, politics, universities, editors, and social services changing the complex politics of Victorian social culture.[47]

In particular, the rise of biological expert was a cornerstone of scientific change of the second half of the century. Evidence has been provided by Simon Patten's *The Failure of Biologic Sociology* (1894) where he wrote:

> The great scientific victories of the nineteenth century lie in the field of biology. . ..We are closing this century with as definite a bias in favor of biologic reasoning and analogy as the last century closed with a similar bias in favor the method of reasoning used in physics and astronomy[48]

From the 1860s, the hypothesis of evolution and its cultural implications were increasingly discussed by writers, scientists, philosophers and men of culture.[49] Notwithstanding this, what was this Cultural Revolution? and how can we talk about the rise of nineteenth-century biological science?

In answering these questions, let me start from what has been pointed out recently by historians of science. The common stereotype of the 'Darwinian revolution' has been

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[46] Roy MacLeod (eds.), *Government and Expertise: Specialists, Administrators and Professionals, 1860-1919*. A similar but more defined case is provided by Robert Kargon, *Science in Victorian Manchester: Enterprise and Expertise*.

[47] Anne Hardy, 'Public Health and the Expert: The London Medical officers of Health 1856-1900' in Roy MacLeod (eds.), *Government and Expertise, Specialists, Administrators and Professionals, 1860-1919*, pp. 128-145.

[48] Simon N. Patten, 'The Failure of Biologic Sociology', *Annals of the American Academy of Political and Social Science 4*, (1894) pp. 63–91, esp. 68.

[49] See Eve-Marie Engels, Thomas F. Glick (eds.), *The Reception of Charles Darwin in Europe*, pp. 1-23.

widely discussed in interdisciplinary terms. Since the 1980s, many historical studies have focused (to varying degrees) on the cultural reception of science. As highlighted by the recent books of Bowler, Desmond, Moore, Beer (with reference to her work relating to historians of science) the history of evolution has been re-shaped in the form of a cultural history of science.[50] Their works have re-discussed Darwin's natural selection starting from its cultural reception and construction instead of focusing only on its scientific implications. Additionally, throughout the establishment of science as a social object, they explained how the general public invested mounting interest in scientific matters and their development within Victorian society. The rise of Victorian science was inevitably connected to a wider set of changes in the social organization of knowledge.

This act of reframing evolution was not confined to Darwin. It also involved studies of other scientists and thinkers occupied in the scientific debate of the time. Huxley, Wallace, Spencer, Marx, Mivart, Romanes, Butler and many others were part of the large group of people able to export evolution to other field, and import continental ideas into the British debate. They produced a radical change in understanding the Victorian role of science. For some of these, science became the object of a specialised field whilst, for others it become the opportunity to inquire into unexplored cultural fields, starting from a consolidated scientific theory.

From the 1880s, it became inevitable for Victorian scientists, scholars and intellectuals to specialise. These new men of science introduced new standards and rigour to protect their specialized knowledge and their new status as experts.[51] New institutions arose including specialist archives, new university buildings, laboratories and public

[50] The attention has been move from science to its cultural outcomes focusing also on the biographical implications of the works of scientists. For example see the use of Thomas Huxley's idea of Gentleman of Science in developing the Victorian scientific community in Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 51-58.

[51] They were forced by Thomas Huxley definition of science as constructed on a denial: 'The improver of natural knowledge'. Refer to Thomas H. Huxley, *On the advisableness of improving natural knowledge, Methods and results*, (London, 1893), p. 40.

displays. They also reshaped their career in relation to specialised fieldworks, new career guidelines, new types of audiences (scientific and public) and the rise of new disciplines.[52]

The most important national example of this new shape of things was the opening in 1881 of that great monument of British science: The Natural History Museum in South Kensington. It was evidence of the intellectual acceptance of the new scientific landscape of England producing the first museum of natural science in the nation.

Strongly desired by Huxley, the establishment of The Natural History Museum represented the triumph of science in gaining the interest of the general public[53] (Figure 1). Behind the public dimension of the museum, it had also another role as pointed out by Huxley in 1858. In a letter written over twenty years before the establishment of the museum, Darwin's 'bull-dog' suggested the division of the zoological collection of British museum into two different locations, one for scientists and another for the general public:

> The best thing, I firmly believe, would be for the economic zoology and a set of well selected types to go to Kensington...[T]o have a grand zoological and paleontological collection for working purposes close to the garden [The zoological garden in Regent's park] where the living beasts are, would be a grand thing.[54]

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[52] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 121-130.

[53] William Stearn, *The Natural History Museum at South Kensington: a history of the British Museum (National History) 1753-1980* and Carla Yanni, 'Divine Display or Secular Science: Defining Nature at the Natural History Museum in London', *Journal of the Society of Architectural Historians*, Vol. 55, No. 3 (1996), pp. 276-299.

[54] Leonard Huxley (eds.) *Life and Letters of Thomas Henry Huxley, Vol. 1*, p. 172.

[55] Figure 1: View of the Natural History Museum building from Cromwell Road, c1890 © Natural History Museum.

Indeed, the main intention of Huxley, as highlighted by the quote, was to safeguard the role of researchers against the growing interest of the general public in museums and exhibitions. It also showed indirectly the growing necessity of making science a public object through a permanent public display.

Public science became a centrepiece of Victorian culture. Not only days at the museum or scientific fiction, but even public lectures and the rise of scientific articles in periodicals were at the base of this new cultural phenomenon. In particular, Darwin's natural selection developed itself in the public domain in a range of different initiatives involving any method of communication.

One of the main manifestations was to be found in the pages of novels and magazines. They offered the opportunity of embedding science in the cultural field, modifying and adapting it to a different kind of reader.[56] The result was the introduction of a new kind of vocabulary to middle-class people. Words like evolution and degeneration, health and disease, progress and exhibition, and so forth became the base of novelists' vocabulary.[57]

From 1859, a growing number of scientific novels drew on natural history as an example of this social change but, even before Darwin, science was used in literature, albeit in a different manner. Although the second half of the century was more influenced by biological science than the first, science in the early decades of the nineteenth-century was more connected with other fields. Geology and astronomy, phrenology and galvanism, physics and thermodynamics dominated the period even involving the philosophical/magical debate.[58]

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[56] See chapter four.

[57] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 25-50.

[58] See Crosbie Smith, 'Frankenstein and Natural Magic', in Stephen Bann (ed.) *Frankenstein, Creation and Monstrosity*, pp. 39-59.

1.2 Literature and science: themes, plots and publishing

The aim of this section is to explore nineteenth-century literature by focusing on the development of science within it. It also aims to give an overview of the main problems of contextualising Victorian novels such as publication, themes, language interaction and plots. Secondly, starting from the contemporary 'literature and science' debate, this section explains the main points of the last twenty years of research.

In the second half of the nineteenth century the situation changed. Writers now tried to popularize science in their books and papers mixing scientific hypothesis with their own opinions. Novels such as Samuel Butler's *Erewhon* (1872), William Morris's *News from Nowhere* (1890), H.G Wells' *The Time Machine* (1895) and *The Island of Doctor Moreau* (1896), Thomas Hardy's *Tess of the D'Urbervilles* (1891), Bram Stoker's *Dracula* (1897) and *Heart of Darkness* (1899-1902) by Joseph Conrad were all examples of Victorian scientific novels.[59]

Scientific stories saw the most rapid growth in the second part of the Victorian period. However, how can we investigate them in relation to science? What kind of methodology can we use to discuss this Victorian type of writing? And in conclusion, can we talk about one culture referring to the interaction between literature and science?

In 1988, George Levine, talking about literature and science in his *Darwin and the Novelists,* described the work of Darwin and other Victorian evolutionists as a form of Victorian literature.[60] Levine's hypothesis provided a new way of accounting for Victorian literature in relation to science on two different levels. On the one hand, science fiction could be understood as a type of popularization of science. On the other hand, literature could be studied as an example of cultural discourse between scientists and novelists.[61]

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[59] See John Glendening, *The Evolutionary Imagination in Late-Victorian Novels*, pp. 7-39.
[60] See George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction*, pp. 3-27, esp. 5.
[61] *Ibid.*, p. 3.

In the middle of the Victorian Era, science, particularly through technology, was reshaping literature. Stories about communication, medical treatments, steam, industrialization, lighting and mass-production, were all important parts of middle-class and working-class literary entertainment. The rise of science and the new role of the scientist were in the process of being addressed in Victorian culture through the publication of scientific fiction in novels and periodicals. According to Beer's *Darwin's Plots*, these types of publications played a primary function: they helped to form the general view of nature and science outside scientific circles and they explained science to common people.[62]

The popularization of science, furthermore, represented another important step in establishing the roles of science and the scientist in popular culture. Filling lecture halls, fossil hunting, insect and plant collecting, scientific fictions, evenings at the microscope, and magazine articles all demonstrated contributions to the rapid spread of scientific knowledge.

From the early nineteenth-century (and even at the end of the eighteenth century), literary writers followed scientific and cultural changes with interest. Specific references to science are easily traceable in any single Victorian novel. In methodological terms, Gillian Beer's book *Darwin's Plots* proposed the interaction between Darwin and George Eliot in shaping an interchange of ideas, metaphors and vocabulary. George Levine did the same with Dickens, and John Glendening applied evolution to the novels of the *Fin De Siècle*.[63]

In the last twenty years, several critical studies accounted for the tendency of Victorian literature to be ever more connected with science. Starting from the idea of

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[62] *Gillian Beer, Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 34-35.

[63] The expression fin de siècle usually refers to the end of the nineteenth-century. The term sometimes encompasses both the closing and onset of an era, as it was felt to be a period of degeneration, but at the same time a period of hope for a new beginning. See Talia Schaffer, *Literature and Culture at the Fin de Siècle*.

scientific obsession in Mary Shelley's *Frankenstein* (1818),[64] to the contextualization of the young researchers in the novels of the *fin de siècle,* evolution become more popularized and explained in literature rather than in 'scientific' publications.[65] According to Levine and Beer, through the study of Victorian literature as a vehicle of scientific history, it appears to be possibly shaping the role, mission and social duty of the scientist across the whole century. Not wishing to overemphasise the role of literature as a historical source, it can still be assumed to be a reasonable meditation on reality albeit partially mixed in with the writers' fantasies.

In terms of scholarly significance, the possibility of discussing literature in science and science in literature sharing a common methodology opens up a new way of thinking about the cultural outcomes of natural science. From the idea of the gentlemanly natural philosopher in the early decades of 1800s, to the new expertise as portrayed by the X Club in 1870s, Victorian novels were the location in which science was discussed, criticized and admired. What is a Victorian novel and how can it be used as vehicle of Victorian science? In answering these questions, we must make a basic assumption: the historical entity of the Victorian novel is as complex as science itself. Methodologically speaking, referring to both the literary and historical fields, the idea of the Victorian novel cannot be easily defined.

In the 1940s, Leo J Henkin summarized more than 2000 novels, in fifteen different categories, reviewed by *The Athenaeum* in a range of thirty years between 1860 and 1890. *The Cambridge Bibliography of English literature*[66] (2000) recorded 270 novelists writing between 1835 and 1900: a relatively small number in relation to the record of 900 novelists as given by *The Longman companion of Victorian Fiction*[67] (2009). According to Franco Moretti's *Graphs, Maps, and Trees,* forty-four new genres appears in the period between

[64] Crosbie Smith, 'Frankenstein and Natural Magic', in Stephen Bann (ed.), *Frankenstein, Creation, and Monstrosity,* pp. 39-60.
[65] Brian Baker, 'Evolution, Literary History and Science Fiction', in Sharon Ruston (ed.), *Literature and Science,* pp 138-140.
[66] Joanne Shattock, *The Cambridge Bibliography of English Literature: Volume 4, 1800 1900.*
[67] John Sutherland, *The Longman Companion to Victorian Fiction.*

the end of the eighteenth-century and the beginning of the twentieth-century in England.[68] From Moretti's point of view, any of these genres of novels had a life of between twenty and thirty years before disappearing or being replaced by something else.[69] Even more controversially, recent studies of literature have also moved the attention of Victorian literature form absurd sensation fiction and 'trash' into what was previously defined as 'high literature'.

The term 'Victorian Novel' appears at best to be an academic flag of convenience. It is too vague and vast to lead to any useful generalization[70] and if our intention is to think about it in terms of our publishing politics, the twenty-first century ideas of novels, editors and publication are unlike those of the Victorians. Starting with the mechanics of publication and moving to the inner nature of the novel, I will explain Victorian as a form of intertextuality.

Victorian Novels were published in a variety of ways. Almost all of them were printed in the first edition as a serial in periodicals and many of them were never published as a book.[71] Chapters of novels were published daily, weekly or monthly and consequently read by a large middle-class audience. As important as these different forms of serializations are to understanding the relationship between Victorian novelists and their readers, it is also important to remember that the majority of Victorian novels made the first appearance in a three-volume book format. In terms of access for readers, novels were not purchased by the majority but borrowed from the circulating libraries of the time or alternatively read inside periodicals.[72]

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[68] Franco Moretti, *Graphs, Maps, Trees: Abstract Models For A Literary History*, p. 18.
[69] *Ibid.*, pp. 18-21.
[70] Kathleen Tillotson, *Novel of Eighteen-Forties* (Oxford, 1961), pp. 15-16.
[71] On the politics of Victorian publication see Kate Flint, 'The Victorian Novel and its readers', in Deirdre David (eds.), *The Cambridge Companion to the Victorian Novel*, pp. 17-36.
[72] A general introduction to this topic has been provided by Robin Gilmour, *The Novel in the Victorian Age, a Modern Introduction* and Simon Eliot, 'The Business of Victorian Publishing', in Deirdre David (ed.), *The Cambridge Companion to the Victorian Novel*, pp. 37-60.

The second reason behind their success seen by this method of selling to the public was largely due to the price. A number of periodicals were sold with a price in the range of 1-3 shillings, a cost affordable by many Victorians. They were cheaper than books which were priced at around 31 shillings and sixpence especially if compared with the average middle-class salary of the period: £160 per annum.[73]

Aside from the price of books and periodicals and the definition of the Victorian novel, the second side of my argument looks at the relationship between science and literature. First, It is widely known how mapping the cultural development of scientific writing and its relation to novels during the nineteenth-century represents a series of complex issues. Second, there is also the need to look at the role of novels in the scientific discourse.

In the cultural context of the Victorian age, a large number of novels and short stories were published covering the main scientific innovations of the period. Although many of these were only marginal records of industrialization or other accounts of scientific revolutions, a small number of novels were considered examples of scientific propaganda.[74] Writers discovered that science fired their imaginations and gave new inspiration to their writing. From Shelley to Dickens and from Butler to Wells, Victorian novelists portrayed the changing of the Victorian social context from a literary perspective. Within their novels they proposed examples of writing in which different topics (including scientific ones) were pieced together in a homogeneous plot.

In particular, this phenomenon, although present in the first half of the century, became particularly important after the publication of Darwin's *On the Origin of Species*. The penetration of Darwin's style of writing in literature had different outcomes. According

[73] An account of Books and their readers has been provided by Simon Eliot, '*Book and their readers*', in Delia Da Sousa Carrera (ed.), *The Nineteenth-Century Novel: Realisms*, pp. 5-39.

[74] A good account of literature and science has been provided by Charlotte Sleigh, *Literature & Science;* John Cartwright, Brian Baker, *Literature and Science Social Impact and Interaction*, pp. 171-220 and Brian Baker, 'Evolution, Literary History and Science fiction', in Sharon Ruston (ed.), *Literature and Science*, pp. 131-151.

to Beer, Darwin's language was assimilated and reinterpreted by novelists.[75] This produced a revolution in the cultural vocabulary and introduced new words and concepts into the cultural discourse: evolution, degeneration, observation, research, natural selection, scientist, expertise were examples of a new way of popularising science.[76]

In the twenty years following the publication of Darwin's *Origin of Species,* a growing number of Victorians followed with interest the development of evolution in the literary field. As seen, Darwin's language shaped a new style of writing but it also accounted for new kind of literary plots. Dichotomies of Good and Evil, Creation and Destruction, Fact and Fantasy, largely discussed in the first half of the century, were replaced by the dynamism produced by Darwin's natural selection. In literature as well as in philosophy old static concepts became dynamic, evolving and changing.

Returning to Beer's point of view, Darwin had the merit to have transplanted scientific methodology and terminology into writing. Exactly as Darwinian evolutionism did in the field of science, Darwinian writing revolutionized the style and topics of many writers and novelists.[77] Many examples can easily be found within current criticism: Beer discussed the plots of Kingsley, George Eliot, Hardy and the role of women in narrative in relation to Darwin's natural selection. Sally Shuttleworth in her study on George Eliot[78] explored the use of organic evolution in many of his novels and Levine's *Darwin and the Novelists*

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[75] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 2-10.

[76] An example among the other is the world evolution, the Oxford Dictionary of English defines it as: 'The idea of organic evolution was proposed by some ancient Greek thinkers but was long rejected in Europe as contrary to the literal interpretation of the Bible. Lamarck proposed a theory that organisms became transformed by their efforts to respond to the demands of their environment. Lyell demonstrated that geological deposits were the cumulative product of slow processes over vast ages. This helped Darwin towards a theory of gradual evolution over a long period by the natural selection of those varieties of an organism slightly better adapted to the environment and hence more likely to produce descendants. Combined with the later discoveries of the cellular and molecular basis of genetics, Darwin's theory of evolution has, with some modification, become the dominant unifying concept of modern biology'. Access 22-02-2013

[77] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 53-60 and 65-70.

[78] Sally Shuttleworth, *George Eliot and Nineteenth-Century Science: The Make-believe of a Beginning*, pp. 1-24.

discussed Darwinian patterns of science within Victorian fiction. In the same mode of Shuttleworth, Laura Otis' *Organic Memory* discussed one of the outcomes of evolution in late nineteenth and early twentieth-century literature.

Before moving on to the next methodological point of this analysis, there is another aspect that has to be considered. I have discussed the idea of the Victorian novel, its relation to scientific terminology and its role within middle-class entertainment but I have not dealt with the role of the Victorian novel in the scientific discourse of the nineteenth-century.

The Victorians were asking for explanations regarding the major scientific discoveries. Hypothesis related to time, religion, science, politics, the arts, evolution and industrialization were part of the cultural context in which Victorian writers published their novels, articles and essays. Many of these themes, as elegantly addressed by Robin Gilmour's study, underpin a complex cultural context in which literature, science, art, philosophy, medicine, and engineering were, very often, published together in books, periodicals and novels.[79]

Periodicals, in particular, were the great Victorian instrument in popularizing and sharing knowledge within the general audience. In addition, rather than a simple instrument for publishing chapter of novels, the periodical was an important vehicle by means of which members of scientific and literary communities had the opportunity to discuss common themes. Through the chapters of novels, reviews and scientific or pseudo-scientific articles, the general public shaped its personal scientific knowledge. *The Athenæum,* for example, has been a widely read literary and scientific periodical, published between 1828 and 1923. According to historians, it grew to become one of the most influential periodicals of the Victorian period (eventually metamorphosing into *The New*

[79] Robin Gilmour, *The Victorian Period: The Intellectual and Cultural Context of English Literature, 1830-1890,* pp. 85-94 and Francis O'Gorman (ed.), *The Victorian Novel,* pp. 235-245.

Statesman), containing reviews, articles, essays, reports of learned societies and news from the scientific and political worlds.[80]

In methodological terms, considering literature and science as two sides of the same discussion opens up a new way of looking at the main methodological issues of the period. Chronologically speaking, this was addressed for the first time in the 1980s and called *'One Culture'*.

1.3 'One Culture' and its development in recent studies of the history and literature of Victorian science

The idea of *One Culture* was introduced by the literary scholar George Levine in 1987 as a methodological criticism made of the concept of two cultures.[81] Before Levine's *One Culture*, literature and science were largely studied in two different debates as two objects without mutual interaction. From a methodological point of view they were, respectively, characterized by different languages, protagonists, and social and cultural developments. As explained by C.P. Snow, literature and science were (before Levine's work) in the position of being two parallel lines with no possibility of meeting.

The interaction between literature and science has been a subject of growing interest in criticism in the last three decades. Starting from the doubtful presence of science in literature and arriving at the paradoxical conception of science as a form of literature, scholars have opened up a series of theoretical and methodological questions.

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[80] Refer to Marysa Demoor, *Their Fair Share: Women, Power, and Criticism in the Athenaeum, from Millicent Garratt Fawcett to Katharine Mansfield, 1870-1920* and Alvin Sullivan (ed.), 'The Athenaeum', *British Literary Magazines*. Vol.3. (1983), pp. 21-24.

[81] The idea of Two Cultures was posited in 1959 by a lecture entitled 'The Two Cultures' by the physicist and novelist C.P. Snow. It was subsequently printed in a volume entitled *The Two Cultures: And a Second Look: An Expanded Version of The Two Cultures and the Scientific Revolution* on 1964. The aim of the lecture was to talk about the gap between literature and science within a broader debate about the nature of knowledge in the modern society. The main point of Snow's lecture was the assumption that British culture has paid more attention to the humanities (especially Latin and Greek) rather than science (physics, biology and medicine) since the Victorian period.

The main questions proposed by historians, philosophers and literary scholars have revolved around the idea of an 'ideal' conjunction between the nineteenth-century establishment of science and its relationship with culture (literature in particular). In 1987, Levine in *One culture* proposed that:

> Literature and science speak to each other because they are siblings, with all the conceivable tension that such a relationship implies.[82]

In writing this, he suggested the possibility 'to attempt to consider ways in which literature and science might be embraced in the same discourse'.[83] This methodological assumption gave scholars the possibility of re-discussing scientific theories through the mediation of literature. It largely developed in both of the fields focusing in particular on the nineteenth-century.

In the literary field, Gillian Beer's *Open fields: science in cultural encounter* and *Darwin's Plots* approached Victorian scientific writing focusing on physics, natural science and Darwinian language in relation to Victorian novelists. George Levine largely discussed the same problem in his *Darwin and the novelists*, and re-invented the father of evolution as a writer in the recent *Darwin The Writer*. Similar cases are present in the current history of science scholarship. Although historians of science found difficulties in the *One Culture* approach, they propose a similar conclusion. From Paul White's *Thomas Huxley: Making the 'Man of Science'*, Ralph O'Connor's large volume *The Earth on Show*[84] to *Victorian Sensation*[85] by James A. Secord, historians of science reframed the discussion of Victorian science looking at its cultural developments.

This new methodological approach, starting from the assumption of embracing literature and science in the same discourse, modified the type of research in both history of science and literature and science.

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[82] George Levine (ed.), *One Culture: Essays in Science and Literature*, pp. 341-342.
[83] *Ibid.*, p. 3.
[84] Ralph O'Connor, *The Earth on Show: Fossils and the Poetics of Popular Science, 1802-1856*.
[85] James Secord, *Victorian Sensation: the Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation*.

Returning to the questions introduced within the title of this section I need to clarify some methodological points. First of all, if *One Culture* offered literature and science as being two parts of a single common discussion, what methodology can one employ to work with both of them?

The *One Culture* perspective finds its support on two different levels. On the one hand science is a social product as is literature. On the other, science is a kind of literature which can be read by those who are not scientists, just as literature can be read by non-novelists. This double nature of science and literature has brought them into the theoretical sphere of scientific topics such as language interaction, crossing barriers and mutual influences, feminist critics of science and Darwinian evolutionism.[86]

Levine's *One Culture* has been fruitfully addressed within scientific and literary debates in plenty of different shapes. Since Gillian Beer's *Darwin's Plots* pointed out that 'Evolutionism has been so imaginatively powerful precisely because all of its implications'[87] in the cultural field, Darwin started to be looked at more as a Victorian man of culture than a simple scientist. Beer's opinion has also been recently shared by Levine. He wrote about Darwin's book:

> The *Origin* is a prosy *Divine Comedy* or "Paradise Lost", an alternative myth to the story that begins with creations and 'man's first disobedience' and it implies far more than Darwin himself could have known.[88]

According to Levine, Darwin's hypothesis of evolution in the *Origin of Species* appeared to be more than a simple scientific theory. The literary scholar arrives even at the point of considering Darwin's *Origin* as a form of Victorian literature. Darwin's book has been viewed as the most important work of imaginative English literature of the nineteenth-century.[89] Furthermore, Darwin's style of writing has been considered the principal reason

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[86] George Levine (ed.), *One Culture: Essays in Science and Literature*, pp. 3-34.
[87] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, p. 6.
[88] George Levine, *Darwin The Writer*, p. 25.
[89] *Ibid.*, p. 1.

for his success among Victorian readers and the reason for his eloquence in explaining science to the general audience.

In a different form, a similar conclusion can be found in 1962 in the work of the American literary critic Stanley Edgar Hyman. Hyman's *The Tangled Bank* defined the *Origin of Species* as 'a work of literature'[90] with 'the structure of a tragic drama'.[91] In saying that, Hyman anticipated, even before Beer and Levine, the opening of Victorian science to the field of literature.

In the nineteenth-century, many novels started to be viewed as examples of popularized science for their influential explanations of complex scientific issues. They were, in the words of N. Katherine Hayles, 'cultural products, at once expressing and helping to form the cultural matrix from which they emerge'.[92] This is a good definition in arguing the increasing influence of both science and literature as two sides of the same discourse but it also opens a series of theoretical issues.

First of all, science has always been around in society. However, the way it has been written about in literature has systematically obscured the determination which constitutes its prerogatives, patronage and outlook. An example of this was the increasing number of scientific novels concerning evolution produced after 1859. There, Darwin's languages and hypotheses were exalted or satirized, popularized or criticized without any formal scientific implication. On the other hand, literature has always described and popularized science for a general audience, but without paying the necessary attention to its inner context and problems.

In the coming section my concern is to discuss the methodology of *One Culture*. Following the major approaches and ideas of recent decades in the fields of the history of

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[90] Stanley Edgar Hyman, *The Tangled Bank: Darwin, Marx, Frazer and Freud as Imaginative Writers*, p. 34.
[91] *Ibid.*, p. 34.
[92] N. Katherine Hayles, 'Information of Noise? Economy of explanation in Barthes's S/Z and Shannon's information theory', in George Levine (ed.), *One Culture: Essays in Science and Literature*, pp. 119-143, esp. 120.

science and literature, my aim is to answer the following questions: how can we talk about the interaction between literature and science in the nineteenth-century and where can we use it properly?

1.3.1 Methodologies of nineteenth-century scholarship

The *One Culture*, as defined by Levine, sought to critique disciplinary boundaries of twentieth-century academic institutions and looked back nostalgically to a time where scientists and literary men spoke a common language. Although the divergence of scientific and literary discourse remains critically important because of the question of authority, Levine offered a new reading of literature and science where they were linked in a practical and theoretical way.

In contrast to Snow and his interpretation of twentieth-century culture, Levine considered the nineteenth-century in a different light. He established a theoretical conjunction between science and literature suggesting that they were both models for discourse. A discourse which involved them not only in a formal way but in a series of practical concerns as well.

In terms of content, Levine was obviously aware of the methodological difference between these two disciplines. However, in contrast to Snow, he tried to move the analysis from a mere politics of their roles to one in which both were a part of the same discussion. Instead of focusing on the differences between literature and science he tried to re-discuss the idea of *One Culture* in two different senses:

> It is One Culture, then, in two senses: First, in that what happens in science matters inevitably to what happens everywhere else, literature included, and second, in that is possible and fruitful to understand how literature and science are mutually shaped by their participation to culture at large- in the intellectual, moral, aesthetic, social, economic and political communities which both generate and take their shape from them.[93]

[93] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 5-6.

Following Levine's own words, the character assumed by literature and science influenced culture at large linking together dissimilar fields such as metaphysics with science and, even, religion with medicine. In terms of methodology, according to Beer, Levine's approach focused on the formula 'literature AND science', where the middle word 'and' established not an 'innocuous copula' but an overture to the possibility of a 'dialogical interaction' between them.[94]

Starting from this new concept of 'and' Levine re-discussed the conventional hostility of literature to science and of scientific indifference to literature.[95] Levine pointed out that their relationship has been one not simply of hostility but rather more one of love-hate, a 'continuous litany of romantic complaints against science'.[96] In particular, this equilibrium of opposites put the scientific and literary authorities in between a series of quarrels and discussions concerning the main topics of any time.

Additionally, according to Levine, this dichotomy has been largely used in establishing the relationship between literature and science during the nineteenth-century (especially in connection with Darwin's style of writing) and it has come to be a position taken more and more often in the last few decades.

Contemporary criticism as found in the writings of Gillian Beer, George Levine, N. Katherine Hayles, James Paradis and Gowan Dawson, amongst others, agreed that *One Culture* has been a methodology that allowed 'exchange of writing styles', literary patterns, metaphors and ideas.

In writing their studies since the 1980s, historians of science and literary scholars have tried to answer a series of questions concerning the complex nature of science and literature, their mutual relationship and interaction, assumptions, ideologies and prejudices within society. They also proposed a reading of nineteenth-century culture, where the

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[94] *Ibid.*, p. 6.
[95] *Ibid.*, p. 6.
[96] George Levine (ed.), *One Culture: Essays in Science and Literature*, p. 22.

common language, in terms of scientific prose and literary prose, allowed the rapid movement of ideas and metaphors to take place.[97] A question finally arises: do historians of science and literary scholars share a common methodology?

In answering this question, I need to start from a theoretical assumption: if science and literature were part of the same discussion I can assume that they also shared a similar methodology. As a proof, within the last twenty years, the *One Culture* idea grew popular with studies developed in parallel to cultural history. This put literary scholars and historians of science in a position to debate and share a similar methodology.

One Culture's developments had, then, a two-way nature. Levine's approach has been developed alongside linguistic patterns and plots by literary scholars on the one hand, and, contextualized together with cultural history by historians of science on the other.

First, there is the work of historians of science. Although *One Culture* has been the methodology used in the 1980-90s traces of it are still present in the current debate. In recent history of science, examples are varied. However, two types of studies have been determinants. First, the above mentioned works of White, O'Connor and Secord highlighted historical studies where the work of famous scientists has been studied in relation to literature and culture. Second, the recent studies on Victorian periodicals have also worked out a reading of Victorian publishing focusing on the interaction between scientific articles and novels printed in the same journals. As evidence, in introducing *Science in the Nineteenth-Century Periodical* Cantor wrote:

> Science, technology and medicine permeated the content of general periodicals in the nineteenth-century Britain, appearing not only in avowedly scientific article, but also in other forms of narrative including fictional representations, glancing asides in political reports, and caricatures and allusions in comic magazines. From the perspective of readers science was omnipresent, and general periodicals probably played a far greater role than books[..][98]

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[97] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 41-42.

[98] Geoffrey Cantor, Gowan Dawson, Graeme Gooday, Richard Noakes, Sally Shuttleworth and Jonathan R. Topham, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*, p. 1.

According to Cantor, scientific subjects permeated with stories and other fictional representations the index of periodicals describing the desires of Victorian readers. From the point of view of historians of science the Victorian periodical represents the perfect place for individuating the link between literature and science. This link, as explained in *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals,* exists because of the flexibility of the periodical press.[99] Literature, plots and novels were indeed, studied as examples of historical culture. Thanks to this, writers and scientists were able to establish scientific reputations irrespective of their previous careers.

Conversely, in the field of literature *Darwin's Plots* examined, outside the unique historical perspective, the dialogue between naturalists and novelists, showing how literature influenced Darwin's writing and how the *Origin of Species* influenced Victorian literature. The use of George Eliot as a case study gave to Gillian Beer the opportunity to investigate the mechanism, and consequently the absorption of, Darwin's style of writing. In Beer's book, science was not seen only as a source of ideas and vocabulary. It has been instead a part of a two-way exchange.

In addition, as George Levine argues in his *How to Read the Victorian Novel,* individual authors at various times had differing relationships with Victorianism while conserving the same cultural matrix. Published in 2007 the book represents one of the last faithful developments of *One Culture*. Using examples from the classics, like *The Pickwick Papers, David Copperfield, Jane Eyre, The Woman in White*, and *Middlemarch*, Levine shows how Victorian literature discussed scientific, social and philosophical problems.

Broad in its scope, the text surveys a wide variety of literary types and explores the cultural and historical developments of the novel form itself. Levine's study also poses a series of questions pertaining to science, capitalism, industry, race, gender, and, to formal

[99] Sally Shuttleworth and Geoffrey Cantor (eds.), *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals,* p. 12.

issues, such as plotting, perspective, realist representation, gender and constructivist history. It identified the qualities that gave to the great variety of Victorian novels a 'family resemblance': the material conditions of their production (editors, press, audience), their tendency to be connected with scientific discoveries, their obsession with scientists and expertise, their problematic handling of gender questions and their commitment to realist representations.

All of these approaches focused on a development of the original *One Culture* looking at it from two different perspectives. They were in agreement in considering the establishment of literature and science through the study of literary patterns and methodologies but the idea of *One Culture* cannot be the one of considering science and literature unified in relation to any period of time.

1.3.2 Literature and natural science in historical perspective

In discussing the idea of *One Culture* I have only focused on the general dimension of the theory without discussing its complex relation with history of evolution.

This section tries to investigate some methodological problems of *One Culture* in relation to the history of science (in particular the history of evolution). The idea of *One Culture* seems to be a useful approach for understanding the outcomes produced by Darwinian evolution. However it can be methodologically difficult if used in relation to other protagonists of the nineteenth-century evolutionary debate. This difficulty exists because the effort of generalizing culture produced by *One Culture* works from a literary perspective but not completely from a historical one.

It is not the case that the main scholarly relevance of *One Culture* (in Victorian science) exclusively involves the study of Darwinian literature. An example is Beer's *Open Fields*. The first part of this volume, showing the boundaries of natural history and the place of humankind within it, addresses only the prominent cultural reception of the languages of

natural selection.[100] Levine's *Darwin and the Novelists* deconstructs Victorian scientific culture, starting from the same assumption. According to Levine, Darwin played, in the culture of the nineteenth-century, the role of a link between science and the 'sweep of historical changes' which 'implicated major non-scientific developments'.[101] Going outside Darwin's language and its cultural outcomes (and referring only to history of science) the concept of *One Culture* becomes problematic.

Within the last twenty years historians of science have developed the study of cultural history by focusing more and more on context and contextualization. The work of Peter Bowler on the history of evolution, Adrian Desmond on the medical school of 1830 London, Pietro Corsi and Ludmilla Jordanova on Lamarck, Paul White on Huxley, James Secord on Chambers and Ralph O'Connor on palaeontology in the first half of nineteenth-century are all examples of this approach. They show instances of history of natural history not directly connected with Darwin's language and science.

Outside the nineteenth-century, Biagioli's *Galileo, Courtier* also proposes evidence of this issue. This book is a perfect example for understanding the role of culture and context in the history of science. Through his study on Galileo Galilei, Biagioli promotes a reading of the Italian astronomer in which science and the scientist can be studied only in relation to the cultural context in which they are fitted.

Biagioli's study is neither a biography nor a social history of Galileo's career. It follows the major discoveries of the Italian scientist focusing on his presence in different Italian courts of the time. In terms of content, as recalled by its sub-title *The Practice of Science in the Culture of Absolutism,* the main methodological effort of Biagioli is the one of advocating Galileo as a man of the *Renaissance*. In other words, instead of focusing on the

[100] Gillian Beer, *Open Fields: Science in Cultural Encounter*, pp. 2-3.
[101] Levine, *Darwin and the Novelists,* p. 8.

distinction between Galileo the scientist and Galileo the courtier, the scholar of history has to find a point in between.

Methodologically speaking, the fact of tracing Galileo's court-based articulation of the new socio-professional identity of the new philosopher/scientist and his role with different patronages, puts Biagioli in the position of a fruitful mix of history of astronomy with Renaissance culture. He reconstructs the culture and codes of courtly behaviour that framed Galileo's everyday practices, his texts, his presentation of himself, his interaction with other courtiers, patrons, mathematicians and philosophers.

Biagioli's study scores a methodological goal in its assumption that the production of a scientist is directly influenced by the context in which he is placed and that he influences the context itself. Biagioli wrote:

> The mythologico-emblematic framework of Medici court society and culture constituted the background for Galileo's representation of his astronomical discoveries as emblems of the Medici dynasty.[102]

Saying that, Biagioli moves the attention, once again, onto the double implication of science with culture and then culture on science. *Galileo Courtier* provides many examples: the interaction between Galileo and the cultural communities of Florence and Rome, his role among other scientists of his time, and, more importantly, the direct influence of the court on Galileo's output.

Another good example has been provided by James A Secord's *Victorian Sensation.*[103] Published in 2000, it offered a view of archives, newspapers, memories and thousands of traces of Chambers' *Vestiges of the Natural History of Creation* within Victorians and Victorian culture. The examination of mid-Victorian publishing and natural history highlights the importance of context and historical contextualization in

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[102] Mario Biagioli, *Galileo, Courtier: The Practice of Science in the Culture of Absolutism*, p. 112.
[103] James Secord, *Victorian Sensation: the Extraordinary Publication, Reception, and Secret. Authorship of Vestiges of the Natural History of Creation*, pp. 3-10.

understanding the cultural development of science and the influence of culture and publishing mechanisms on scientists and writers.

In addition, Secord offered a reading of the main developments of Chambers' *Vestiges* in relation to science and its role within Victorian debate. In an ambitious synthesis, Secord combined history of astronomy, geology, physiology, psychology, anthropology and theology all together in describing Victorian society. His strategy of following a single book in all of its uses and manifestations such as conversation, solitude, authorship, religious controversy and civic politic gave him the possibility of reading scientific work as a 'cultural tracer'.[104] In terms of methodology, Secord's *Victorian Sensation* raises questions concerning the interaction between scientific theories and cultural circles, publication in natural history and general writing. How do they fit with the idea of *One Culture*?

Current criticism has shown, in approaching these problems, how Levine's ideas can be used in both literature and science, sharing methodologies, discussing eminent publications and linking the work of scientists with the work of novelists. In particular, it has pointed out how the idea of *One Culture,* in establishing itself, proposes literature and science as two parts of a common discussion. Secondly, it has been shown how *One Culture* fits with any era of history even with the twentieth-century,[105] but how can it methodologically fit with science and literature in the period between 1860 and 1890?

In answering this question, we need to start from the assumption that the nineteenth-century *One Culture* is one very particular culture, a highly literate upper middle class relationship which has seen different developments within the history of science. Historically speaking, in the last few decades, accounts of science and literature in the Victorian period have been informed by the assumption of a single, overarching culture,

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[104] *Ibid.*, p. 3.

[105] Elinor Shaffer (ed.), *The Third Culture: Literature and Science*, pp. 6-12.

embracing and subsuming differences of profession and specialism. However, this single and overarching culture does not fit perfectly with the history of science.

Sally Shuttleworth in her *Nature Transfigured: Literature and Science, 1700-1900* clearly declares that scientific writing is not literature and reducing science to literature by insisting that science is a type of writing misrepresents the work of authors in both of the fields.[106] Literature and science, although speaking the same language in some decades of the nineteenth-century, have different goals and different reading contexts. As suggested by N. Katherine Hayles, to do justice to them it is important to study their similarities, but, even more, their differences.[107]

According to the conclusion of Shuttleworth and Hayles, historians of science have applied similar methodologies to other important case studies such as books, authors and scientists. In doing so, they opened up the methodology of *One Culture* applying it to cultural history. One such example is the book *Thomas Huxley: Making the 'Man of Science'*, which treats Huxley, following a comparative point of view, as the shaper of the role of scientists set in the second part of nineteenth-century. Paul White, the author, through an array of examples, suggests a reading of Darwin's bulldog focusing on his academic career but also on his role/position within Victorian cultural debate.

White achieves cultural contextualization of Huxley, addressing events from his private and public life, in shaping his role as a mediator between the public and the new Victorian expertise.[108] Working across the history of science, Victorian cultural history and some aspects of Victorian literature, White approaches literature and science not as aspects of an interdisciplinary or pre-disciplinary culture but as resources for the forging of identities and communities.[109] His criticism made of Levine's *One Culture* is set alongside

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[106] Sally Shuttleworth, John Christie (eds.), *Nature Transfigured: Literature and Science, 1700-1900*, p.3.
[107] N. Katherine Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science*, p.3.
[108] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 96-99.
[109] *Ibid.*, p. 98.

the limits imposed by literary critics of the last decades. He points out, with the use of Huxley's roles in cultural and scientific debate of the Victorian era, that science was, at certain points, a form of literature.

In terms of content, White's approach seems to suggest a picture of Huxley's life and ideas in the shape of a cultural study of Victorian society. In contrast to the classic picture of Huxley as the thinker who opened up the gap between science and culture, White overturns the problem. He Huxley to be the architect of universal 'High culture' rather than at the forefront of a movement that would culminate in the separation of the sciences and the humanities as normally addressed by historical criticism.[110]

Outside the specific case of Huxley's life, White's book also shows an important point in developing the application of *One Culture* to the domain of Victorian natural science. On the same line of literary studies, White describes Huxley as a Victorian writer (as have Beer and Levine with Darwin) rather than a simple scientist.

The same problems appear clear in *The Earth on Show*. In his book, Ralph O'Connor discusses literature in science in ways similar to the work done by Secord's *Victorian Sensation*. His argument examines British popularized geology and its role in the public realm.[111] O'Connor proposes neither a study of literature nor of science but a study of 'Science's literary projection'.[112]

In O'Connor's opinion, scientific writing is an integral part of nineteenth-century literary culture. According to his work, poetry and palaeontology were not uniquely related to the famous 'And' proposed by Levine, their relationship was something different.[113] O'Connor's conclusion is based on the necessity of studying Science *as* Literature and not Science *and* literature. Proposing the cultural implications generated by the popularization

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[110] *Ibid.*, p. 97.
[111] Ralph O'Connor, *The Earth on Show: Fossils and the Poetics of Popular Science, 1802-1856*, pp. 6-9.
[112] *Ibid.*, p. 9.
[113] *Ibid.*, pp. 13-18.

of science in the mid-Victorian period he, like White, sets the studying of periodicals, magazines and literary publications as a vehicle for explaining science among Victorians.

In doing so, O'Connor's volume opens up another historical issue: the connection of dialogue between poetry and palaeontology in the first half of Victorian age suggests a differentiation of relationships between science and literature in different moments. Instead of being a harmonious approach, the relationship between literature and science changes in relation to any period of the nineteenth-century. In accordance with the chronological approach, each period (early, mid and late Victorian) had a different contextualization of literature and science. They shared a way of discussing things in the early period (literature *as* science), a complex relationship in the middle of the century (literature *and* science), and an opposing set of rules in the later Victorian debate (Novelists- Men of science).

In contrast to Beer and Levine who looked at metaphors and plots of evolution in the whole of nineteenth-century narrative, O'Connor proposes a unity between literature and science only in its early decades. This approach, even if indirectly, shows how literature and science has to be historically constructed. Novelists like Butler, Eliot, Kingsley and Morris have to be historically studied in their own time using different understandings of literature and science. Having said that, a problem still remains unsolved: how can we use literature and science across different parts of the nineteenth-century?

Starting from the methodology proposed by Levine and developed by both historical and literary studies, my reading seeks to address Victorian scientific writing as a middle point between a literary and historical approach. It is neither a historical study of science nor a literary one. Using the case of Samuel Butler I will investigate literature and science between 1860 and 1890 emphasizing its historical problems.

Starting with Butler's ability of sharing languages, metaphors and style of writings in periodicals, novels and scientific books I will demonstrate how the author has to be

considered as being between the fields of literature and the history of science. In particular, in focusing my study on his psychophysiological hypothesis I will demonstrate how his hypothesis of unconscious memory represented the encounter of literature and science as a part of a large pan-European debate.

1.4 Samuel Butler between literature and science

In concluding this chapter, I want to say a few more words on Samuel Butler, the protagonist of this doctoral thesis. My aim is to reflect upon the main points I have discussed in this chapter but also to look at them in relation to Butler's work. I consider it important to place Butler between literature and science, in order to understand why and how he can be considered as a problematic alteration of the 'one culture' model. Specifically, the major difficulties of Butler's work are as follows:

a) Butler, during his career worked respectively as a novelist, amateur scientist, populariser of science and artist in the late nineteenth-century. As a consequence of working in the age of specialism (inaugurated by Huxley's 'man of science') he never came into fame. From another point of view, Butler worked between the years of the establishment of gentlemen of science and he was not therefore at home either in scientific or literary communities. Additionally, Butler's work was a complex task for reviewers, who were unable to understand if he was writing as a novelist, scientist or philosopher. The problem of Butler's identity is one of the turning points I would like to discuss in this research.

b) As stated in the second section of this chapter, nineteenth-century literature and science has been treated as a Darwin-centric topic by the last twenty years of scholarship. The use of Butler as a case study can represent a shift of interest outside the Darwinian shadow. Butler's work showed an unusual and interesting side of Victorian evolutionary science which has been forgotten and still demands explanation.

c) Butler, as we will see later, refused to be merely a populariser of science. He wanted, instead, to actively participate in the debate of evolution. This aspect represents another shift in the literature of the Victorian 'popularisation of science'.

d) As a final point, we come back to the core argument of this chapter. Butler's varied treatment of literature and science challenged the 'one culture' model. Butler considered literature and science as two different models, yet, they were able to interact with one another.

They might speak of this by a figure of speech, but they could not see it as a fact. Before this could be intended literally, Evolution must be grasped, and not Evolution as taught in what is now commonly called Darwinism, but the old teleological Darwinism of eighty years ago.
Samuel Butler, 'God the Known and God the Unknown'[1]

CHAPTER TWO:

The problem of genre in Butler's writing

2.1 Introduction

Samuel Butler's writing was, and, still is the object of numerous interpretations and misunderstandings. Both past and contemporaneous literary scholars and historians of science have been in disagreement over how to understand and categorise Butler's style of writing, use of metaphors, tone and his overall use of genres. However, before discussing Butler's work, it is necessary to dedicate a few sentences to the aspects of literary criticism that will be discussed in this chapter.

Literary scholars have conducted studies about writers, novelists and poets, looking at their works in relation to literary categories such as style, topic, plot, content, tone, metaphor, theme, narrative, persona, time, culture and genre. Each of these aspects are important in order to contextualise literally and historically any *fictional* or *nonfictional* publication. As indicated by Myers-Shaffer's *The Principles of Literature* (2000), five of the previously mentioned points are of primary importance in understanding a given piece of writing. These points represent the link between the writer and the reader presenting his with the 'opportunity to look into the hearts and minds of people who lived in a different time and place.'[2] What are these five fundamental elements? First, there is the 'meaning' which indicates the topic, argument and theme of a work, but also the writer's intent in writing it. The 'meaning' is particularly important in *nonfictional* writing because it

[1] Samuel Butler, *God the Known and God the Unknown*, p. 71.
[2] Christina Myers-Shaffer, *The Principles of Literature: A Guide for Readers and Writers*, p. v.

describes the core of the argument adopted by the writer. Second, there is the 'form' which represents how the writer organises his or her work. It includes the distinction between poetry and prose, the structure of a book (i.e. long narratives, short-stories, episodes). Third, there is 'voice and tone'. These inform the reader about who is telling the story, if there is a narrator, and whether the narrator is the writer or one of the characters. It also provides an overview of the general atmosphere of the 'story'. Fourth, there is the 'character', which gives information about the protagonist(s) of a novel or the main object of an investigation. Finally, there is the 'language'. Language is a key factor for understanding any piece of writing in relation to 'uses' and 'meanings'. Language can be imagery, propaganda, the type of speech the writer uses, the critical use of diction, the impact of words, phrases and lines in a paragraph, the use of denotation, connotation and syntax, and a mixture of all of these.

All of these five aspects are considered the basis of the interpretation of any piece of writing. However, as elegantly explained by Christina Myers-Shaffer, they can work only together for unity producing the unique blend of a specific piece of writing.[3] Thus, any book, novel or essay becomes a complex mixture of many factors that together define its genre and consequently the positive or negative reception of its publication.

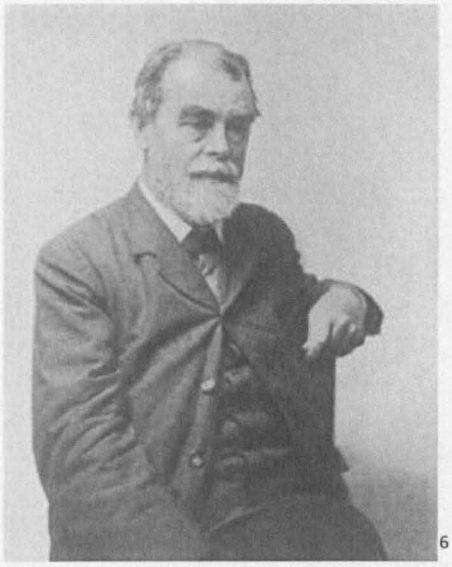
The aim of this chapter is to discuss the problem of genre in Butler's writing and to try and understand if it was one of the reasons which caused the decline of his fame among Victorians. Specifically, this chapter will look at three publications which best represent Butler's work: the series of articles 'God the Known and God the Unknown', the novel *Erewhon* (1872) and the scientific book *Life and Habit* (1878).

In the past few decades many pages have been written on Samuel Butler and his social, scientific and philosophical role in Victorian Britain and Europe. From the early studies in the 1920s concerning his literary and scientific career, to the latest books, articles

[3] *Ibid.*, pp. 9-10

and colloquia undertaken by scholars in the last ten years, the study of Samuel Butler has been developed in a wide range of differing approaches, opinions and publications. Many of these refer to him in relation to the role of the author within Victorian culture, other studies rate Butler poorly as just a 'suspicious, critical, alert, witty, devious, elusive.'[4] Others have portrayed him as a populariser of science, psychologist and philosopher of the unconscious.[5]

The general habit of considering Butler only as a writer with a passion for science has resulted in the loss of some of the most interesting dimensions of his writing.



[6]

According to the main biographical studies, Butler has always been described as a Victorian writer well known only in his own country. From George Bernard Shaw in his *Major Barbara* (1907) to the more recent biography written by Peter Raby (1991), Samuel Butler has always been described as an eminent Victorian writer rather than a European amateur scientist. In fact, Butler had more fame in Europe than in England during his lifetime and the re-birth of his reputation after his death came from Europe as much as from England.

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[4] William Irvine, *Apes, Angels and Victorianism, the Story of Darwin, Huxley and Evolution* (London, 1955), p. 246.

[5] See James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, where Butler's work has been considered in relation to popularization of science, prophetical writing, psychological literature etc.

[6] Picture of Samuel Butler from St John's College Library, Cambridge (Samuel Butler collection).

Evidence for this is varied and reveals a completely new portrait of Butler: a picture in which the English writer appears as something more than a man of letters with an obscure passion for science.

This chapter aims to discuss and introduce Butler's style of writing: his tendency for mixing scientific and literary languages, his use of macaronic language and, furthermore, the problem of identifying the genres of his books. It also aims to point out and then solve the problem of Butler's own identity. The problem of identity represents the obscure side of Butler's study – was he a writer, a scientist or something else?[7] In providing an answer, my aim is to investigate and consequently determine the roles and consequences of genres in Butler's style of writing. In order to understand this topic in relation to his specific case I need to establish what genre meant within the context of Victorian culture.

Before going through Butler's use of genres, we must look at Butler's reputation, in two different respects: the reception of Butler's work during the last century and the incompatibility among Butlerian studies. In relation to this, I aim to consider four examples written respectively in the 1930s, 1950s, 1980s and 2000s showing the main problem with the studies of Butler: the impossibility of understanding his work according to one single literary or scientific genres.

2.1.1 A picture of Butler from four different perspectives

Since Butler's death, scholars of different kinds have focused their researches on understanding his bizarre character and unusual way of thinking. Like other Victorian writers Butler's posthumous interpretations were, very often, in contrast with one another.

One of the early studies written on Butler was Malcom Muggeridge's *The Earnest Atheist.*[8] In 1936, Muggeridge, a journalist, writer and satirist, focused on two important

[7] Refer to the conclusion provided by James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 2-15 esp. 5.
[8] Malcom Muggeridge, *The Earnest Atheist, A Study of Samuel Butler* (London, 1936).

points: Butler's posthumous fame, and, looking back at the nineteenth-century, how the Victorians refused to validate his work. According to Muggeridge, Butler was not an anti-Victorian (as his contemporaries considered him); he was instead the ultimate Victorian with a deep need to escape from the reality of his own existence.[9]

This need to escape culminated in a writing style which mixed genres, topics and literary and scientific vocabularies. From Muggeridge's point of view, Butler was not a Victorian writer or scientist. He was, instead, positioned somewhere between literature and science. Muggeridge wrote:

> Samuel Butler must be regarded as one of the most significant figures of the latter part of the last century. His own generation ignored him. His fame was almost wholly posthumous. In so far as he was known at all in the flesh he was as an oddity, an eccentric with a number of queers in his bonnet, as that the Odyssey was written by a woman, that the credit for formulating the theory of evolution must go rather to Erasmus Darwin, Buffon and Lamarck than to Charles Darwin, and that habit, not chance, was the chief factor in producing variations.[10]

As reported by Muggeridge's work, Butler was one of the most significant figures of the latter part of the nineteenth-century but, at the same time, an ignored protagonist of the Victorian debate. In his era, he lived over the edge of eccentricity and oddity, being criticized and ostracized by both men of science and culture but a 'few years later his reputation had swollen to immense proportions'.[11]

The second case I want to discuss comes from an old-school historian of science: William Irvine. In 1955, he published a study which, starting with Charles Darwin's and Thomas Huxley's biographies, provided an accurate account of the historical context, network and family gossip of Victorian evolutionary science. Although, in writing it, Irvine did not make a major contribution to the corpus of Butlerian studies, he spent a couple of pages describing Butler's evolutionary hypothesis in relation to Darwin's work. In his *Apes, Angels and Victorianism,* Irvine wrote:

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[9] *Ibid.*, p. ix.
[10] *Ibid.*, p. vii.
[11] *Ibid.*, p. vii.

> He [Butler] was suspicious, critical, alert, witty, devious, elusive. He also had the satirist's power of turning his victims into vivid, plausible villains who thoroughly deserved the savagery of his pen. The Darwin of Luck or Cunning?, like the Theobald Pontifex of The Way of All Flesh, causes the reader to burn with moral indignation[12]

Thus, Butler became in the 1950s' history of science a 'suspicious, critical, alert, witty, devious, elusive man', the perfect anti-Victorian. A few pages later, Irvine's critical judgment went still deeper. In describing the quarrel between Darwin and Butler, he wrote:

> By a very romantic logic of his own, Butler had found Darwin to be first superhuman, then human, and finally inhuman. That inhumanity needed only to be demonstrated by an overt act. Of course it was, almost at once.[13]

Irvine's study has, for a long time, represented the classic way of interpreting Butler as an outsider in the field of science.[14] To shed new light on Butler's opinions, one has to wait until the end of the 1980s. Before this new 'beginning', it must be said other studies such as P. N. Furbank's *Samuel Butler, 1835-1902* (1948), Stanley B. Harkness' *The Career of Samuel Butler, 1835-1902: A Bibliography* (1955) Holt's *Samuel Butler* (1963) discussed Butler addressing him from a literary point of view but without providing any further information in relation to his other activities.[15]

In the last three decades, the whole of Butler's work has been rediscovered, once again, but this time in a different perspective. Since the 1980s, scholars have started a new series of studies focused on the re-discovery of Butler's eccentric work. Two names have become predominant: Elinor Shaffer and James Paradis. In the volumes *Erewhons of the Eye: Samuel Butler as Painter, Photographer, and Art Critic* (1988) by Shaffer and the *Samuel Butler: A Victorian against the Grain* (2007) by Paradis have emerged, for the first time, a description of the English writer looking at his artistic predisposition (Shaffer) and studied in his whole complexity (Paradis).

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[12] William Irvine, *Apes, Angels and Victorianism, the Story of Darwin, Huxley and Evolution*, p. 246.
[13] *Ibid.*, p. 249.
[14] Even in Peter Bowler's *Evolution: The History of An Idea* Butler's science has been dismissed as the shot of a writer without any possibility of real success in the scientific field. Peter Bowler, *Evolution: The History of An Idea*, p. 259.
[15] For a general bibliography refer to James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 380-390.

Both Shaffer and Paradis re-discovered and re-discussed Butler and his work across different disciplines as a means to a deeper discussion of Victorian culture. Shaffer, in introducing her research, wrote: 'all accounts so far given of Samuel Butler are truncated: they are savage amputations of the limbs of his life'.[16] Her book was designed to reintegrate Butler various works 'into a full account of multifarious activity as writer, painter, and author of pungent and far-reaching critiques of literature, art, religion and science'.[17]

Twenty years later in 2007, Paradis, introducing his edition of critical studies, arrived at a similar conclusion.

> Samuel Butler(1835-1902), Victorian satirist, critic, and visual artist, possessed one of the most original and inquiring imagination of his age.[...]Evolutionary free-thinker, he rejected natural selection and traditional natural theology alike in a series of evolutionary studies[..]that placed evolutionary thinking within a new historical framework and that assessed, in a neo-Lamarckian context, the role of memory in shaping the organism.[18]

Starting from the necessity of re-discovering Butler's framework, Paradis' collection of essays re-portrays Butler's life and books, contextualising them into Victorian culture. His contributors discuss Butler's work in a mix of different readings, from Butler's religious ideas to his role in the Victorian popularization of science.

2.2 Literature as science or science in literature: the Victorian problem of genre and literary identity

The problem of identity for literary and scientific men, typical of the Victorian period, has been widely discussed. In their literature, Victorian novelists integrated science with culture, philosophy with politics and created a new ground for literary genres. In England, especially, novelists became a centre of intellectualism. As Sleigh's *Literature & Science*

[16] Elinor Shaffer, *Erewhons of the Eye: Samuel Butler as Painter, Photographer, and Art Critic*, p. xi.
[17] *Ibid.*, p. xi.
[18] James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 1.

suggests, 'no topic was off-limits to them; they discussed God, politics, science and poetry with equal enthusiasm and knowledgeablity'.[19]

Researchers in the fields of literature and science agree on the fact that the nineteenth-century, especially in the latter half, was a training ground for amateur scientists, writers and thinkers of any kind fascinated by the role of science in the public domain.[20] In particular, the reception of evolution through novels into the general public domain made Victorian literature scientifically relevant but also created some reinterpretation of that science.

In the period between 1859 and 1880, there were traces of evolution in literature (Samuel Butler, William Morris, Charles Kingsley, George Eliot, H.G. Wells etc), in philosophy and psychology (Spencer and the famous case of Marx dedicating *Das Capital* to Charles Darwin, George Romanes, James Ward etc.) and theology (Mivart, Butler etc.). In addition, according to the work of Thomas Glick and Eve-Marie Engels, outside the UK the reception of Darwinism modified the way of thinking about natural science in Europe and, later on, in the whole world. In France, for example, thanks to Darwinism and the work of Claude Bernard, literature became 'experimental'. The case of Zola's texts is a perfect example. In his work, the French novelist, using scientific vocabulary and descriptions, tried to create objective knowledge in a literary plot.[21]

Returning to Britain, Darwin's science influenced every single branch of Victorian culture.[22] Laura Otis's *Literature and Science in the Nineteenth Century* shows exactly this

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[19] Charlotte Sleigh, *Literature & Science*, p. 131.

[20] For general comments see Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction;* Roger Luckhurst and Josephine McDonagh (Eds.), *Transactions and Encounters: Science and Culture in the Nineteenth Century*; John Glendening, *The Evolutionary Imagination in Late-Victorian Novels: An Entangled Bank* and James Paradis and Thomas Postlewait (eds.), *Victorian Science and Victorian Values: Literary Perspectives*.

[21] Charlotte Sleigh, *Literature & Science*, pp. 107-121.

[22] Refer to Jonathan Hodge and Gregory Radick (eds.), *The Cambridge Companion to Darwin*; Adrian Desmond and James Moore, *Darwin*; Janet Browne, *Charles Darwin: The Power of Place* and Thomas F. Glick, *What about Darwin? All species of opinion from scientists, Sage, Friends and enemies who met, read and discussed the naturalist who changed the world.*

point.[23] From Otis' point of view, it is possible to find in Victorian novels and short-stories traces of mathematic, physical science, technology, animal electricity, organic memory, physiology, medicine, hygiene, germ-theory, infection disease, experimental medicine, vivisection and evolution. In the nineteenth-century science was not perceived to be written in a 'foreign language', it was instead 'a variety of literature.'[24]

In the example of Victorian periodicals, scholars have recognized how different genres such as scientific articles, religious and philosophical ones were mixed up with chapters of novels and various advertisements. With their rich variety of voices and contexts, Victorian periodicals addressed the most important subjects of the period: marriage and divorce, empire, local politics, science, religion, gender and class politics, and new claims of authority in social, political, and cultural matters.[25]

Furthermore, they were the vehicles which opened science to writers of different genders. As the recent *Gender and Victorian Periodicals* suggests, journalism (especially through the use of periodical articles) became, in the Victorian period, a female prerogative instead of being only the emblem of masculinity.[26] According to Tricia Lootens' *Lost Saints* women became important protagonists of Victorian literature and poetry.[27]

On the whole, the study of genres in periodicals explores writing by authors and journalists on a variety of topics, and by readers whose responses to articles and debates transformed them into active participants in the Victorian debate. Periodicals were a place where authors and scientists were allowed to mix their own knowledge with unexplored ideas. Periodicals can be seen also as being the starting point of *non*-famous writers. Historically speaking, the impossibility of thinking about Victorian literature as a unitary

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[23] Laura Otis, *Literature and Science in the Nineteenth Century: An Anthology*, p. xxii.
[24] *Ibid.*, p. xvii.
[25] Lauren Brake and Julie Codell (eds.), *Encounters in the Victorian Press: Editors, Authors, Readers (Palgrave Studies in Nineteenth-Century Writing and Culture)*, p. 1.
[26] See Judith Johnston, Hilary Fraser and Stephanie Green, *Gender and the Victorian Periodical*, pp. 26-35.
[27] Tricia Lootens, *Lost Saints: Silence, Gender, and Victorian Literary Canonization*, pp. 1-12.

concept has been shown recently by both historians of science and literary scholars. The same happened to science, especially in the cases concerning biology and natural science.

In the first chapter, my study has identified two important aspects typical of the Victorian period. First, the impossibility of thinking about Victorianism in terms of two cultures (a separation between the fields of science and humanities). Second, I have also discussed how in the past twenty years it has become conventional wisdom that periodicals were used as the discursive context and historical medium of the Victorian scientific debate. Within them unconventional writers formed part of the scientific debate and scientists were able to discuss the human implications of their theories outside the rigour of science. It has seemed that, with the development of literature and science periodicals, many new genres found their birthplace in the pages of Victorian periodicals.[28] In approaching, once again, this problem a series of questions arises: What is a genre? What was its role within the Victorian debate? Moreover, how did the introduction of new genres modify the way of thinking about literature and science?

2.2.1 The problem of genre

In answering the questions at the end of the previous paragraph, I should refer to a large group of studies which in the last twenty years has given rise to new readings of genres in relation to the history of science, literature, philosophy and the history of ideas. The English scholar Carolyn Williams writes: 'Genre theory has not been fashionable in cultural studies, partly because of its literary associations and partly because it has been reductively taken to indicate a simplistically taxonomic, rule-governed, and prescriptive formalism'.[29]

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[28] In the specific case of Butler refer to James Paradis 'The Butler-Darwin Biographical Controversy in the Victorian Periodical Press' in Geoffrey Cantor and Sally Shuttleworth (eds.) *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals,* pp. 307-331.

[29] Carolyn Williams, '"Genre" and "Discourse" in Victorian Cultural Studies', *Victorian Literature and Culture* Vol. 27, No. 2 (1999), pp. 517-520.

When we talk about genres we are used to thinking about them as an object of literary criticism. By definition, a literary genre is a category of literary composition. Genres may be determined by literary technique, tone, content, or even (as in the case of fiction) length. However, how can we define a genre? Providing an answer to this question is not easy because a genre is not a unitary concept. Genres are often divided into sub-genres and sub-genres are categories which better express the complexity of the genres analysis. In order to make my point clear let me provide an example.

Literature is divided into three basic types of writing according to the classic genres of Ancient Greece: poetry, drama, and prose. Nevertheless, these categories are still not definitive. First, poetry can be subdivided into epic, lyric, and dramatic. Drama, the second ancient Greek category, includes comedy, tragedy, melodrama and their mixtures like tragicomedy. Comedy, for example, can be again subdivided into farce, comedy of manners, burlesque, and satire. The same happens to tragedy. Also, the mixtures, such as tragicomedy, have sub-genres, for example, hardboiled fiction characterized by the tragicomic cynical narrator's self-talk. Third, prose can cross many genres but is typically expressed in essays, memoirs, and other forms that may or may not be narrative but share the characteristics of being fact-based, artistically-rendered prose. Thus, it seems that there is not an easy way to define what is a genre. However, literary scholars have arrived at a simplification of the problem. If a genre is a literary category that cannot be captured by a single concept, it may be defined by something else. Therefore, literary scholars proposed to consider three main aspects of any literary composition, that can help in the process of identifying a literary genre.

First, a genre can be defined by content. Content is the first aspect that can be noticed in *fiction* and *nonfiction*. The main contents of nonfictional writing include, among others: philosophy, psychology, history, theology and any type of writing where the author is writing about facts. The content of fictional writing is mostly related to the type of plot

chosen by the writer. In this case, the content of a novel is defined by certain central themes, which include: drama, fable, fairy tale, fantasy, fiction narrative, fiction in verse, folklore, historical fiction, horror, humour, legend, mystery, mythology, poetry, realistic fiction, science fiction, short story, tall tale and more. A fictional content can also involve science and other disciplines, such as psychology, philosophy and anthropology. Content can be related to historical periods, which in English literature include: Old English, Middle English, the Renaissance, the seventeenth-century Shakespearean and Elizabethan times, the eighteenth-century, the Victorian age, and Modernism. However, this should not be confused with the age category, by which literature may be classified as either adult, or children's. Finally, content can also be related to important intellectual movements that have influenced the study of literature, including: feminism, post-colonialism, psychoanalysis, post-structuralism, post-modernism, romanticism, and Marxism.

Second, if the genre of a *fictional* or *non-fictional* publication cannot be defined only by its content, it can be defined by its format. Format, can take the shape of a novel, short-story, article, pamphlet or essay, and it can be published as a book or as an article/essay in a newspaper or periodical. The format is often considered as a medium because in it there can be found the co-penetration between two or more types of content. The distinctions between genres and categories are flexible and loosely defined, often with subgroups. The nineteenth-century genres, in particular, are well-known to co-penetrate one another. As an example, the Victorian periodical was a type of publication where literary, philosophical and scientific articles were printed together one after the other in the same volume.

Third, a genre can be defined by the mode of writing. This final aspect is very important in the field of literature. Very often understanding the mode of writing of a paper becomes the crucial factor used to define the 'real' intention of a piece of writing. As an example, we should consider the difference between satire and didactic writing. Satire is a

genre of literature in which vices, follies, abuses, and shortcomings are held up to ridicule, ideally with the intent of shaming individuals, and society itself, into improvement.[30] Although satire is usually meant to be funny, its greater purpose is often constructive social criticism, using it as a weapon. On the other hand, didactic writing is a mode of writing which emphasises instructional and informative qualities in fictional and non-fictional paper.[31]

The problem of genre represents a process of understanding the circulation of a variety of forms of writing, and for scholars of literature and science has been a central concern. As Beer has said in *Open Fields*, this may involve conflict and transformation as much as mutual understanding and reconciliation.[32] Additionally, according to James Secord the study of genres is part of the study of the interaction between different cultures, the history of books and production of papers and their development within Victorian readers.[33]

The problem of genres has been a Victorian peculiarity.[34] According to the literary scholar James Eli Adams the Victorian Era has come to be recognised as a period in which a number of new major genres arose. The recent *A History of Victorian Literature* demonstrates exactly this point. Going through the history of Victorian literature from the death of Lord Byron to the end of the century, James Eli Adams reconstructs how, when and where new genres such as historical, social, philosophical novels, literature of travels,

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[30] Robert C. Elliott, 'Satire', in *Encyclopædia Britannica*. http://www.britannica.com/EBchecked/topic/524958/satire accessed 10/03/2013.

[31] The underlying questions involved in genre discourse are well summed up in Jan Golinski's *Making Natural Knowledge* (1998), which introduces historians to social theory and certain varieties of philosophy. See Jan Golinski, Making *Natural Knowledge: Constructivism and the History of Science* (Cambridge, 1998).

[32] Gillian Beer, 'Translation or Transformation? The Relations of Literature and Science', in Gillian Beer, *Open Fields: Science in Cultural Encounter*, pp. 173–195.

[33] James Secord, 'Knowledge in transit', *Isis* 95 (2004), pp. 654-672.

[34] Carolyn Williams, '"Genre" and "Discourse" in Victorian Cultural Studies', *Victorian Literature and Culture* Vol. 27, No. 2 (1999), p. 517.

Darwinism, nature, literature for children, Hellenics, domestics, politics and empire in novels arose.[35]

Furthermore, it is well recognized that the complexity of genres typical of the Victorian era cannot be summarised in a single study. Evidence of this difficulty is provided by the volume of *The Cambridge Bibliography of English Literature* dedicated to the nineteenth-century. The volume underscores how much history of this kind is normally omitted and, in parallel, how many Victorian genres are normally ignored by contemporary scholarship.[36] Although many historians of science and literary scholars have, in recent years, referred to the techniques of literary persuasion discussed in *Leviathan and the Air-Pump*, few have followed the authors further in this direction or explored the extensive literature on prose rhetoric and genre.[37]

In terms of scholarship, studies into Victorian genres tend to vary. From general studies such as *The Cambridge Bibliography of English Literature* and Adams' *A History of Victorian Literature* to specific volumes such as Secord's *Victorian Sensation,* White's *Thomas Huxley Making the 'Man of Science',* Beer's *Open Fields* and many others, the Victorian period has been well and truly dissected in relation to the rise of genres involving science and literature. The issue of genres ran through the complete Victorian debate and influenced scientific and literary publications[38] and even more so the dimension of journalism.[39] Therefore, what is the best way for discussing the interaction between genres in the Victorian period? The working models adopted by current historiography develop the study of genre (in our case from 1859) in relation to Darwinian science as an exchange of plots, terminology and metaphor both from the literary and scientific worlds. As evidence,

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[35] James Eli Adams, *A History of Victorian Literature*, pp. 20-27.

[36] See Joanne Shattock (ed.), *The Cambridge Bibliography of English Literature, Volume 4, 1800–1900.*

[37] Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, pp. 3-22.

[38] William Baker and Kenneth Womack (eds.), *A Companion to the Victorian Novel*, pp. 1-9.

[39] See Dallas Liddle, *The Dynamics of Genre: Journalism and the Practice of Literature in Mid-Victorian Britain.*

when we consider the major protagonists of the period it appears to be impossible not to recognise a pronounced general tendency of mixing different genres, even within specific professions, such as scientific publication.

Before the revolution brought about by the *Origin of Species*, science was not a mainstay in the realist novel and neither was scientific language. It was not at home even in academia. I have described in the first chapter where and when we can start speaking about a continuity between literature and science. From the early 1980s, Gillian Beer and George Levine have argued for the possibility of seeking evidence of literature in science and the influence of science in literature. By proposing the concept of transformation as a key of understanding Victorian literature, they related genre, nationalism, and desire, in exploring the ways in which the nineteenth-century conceived of, responded to, and created changes in literature and science.

Beer's *Darwin's Plots* has applied a partially similar methodology in tracing the reception of Darwin's languages and metaphors in George Eliot and other novelists of the period. Without focusing on the *Origin of Species* itself, Beer has studied the implications of scientific language and its mutual engagement with literature. In term of genres, Beer has pointed out how scientific terminology was applied by novelists and where and when literary plots and metaphors were used by scientists in popularizing their own scientific ideas.[40]

In the history of science, James Secord's *Victorian Sensation* offers a good starting point. Moving from the reception of the *Vestiges*, this historian of science describes the role of biology for Victorians, its role in the Victorian circles and, more importantly, the cultural implications of scientific knowledge. Secord, also, introduces a new methodology where the reader is considered central to the reception of a scientific book. He wrote: 'Placing reading at the centre of a history opens up general possibilities for understanding

[40] Gillian Beer, *Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 30-40.

what happens when we read[..]It unites an interpretation of words on the page with and understanding of the physical appearance and genre of work in which it is marked and discussed'.[41] The implications of this approach are well developed within the whole study showing sometimes more, sometimes less, how a book about evolution for people also evolved the self-identity of these people.[42]

Returning to the question asked above, the identification of the Victorian literary genre becomes the sum of different aspects of proper Victorian writing. In this case, the equation (that I would like to adopt) which defines genre should be made by the reciprocal interaction of style/mode of writing, content and format.

Butler's case represents an important way of thinking about culture and science in terms of their own reciprocal engagement. One of the major problems with Butler's writing has always been the impossibility of understanding the relationship between content, style and format in his books. In Butler's publications, there is a strong presence of science, especially in terms of Darwinian science. From the beginning of his career to his last scientific publication in 1890, he discussed and applied Darwinian evolution to art, music, philosophy, history and theology. Butler himself was aware of the different genres and styles of writing relating to his time. This informed him on the interests and tastes of his own generation of Victorians in terms of their readings. In 1893, in his notebook he pointed out in relation to the reception of books:

> People between the ages of twenty and thirty read a good deal, after thirty their reading drops off and by forty is confined to each person's special subject, newspapers and magazines; so that the most important part of one's audience, and that which should be mainly written for, consists of specialists and people between twenty and thirty[43]

Butler, like many other people of his time, was conscious of the power of communication through proper sources used in relation to different ages. Although the previous note is

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[41] James Secord, *Victorian Sensation: the Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation*, pp. 4-5.
[42] *Ibid.*, p. 6.
[43] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 109.

more related to the question of audience, it shows how Butler's interests were far behind his own ideas. The writer was aware about the rule of audience in decreeing the failure or success of a career, but also aware of the importance of writing something suitable for readers.

The following section aims to show, by providing an example from Butler's work, how Butler mixed up the genres of literature and science in the same publication. As discussed in this section, the co-penetration of genres is a prominent Victorian trait. Therefore, the identification of a genre in the Victorian period was a complex task for both authors and their readers. The problem of genres becomes a question of understanding different aspects of literature. It is not only a question of content, style of writing or format; it is a question of all of them together.

In the light of this, Butler represented, among other famous cases of the same period such as Kingsley, Eliot and, later on, Wells and Stoker, a unique case study. Butler is unique because in contrast to the success of other novelists, his use of genres underpinned the failure of his literary and scientific career.

2.3 Case studies in Butler's use of genres: 'God the Known and God the Unknown' (1879), *Life and Habit* (1878) and *Erewhon* (1872)

In the previous section, I have briefly discussed the problem of genres in relation to Victorian literature and literature in general. Our attention now turns to Butler's style of writing and, with the help of a variety of examples shows how the mixing of genres destroyed Butler's credibility. To help illustrate this point, Derrida's words seem to be most apt. He wrote at the beginning of his 'The Law of Genre':

> If a genre is what it is, or if it is supposed to be what it is destined to be by virtue of its *telos*, then "genres are not to be mixed"; one should not mix genres, one owes it to oneself not to get mixed up in mixing genres. Or, more rigorously: genres should not intermix.[44]

[44] Jacques Derrida, 'The Law of Genres', *Critical Inquiry*, Vol. 7, No. 1, (1980), pp. 55-81, esp. 57.

In contravention of Derrida's apparent dictat, Butler based his publications on the intermixing of genres. Despite the fact that Butler was only one of the famous cases (e.g. Kingsley, Ruskin, Eliot) in which science mixed itself with literature and theology, he represented a special case for two main reasons. On the one hand, in his literary writing there is a strong presence of European science, an aspect atypical of the period. On the other hand, in his scientific writing, metaphors from the literary and artistic worlds are applied everywhere to the shaping of complex scientific concepts. Therefore, how can we understand what were the genres used by the writer in his writing? To give an answer to this question, I want to analyse three case studies in order to understand Butler's use of genres. In doing so, I will respect the equation proposed in the previous section. Butler's use of genre can be understood only in relation to three key aspects of his writing: content, style and format.

2.3.1 Butler's 'God the Known and God the Unknown'

The first case study I would like to propose is a series of articles written by Butler in which he discussed scientific, philosophical and teleological questions. After the publication of *Life and Habit* and *Evolution Old and New*, which were two non-fictional scientific books aimed at the discussion and popularisation of evolution, Butler wrote a series of articles, eight in total, mixing together theological issues and natural science. 'God the Known and God the Unknown' first appeared in *The Examiner* in May, June, and July, 1879. Here, Butler focused his attention on the role of God in nature, giving different readings from the old pantheistic perspectives to God's role in relation to biological science.

'God the Known and God the Unknown' was a problematic publication. It could not easily be defined as one of the classic *nonfictional* genres and it had no similarities with any previous publications by Butler. The articles were neither philosophical, nor literary nor

theological. Firstly, although they started from a religious/theological problem, they arrived at a philosophical and evolutionary solution, even recalling the conclusion recently discussed in *Life and Habit*. Secondly, the use of different sources such as religious documents, classic and philosophical texts and books about natural science made these articles a perfect case study in relation to Butler's ability of mixing different genres. Additionally, the mixture of English with Latin and Italian quotations produced a sense of inadequacy for the reader. Although Butler's writing could appear to be quite clear to the eyes of an expert reader, it appeared foggy and unclear to an uneducated Victorian.

'God the Known and God the Unknown' arose from an important Victorian debate regarding the nature of God. Although mostly discussed by theologians and philosophers before 1860, the debate was still open in the late 1880s.[45] Theology was, as defined by John Henry Newman in *The Idea of a University* (1873), the revelation of divine truth, the *logos* that brings unity to the diversity of subjects though in a university.[46] It also involved topics and plots in literature and consequently a mixture of all of them with science in periodicals.[47]

Theology was the first issue looking for a solution in 'God the Known and God the Unknown'. In terms of content, Butler's point was clearly highlighted at the beginning of the second chapter. He wrote:

> Firstly, I can demonstrate, perhaps more clearly than modern science is prepared to admit, that there does exist a single Being or Animator of all living things—a single Spirit, whom we cannot think of under any meaner name than God; and, secondly, I can show something more of the persona or bodily expression, mask, and mouthpiece of this vast Living Spirit than I know of as having been familiarly expressed elsewhere, or as being accessible to

[45] In terms of literature, theology experienced significant developments in the Victorian novel. James Russell Perkin's Theology and the Victorian Novel identifies that religion was a central part of Victorian England and had a considerable impact on culture and literature not only in those novels in which religion was a primary issue.[45] Especially in natural history, theology represented the main detractor of natural selection. it was used in justifying the necessity of re-thinking evolution in metaphysical terms and not only materialistically as done by Darwin. See James Russell Perkin, *Theology and the Victorian Novel,* pp. 5-8

[46] John Henry Newman, *The Idea of a University*, pp 374-375.

[47] Darren J. N. Middleton 'James Russell Perkin, Theology and the Victorian Novel', *Religious Studies Review*, Vol. 36, Issue 4, (2010) p.289.

> myself or others, though doubtless many works exist in which what I am going to say has been already said.[48]

In the articles, Butler started seeking for God first in Pantheism with the assumption that 'God is everything and everything is God', and failed to find him. The author explained that:

> we can see the gold-fish as forming one family, and therefore as in a way united to the personality of the parents from which they sprang, and therefore as members one of another, and therefore as forming a single growth of gold-fish, as boughs and buds unite to form a tree; but we cannot by any effort of the imagination introduce the bowl and the water into the personality, for we have never been accustomed to think of such things as living and personal.[49]

The first point of Butler's argument is that humankind normally associates the idea of God with that of an organic living person but the bowl and the water, being inorganic, cannot be associated with a living person. Furthermore, in criticising these ideas it follows that what Pantheists believe in is not a personal God who governs and directs, but an impersonal unconscious principle of life. According to Butler pantheism is, in conclusion, a form of Atheism.

Secondly, after the definition of Pantheism, Butler next turned to orthodox Deism. According to his opinion, orthodox Deism offers to the humankind a God of a spiritual nature only and therefore impersonal, a God that is not a God. Therefore, deism was, in Butler's argument, merely a form of Atheism. The conclusion of the chapter offered to the writer the opportunity of questioning, once again, the nature of God. Butler wrote:

> But it must be remembered there can be no God who is not personal and material: and if personal, then, though inconceivably vast in comparison with man, still limited in space and time, and capable of making mistakes concerning his own interests, though as a general rule right in his estimates concerning them. Where, then, is this Being? He must be on earth, or what folly can be greater than speaking of him as a person? What are persons on any other earth to us, or we to them? He must have existed and be going to exist through all time, and he must have a tangible body. Where, then, is the body of this God? And what is the mystery of his Incarnation?[50]

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[48] Samuel Butler, *God the Known and God the Unknown*, p. 19.
[49] *Ibid.*, p. 26.
[50] *Ibid.*, pp. 51-52.

Starting from the questions reported above, the writer opened up the third and conclusive section of the essay in which he finally touched the scientific sphere. Here, Butler proposed a third possibility; to conceive of God as we conceive of Hope (which we personify without meaning that it has a real body). This final approach cannot work, because no conception of God can have any meaning for us unless it involves his existence as an independent material living Being.

Starting from the idea that, reporting a passage of *Life and Habit*, 'Each cell in the human body is now admitted by physiologists to be a person with an intelligent soul, differing from our own more complex soul in degree and not in kind'[51], Butler arrived at the conclusion that 'memories which all living forms prove by their actions that they possess- the memories of their common identity with a single person in whom they meet is incontestable proof of the fact of being animated by a common soul'.[52] The next step became so inevitable, he wrote: 'It is certain, therefore, that all living forms, whether animal or vegetable, are in reality one animal; we and the mosses being part of the same vast person in no figurative sense, but with as much bona fide literal truth as when we say that a man's finger-nails and his eyes are parts of the same man'.[53]

This idea was not limited to these articles. In *Life and Habit* he had put forward the suggestion that we are one person with our ancestors. Moreover, in *Unconscious Memory* Butler, re-framing the same concept, wrote:

> It follows from this that all living animals and vegetables being as appears likely, if the theory of evolution is accepted descended from a common ancestor, are in reality one person and united to form a body corporate of whose existence, however, they are unconscious. There is an obvious analogy between this and the manner in which the component cells of our bodies unite to form one single individuality, of which it is not likely they have a conception, and with which they have probably only the same partial and imperfect sympathy as we, the body corporate, have with them.[54]

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[51] *Ibid.*, p. 55.
[52] *Ibid.*, p. 62.
[53] *Ibid.*, p. 62.
[54] Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902): A Memoir, Vol. 1*, p. 301.

Returning to 'God the Known and God the Unknown', Butler's point, was therefore, the application of the identity of God in relation to natural science. He highlighted his personal intuition regarding the deeper connection between theology in the shape of design proper of traditional philosophy, and evolutionary biology.

The problem did not find a well-formed solution in the article. It was, instead, re-discussed later on in *Unconscious Memory* and *Luck or Cunning?* where mixing once again scientific writing with philosophy and psychology of the unconscious he tried to solve the issues:

> In the articles above alluded to ['God the Known and God the Unknown'] I separated the organic from the inorganic, but when I came to rewrite them I found that this could not be done, and that I must reconstruct what I had written. This reconstruction never having been effected, it may be well to quote further from "Unconscious Memory" (concluding chapter): "At parting, therefore, I would recommend the reader to see every atom in the universe as living and able to feel and remember, but in a humble way. He must have life eternal as well as matter eternal; and the life and the matter must be joined together inseparably as body and soul to one another. Thus he will see God everywhere, not as those who repeat phrases conventionally, but as people who would have their words taken according to their most natural and legitimate meaning; and he will feel that the main difference between him and many of those who oppose him lies in the fact that whereas both he and they use the same language, his opponents only half mean what they say, while he means it entirely... We shall endeavour to see the so-called inorganic as living, in respect of the qualities it has in common with the organic, rather than the organic as non-living in respect of the qualities it has in common with the inorganic.[55]

Later on a similar concept was pointed out within the notebook. In 1893 in a note called 'The Super-Organic Kingdom' Butler shaped his idea of 'modest pantheism'. He wrote:

> As the solid inorganic kingdom supervened upon the gaseous (vestiges of the old being, nevertheless, carried over into and still persisting in the new) and as the organic kingdom supervened upon the inorganic (vestiges of the old being, again, carried over into and still persisting in the new) so a third kingdom is now in process of development, the super-organic, of which we see the germs in the less practical and more emotional side of our nature. Man, for example, is the only creature that interests himself in his own past, or forecasts his future to any considerable extent. This tendency I would see as the monad of a new regime - a regime that will be no more governed by the ideas and habits now prevailing among ourselves than we are by those still obtaining among stones or water. Nevertheless, if a man be shot out of a cannon, or fall from a great height, he is to all intents and purposes a mere stone. Place anything in circumstances entirely foreign to its immediate antecedents, and those antecedents become non-existent to it, it returns to what it was before they existed, to the last stage that it can recollect as at all analogous to its present.[56]

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[55] Samuel Butler, *God the Known and God the Unknown*, p. 45.

[56] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 78.

Butler's conclusion seems to be an evocation of his personal conception of design. The description of a super-organic kingdom gives to him the possibility of gaining a deeper insight into the problem. Instead of simply addressing it in the shape of theological conception he mixed it up with philosophy and the modern physiological debate. In addition, it assumed the connotations of something in between the ideas of mental evolution and its cultural application. Butler wrote:

> They might speak of this by a figure of speech, but they could not see it as a fact. Before this could be intended literally, Evolution must be grasped, and not Evolution as taught in what is now commonly called Darwinism, but the old teleological Darwinism of eighty years ago. Nor is this again sufficient, for it must be supplemented by a perception of the oneness of personality between parents and offspring, the persistence of memory through all generations, the latency of this memory until rekindled by the recurrence of the associated ideas, and the unconsciousness with which repeated acts come to be performed. These are modern ideas which might be caught sight of now and again by prophets in time past, but which are even now mastered and held firmly only by the few.[57]

In the final two chapters, his attention moved towards the unknown nature of God. Butler, starting from the original interpretation of the world as a well-known form of pantheism, arrives at the other extreme: of conceiving of the nature of God as something super-organic.

As stated, identifying the content of 'God the Known and God the Unknown' appears to be difficult. After a first look, Butler's work seems to be a *non-fictional* publication regarding theology. However, after a deeper analysis, 'God the Known and God the Unknown' offers something more. In it, Butler tried to put together theological questions with the new answers offered by Victorian science, theology and psychology where God became an object to be looked at with a critical eye. Additionally, if we look at the content of 'God the Known and God the Unknown' in relation to other publications including *Life and Habit*, the 1893 note about 'The Super-Organic Kingdom', *Unconscious Memory* and *Luck or Cunning?* the identification of one single content becomes even harder.

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[57]Samuel Butler, *God the Known and God the Unknown*, p. 50.

The second aspect that has to be considered is the style of writing. 'God the Known and God the Unknown' was published in the middle of Butler's scientific research for the publication of *Evolution Old and New*. Although the intention was to seek the nature of God in theological terms, the problem was carried to its paradoxical consequences in relation to natural science. The style of writing adopted by the writer reflects in some way the strong contrast between the different subjects discussed in the text. First, there is the theological side. Here, Butler used a language and tone rich of metaphor and philosophical terminology, in order to show the theological complexity of God's role in the world. Second, there is the scientific side of the articles, in this case, the style of writing adopted by the writer's tone becomes less affected but the examples used become more sophisticated. Butler, in the text, discussed scientific physiology (e.g. the presence of a common mind in any corporal cell) and explained to the reader Latin expressions like '*Vox Populi Vox Dei*' contextualizing them in relation to history of religion, evolutionary science and philosophy. As an example, Butler, in the article, analysed passages from *The Origin of Species* discussing the revolution done by Darwin's natural selection in one section and just one page later the writer discussed the psalm's sentence like:

> "My bones are not hid from thee: though I be made secretly and fashioned beneath in the earth, thine eyes did see my substance yet being unperfect; and in thy book were all my members written, which day by day were fashioned when as yet there was none of them. Do I not hate them, O Lord, that hate thee? and am I not grieved with them that rise up against thee? Yea, I hate them right sore, as though they were mine enemies." (Psalm CXXXIX.)[58]

As demonstrated by the previous example, it is not easy to determine a single style of writing or a single content. To better understand 'God the Known and God the Unknown' there is a need to refer to Butler's format. Butler's articles were published in the Victorian periodical *The Examiner*. *The Examiner* appeared for the first time in 1808, combining

[58] *Ibid.*, pp. 80-81.

surveys of politics, literature, drama and the pictorial arts, in articles intended to resemble more careful and deliberate essays than articles of the daily newspaper.[59]

The format of 'God the Known and God the Unknown' respected perfectly this intention. Butler's aim was not to propose a novel or an essay but a mixture of different ideas all together. Recalling, once again, the equation of genre, the content, the mode of writing and the format of 'God the Known and God the Unknown' perfectly show why we can define Butler's use of genre as being problematic.

2.3.2 Butler's 'literary' *fiction* and 'scientific' *non-fiction*: the problem of genre in *Erewhon* and *Life and Habit*

In this section, I use two examples from Butler's books, in order to demonstrate the continuity of content, style of writing, aim and audience between Butler's literary and scientific writing. The selection of these two books is due to their close relationship. *Life and Habit* as explained by Butler in a letter to his father in 1876, began as a development of what had been the idea of unconscious memory in *Erewhon*. Therefore, between the two publications there must be something more than a simple chronological relationship. My aim is to understand the genres of *Erewhon* and *Life and Habit* starting from the equation proposed above: their genre can be understood by content, style of writing and format.

In 1872, *Erewhon* anonymously made an ironical criticism of Darwinian evolution in literary terms.[60] Additionally, the novel was the first concrete hypothetical explanation of Butler's idea of the unconscious. In relation to Butler's first scientific work *Life and Habit*, *Erewhon* appears to be a naive explanation of a literary interpretation of Darwinian evolution. Although written in the style of an ironical novel, it attracted the attention of people interested in both science and literature.

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[59] A.W. Ward, A.R. Waller, W.P. Trent, J. Erskine, S.P. Sherman and C. Van Doren (eds.) *The Cambridge History of English and American Literature: An Encyclopaedia in Eighteen Volumes* Vol. xii, pp. 244–248.

[60] See Peter Raby, *Samuel Butler: A Biography*, pp. 119-120.

First, it is important to look at the format and sales of *Erewhon*. The novel was published anonymously in 1872. The anonymity had two main reasons. On the one hand, this was typical of the politics adopted by an editor in publishing new writers. On the other hand, Butler's anonymity was a complex mix of insecurity and anxiety about the possible reaction from his family.[61] A proof of this can be found in a letter written by Thomas Butler to his son on the 29th May 1872.

> Dear Sam,
>
> I shall take your advice and not read your book. It would probably pain me and not benefit you. I do not the least object to your putting your name to it tho' I may not value the éclat. The grief is that our views should be so wide asunder. Perhaps the book might pain me less than your letter leads me to infer. I gladly give it the benefit of the doubt.
> Your affectionate father,
> T. Butler[62]

From the second edition of *Erewhon* the sales fell off sharply once Butler's name was announced. This was because Butler was not famous enough to be recognised and appreciated by Victorian readers. By 1893, the novel had sold 3864 copies[63] and it was the most popular book of Butler's career.[64]

Second, there is the need to refer to the problems created by the content and style of writing. In terms of Victorian literary gossip, there was some misunderstanding around the novel. Published anonymously in 1872, it was considered to be the sequel of a novel written by Lord Lytton in 1871 entitled *The Coming Race*. This was because the two novels presented a number of small points of similarity. Some characters had similar names (the heroine of *The Coming Race* was Zee the one of *Erewhon* Zelora and then, in the second edition, Zelura) and the content and style of writing, especially in relation to the criticism made of Victorian culture, seemed to be written by the same author.

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[61] *ibid.*, p. 119.

[62] Arnold Silver (ed.), *The Family Letters of Samuel Butler 1841-1866*, p.118.

[63] This number is reported in the section 'Analysis of the Sales of My Books' in Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 368.

[64] *The Way of all Flesh* was more successful (nationally and internationally) but published only after Butler's death on 1903.

Like many other novels of the period, Butler's *Erewhon* indirectly focused its plot on the main topics being discussed in London at the time. Not only evolution but a mixture of religious, social, philosophical and cultural ideas provided the background against which the novel was written, in the hope of giving a dramatic prophecy about the future. *Erewhon* was indeed a satirical novel but with the potential of being prophetical.[65] Beer in her essay 'Butler, Memory and the Future'[66] argues, referring to Butler's vision of the future, that this was one of the central points of *Erewhon*. She wrote: 'Indeed, futurity has borne out some of Butler's most important arguments: the 'book of machines' in Erewhon not only foresees the development of computers but prognosticates their miniaturizations, their capacity to undertake computations that outrun human capacities, and their capacity for self-reproduction'.[67] In developing the idea of machinery's evolution, according to Beer, Butler applied the vitality proper to evolution to prophecies for the future.[68]

On the other hand, *Erewhon* also contained content and used a style of writing belonging to the period. Apart from the satire of the Victorian society, *Erewhon* in some of its chapters discussed Darwinian evolution and its extremes consequences using a language and tone more similar to a philosophical essay than a *fictional* novel. Especially, in 'The Book of the Machines', the content and style of writing seem to shift from the *fictional* (satirical and prophetical genre) to a *non-fictional* essay, where Butler enlarged and improved his hypothesis of unconscious evolution already discussed in 'Darwin among the Machines' and 'Lucubratio Ebria', and linked it with the scientific core of *Life and Habit*.

Unlike the rest of the novel, 'The Book of the Machines' leaves the content and style of writing of the utopian land of Erewhon and enters into a philosophical/scientific discussion upon the evolution of machines and its consequences. In this part of the book

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[65] Carla Maria Grappi 'A Victorian Ulysses: Samuel Butler' in Raffaella Baccolini (ed.) *Viaggi in Utopia*, pp. 256-282.
[66] Gillian Beer, 'Butler, Memory and the Future', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 45-57.
[67] *Ibid.*, p. 55.
[68] *Ibid.*, pp. 55-57.

we can notice a strong shift of content and mode of writing. First, the chapters have the structure of a philosophical essay. Butler asked one or two questions (i.e. 'Where does consciousness begin, and where end? Who can draw the line? Who can draw any line? Is not everything interwoven with everything? Is not machinery linked with animal life in an infinite variety of ways?'[69]) and then philosophically discussed them using a Cartesian methodology.

Second, Butler tried to use a scientific style of writing enforced by the use of scientific vocabulary. One example among others is best representative of this. In the first part of the 'The Book of the Machines' Butler wrote:

> no animal has the power of originating mechanical energy, but that all the work done in its life by any animal, and all the heat that has been emitted from it, and the heat which would be obtained by burning the combustible matter which has been lost from its body during life, and by burning its body after death, make up altogether an exact equivalent to the heat which would be obtained by burning as much food as it has used during its life, and an amount of fuel which would generate as much heat as its body if burned immediately after death[70]

This sentence, which seems to recall the style of a scientific essay, is nothing else than a quotation (not properly acknowledged) of a paper published by William Thomson in February 1865 entitled 'Origin and Transformation of Motive Power', where Thomson wrote:

> It appears certain from the most careful physiological researches, that a living animal has not the power of originating mechanical energy; and that all the work done by a living animal in the course of its life, and all the heat that has been emitted from it, together with the heat that would be obtained by burning the combustible matter which has been lost from its body during its life, and by burning its body after death, make up together an exact equivalent to the heat that would be obtained by burning as much food as it has used its life, and an amount of fuel that would generate as much heat as its body if burned immediately after birth.[71]

This is only one of the many passages where Butler seems to report extracts from scientific publications in order to make his argument stronger. Returning to 'The Book of the Machines', these three can be considered the aspects that made and still makes

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[69] Samuel Butler, *Erewhon or Over the Range*, p. 237.
[70] *Ibid.*, p. 251.
[71] William Thomson, *Mathematical and Physical Papers*, p. 188.

problematic the identification of a single genre for *Erewhon*. On the one hand, they can be considered in line with rest of the novel and so a satirical interpretation of evolution in the field of machines (genre of *fictional satirical novel*).[72] However, on the other hand, they can also be considered the link (and it changes the genre of this part of the novel to a *non-fictional* philosophical essay) between the argument of 'Darwin among the Machines' and the hypothesis of unconscious evolution proposed in *Life and Habit*.

This second option needs more attention in order to understand Butler's problem of genres. In terms of content and style of writing, *Erewhon* and *Life and Habit* are two volumes intrinsically connected although presenting some substantial differences. In both of them Butler tried to point out the mechanism of the unconscious in evolution, treating it through two dissimilar styles of writing. With the novel, Darwinian evolution was addressed in two different ways. First, Butler's description of the population of Erewhon represented a fictional representation of the idea of 'survival of the fittest' applied to human society. Second, the three chapters written under the cumulative title 'The Book of the Machines', representing the idea of mechanical evolution, explored the possibility of applying the mechanism of evolution to the mechanical kingdom.

Butler himself highlighted the connection between the novel and the book in a letter to his father. On the 18th February 1876 he wrote: 'My present literary business is a little essay some 25 or 30 pp. long, which is still all in the rough and I don't know how it will shape'.[73] In 1876 *Life and Habit* was nothing other than a long paper about memory, identity, heredity and reproduction and Butler was not sure about the shape it would take eventually.[74]

After a long gestation in 1878 *Life and Habit* was published, once again, by the London editor Trubner. In contrast to *Erewhon*, it developed the idea of unconscious

[72] I do not agree with this point and I will fully discuss the reason of this in chapter five.
[73] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 53.
[74] *Ibid.*, p. 53.

memory in the form of a scientific hypothesis. Although the volume was published six years after the novel and Butler's own knowledge of the evolutionary debate was improved, the germ of the idea remained the same.

I have defined *Life and Habit* as being the first engagement with evolution because, although before its drawing up Butler spoke of evolution in literary terms in *Erewhon* and in the New Zealand Articles, he never assumed that they formed part of his scientific opus. Proof of this has been provided by a note published in Butler's notebook and later on in the *New Quarterly Review* (Vol. III. No. 9), in which he summarises his work on biology.[75] There, the author speaking about his career, in terms of evolutionary writing, defined *Life and Habit* as an *opus prima*.

Life and Habit represented the first engagement with evolution. In writing it, Butler made his first formal acquaintance with scientific writing. The book, a study of the Darwinian mechanism of natural selection in relation to design and unconscious memory, proposed the first scientific account of psychological evolution. In particular it aimed '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'.[76]

Proof of this is, once again, a relevant section of Butler's published notebooks. The section 'The Germs of Erewhon and of Life and Habit' summarizes this point. Here, the writer, providing copies of his New Zealand articles and some letters and notes, described the ancestral literary origin of his hypothesis of unconscious memory.

According to a note made in Darwin's *Origin of Species* represented the starting point of Butler's work.[77] Thus, regarding the common origin of *Erewhon* and *Life and Habit*,

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[75] Samuel Butler, *Life and Habit*, pp. viii-ix.

[76] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 66 and Samuel Butler, *Life and Habit*, pp. viii-ix.

[77] In 1880, at the very beginning of Unconscious Memory, Butler described himself and his acquaintance with Darwinian evolution with the following sentences: 'As a member of the general

Henry Festing Jones wrote in 1912: 'They are interesting as showing that Butler was among the earliest to study closely the *Origin of Species*, and also as showing the state of his mind before he began to think for himself, before he wrote 'Darwin among the Machines' from which so much followed; but they can hardly be properly considered as germs of Erewhon and Life and Habit. They rather show the preparation of the soil in which those germs sprouted and grew; and, remembering his last remark on the subject that "it was all very young and silly," I decided to omit them. The Dialogue is no longer lost, and the numbers of the Press containing it and the correspondence that ensued can be seen in the British Museum'.[78]

A second proof was provided by Butler within the 1901 edition of *Erewhon*. Here, in the preface, Butler declared: 'The first part of *Erewhon* written was an article headed 'Darwin among the Machines' and signed 'Cellarius.' It was written in the Upper Rangitata district of Canterbury Province (as it then was) of New Zealand, and appeared at Christchurch in the Press newspaper, June 13, 1863. A copy of this article is indexed under my books in the British Museum catalogue.'[79] Additionally, another extract from *Erewhon*'s preface sheds more light upon the common origins of Butler's novel and *Life and Habit*. He wrote:

> A second article on the same subject as the one just referred to appeared in the Press shortly after the first, but I have no copy. It treated machines from a different point of view and was the basis of pp. 270-274 of the present edition of *Erewhon*. This view ultimately led me to the theory I put forward in Life and Habit, published in November, 1877. {41} I have put a bare outline of this theory (which I believe to be quite sound) into the mouth of an Erewhonian professor in Chapter XXVII of this book.[80]

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public, at that time residing eighteen miles from the nearest human habitation, and three days' journey on horseback from a bookseller's shop, I became one of Mr. Darwin's many enthusiastic admirers, and wrote a philosophic dialogue (the most offensive form, except poetry and books of travel into supposed unknown countries, that even literature can assume) upon the Origin of Species. This production appeared in the Press, Canterbury, New Zealand, in 1861 or 1862, but I have long lost the only copy I had.' See, Samuel Butler, *Unconscious Memory*, p. 11.

[78] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, pp. 40-41.

[79] Samuel Butler, *Erewhon or Over the Range*, p. xi

[80] *Ibid.*, p. xi.

The continuity of content between these two volumes went far beyond the simple common origin. In writing *Unconscious Memory* Butler dedicated the whole second chapter to the drawing up of *Life and Habit*. In a mix between chronological, biographical information, the chapter narrowed down the genealogy of the hypothesis of memory as heredity from its childhood in the realm of literature even until its adulthood in the field of science.

If *Erewhon* aimed to develop Darwinian evolution in literary terms, in *Life and Habit* the intention can be reckoned to be the opposite. As discussed, the problem of genres in *Erewhon* was best represented by 'The Book of the Machines' and its nature of being a sort *nonfictional* essay into a novel. However, in *Life and Habit* the situation becomes more complex. Starting from the first page, it is possible to flag up a contrast in terms of languages and intentions. We said above that a genre can be defined by the interaction between content, style of writing and format. Therefore, what is the main *nonfictional* genre of *Life and Habit*? is it a scientific essay, an example of popularisation of science or a philosophical discussion upon psychological evolution? Attempting to give an answer to this question best represents the problem of genres in Butler's first scientific book.

According to Butler's own words *Life and Habit* was written with the aim of demonstrating relevant scientific hypotheses of the identification of heredity and memory, in psychological evolution in support to Darwin's evolution. However, it was also written with the 'smallest pretension to scientific value, originality, or even to accuracy of more than a very rough and ready kind - for unless a matter be true enough to stand a good deal of misrepresentation, its truth is not of a very robust order, and the blame will rather lie with its own delicacy if it be crushed, than with the carelessness of the crusher.'[81]

As shown by the quotation, we can see a contrast between the scientific aim of the book and Butler's personal opinion about *Life and Habit*'s scientific value. It must be said that Butler was a 'master of irony' so his dismissal of *Life and Habit*'s content could

[81] Samuel Butler, *Life and Habit*, pp. 1-2.

represent the opposite. However, from the point of view of Victorian scientists and readers the quotation seemes misleading. The main problem of the book was the nature of its argument. *Life and Habit* still involved philosophical questions and discussions, instead of using a proper scientific methodology based on observation and verification.

In terms of writing style, *Life and Habit* was a hybrid. In it, Butler mixed together the scientific vocabulary used in describing his hypothesis of unconscious memory, the ironical literary style of *Erewhon,* with several quotations from the British scientific debate. In the book, examples of this tend to vary. Butler used scientific terminology such as evolution, instinct, processes of digestion, the action of the heart, and the oxygenisation of the blood, Latin expressions such as *de novo, cogito ergo sum* and *summum bonum,* references to Italian and French art including descriptions of the Venus of Milo, the Discobolus, the St. George of Donatello and quotations from Carpenter's *Mental Physiology*, Darwin's *Origin of Species* and many more scientific books. This mixture of style of writings, once again, confused Victorian readers.

Therefore, the scientific reception of Butler's first book was disastrous. Not only the idea of memory, as a form of heredity, was rejected by the scientific community but, even more, Butler was ridiculed. He was defamed as a writer without any scientific experience who tried to work in the field of science. However, the central point of the rejection of Butler's ideas was that the Victorians were unable to understand his place in the debate of evolution.

As an example, I want to look at two key reviews of the book which show the general misunderstanding of (and produced by) Butler's use of genres. *The Saturday Review* of 26th December 1878 opened its review of *Life and Habit* by saying: 'The author or *Erewhon* might have been expected to write a fanciful book, and he had done so; but he has also shown himself capable of more than mere fancies. He disclaimed, indeed, any

seriously scientific initiation, as well as any special scientific knowledge'.[82] As stated by the quotation above, *Life and Habit* had no scientific value and both content and style of writing was considered by the reviewer as a fanciful writing exactly as *Erewhon.*

However, *Life and Habit* also had a completely different reception. In contrast to *The Saturday Review*, a later review published unsigned on January 1880 in the *Daily News* seems to be in disagreement. Although the reviewer was wrong in terms of dates, he drew attention to the intention of *Life and Habit* of being a serious attempt at science rather than an ironical book. He wrote:

> The writer is, it appears, the author of a philosophical romance, entitled *Erewhon* or, over the range, which attracted some attention a year or two ago. As *Erewhon* is described in an advertisement on the flyleaf of this book as 'a work if satire and imagination' it may be as well to observe that Mr. Butler's latest production seems to have been written in perfect good faith. If the reader should therefore find himself laughing here and there, he should bear in mind that he laughs entirely upon his own responsibility.[83]

Life and Habit was indeed written in good faith. As reported by Butler himself in the conclusion of the book, he wrote:

> Here, then, I leave my case, though well aware that I have crossed the threshold only of my subject. My work is of a tentative character, put before the public as a sketch or design for a, possibly, further endeavour, in which I hope to derive assistance from the criticisms which this present volume may elicit. Such as it is, however, for the present I must leave it.[84]

However, the book was also aimed to be a writing experiment. Butler was indeed aware of being a non-specialist writer, as he declared at the end of *Life and Habit*'s conclusion:

> Of course, if I were a specialist writing a treatise or primer on such and such a point of detail, I admit that scientific accuracy would be de rigueur; but I have been trying to paint a picture rather than to make a diagram, and I claim the painter's license "quidlibet audendi." I have done my utmost to give the spirit of my subject, but if the letter interfered with the spirit, I have sacrificed it without remorse.[85]

It seems, according to the previous quotations, that the main problem with Butler was not the ability or inability of producing relevant scientific hypothesis. The problem was, instead,

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[82] 'Review of Life and Habit' in *The Saturday Review* of 26th December 1878, pp. 119-121, esp. 119

[83] 'Review of Life and Habit' in the *Daily News* on 20 January 1880. No page number on the original source.

[84] Samuel Butler, *Life and Habit*, p. 294.

[85] *Ibid.*, pp. 301-302.

the use of unsuitable language and the inappropriate mixture of genres. The cases of *Erewhon* and *Life and Habit* show how Butler's use of genres became a problem in the Victorian period, negatively influencing the author's public and private identity.

According to Bernard Shaw, Samuel Butler's opus was the product of one of the most varied and eccentric careers of the Victorian period.[86] Within his immense numbers of papers, published and unpublished, Butler explored a series of genres ranging from travellers' guides to foreign countries, to art, science and literature and to the composition of musical scores (especially Handel). In building up this new picture of Butler, we have to mine new material. Fortunately, although Butler was not a hoarder, he destroyed precious little. Notebooks, old manuscripts, torn-out pages, annotated scientific books were all stashed away. In the last few years scholars have embarked on a wide-ranging series of discoveries in which new material has shown the eccentricity of his style of writing. Already considered an eccentric Victorian by his contemporaries, he appears even more bizarre in the light of recent studies.[87]

The problem of genres, in Butler's life, has deep roots. As many biographical studies note Butler was never completely sure about his vocation. He changed opinion about himself and his job several times. Thus, Peter Raby has pointed out the impossibility of distinguishing a single genre within Butler's writing.[88] Neither a scientist nor a novelist, artist or philosopher, the main peculiarity of this eccentric Victorian was not to be a specialist of any field.[89]

In the field of science, Butler's inadequate knowledge of scientific questions, combined with the naive desire of being famous and respected as a scientist, made his books difficult to read. The scientific opus of Butler was misunderstood by both scientists

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[86] George Bernard Shaw, *Major Barbara,* pp. i-iii.
[87] See James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: a Critical Overview*, pp. 3-20 esp. 5.
[88] Peter Raby, *Samuel Butler: A Biography*, p. 116.
[89] *Ibid.*, pp. 161-165.

and men of culture. In 1985, the American literary scholar Philip Cohen based an article on Butler's reputation.[90] Writing about the rise and fall of Butler's personal and literary fame, he explained, among other things, how the fact of mixing up literature with science made him a sort of 'philosopher of common sense' rather than a scientist or literary writer.[91]

Butler's reception was a puzzle: a puzzle made up of different pieces with shapes that cannot be embedded in one another. James Paradis, in the introduction of *Samuel Butler, Victorian Against the Grain*, comes to the same conclusion. Paradis points out that 'if Butler was important to writers', referring to his reception among novelists of the fame of George Bernard Shaw, Virginia Woolf, F. Scott Fitzgerald, 'his reception among critics was controversial, beginning with- perhaps especially with- his contemporaries, who were often puzzled or offended by his free-thinking, audience-baiting irony'.[92] Before Paradis, Lee Holt's article 'Samuel Butler up to date' (1960) arrived at a similar conclusion. He wrote that Butler was 'Generally blinded to real value by their [Victorian reviewers] moral, religious, scientific and literary preconceptions'.[93]

Another point that has made Butler's books to be of particular interest was the complexity of Butler's publishing politics. Like many of his contemporaries, he was unable to focus his attention in only one field or direction. Looking at his publications in chronological order it is even difficult to divide them. For example, when Butler was writing *The Way of All Flesh*, he was also studying evolution and publishing his major tomes in the field. Furthermore, when he was having his quarrel with Darwin's family he wrote his travel Guide *Alps and Sanctuaries of Piedmont and the Canton Ticino* (1881). Butler wrote regarding his own book the following note:

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[90] Philip Cohen, 'Stamped on his work: the decline of Butler's literary reputation' *The Journal of the Midwest Modern Language Association*, Vol. 18, No. 1 (Spring,1985), pp. 64-81.
[91] *Ibid.*, pp. 65-66.
[92] James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 5.
[93] Lee Holt, 'Samuel Butler up to date' *English Literature in Transition, 1880-1920*, Vol. 3, no. 1, (1960), pp. 17-21.

> I never make them: they grow; they come to me and insist on being written, and on being such and such. I did not want to write *Erewhon*, I wanted to go on painting and found it an abominable nuisance being dragged willy-nilly into writing it. So with all my books - the subjects were never of my own choosing; they pressed themselves upon me with more force than I could resist. If I had not liked the subjects I should have kicked, and nothing would have got me to do them at all. As I did like the subjects and the books came and said they were to be written, I grumbled a little and wrote them.[94]

As the note explains, Butler was obviously aware of his tendency to write about evolution and at the same time, painting and studying arts, investigating, musing and exploring literary controversial issues such as the order of Shakespeare sonnets or the author or, maybe, the 'authoress of the Odyssey'.

As a conclusion to this section, one final question must be proposed. Were Victorian reviewers really blinded by their preconceptions or was Butler's determination to mix together genre the reason for their puzzlement? In order to answer this question there is a need to move on to the second big problem of Butler's writing. The difficulties in identifying genres in Samuel Butler's writing (for both Victorians and contemporary critics) have translated into similar difficulties in attaching a social identity to Butler himself.

2.4 The problem of Identity

In the field of literature from Dickens to H.G Wells, novelists explored, with ability, the social and scientific issues of the period. They proposed readings (sometimes paradoxical) of the future, and criticised the miserable condition of human kind. In science, eminent scientists such as Darwin and Wallace and academics like Huxley and others discussed scientific problems, addressing them with the use of literary metaphors. This mixture of genres, languages, ideas and plots produced an inevitable problem concerning the identity of the Victorian man of culture. As seen, Butler's writing about science in *Erewhon* and *Life and Habit* can be taken as an example in demarcating the problem of identity. However, as a polymath Butler like other famous Victorians (e.g. Disraeli) had some problem in finding a

[94] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 106.

place in the Victorian literary and scientific debate. Was he a novelist, a scientist, a populariser or, at the very least, a mix of all of them?

In answering this question, I have to refer to the complexity of the Victorian reception of cultural and scientific information. The recent book *The Making of the Victorian Novelist* points out, speaking on Victorian authorship, the necessity of re-framing the idea of the novelist.[95] According to Bradley Deane, the image of the author as friend reigned supreme until the 'moment of sensationalism' in the early 1860s.[96] As stated by Daniel Hack's review of the book, at this juncture, the explosive growth of cheap, widely circulating periodicals led to the creation of a 'new critical constabulary' that asserted its authority by rejecting popularity as an aesthetic criterion and celebrating distinction over sympathetic identification, moves most visible in attacks on the sensation novel.[97]

Relying mainly on a reading of *The Woman in White* (1859– 60), Deane argues that novelists responded to this new critical climate by linking authorship to 'an ideology of professionalism, which is portrayed as largely incompatible with sympathy.'[98] Furthermore, both Bianca Tredennick's *Victorian Transformations* and Herbert F. Tucker's edition of *A companion to Victorian literature & Culture* highlight the necessity of discussing the new role of science in literature and the presence of scientists in the literary field.[99]

Arriving at the case of Butler, we cannot find difficulties in defining him as a Victorian novelist. Although classic critical scholarship insisted on considering him to be a utopian Victorian writer until the 1980s, scholars have recently re-opened up the problem

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[95] Bradley Deane, *The Making of the Victorian Novelist: Anxieties of Authorship in the Mass Market*, pp. 10-20.
[96] *Ibid.*, p. 59.
[97] Daniel Hack, 'The Making of the Victorian Novelist: Anxieties of Authorship in the Mass Market by Bradley Deane (review)', *Victorian Studies*, Vol. 47, No. 3, (2005) pp. 473-475.
[98] Bradley Deane, *The Making of the Victorian Novelist: Anxieties of Authorship in the Mass Market*, p. 79.
[99] Bianca Tredennick (ed.), *Victorian Transformations: Genre, Nationalism and Desire in Nineteenth-Century Literature*, pp. 1-7; Herbert F. Tucker (ed.), *A Companion to Victorian Literature & Culture* (Oxford, 1999), pp. X-XIV.

of Butler's authorship.[100] Outside of literary criticism, Butler has been re-presented as a populariser of science, photographer, psychologist and philosopher.[101] In order to discuss these two conflicting interpretations, there is a need to compare the interpretation that Clara Stillman provided on Butler in 1932 and the conclusions of Paradis in his 2007 volume.

First, in 1932, the tendency of working across different genres made Butler's studies, as assessed by Clara Stillman, problematic. His 'contradictory opinions, his excessive or insufficient emotions, his whimsical dislikes, his oddities of behaviour, his sensitiveness, his self-protective way of life were the tentative unconscious efforts at adjustment of a soul that had not received its full birthright of initiation in human relations'.[102] Butler was not only a problematic product of Victorian culture. He was instead a problematic Victorian. In the light of this Stillman wrote:

> Butler was alone among English writers in thoroughly transcending the current philosophic and psychological assumptions of his period, and he is alive today because many of his ideas have become the current assumptions of ours[103]

Second, in 2007, according to Paradis, Butler becomes seen as 'Victorian England's ultimate polymath, an artistic and intellectual ventriloquist who assumed an extraordinary range of roles - as satirist, novelist, evolutionist, natural theologian, travel writer, art historian, biographer, classicist, painter, and photographer'.[104]

The reason for Butler's personal and generic non-identifiability is that his career occurred during two different moments of Victorian science. On the one hand, there was an earlier period in which authors and writers such as Charles Kingsley, George Eliot and others were allowed to write about science in a cultural context and were acclaimed for

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[100] Two main studies have opened up once again Butler's identity. See James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview* and Elinor Shaffer, *Erewhons of the Eye: Samuel Butler as Painter, Photographer, and Art Critic.*

[101] See Bernard Lightman, 'A Conspiracy of One': Butler, Natural Theology, and Victorian Popularization' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 113-142.

[102] Clara Stillman, *Samuel Butler A Mid-Victorian Modern*, p. 11.

[103] *Ibid.*, pp. 7-8.

[104] James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 7.

doing so. On the other hand, Butler worked in the era of specialism in which everything needed to be recognized to fall within a specific genre. It was the period of Thomas Huxley and his dream of making the man/gentleman of science, in other words, the necessity of flagging up a specific theoretical box for every discipline. Science was the realm of scientists and literature was the object of literary men in novels and literary circles.[105]

Among others, *Victorian Sensation* and *Thomas Huxley Making the 'Man of Science'* explore this specific topic in two different moments of the Victorian age. James Secord within his monumental book, used the *Vestiges of Natural Creation* as an example in exploring the complex presence of science in the cultural circles of the period. In doing so, the historian of science has shown how, where and when natural science becomes a cultural object rather than a scientific one. In that period natural science was the domain of the philosopher and of men of culture who were used to discussing its issues in comfortable armchairs enjoying a glass of sherry while smoking cigars. On this, a young Huxley wrote on the 4th May 1851 a letter to his sister: 'It is that there is no chance of living by science. I have been loath to believe it, but it is so. There are not more than four or five offices in London which a Zoologist or a comparative anatomist can hold and live by. Owen, who has a European reputation, second only to that of Cuvier, gets as Hunterian Professor 300 pounds sterling a year! Which is less than the salary of many a bank clerk.'[106]

On the other hand, Paul White, in describing the structure of Victorian science and scientists in the rigour of institutes, laboratories and professionalism, re-defined science in the second half of the century. The change can best summed up in two ways. First, science moved from a theoretical perspective to a practical one with the introduction of instruments and specific places for research. William Irvine in his biography of Darwin and Huxley pointed out some pertinent events in Huxley's life which shaped his intention of

[105] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 50-59.
[106] Leonard Huxley, *The Life and Letters of Thomas Henry Huxley*, p. 62.

make science more professional. On the one hand was obviously the difficulty of getting a job in the scientific field as reported in the quotation above. On the other, was the nature of science which, in the 1850s, was not an exclusive place for scientists. In the light of this, to reform his own position, Huxley needed almost a revolution of the shape of science and a rigorous selection of its members.[107]

Second, there was the theoretical dimension of the problem. If we assumed that science became the object of professionalism and the profession was in the hands of a small group of men of science, everyone outside this circle was simply ignored. Thomas Huxley and his making of the man of science was a perfect example of this.

Samuel Butler worked between these two periods. As an example, Beer in her contribution to *The Cambridge Companion to the Origin of Species* in writing about Butler and Kingsley points them in contrast one with the other.[108] According to Beer, both *Erewhon* and Charles Kingsley's *The Water-Babies* (1863) critically explored alternative readings of Darwin within Victorian society. *The Water-Babies,* in addressing evolution in a children's tale (although originally published as a serial in *Macmillan's* Magazine which was not a children periodical) advocated an agreement with Darwin's idea. In contrast, *Erewhon,* published later in another cultural climate, satirically described evolution in a fictional society without creating any theoretical alliance.

Butler would have probably been a perfect man of science between 1840 and 1850 but not in the period in which he wrote his main books. As Grant Allen declared in his review of *Evolution Old and New* published in the *Examiner* on the 17th May 1879, Butler approached evolution exactly like Swift, at his time, approached his criticism of the English society. He wrote: 'If Swift had lived to be an evolutionist, he would have written Mr

[107] William Irvine, *Apes, Angels and Victorianism, the story of Darwin, Huxley and Evolution*, pp. 181-185

[108] See Gillian Beer, 'Lineal Descendants The Origin's literary progeny', in Michael Ruse and Robert Richards (eds.), *The Cambridge Companion to the 'Origin of Species'*, pp. 287-288.

Butler's new book'.[109] The comment recalled obviously Allen's literary background suggesting also his aptitude as a novelist and scientific author instead of a scientist.[110] Nonetheless, Allen's comment implied another point. If Butler's *Evolution Old and New* was considered to be the 'new' version of *Gulliver's travels*, this implied that it lacked any scientific influence. According to the general tone of the review, we can demarcate a general rejection of Butler due to his style of writing. In particular, the comparison of Butler with Swift delineated the impossibility to consider *Evolution Old and New*'s scientific aim to be scientific at all.

James Paradis in his essay 'Butler after Butler: the Man of Letters as Outsider', in commenting on the failure of Butler's literary career, defines Butler's sarcastic style of writing as the main reason for the collapse of his career. According to Paradis, especially in relation to *Evolution Old and New*, it was the book which 'closed the door on his [Butler] Victorian natural history audience and opened another to his self-fashioning as the Victorian outsider addressing an audience of the future'.[111]

In a wider perspective, Butler's problem of identity was due to his unclassifiable working activity. Butler was active in both literature and science until his death in 1903. As stated above, he started his writing career in Cambridge before 1859 with a series of articles collected together under the title *The Cambridge Pieces of Samuel Butler*. Afterwards, in New Zealand, he moved his attention from classics to science, writing pseudo-scientific articles in the *The Press* of Christchurch (1863-65). In London, after 1865, he studied art and wrote his first novel *Erewhon* (1872) where science was mixed with utopian literature. As a result, in the period in between 1878 and 1890 the author worked hard at popularizing his own evolutionistic theory in the scientific community of the time. In the meantime Butler was also a prolific author in the fields of travels guide, arts, music and

[109] Grant Allen 'review of *Evolution Old and New' The Examiner* (17th May 1879), pp. 646-647.
[110] Dominic Head, *The Cambridge Guide to Literature in English*, p. 19.
[111] James Paradis, 'Butler after Butler: The Man of Letter as Outsider', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 343-370, esp. 351.

literature, publishing books and articles on a great variety of topics. Additionally, in his notebooks Butler came to characterize himself with these words:

> I am the *enfant terrible* of literature and science. If I cannot, and I know I cannot, get the literary and scientific big-wigs to give me a shilling, I can, and I know I can, heave bricks into the middle of them.[112]

The definition, although bumptious, suggests perfectly the approach used by Butler in defining himself and his opus. Being the *enfant terrible* gave him the opportunity of exploring different genres without losing, in his own perspective, credibility as a literary writer and populariser of science. Outside his own perspective, in the real Victorian world this approach represented a disaster in terms of fame. Furthermore, it also opened up a problem concerning the nature of Butler as an author. Was Butler a writer or a scientist, a traveler or an artist or all of these? and how did this state of being over the edge of culture influence his credibility and reputation?

Butler was, in a small measure, part of all of these people and his reception was, positively or negatively, evidence of that. The next chapter aims to show Butler's place in between the nineteenth-century and the early twentieth-century debate in relation to his fame and literary failure. In particular, it shows how his fame arose and then decreased in relation to his friendship with Charles Darwin, his family and members of the scientific circles of the time. The problem of his authorship and the direct consequences that it inflicted on his own career will be pointed out in relation to two main periods. First, during his life looking at his social and literary failure, and, second the rise of his literary and scientific fame in the first decades after his death.

[112] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 183.

Mr Samuel Butler was a humourist, and he did many thing, handicapping himself thus doubly, as he well knew, to the world's view. The author of *Erewhon* was not supposed to be serious in anything, and in this age of specialism for a classic scholar to know anything of art or science is considered indecent, if not inconceivable.
The Athenaeum, 28th June 1902[1]

CHAPTER THREE:

Butler's social and scientific position within the late nineteenth-century scientific community

3.1 A man, philosopher, writer and scientist: Butler's rise and fall of fame

There is no study focused on Butler's reception in Europe during his lifetime. However, Paradis' recent essay 'Butler after Butler: the Man of letters as Outsider' provides a general account of his reception within the UK. Starting from the analysis of Butler's sales, Paradis moves onto his reception in England, first during his life and immediately after his death.[2]

My argument, starting from the same data, tries to see Butler's fame across two centuries focusing on different countries. It also tries to show how Butler's tendency to being considered an eccentric Victorian directly influenced his fame and his life. Proof of this has been provided by the author himself within the 'Analysis of the Sales of My Books' a section of Butler's notebooks.

[1] Richard Streatfeild (ed.), *Samuel Butler: Records and Memorials*, p. 9.
[2] James Paradis, 'Butler after Butler: the Man of letters as Outsider' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 343-345.

	Copies Sold	Cash Profit	Cash Loss	Total Profit	Total Loss	Value of Stock
Erewhon	3843	62:10:10	–	69:3:10	–	6:13:0
The Fair Haven	442	–	41:2:2	–	27:18:2	13:4:0
Life & Habit	640	–	4:17:1½	7:19:1½	–	12:16:3
Evolution Old & New	541	–	103:11:10	–	89:13:10	13:18:0
Unconscious Memory	272	–	38:13:5	–	38:13:5	–
Alps & Sanctuaries	332	–	113:6:4	–	110:18:4	22:8:0
Selection from Previous Works	120	–	51:4:10½	–	48:10:10½	2:14:0
Luck or Cunning?	284	–	41:6:4	–	13:18:10	27:7:6
Ex Voto	217	–	147:18:0	–	111: 8:0	36:10:0
Life & Letters of Dr. Butler	201	–	216:18:0	–	193:18:0	23:0:0
The Authoress of the Odyssey	165	–	81:1:3	–	59:10:3	21:11:0
The Iliad in English Prose	157	–	89:4:8	–	77:6:8	11:18:0
A Holbein Card	6	–	8:1:9	–	8:1:9	–
A Book of Essays	0	–	3:11:9	–	–	3:11:9

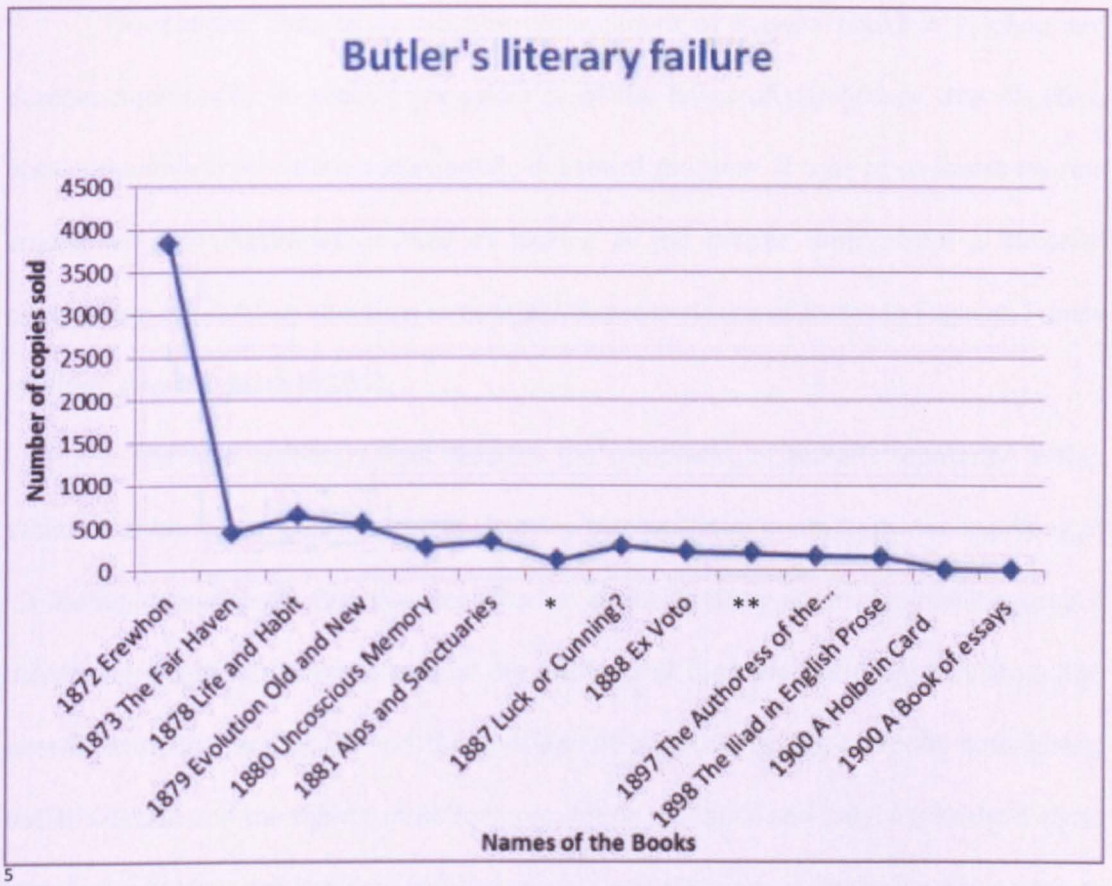
TOTALS: Cash Profit = 62:10:10; **Cash Loss** = 960:17:6; **Total Profit** = 77:2:11½; **Total Loss** = 779:18:1½; **Value of Stock** = 195:11:6[3]

The table shows, in terms of sold copies, the failure of Butler's literary activity during his life. Written by Butler in 1898 and edited by Henry Festing Jones in 1912, this table was the last and only report provided by the writer regarding the sales of his books.

Starting from it, a substantial reduction of the amount of sales can be found after the publication of *Evolution Old and New*. In biographical terms, Butler himself defined the data by saying 'It will be noted that my public appears to be a declining one; I attribute this to the long course of practical boycott to which I have been subjected for so many years, or,

[3] Elaboration, in a table, of Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 368.

if not boycott, of sneer, snarl and misrepresentation. I cannot help it, nor if the truth were known, am I at any pains to try to do so'.[4]



[5]

As the table shows, the reputation of Butler radically decreased after *Evolution Old and New* and the consequent quarrel with Charles Darwin. The reduction in the sales of his scientific books also compromised his fame in the literary field. From 3843 copies of *Erewhon* to the 165 of *The Authoress of the Odyssey*, there was a significant reduction of interest in Butler's books. This is a meaningful data which has to be unpacked. My hypothesis suggests that the quarrel between Butler and Darwin has been at the core of the writer's decline in fame. Especially in terms of its public development in periodicals (this will be largely discussed within chapter 4), the quarrel became the main reason for Butler's

[4] *Ibid.*, p. 370.

[5] See the voice 'Analysis of the Sales of My Books', Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 368. * indicates the volume 'Selection from Previous Works'. ** indicates 'Life and Letters of Dr. Samuel Butler'.

social failure. It represented also the reason behind Butler's status of outsider and for his re-birth at the beginning of the twentieth-century.[6]

This chapter aims to discuss the development of Butler's books in England and Europe. Additionally, in seeking for evidence of the levels of significance that his ideas obtained within the cultural and scientific debate of the time, it tries to re-assess his role among his contemporaries. Instead of looking at the matter simply from a Victorian perspective, my reading also aims to consider the renaissance of Butler in England, France and Italy after his death in 1904.

In the next section, I shall describe the complexity of Butler's reputation within Victorian cultural and scientific circles. I aim to discuss Butler's role from the beginning of his literary career to the first decades after his death. In doing so, my work will approach three different events which produced the decline and then the rise of Butler's fame: the quarrel with Charles Darwin and the consequent rejection by the scientific community; Butler's death; and the rebirth of Butler's reputation in France and Italy. My analysis starts with Butler in Victorian England, and then moves on to Europe and colonies. I also wish to consider the possibility of identifying traces of Butler's scientific role within early twentieth century scientific culture.

3.1.1 Samuel Butler's place in England

Starting from a retrospective point of view, it is always a complex issue writing about the fame of an author. It is complex because our interpretation can be influenced by a multitude of factors. First of all, interpretations done by other historians and literary scholars can shape our approach in a positive or negative way. Secondly, our desire to

[6] In 'Butler after Butler' Paradis uses a similar starting point in addressing his interpretation of Butler as a Victorian outsider but instead opening the debate to his reputation within the twentieth-century in Europe he focused only on the British debate.

highlight the author's fame can cause us to write the outcomes of his life in an inappropriate perspective.

James Paradis' 'Butler after Butler: the Man of Letters as Outsider' provides the most recent investigation of Butler's reception among his contemporaries describing his as an outsider. Before Paradis, Peter Raby in his biography of Butler wrote few pages concerning the writer's place in the UK, looking at him from the point of view of literary criticism. Both of these approaches suggest a portrayal of the English writer as 'the archetypal rebel, stood deliberately at an angle of his age, relisting its values and judgments'.[7]

Assessed through the eyes of the Victorians the opus of Samuel Butler seems to be the emblem of a big failure. In 1903, immediately after Butler's death, Henry Festing Jones started his large biographical work on the British writer. Through the publication of a *memoir*, articles and several other contributions Jones was the first who tried to re-establish Butler's name. After him, many others published studies trying to re-establish Butler's fame in literature and art. However, for Butler's scientific work the situation was different. Historians of science, started to work properly on Butler's science only recently considering him as a Victorian amateur scientist.

Nothing can be further from the truth. Butler was indeed, a relevant participant in the debate, but he was also an outsider. During the thirty years between 1860 and 1890 Samuel Butler published scientific books, presented papers and was in contact with European scientists and men of culture, but he was also totally ignored and derided by his Victorian contemporaries. In re-constructing Butler's presence within the British debate I need to focus on two different points in time. First, there is the reception of Butler by the people of his generation and the consequent rise and fall of his fame. Second, there is the

[7] Peter Raby, *Samuel Butler: A Biography*, p. 295.

renaissance of Butler's fame in the period in between 1904-1920 and the consequent acknowledgment of his scientific ideas.

The best place to start in seeking evidence of Butler's place in England is London in 1902, the year of Butler's death. The notice of Butler's demise appeared in the main journals and newspapers (published in the weeks immediately following the writer's death) including: *The Times, The Athenaeum, The Monthly Review* and *The Eagle*. Furthermore, the same news was published in several Italian journals such as *Il Corriere Valsesiano, Il Monte Rosa, Quo Vadis?* and *Nuova Antologia.*[8] In retrospect, the news of his death did not make many changes beyond the boundaries of his private network. Of the ten obituaries that Richard A. Streatfeild, Butler's friend and testament executor, conserved for private circulation, one came from Cambridge- (*The Eagle)*, one from New Zealand- (*The Press)* and five from Italy (Varallo, Trapani and Rome).[9]

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[8] Richard Streatfeild, *Samuel Butler: Records and Memorials*, pp. 1-3.

[9] Peter Raby, *Samuel Butler: A Biography*, p. 295.

[10] Samuel Butler in his room at Clifford's Inn, about 1890, the picture is property of Butler's collection at St John's College Library, Cambridge.

In commenting on Butler's death, the main journals of the time agreed in defining him as a writer (author of the famous *Erewhon*) but also the man who railed against Darwin and his idea of natural selection. On the 20th June 1903 *The Times* wrote:

> We regret to announce that Mr Samuel Butler, best known to his countrymen as the author of *Erewhon*, died on Wednesday night, in his 67th year. He was a remarkably gifted man, though he never won the success and recognition to which his intellectual force and his powers of expression entitled him. [...]he used to boast that his grandfather the Bishop attacked Darwin's Grandfather, that his father has been in controversy with Darwin's father, and he seemed to his own hostility to Darwin's system and his vindication of Lamarck as instance of hereditary feud.[11]

More specifically, in terms of Butler's own engagement with evolution in the shape of anti-Darwinism the correspondent of *The Times* reported:

> It is certain that he set the greatest value on his anti-Darwinism writings, a judgment in which few impartial critics will agree. There was much that stimulating in his books connected with this subjects[..] but they were lacking in clearness, coherence and consistency, and their effect was inevitably imperfect and evanescent.[12]

As shown by the quotations we can see that, at the time of his death, Butler was considered a gifted man but also a man unable to escape from his own destiny. In particular, in relation to Darwin and evolution, Butler's books were theoretically stimulating but, as stated by *The Times*, lacking in clearness, coherence and consistency, the expected aspects of late nineteenth-century scientific expertise.

One week later, *The Athenaeum* dedicated an article to Butler's demise, signed by Vernon Horace Rendall. The critical tone of the article recalled that of *The Times*, but it also dismissed even further Butler's personality and scientific books. According to the article Butler was 'a humourist, and he did many things, handicapping himself thus doubly, as he well knew, to the world's view ', he also 'was not supposed to be serious in anything, and in this age of specialism for a classic scholar to know anything of art or science is considered

[11] Richard Streatfeild, *Samuel Butler: Records and Memorials*, p. 3.
[12] *Ibid.*, p. 4.

indecent, if not inconceivable'.[13] The tone became even more critical when Rendall focused on Butler's scientific books. He wrote:

> His scientific books[...]are now, perhaps forgotten, and difficult to get, as only small editions were printed. I do not think that he consider them the best of his work, though the increasing body of Neo-Lamarckians might find them useful. The hereditary quarrel with Darwin and Darwin's forbears of which he used to speak was in later life at any rate not more than a jest, though he always felt that Darwin had not treated him quite fairly'[14]

As written, Rendall's conclusion underestimated the weight of Butler's books within the continental debate of his time. However, it also reflected the genuine opinion of the early twentieth century British community upon the Victorian writer. This second aspect was particularly interesting. According to Rendall's article, there was a duality in the thinking regarding Butler in terms of his fame: as an eccentric Victorian unable to grasp a specific topic, and a posthumous genius acclaimed by post-Victorian society. We can agree with these two portrayals. As an example, Paul White's study on Huxley and his work in making the figure of the Victorian man of science suggests that being outside institutions corresponded to the failure of a scientific career.

During the period between the publication of *Life and Habit* and *The Deadlock of Darwinism* Butler opened up a war against the biological orthodoxy of the period. These books did exactly the opposite of what was suggested by Huxley, in shaping his gentleman of science. Instead of considering science in terms of expertise and specialism, Butler's books still discussed evolution in relation to metaphysics. Thus, evolution was not treated and investigated with observation and scientific experiments. It was, instead, studied in relation to concepts such as teleology, mind and the tabula rasa. This approach placed Butler in the difficult position of being an outsider regarding the consolidated world of institutional scientific research.

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[13] *Ibid.*, p. 7.
[14] *Ibid.*, p. 7.

At the end of his life, Butler was significantly outside all respectable scientific communities. The author was also not involved in any activities within colleges or academia, even though he had tried to obtain a lectureship in history of art at the University of Cambridge. Butler was aware of the risk of working in an institution, considering it an obstruction for his freedom. Butler wrote concerning the shape science was assuming at the end of the century: 'Universities and academies are an obstacle to the finding of doors in later life; partly because they push their young men too fast through doorways that the universities have provided, and so discourage the habit of being on the look-out for others; and partly because they do not take pains enough to make sure that their doors are bona fide ones.'[15]

3.2 Samuel Butler 'the man of science' in Britain between 1860 and 1890

In determining Butler's scientific position within the British debate during the second part of the nineteenth-century, the best way to seek for evidence is within the amount of reviews his scientific books received. They were all-negative and produced an inevitable decrease in his fame. The first positive shift in Butler's reputation came with the publication of *The Way of All Flesh* in 1903 and Henry Festing Jones' edition of Butler's notebook in 1912. In particular, the 1912 edition of Butler's notebook led to a major revaluation of him as a writer, philosopher, artist and populariser of science re-portraying him as a modern individual, frank, unconventional, provocative and intimate.[16]

Although the issue of sales is a primary historical source for establishing the success or failure of a writer, a second argument, deeper in terms of evidence, may be more historically relevant. In recent years, historians of science and literary scholars have demonstrated how the core of Victorian biological science in England (after 1859) was in

[15] Samuel Butler, *Alps and Sanctuaries of Piedmont and the Canton Ticino*, p. 154-155.
[16] Peter Raby, *Samuel Butler: A Biography*, p. 298.

the hands of two people. On the one hand, Darwin, the father of 'evolution' and 'natural selection' and, on the other hand, Thomas Huxley, the architect of the new politics of making science as the field for specialism. These, directly and indirectly, decided the roles of Victorian natural science, allowing people to be part of the game by role. It follows, that for an author who could be an amateur scientist, a populariser of science or a novelist, the fact of being accepted by one (or both) of these two men could determine the development of his own career. The case of Butler's fame was an example of this cultural tendency.

Before the beginning of the quarrel with Charles Darwin and his family, Butler was respected as a novelist and his scientific ideas were even accepted with enthusiasm by Darwin and his circles. In terms of correspondence, a large number of letters between Butler, Charles and Francis Darwin are kept in the archive room of the University of Cambridge. These letters tell a different story concerning the real relationship between Butler, the father of evolution and the scientific community of the time. Before 1879, the year of *Evolution Old and New*, Butler was on friendly terms with the whole Darwin family. He used to visit them at Down House and met in London with Francis ('Frank') Darwin.[17] As reported by Henry Festing Jones, Butler was also known by and, even on friendly terms with, Mivart, Wallace, Hooker, Allen and many other scientific personalities of the period.[18]

3.2.1 Reconstructing a family tale

In reading the major studies concerning Butler's life and writing activity, it appears immediately evident how the quarrel between Butler and Darwin has been a primary historical object used in reconstructing the scientific credibility of Butler. As a matter of fact, when historians speak about Butler and Darwin, they inevitably start with the quarrel.

[17] In developing the Butler-Darwin friendship Henry Festing Jones wrote two pamphlets entitled *Samuel Butler: A Sketch* (1913) and *Charles Darwin and Samuel Butler: A Step Towards Reconciliation* (1911).

[18] Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir*, Vol. 1 pp. 267-293.

The quarrel represents a well-known episode regarding Butler and his scientific activity, but it is only one part of the story. From Basil Willey's *Darwin and Butler: Two Versions of Evolution*[19](1960) to the recent James Paradis essay 'The Butler-Darwin Biographical controversy in the Victorian periodical press'[20] the questions concerning the complexity of Butler and Darwin's relationship have been examined only in the light of the quarrel. Was it the real story? Was there only a quarrel between the father of evolution and the writer or maybe it is deeper and more detailed?

The 1879-1882 quarrel between Butler and Darwin has been the object of many studies. It involved letters written between Butler and Darwin upon the biography of *Erasmus Darwin* published in 1879 by Ernst Krause in the German periodical *Kosmos*. As stated by Butler in *Unconscious Memory* (1880), the main reason behind the beginning of the quarrel was the *non*-acknowledgement of *Evolution Old and New* (which provided chapters about Erasmus Darwin's work on evolution) by Krause and then by Darwin's introduction to English translation of Krause's paper.

Without focusing on the letters, my aim is to discuss how the quarrel has been used in defining Butler's scientific work. The first recent study concerning the quarrel was published by Nora Barlow. She developed it within an appendix included in her edition of *The Autobiography of Charles Darwin 1809-1882* saying:

> Today the once notorious quarrel between Samuel Butler and Charles Darwin is almost forgotten, and the short account in the complete version of the Autobiography,—printed here for the first time,—will only raise vague memories in the minds of most readers.[21]

It was 1958 and the quarrel between Butler and Darwin was totally forgotten amidst many other Victorian memories. Barlow's study, although original and innovative, lacked much in

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[19] Basil Willey, *Darwin and Butler: Two Versions of Evolution: The Hibbert Lectures of 1959*.

[20] James Paradis, 'The Butler-Darwin Biographical Controversy in the Victorian Periodical Press' in Geoffrey Cantor and Sally Shuttleworth (eds.), *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals*, pp. 307-331.

[21] Nora Barlow (ed.), *The Autobiography of Charles Darwin 1809-1882. With the Original Omissions Restored. Edited and with Appendix and Notes by his Grand-Daughter Nora Barlow*, p. 168.

terms of the sources analysed. Barlow -Darwin's granddaughter- referred to a Cambridge dossier (a collection of letters stored in the manuscript room at Cambridge university library) and to a pamphlet saying 'Henry Festing Jones, Butler's biographer and friend, brought out a Pamphlet, in 1911, now out of print, entitled "Charles Darwin and Samuel Butler, A Step Toward Reconciliation"'.[22] Within the appendix, Barlow aimed to shed new light upon questions concerning the quarrel while maintaining preference to its Darwinian side. In doing so, she included a large part of the correspondence stored at Cambridge University, but focusing only on the letters written after the publication of *Evolution Old and New* in 1879. She defined Butler:

> Butler stands as the perpetual revolutionary, who only turned against Darwin after Darwin had become the acknowledged prophet. Darwin was rebelling against current biological concepts and delivered Man into the evolutionary machine; he rejected all easy speculators as ephemeral, and to him Butler and his theories remained ephemeral.[23]

In saying this, Barlow portrayed Butler as a villain against her grandfather, but also reflected the 1950s state of knowledge regarding Butler's scientific ideas. Barlow's appendix was the starting point for how Butler's fame changed over the latter half of the twentieth century. In order to summarize the incoherent interpretation that dogged Butler from the Victorian age to 1950, one need cite only the last part of Barlow's appendix.

> Butler's satirical genius lashed the shams and hypocrisies of his time. His writings on quasi-scientific themes as well as his philosophy on the art of living, were based on his inward experience, in revolt against fact-finding materialism. In Natural Selection and its dependence on chance variation for its effectiveness,—though Darwin himself vacillated on this point as Butler very well knew,—Butler saw a complete surrender to a mechanical world, with Man as the supreme machine, and all effect of Mind and its striving ruled out as a guiding force. He formed his theory of Mind and Memory in the speculative manner of the previous century, following and extending the ideas of Lamarck and Dr. Erasmus Darwin, with acknowledged indebtedness to his own contemporary, Dr. Hering. Butler paraded the old theories in a new guise, and took on the role of the maltreated, posthumous "enfant terrible" of the Physico-theologians of the 18th century. Butler's intervention into the scientific fold with this hybrid of science and philosophy could not be tolerated by the new biological school of Darwin and Huxley.[24]

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[22] *Ibid.*, p. 172.
[23] *Ibid.*, p. 217.
[24] *Ibid.*, pp. 217-218.

According to the quotation, Butler's work was not be tolerated by the new biological school of Darwin and Huxley and consequently Butler held no interest for 1950s historians of science. He was only one part of that group of Victorians who were unable to recognise the unique role of Biological science.

Published in 2004, James Paradis' 'The Butler-Darwin Biographical Controversy in the Victorian Periodical Press' shows us a completely different side of the quarrel.[25] In disagreement with Barlow, Paradis states that the quarrel was something more than a family discussion. According to him, the main outcome of the quarrel was the dismissal of Butler from the Victorian scientific community and the total defeat of his psychophysiological hypothesis in the Victorian press.[26] In Paradis' paper we can see two important aspects that were ignored by Barlow. First, in the Butler and Darwin controversy the real battlefield was not the correspondence but the periodical press. Through their able use of periodicals Darwin, Huxley and Romanes were able to describe Bulter's work to Victorian readers as a 'vile and abusive' attack on the great Victorian hero: Charles Darwin.[27] Second, Darwin, Huxley and Romanes moralized their criticism on Butler by focusing on his human side rather than his scientific hypothesis.[28] Thus, Butler became the villain, the anti-Victorian, the nemesis of Victorian science.

Returning to the questions proposed at the beginning of this section the answer is no. The story was more complex. The relationship between Butler and Darwin was a sort of Victorian family tale. As Francis Darwin wrote in his *Life and Letters of Charles Darwin*:

> The friendship between the families of Darwin and Butler began many years ago. Charles Darwin's father, Robert, was the leading doctor in Shrewsbury when Butler's grandfather, Dr. Butler, was headmaster of Shrewsbury School. Charles Darwin and Butler's father, Canon Butler, were schoolfellows at Shrewsbury, under Dr. Butler, and undergraduates together at Cambridge. They spent the summer of 1828 together on a reading-party at

[25] James Paradis, 'The Butler-Darwin Biographical Controversy in the Victorian Periodical Press' in Geoffrey Cantor and Sally Shuttleworth (eds.), Science *Serialized: Representation of the Sciences in Nineteenth-Century Periodicals*, pp. 307-331, esp. 310-315.
[26] *Ibid.*, pp. 320-323.
[27] *Ibid.*, p. 324.
[28] *Ibid.*, pp. 324-325.

> Barmouth, and Canon Butler said of Charles Darwin, "He inoculated me with a taste for Botany which has stuck by me all my life.[29]

This begins to suggest that between the writer and Darwin there was more than a simple quarrel regarding evolution. The classic history of science has claimed that Darwin started his discussion with Butler only after the publication of *Life and Habit*, but in fact the story of this friendship/relationship started even before the return of Butler from New Zealand.

Several letters were written before 1865 by Darwin regarding a 'New Zealand farmer' with a genuine passion for evolution. Everything started with the publication of a dialogue: 'Darwin on the Origin of Species: a Dialogue', published in *The Press* of Christchurch, New Zealand, on 20 December 1862. This small piece of writing created a large ripple in New Zealand and it also reached the ear of Charles Darwin.

> Down. | Bromley. | Kent. S.E.
> 1863 -March 24 th
> Private
> Mr. Darwin takes the liberty to send by this post to the Editor a New Zealand newspaper for the very improbable chance of the Editor having some time spare space to reprint a Dialogue on Species. This Dialogue, written by some quite unknown to Mr. Darwin, is remarkable from its spirit & from giving so clear & accurate a view of Mr. Ds. theory. It is, also, remarkable from being published in a Colony exactly 12 years old, in which, it might have thought, only material interests would have been regarded.
> Yours Obediently | Ch. Darwin[30]

Darwin seemed to be interested in the 'Dialogue on Species' for two main reasons. First, Darwin seems to have appreciated its spirit and accuracy in explaining natural selection. Second, the Dialogue had particular relevance as it was written in New Zealand, a young colony where it was not easy to hear about the English scientific debate.[31]

Darwin continued to be fascinated by Butler's Dialogue. In the same year, in a letter written on the 18th July to John (Julius) Haast,[32] Darwin mentioned, once again, the

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[29] Francis Darwin, *Life and Letters of Charles Darwin, Vol. I*, p. 168.

[30] Charles Darwin to anonymous 24th March 1863, Darwin Correspondence Project letter n. 4058.

[31] The editor and journal to which Darwin sent this letter have not been identified; however, in 1911, the letter was discovered among the papers of John Malcolm Forbes Ludlow, a Christian socialist with an extensive acquaintance see ('Samuel Butler's lost dialogue', *Press*, 1 June 1912).

[32] German-born explorer and geologist. Travelled to New Zealand in 1858 to report on the prospects for German emigration. Explored the western districts of Nelson province at the request of the

mysterious dialogue, saying 'I wonder whether you were the Author of a very amusing & really excellently done Dialogue on Natural Selection, in a New Zealand paper, which was sent to me?'.[33] For the whole year, the secret concerning the author of the dialogue remained hidden in New Zealand. The solution of the mystery arrived only a few months later in a letter from Emma Darwin to Hooker dated 7th December 1863. Emma wrote:

> Also 2 squibs[34] by the Author of the Dialogue in the New Zealand paper on Origin. He is a Mr Butler Grandson of the old master of Shrewsbury C.'s schoolmaster[35].

The next step of the story occurs in the year 1865. Butler was now recognised as a writer by Darwin. Between the 30th September and the 26th December 1865, there was another exchange of letters. The object of the letters was, in that case, Butler's book *The Evidence of the Resurrection of Christ* (pamphlet sent from Butler do Darwin in the summer of 1865) and some comments regarding a possible return of the writer to London.

The first letter of this group was written by Darwin on the 30th September 1865. The letter showed Darwin's interest in Butler's book and future plans. Darwin wrote: 'I am much obliged to you for so kindly sending me your "Evidence &c—" We have read it with much interest. It seems to me written with much force, vigour, & clearness; & the main argument is to me quite new. I particularly agree with all you say in your preface. I do not know whether you intend to return to New Zealand & if you are inclined to write I should much like to know what your future plans are'.[36]

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provincial government in 1859. Appointed provincial geologist, 1861. Conducted the first geological survey of Canterbury province, 1861–8. Became a British national in 1861. He was friend of Samuel Butler as reported in the record of his geological expedition and, later on, by Henry Festing Jones in his memoir. He, also, founded the Philosophical Institute of Canterbury in 1862, and the Canterbury Museum in 1863. Professor of geology, Canterbury College, 1876–87. Member of the senate of the University of New Zealand, 1879–87. Knighted, 1886. FRS 1867.

[33] Letter from Charles Darwin to John (Julius) Haast 18th July 1863, Darwin Correspondence Project letter n. 4245.

[34] The squibs were published in the Press on 13th June 1863, p. 1, and 15 September 1863, p. 2. There are copies in the 'Scrapbook of reviews' in the Darwin Archive–CUL.

[35] Extract of a letter from Emma Darwin to J. D. Hooker on the 7th December 1863, Darwin Correspondence Project letter n. 4351.

[36] Darwin to Butler Samuel 30th September 1865, Down, Darwin Correspondence Project Letter n. 4902.

In reply on the 1st October 1865 Butler wrote a long letter which presented two important aspects. First, the letter provided some personal information about Butler's future plans regarding a possible return to London and his desire to work there as an artist. Second, and more important, Butler tried to clarify some aspects regarding the correlation between the *Origin of Species* and his New Zealand dialogue. Butler wrote:

> I always delighted in your origin of species as soon as I saw it out in N.Z—not as knowing anything whatsoever of natural history, but it enters into so many deeply interesting questions, or rather it suggests so many that it thoroughly fascinated me. I therefore feel all the greater pleasure that my pamphlet should please you however full of errors it may be. The first dialogue on the origin which I wrote in the Press called forth a contemptuous rejoinder from (I believe) the Bishop of Wellington—(please do not mention the name, though I think that at this distance of space & time I might mention it to yourself) I answered it with the enclosed which may amuse you. I assumed another character because my dialogue was in my hearing very severely criticised by two or three whose opinion I thought worth having, and I deferred to their judgement in my next. I do not think I should do so now. I fear you will be shocked at an appeal to the periodicals mentioned in my letter, but they form a very staple article of bush diet, and we used to get a good deal of superficial knowledge out of them. I feared to go in too heavy on the side of the origin because I thought that having said my say as well as I could I had better now take a less impassioned tone: but I was really exceedingly angry.[37]

As stated in the letter, Butler's tone seemed to be quite dismissive. Conscious of Darwin's interest in his work, Butler was still looking for his approval. Additionally, Butler seemed to share with Darwin a belief in an antagonism between science and theology.

On the 26th December 1865, another letter from Darwin to Haast referred, once again, to Butler: 'Mr S. Butler is now established in London as an artist. He lately sent me a clever theological pamphlet. I should have much liked to have seen him here & have heard N.Z. news, but the bad state of my health has rendered this impossible'.[38] John (Julius) Haast was, in this period, particularly important. First, he was the formal link between Butler and Darwin. Haast was Butler's friend in New Zealand, as proved by the correspondence.[39] Second, Haast was also a scientist who probably discussed with the

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[37] Charles Darwin to Butler Samuel 1st October 1865, Darwin Correspondence Project Letter n. 4904.

[38] Charles Darwin to Haast, Darwin, 26th December 1865, Darwin Correspondence Project, Letter n. 4956.

[39] Henry Festing Jones in his memoir referred to a long friendship between Butler and Haast evidenced by many letters. See Jones, Henry Festing, *Samuel Butler, Author of Erewhon (1835-1902): A Memoir, Vol.1,* pp. 70-86.

writer several point of Darwin's *Origins*. As a proof of this in *Geology of the Provinces of Canterbury and Westland,* Haast wrote:

> We following this opening to the Rangitata, having the snow-covered peaks of the central range before us; and, after descending several hundred feet into the bed of the river Potts where it joins the Rangitata, we crossed that river and reached Mesopotamia, then the sheep station of Mr Samuel Butler, where I established my head-quarters[40]

Before the beginning of the quarrel, there was also another group of letters regarding Butler's scientific writing, which has been almost forgotten. In the period in between the publication of *Erewhon* and *Life and Habit* we can see between the writer and Darwin a relationship founded on a mutual respect. Far from the servile and obsequious tone of the first letters, between 1872 and 1878, Butler started approaching Darwin in a different way.

The first letter of this new group was written from Butler to Darwin on 11 May 1872 with the intention of explaining the misunderstanding generated by the reception of *Erewhon* in relation to Darwin's natural selection (Letter 8318, London). Butler wrote:

> I venture about the liberty of writing to you about a portion of the little book Erewhon which I lately published, and which I am afraid has been a good deal misunderstood. I refer to the chapter upon Machines in which I have developed and worked out the obviously absurd theory that they are about to supplant the human race and be developed into a higher kind of life[..]I therefore thought it unnecessary to give any disclaimer of an intention of being disrespectful to *The Origin of Species*, a book for which I can never be sufficiently grateful, though I am well aware how utterly incapable I am of forming any opinion on a scientific subject which is worth a moment's consideration.[41]

According to the quotation, Butler had to clarify his use of Darwin's natural selection in *Erewhon.* As stated in chapter two, in *Erewhon* the writer took natural selection to his extreme consequences applying evolution to machine.[42]

To this letter there was no reply, but Butler was invited to visit Darwin and his family in Down and to discuss the novel face to face.[43] A couple of weeks later, on the 30th May 1872, Butler wrote again to Darwin proposing to send to him a copy of the second

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[40] Julius Haast, *Geology of the Provinces of Canterbury and Westland*, p. 4. Also quoted in Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir* , Vol 1, p. 88.

[41] Samuel Butler to Charles Darwin, 11 May 1872, Darwin Correspondence Project Letter 8318.

[42] An explanation of Butler's use of Darwin's 'natural selection' in the novel *Erewhon* will be provided in chapter 5.

[43] Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir*, Vol 1, p. 157.

edition of *Erewhon* (Letter 8361, 30th May 1872 London). He also enclosed in the letter the name of a young artist, friend of Butler at the London art school Heatherley, Arthur May. At the time Darwin was looking for someone able to draw pictures for his imminent book *The Expression of the Emotions in Man and Animals* (1872).[44] Butler showed some of May's drawings to Darwin, some of which were later included in the book.

In 1873, Butler wrote to Darwin about his new religious book, *The Fair Haven*. Butler sent a copy of the novel to Darwin, who replied with words of esteem and enthusiasm. As happened before, the father of evolution read with interest Butler's criticism made of theology and church tradition. As a reply to this letter, Charles Darwin, on the 1st Apr 1873, invited Butler to visit him saying 'if you could come here we should have been very glad to have seen you at luncheon or dinner.'[45] Butler enthusiastically replied, also encouraged by the reception of his second novel on the 15th April 1873.[46] After 1873 Butler remained on friendly terms with Francis Darwin. According to Jones's *Memoir* they (Butler and Francis) often met in London, and were in the habit of dining together and going to concerts.[47]

During their meetings, they were used to discuss scientific topics, especially those connected with the imminent publication of *Life and Habit*. On the 24th Sept 1877, Butler brought to the attention of Charles Darwin, via his son, a manuscript copy of a part of *Life and Habit* with a long letter (Darwin Correspondence project, Letter 11152). Butler's aim was to inform Charles Darwin about his idea of unconscious memory, and to solicit comments and suggestions about the coming up book. However, he was also offering to Francis the opportunity to read a preview of his first scientific book.

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[44] Butler, Samuel to Darwin, Francis, [before 30th May 1872], Darwin Correspondence Project Letter n. 8305.

[45] Samuel Butler to Charles Darwin, 1st Apr 1873, Darwin Correspondence Project Letter 8835.

[46] Samuel Butler to Charles Darwin 15th April 1873, Darwin Correspondence Project Letter 8859.

[47] Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir*, Vol 1, pp. 256-257.

Two months later, on the 25th November 1877, Butler wrote to Francis announcing the forthcoming publication of *Life and Habit*. However, in the letter he also offered to send two copies of his book one to Francis and the other to his father (Letter 11254, London). He wrote:

> I am going Down home this week but I expect before I return my book will be out; it has been vexatiously delayed by printers, but should leave the binders on Thursday or Friday, and I have left the instruction that two copies shall be at once sent you –one of which if you think fit after reading it, you will perhaps be kind enough to give it to your father.[48]

According to the quotation, Butler seemed to ask Francis about the validity of his hypothesis before offering *Life and Habit* to the attention of Charles Darwin. Butler was obviously worried about his strong use of the work of Lamarck and Mivart in establishing the central place of memory as a form of heredity in the process of evolution.

Additionally, Butler pointed out his support for Darwin in the letter, although suggesting the necessity to amalgamate his theory of natural selection with that of Lamarck:

> With these additions (if they are additions) I cannot see that Lamarck's system is wrong. As for "natural selection," frankly, it now seems to me a rope of sand as in any way accounting for the origin of species. Of course I am strengthened in my opinion by seeing that it [Life and Habit'] reduces to a common source the sterility of hybrids; the sterility of many wild animals under domestication; all variation (as being only a phase of sterility itself or rather the only alternative left to a creature under greatly changed conditions if the changes are not great enough to induce sterility); the phenomena of growth and metagenesis; the phenomena of old age; and a lot more which I see at present too uncertainly to venture to commit myself to paper concerning them.[49]

On the 28th November 1877, Francis replied to Butler concerned about his stern judgment on natural selection. In the letter, he especially referred to the writer's use of Mivart, defining it with these words:

> I think the falseness of Mivart's argument (Genesis of Sp. chapter ii.) is shown by applying it to man's selection which we see before our eyes at work[...]I think if Mivart had been more of a naturalist instead of an anatomist he would not have dared to think that he could gauge natural selection's power of discrimination.[50]

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[48] Samuel Butler to Francis Darwin, 25th Nov 1877, Darwin Correspondence Project, Letter n. 11152.
[49] *Ibid.*.
[50] Letter from Francis Darwin to Samuel Butler, 28th November 1877. See Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir*, Vol 1, p. 261.

As stated in the letter, Francis seemed not sure about Butler's hypothesis of evolution especially because of his apparent preference for Mivart's teleological approach over that of natural selection.

Sent one month later, on 28th December 1877, a second letter from Francis Darwin returned to the same problem, providing a more detailed explanation. Here, Francis Darwin made several criticisms concerning the conclusion of *Life and Habit,* signifying the inefficacy of Butler's argument recommending, instead, Huxley's hypothesis of 'animal automatism'.[51] According to Francis, although Butler's hypothesis regarding the analogy between memory and heredity was very well worked out, his psychophysiological vision of evolution was not properly scientific. Instead, he suggested the use of Huxley's article, where the scientist 'tried to show that consciousness was something superadded to nervous mechanism, like the striking of a clock is added to the ordinary going parts'.[52]

Butler replied on the 29th December showing his own disappointment regarding the heavy-handed judgment about his *Life and Habit*. He wrote: 'One line to thank you for yours of this morning, which I confess was rather a relief to me, as I was afraid you might have considered Life and Habit unpardonable'.[53] In the letter, he also referred to his new passion for Lamarck suggesting his intention to write a book upon hypotheses of evolution before *The Origin of Species*.

To Conclude this section, I want to discuss one final point. According to the quotations, we have seen how between Butler and Darwin there was more than a brief controversy. Especially in between 1872 and 1878, Butler seemed to be on very friendly terms with Charles and Francis Darwin visiting them at Down house, discussing with them his work, and even putting them in touch with an artist like Arthur May. However, after the

[51] *Ibid.*, p. 261.
[52] *Ibid.*, p. 263.
[53] *Ibid.*, p. 264.

publication of *Life and Habit* the situation changed. We can state two things. First, the quarrel between Butler and Darwin represented, in the Victorian period, the end of Butler's fame in England. However, as discussed in this section, it was only a small part of the Butler-Darwin relationship. Between the writer and the scientist, there was a deeper engagement which involved more than a personal and public dispute upon the biography of Erasmus Darwin. Second, regarding Butler's reception in England, we notice how it was directly linked with his relationship with Darwin. According to Paradis' essay, from the beginning of the quarrel Butler became part of a 'conspiracy' devoted to the annihilation of his work. In the coming section, my aim is to look at Butler's fame outside Great Britain seeking evidence of Butler's reception in foreign countries.

3.3 Butler's reception in Europe

Butler's work was widely disseminated in Europe and New Zealand both during and after his lifetime. Especially on the continent, his scientific ideas were the object of growing attention within the evolutionary and psychological debates of the *fin de siècle*.

According to Stanley Bates Harkness' *The Career of Samuel Butler, 1835-1902: A Bibliography* Butler's books had two lives: first, in England as seen above and then between 1890 (the year of 'The Deadlock of Darwinism') and the 1920s, in France and Italy. In these two countries, Butler's work became known and respected by writers and scientists. Although translations of Butler's main books were made in Spanish, Dutch, Italian, French, German and other languages,[54] his scientific ideas were discussed mainly in Italy, before and after his death, and in France after 1910.[55]

In this section, my aim is to discuss the reception of Butler's work in Italy and France. However, it is important to notice that this section is not an epilogue of Butler's

[54] Stanley Bates Harkness, *The Career of Samuel Butler, 1835-1902: A Bibliography,* p. 15.
[55] *Ibid.*, pp. 14-16.

career (it will be presented at the end of chapter 5). It is instead an analysis of the *prima facie* public and academic reception of Butler in two countries where his ideas had a prominent role in shaping the scientific and literary culture of the period. Both Italy and France discovered Butler's opus only at the turn of the twentieth-century, creating the first original 'renaissance' of his ideas.

3.3.1 Italy

Italy had always been a place of inspiration for Butler. Traces of Italian culture, ideas, art and science were presented throughout the whole of Butler's opus. The quantity of references in Butler's writing concerning Italy and its culture was second only to the number of references concerning Victorian culture.

As it is widely known, travels in Italy were an important part of the life of many important Victorian writers. During the Victorian period, Italy was considered a privileged place for studying art, writing and having the chance to meet European writers, philosophers and men of science. Recent studies have reconsidered the role of Italy in the Victorian imagination, offering new highlights on the fecund and complex relationship between English and Italian literatures, English culture and the Italian Risorgimento, Roman Catholicism, Italian history and art.[56] *The Victorians and Italy: Literature, Travel, Politics and Art*, for instance, focuses on writers and poets as diverse as Christina Rossetti, Charles Dickens, Robert Browning, Coventry Patmore and George Eliot, looking at their relationship with High Renaissance poetic forms, such as the sonnet, and the poems, novels set in Renaissance Italy. It also looks at the different interpretations of the Renaissance put

[56]The presence of Victorian in Italy have been object of growing interest in recent years. To have more info please refer to Alessandro Vescovi, Luisa Villa and Paul Vita (eds.), *The Victorians and Italy: Literature, Travel, Politics and Art*; Hilary Fraser, *The Victorians and Renaissance Italy* and John Easton Law, Lene Østermark-Johansen, *Victorian And Edwardian Responses to the Italian Renaissance*.

forward by cultural historians such as Ruskin, Pater and Symonds suggesting that in the nineteenth-century Italy and England were not that far apart.

In 1920, Henry Festing Jones' *Memoir* pointed out the important relationship between Samuel Butler and the Italian peninsula. As with other Victorian writers, Butler's relationship with Italy and its culture had been at the base of much of his writing and art criticism. From the beginning of his painting career the engagement with Italian culture and art became, year after year, more deep. His reception there was inevitable. From personal events to novels, passing through photography and art, Italy can be considered Butler's adoptive nation.[57] From the 1840s, Butler started a long continuous personal and cultural partnership with the country. During his childhood he travelled in Italy with his family many times. Several records are present within his notebooks and in his novels.[58]

In all of Butler's novels there has always been a degree of Italian culture. For example, *The Way of all Flesh*'s main character Ernest Pontifex went to Italy during his childhood and later on during his life. Exactly like Butler, the young Ernest spent time in exploring the peninsula and, there, got the chance to learn Italian.

Butler, as reported by Festing Jones, had a similar trip in Italy but instead of arriving in Italy through Nice in France, he passed through Switzerland and arrived in Milan.[59] *The Way of All Flash,* in its partially biographical nature, gives a strong proof of association. Another example comes from Butler's first novel. In *Erewhon* there were many allusions to the country. Although the novel seems to be set in the New Zealand countryside, its population suggests Italian memories. Butler wrote:

> Both the girls and the men were very dark in colour, but not more so than the South Italians or Spaniards. The men wore no trousers, but were dressed nearly the same as the Arabs

[57] See Elinor Shaffer, *Erewhons of the Eye: Samuel Butler as Painter, Photographer, and Art Critic*, pp. 67-167.

[58] In the second volumes of Butler's notebook there are many comments about Italy and Italian art, literature and culture. Two copies: Chapin Library, Williams College (Copy 'A' – the original "master copy", in 8 volumes, containing additions and corrections by Butler). British Library, London (Copy 'B' – a pressed copy of vols 1-6).

[59] Henry Festing Jones, *Samuel Butler, Author of Erewhon (1835-1902); A Memoir*, Vol 1, pp. 26-28.

> whom I have seen in Algeria. They were of the most magnificent presence, being no less strong and handsome than the women were beautiful; and not only this, but their expression was courteous and benign.[60]

As the quotation suggests, the physicality of the Erewhonians recalls faces, bodies and skin colours of the Italians or Spanish but, also, is probably a tribute to Italy itself. It is not the only example. References to Italy in the novel are various. From the language which recalls Italian memories in tones and accent, to the name of the ship at the end of the novel 'the *Principe Umberto*, bound from Callao to Genoa'[61] the world of *Erewhon* seems to be a tribute to Italy. But why was Italy so important to Butler?

In giving an answer to this question two points are relevant. On the one hand, there were the 'happy memories' of his childhood. On the other, there was his reception as a man of culture. In contrast to his negative reputation in England, in Italy Butler was perceived in a totally different light. Before his death, Butler was known in Italy for his literary books, art skills and even for his bizarre scientific ideas. He was an appreciated literary man in Sicily and a recognised artist, photographer and traveller in Piedmont and Lombardy.

The book *Erewhons of the Eye* has provided a detailed and important account of this. In describing Butler's artistic career, Elinor Shaffer distinguishes two prominent places: the school in London as the classroom and Italy as a training ground. The book also provides, with a large selection of photos, evidence of Butler's own passion for the Italian landscape and population. In bibliographical terms, the same evidence was provided by Butler at the beginning of his *Alps and Sanctuaries of Piedmont and Canton Ticino*. There, he wrote referring to himself, Handel and Shakespeare:

> It is always a pleasure to me to reflect that the countries dearest to these two master spirits are those which are also dearest to myself, I mean England and Italy. Both of them lived mainly here in London, but both of them turned mainly to Italy when realising their dreams. Handel's music is the embodiment of all the best Italian music of his time and before him, assimilated and reproduced with the enlargements and additions suggested by his own

[60] Samuel Butler, *Erewhon or Over the Range*, p. 49.
[61] *Ibid.*, p. 314.

> genius. He studied in Italy; his subjects for many years were almost exclusively from Italian sources; the very language of his thoughts was Italian, and to the end of his life he would have composed nothing but Italian operas, if the English public would have supported him. His spirit flew to Italy, but his home was London. So also Shakespeare turned to Italy more than to any other country for his subjects. Roughly, he wrote nineteen Italian, or what to him were virtually Italian plays, to twelve English, one Scotch, one Danish, three French, and two early British.[62]

The volume, a description of churches and sanctuaries of the north of the country, was also an aesthetic study and commentary on religion, culture and art, mixed with Butler's own comments upon the humanities and science. Published in 1881, *Alps and Sanctuaries* was the first of Butler's books fully dedicated to Italy. A second such book was also published by Butler: *Ex Voto* was a gift from Butler to the people of Varallo sesia. *Ex Voto* a study of the Sacro Monte di Varallo and the art of Tabuchetti at Crea reported the acknowledgment 'Ai Varallesi e Valsesiani l'autore riconoscente'. Attilio Sella, an Italian journalist friend of Butler, reported in his articles that Butler after a dinner offered by the people of Varallo at the Sacro Monte promised to write a book dedicated to the art of that wonderful town.[63]

Outside the written perspective, Butler's relationship with Italy has been additionally proved by his numerous paintings of Italian churches and landscapes. A large number of Butler's paintings and photographs are stored at St John's College, Cambridge.

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[62] Samuel Butler, *Alps and Sanctuaries of Piedmont and Canton Ticino*, pp. 18-19.

[63] See Attilio Sella 'Samuel Butler un Fervido Amico dell'Italia' a series of articles published in the *Gazzetta di Novara* between 1898-1900.

 [64]

The same kind of association was present in connection to music, another of Butler's passions. In his notebook, he wrote, referring the Handel's biography, the prominent connection of the musician with three countries: Italy, Germany and England. Although he was writing under the title 'of borrowing music', the sentence seems to recall some connection with his own life. Butler wrote:

> As a young man, though Italy and Germany were open to him, he adopted the country of Purcell, feeling it, doubtless, to be, as far as he was concerned, more Saxon than Saxony itself. He chose England; nor can there be a doubt that he chose it because he believed it to be the country in which his music had the best chance of being appreciated.[65]

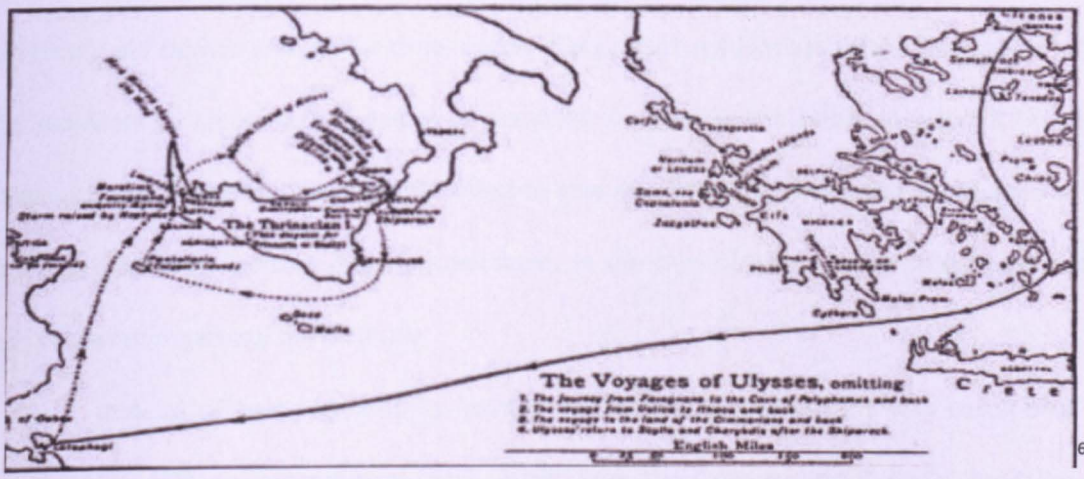
Arriving at Butler's reception in Italy, we can see two main examples. The first one is related to Butler's work on the Odyssey. Butler's suggested that the Odyssey, usually considered a book written by the Greek Homer, was instead written by a Sicilian woman called Princess Nausicaa. Butler explained this hypothesis in his notebooks:

> The finding out that the *Odyssey* was written at Trapani, the clearing up of the whole topography of the poem, and the demonstration, as it seems to me, that the poem was written by a woman and not by a man. Indeed, I may almost claim to have discovered the *Odyssey*, so altered does it become when my views of it are adopted. And robbing Homer of

[64] Samuel Butler, Colonico, the picture is stored in St John's College Library, Cambridge.
[65] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 128.

> the *Odyssey* has rendered the *Iliad* far more intelligible; besides, I have set the example of how he should be approached.[66]

Butler was a classicist by training. Schooled in Latin and Greek, he obtained a first class degree at St. John's College in 1858. According to the author himself he started work on the *Odyssey* in the 1890s. In Butler's hypothesis most of the adventures of Odysseus, the protagonist of the poem, could be located around Sicily and consequently the author of the poem (better to say the authoress) hailed from the town of Trapani.



[67]

As reported in his notebook Butler's work on the *Odyssey* represented the awaking of an old young princess. Under the voice 'Nausicaa and Myself' he wrote in his notebook:

> I am elderly, grey-bearded and, according to my clerk, Alfred, disgustingly fat; I wear spectacles and get more and more bronchitic as I grow older. Still no young prince in a fairy story ever found an invisible princess more effectually hidden behind a hedge of dullness or more fast asleep than Nausicaa was when I woke her and hailed her as Authoress of the *Odyssey*. And there was no difficulty about it either - all one had to do was to go up to the front door and ring the bell.[68]

Butler's work on the *Odyssey* resonated well with the people of Sicily and the writer made acquaintances, especially in Trapani. There, the writer published articles and essays in the main journals of the city such as *Il Lambrischini* and *Quo Vadis* in both English and Italian. Apart from publishing, in Sicily Butler made many important friendships with the principal personalities of the cities of Trapani and Acireale. As reported by *La Falce* (another journal

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[66] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 376.
[67] Samuel Butler, *The Authoress of the Odyssey*, p. 181
[68] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 193.

published in Trapani), Butler was a famous protagonist of a public debate about the Odyssey in Trapani in 1898. When he arrived in Trapani on the 8th May 1989 for his annual visit to Sicily, the main personalities of the city welcomed him openly.[69] The episode reported by *La Falce* is only one of the examples of Butler's fame in the island. Butler, on the 20th March 1893, was awarded a certificate by the *Accademia di scienze, lettere e belle arti of Aci-reale* and on the 9th July of the same year, awarded with the title of correspondent by the same institution.[70] The *Accademia di scienze, lettere e belle arti degli Zelanti e dei Dafnici* was, at the time, one of the ancient academies in Italy. Opened in 1671 in Aci-reale (a small Sicilian town), it provided support in the fields of Natural History, Literature and Poetry. It was also entitled to give certificates ad honorem to scholars with an established national or international fame. In the case of Butler, the academy awarded his research regarding the Odyssey.

Instead of being ignored as he was in England, Butler in Italy was considered a personality with an international fame. Apart from the *Odyssey* and Butler's reception in Sicily, a second point that must be analyzed is the reception of Butler's hypothesis of evolution in Italy. In contrast to his literary and artistic fame, Butler's scientific renown was almost posthumous. In Italy, as in England, Butler's scientific theories were re-discovered mostly in the second decade of the twentieth-century, in both literary and scientific articles. In September 1916, Attilio Sella wrote a long article about Butler's books and ideas.[71] According to Sella's article, Butler's scientific work represented for the writer his

[69] Extract from *La falce*, year 1, n. 20, 15th May, 1898: 'Domenica 8 maggio 1898 con il diretto delle 20,40, arrivò come avvisammo sul numero precedente S. Butler, il noto letterato inglese, lo scopritore dell'origine italiana dell'odissea. Erano andati a salutarlo a marsala il Signor Pietro Sugameli e il Signor Giacalone Patti. Alla stazione furono a riceverlo il nostro direttore, Mario di Ferro, V. Paolo Bellomo, il professor Tumbarello e l'avvocato G. Malato: andò ad alloggiare all'albergo Trinacria.'

[70] Both or the certificates are stored at St John's College Library, Cambridge.

[71] Attilio Sella, 'Samuel Butler' *Rivista Valsesiana* (1899) pp. 116-126, esp. 117.

main passion for many years and they were famous not only in the UK.[72] However, Sella did not provide further evidence regarding the reception of Butler's science.

In order to get more information upon Butler's scientific work we must refer to the work of Eugenio Rignano. Eugenio Rignano was an engineer, philosopher and writer strongly interested in all branches of science. At the beginning of the twentieth-century, he published books concerning the evolutionary implications of heredity, such as *L'Adattamento Funzionale e la Teleologia Psico-fisica del Pauly* (1907), *La Mémoire Biologique en Energétique* (1909), *Le Rôle des Théoriciens dans les Sciences Biologiques et Sociologiques* (1912) and *La Valeur Synthétique du Transformisme* (1917). He was also the founder of the international review *Rivistà di Scienza* (also called Scientia after 1909). In brief, Rignano, as a philosopher interested in psychophysiological evolution, worked in the European debate of the beginning of the twentieth-century with thinkers like Sigmund Freud, Henri Bergson developing post-evolutionary ideas regarding mind, body, degeneration, memory and so on.

Regarding Butler, Rignano published in French a volume entitled *Sur la Transmissibilité des Caractères Acquis - Hypothèse d'un Centro-épigenèse* where he accepted the Hering-Butler hypothesis of psychophysiological evolution.[73] In this volume, Rigano made a distinct advance on Hering's rather crude hypothesis of persistent vibrations by suggesting that the centres of remembering store slightly different forms of energy, to give out energy of the same kind as they have received, like electrical accumulators. In particular, the final chapter entitled 'Le Phénomène mnémonique et le Phénomène vital' seems to be based on Butler's idea of organic memory.[74]

Rignano, at the beginning of the twentieth-century, promoted a reading of Butler where he was considered, alongside the French father of experimental psychology

[72] *Ibid.*, p. 118

[73] The term Hering-Butler has been firstly used by Marcus Hartog in his introduction to the 1911 edition of Butler's *Unconscious Memory*.

[74] Samuel Butler, *Unconscious Memory*, pp. xi-xxxvii.

Théodule-Armand Ribot and the German physicist/physiologist Ewald Hering, a relevant figure of the post-Darwinian debate upon heredity. Without discussing in details Rignano's opinion now, I want to focus on the outcome of his interpretation of Butler. At the beginning of this chapter, and later on, discussing the quarrel, I showed how Butler was considered an outsider from the Victorian scientific community. However, at the beginning of the twentieth-century, by contrast, Butler's scientific hypothesis began to be appreciated especially outside the UK. As evidence, S. J. Tomekeieff's 'The Mnemic Theories of Evolution'[75] published in *Scientia* (1923) defined Butler as the writer 'whose genius is not yet fully appreciated even in his own country'.[76] Nonetheless, before 1923, Butler already had fame and success in Italy.

3.3.2 France

In France, Butler's ideas circulated with success in literary and scientific circles, but only after his demise. Butler's novels and parts of his notebooks were translated and commented on by the novelist and translator Valery Larbaud. Additionally, Butler's scientific ideas penetrated the philosophical/scientific debate of the period (1900-1920) becoming arguments, of the French philosophical debate about evolution.

In promoting Butler's work, Valery Larbaud published a series of articles in journals such as *La Nouvelle Revue Françoise* and *La Revue De Paris* popularising Butler and his literary and scientific opus within the French cultural community of the beginning of the twentieth-century. Larbaud's description of Butler focused on two prominent points. Firstly, he recognized the tendency of the Victorians to obscure Butler's fame. Secondly, in writing about 'une conspiration du silence ',[77] the French novelist found in Butler a free thinker

[75] S. J. Tomekeieff, 'The Mnemic theories of evolution', *Scientia*, Vol. 23 (1923) pp. 159-172.
[76] *Ibid.*, p. 160.
[77] Valery Larbaud , 'Samuel Butler', *La Nouvelle Revue Françoise*, n. 76 (1920) pp. 5-37, esp. 6.

who was able to popularize scientific theories and literary ideas against the predominant culture of his generation.[78]

Beside the series of articles by Valery Larbaud[79] Samuel Butler's ideas were promulgated by a long essay by Marcus Hartog, translated into French, entitled *Samuel Butler et les récentes théories biologiques de la mémoires.*[80] Along the same lines of Valery Larbaud, in August 1921, the *Revue des Deux Mondes* dedicated an article to Samuel Butler in the section *Littératures Etrangers* signed by Luis Gillet.[81] The article entitled 'Le Renommée Posthume De Samuel Butler' paraphrased Henry Festing Jones' *Memoir,* promoting Butler as a thinker who needed to be re-discovered. Luis Gillet, in explaining Butler to his readers, went through his whole literary activity focusing sporadically also on his scientific tomes. He promoted the scientific conclusions of *Life and Habit* and *Evolution Old and New* in the new light of the early twentieth-century psychophysiological debate (on the same lines as Rignano). Moreover, he even came to identify the Erewhon's 'The Book of the Machines' as a possible example of scientific writing.[82]

Similarly, in 1934, the French journal *Europe* dedicated an article to the English writer entitled *Les Carnets de Samuel Butler.*[83] The article portrayed Butler with sentences such as 'avec Samuel Butler nous retrouvons l'ordre avec l'abondance'[84] and 'Son éclectisme, la diversité de ses intentions rappellent nos encyclopédistes, son style prolonge

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[78] Valery Larbaud, 'Samuel Butler', *La Revue De Paris,* 30 n. 16 (1923) pp. 748-762, esp. 749.

[79] Valery Larbaud (29 August 1881 Vichy – 2 February 1957 Vichy) was a French writer, translator and literary critic. In France he helped translate and popularise Samuel Taylor Coleridge, Walt Whitman, Samuel Butler, and James Joyce, whose Ulysses was translated by Auguste Morel (1924-1929) under Larbaud's supervision.

[80] Marcus Hartog, 'Samuel Butler et Les Récentes Théories Biologiques de la Mémoires', *Scientia,* Vol. XV, No. XXXIII-1, (1914) pp. 43-55.

[81] Luis Gillet, 'Le Renommée Posthume de Samuel Butler', *Revue des Deux Monde,* Vol. 1 (August, 1921) pp. 685-696.

[82] *Ibid.,* pp. 690-691.

[83] The 'Les carnets de Samuel Butler' has been published on the French journal *Europe* in 1934 signed by Valery Larbaud, and before published in 'Extraits Des Carnets de Samuel Butler. Traduits de l'anglais par Valery Larbaud' *Editions De La Nouvelle Revue Française.* Revue de Paris, (1922) pp. 486-505.

[84] *Ibid.,* p. 485.

le rapprochement. Un siècle plus tôt il eut été sans doute le grand ami de Voltaire and de Chamfort'.[85] The author, alongside the critical heroes of the French revolutionary culture, was considered a man of culture and science *tout court*.

In conclusion, it seems that in France as in Italy Butler had more fame than in England. Even though recalling the conspiracy of science promoted by Victorians, 1920s French cultural and scientific circles fully accepted Butler as both an author and scientist. However, before finishing this chapter, a final fact must be examined. In contrast to Paradis's definition of Butler as an outsider, in this chapter I have shown that Butler was also a relevant protagonist of the cultural and scientific debate in England and abroad.

First, the evidence provided by the Darwin-Butler correspondence presented a different portrayal of Butler. He was not only the villain of the quarrel, he was also on 'friendly' terms with Darwin's family. Second, the recognition of Butler's work in Italy and France, apart from being evidences of Butler's posthumous fame, also represented a relevant point in establishing his career during his life. It is true that Butler, as suggested by Raby, was an uncategorisable author for the nineteenth-century standard. Nevertheless, he was also the symbol of the new and fresh twentieth-century cultural debate, which was looking for authors able to cross the boundaries of different disciplines.

[85] *Ibid.*, p. 485.

> Few know that there are other great works upon descent with modification besides Mr. Darwin's. Not one person in ten thousand has any distinct idea of what Buffon, Dr. Darwin, and Lamarck propounded. Their names have been discredited by the very authors who have been most indebted to them; there is hardly a writer on evolution who does not think it incumbent upon him to warn Lamarck off the ground which he at any rate made his own, and to cast a stone at what he will call the "shallow speculations" or "crude theories" or the "well-known doctrine" of the foremost exponent of Buffon and Dr. Darwin.
>
> Samuel Butler, *Evolution Old and New*.[1]

CHAPTER FOUR:

Samuel Butler and the popularisation of science: methodologies, partners and detractors

4.1 Victorian circulation of scientific ideas

4.1.1 Introduction

The free circulation of scientific ideas was a key factor of Victorian science. In the form of books, essays, notes and letters, scientific theories fully penetrated science, philosophy, literature and culture. An example comes from the success obtained by Lamarck's theory of evolution in the London medical schools in 1830[2] and the consequent discussion of related natural sciences in wide circles and general periodicals.[3]

From 1859 the situation changed. The scientific community started to refer mostly to the new national heroes of science. The work of scientists such as Charles Darwin, Alfred Wallace and Thomas Huxley reframed the coordinates for studying, understanding and popularizing evolution. Even though their work did not formally become orthodox, the popular reception of their hypotheses fascinated people so much to become the only one accepted and formally popularised in the UK. Their work created a gap between the science made by professionals or 'men of science' and the scientific attempts of amateurs.

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[1] Samuel Butler, *Evolution Old and New*, pp. 60-61.
[2] Adrian Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London*, p. 24.
[3] James Secord, *Victorian Sensation: the Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation*, pp. 5-6.

As a consequence, many scientific hypotheses remained largely unknown in England even though they obtained real success in other countries. One example was Butler's hypothesis of psychophysiology as an alternative to natural selection. With this, Butler tried to popularize and re-discuss Lamarckism, teleological design and the substantial relationship between organic memory and heredity, yet received little if any acknowledgment from the Victorian scientific community.

The popularization of science in the Victorian period has been the object of many recent historical studies. Published in recent years, books such as *Victorian Science in Context* (1997), *Science and Salvation* (2004), *Victorian Popularizers of Science* (2007), and *Science in the Marketplace* (2007) have developed, through different steps, the scholarly significance of terms like 'popular' and 'popularization'.

Published in 1997, *Victorian Science in Context* represented the first engagement of the historian Bernard Lightman with the Victorian popularization of science. The collection of essays developed three main themes and questions. Part 1 opens the discussion, providing an answer to the question: What defined "science" in the Victorian period? Part 2 focuses on popular science addressing the question: in a period traditionally characterized by scientific professionalization, what place did non-professional audiences play in defining science? Part 3 focuses on the broad question: In what ways were the practices of science situated in and responsive to broader cultural dynamics in the Victorian period? According to D. Graham Burnett's review of the book: 'in an important way, *Victorian Science in Context* represents an invention of tradition of its own. The title of the book offers a clue: this collection represents contextualist history of science.'[4]

Representing an invention and a contextualization of Victorian science, the book has shown a new way for discussing the relationship between professional and popular science. In this respect, the second section of Lightman's collection is particularly

[4] D. Graham Burnett 'Review of Victorian Science in Context, edited by Bernard Lightman (Chicago, 1997)' *The Journal of Modern History*, Vol. 71(3): (1999), pp. 689-691.

interesting. According to Lightman's point of view, the enormous volume of scientific books written for the Victorian public offer much material for reflection, providing evidence of the place of science in the Victorian context. This aspect also opened up the necessity to clarify the context and the place of these publications in the Victorian scientific debate. In his essay '"The Voices of Nature": Popularising Victorian Science', Lightman explained how simultaneous professional codification of science and popular writing worked on the same themes. However, he also suggested that popular science writing in the period is best understood as a product of the conflict of these two communities over a common subject.[5] Rather than scientists offering the populace a new language for discussing race, scientific language itself drew on and reinforced popular terms.

Published in 2004, *Science and Salvation* provides a study of the popularisation of science and religion in nineteenth-century Ireland. At the beginning of the book, Fyfe defines her aim declaring that she is looking at 'the science-religion debates from a fresh angle, by examining the public understanding of science as opposed to that articulated by experts through their published papers. *Science and Salvation* is not concerned with eminent men of science, nor even with particularly well-known clergymen. I seek a wider scope by attempting to gauge attitudes to the sciences and faith as held by laypeople'.[6] From a methodological point of view, in the book, Fyfe manages to challenge conventional approaches to the history of science as well as explaining to the reader the rise of a mass reading audience.

In *Science and Salvation*, Fyfe's first task is to re-shape what historians have meant by the terms 'popular' and 'popularize.' According to Fyfe, the word popular 'was not a description of the reception of a work (for example, a book was popular because everyone read it and liked it), but a statement about the intended audience envisaged by writers and

[5] Bernard Lightman, '"The Voices of Nature": Popularising Victorian Science', in Bernard Lightman (ed.), *Victorian Science in Context*, pp. 187-211.
[6] Aileen Fyfe, *Science and Salvation: Evangelical Popular Science Publishing in Victorian Britain*, p. 4.

publishers. . . . A 'popular' work was one that was intended for 'the people,' which by the middle of the nineteenth century increasingly included the working classes.'[7]

In particular, the volume focuses on redefining the place of science in the Victorian scientific and cultural debate. Fyfe's valuable answer to the question, what Victorian means in relation to Victorian science, is that we cannot understand ideas and attitudes towards science in the Victorian age by concentrating solely upon elite scientists and authors. Fyfe points out two main conclusions. First, 'the existence of a "mass audience" was just beginning to be recognised in the 1840s, and it was frequently perceived as a crowd of different sorts of people rather than as the homogeneous mass that we tend to think of today'.[8] Second, she declares that 'both the size of the potential market and the price tag that the market could take. A few years later the success of the penny weekly magazines demonstrated to the entire book trade that an enormous reading audience definitely did exist — if the price was pennies rather than shillings.'[9] In *Science and Salvation* the label 'popular' involves the presence of a mass audience for Victorian scientific writing and the acceptance of a new type of writers outside elite scientists and authors.

According to *Victorian Science in Context* and *Science and Salvation*, the act of popularizing science becomes something between the popular audience and the professionalism of science. However, it also opened up several controversies, especially in relation to the concept of amateur and professional scientists without providing any definitive solution.

In 2007, with the publication of *Victorian Popularizers of Science: Designing Nature for New Audiences* and *Science in the Marketplace* we arrive at a new meaning of the term popularization of science. Historians became aware of the differences between professional scientists and amateurs, in terms of their usage of different languages (scientific and

[7] *Ibid.*, p. 56.
[8] *Ibid.*, p. 6.
[9] *Ibid.*, p. 48.

popular), places for research (public and private laboratories, museum, and universities) and audiences (scientists, philosophers, and anyone interested in science).

As discussed in *Science in the Marketplace,* for many years historians focused their studies on the professional popularization of science, excluding the 'lower' sciences. However, they have recently used a more balanced approach providing attention to all levels of popularization.[10] This balance has been developed in the study of Victorian periodicals and the establishment of a marketplace of science.[11] In *Science in the Marketplace,* the marketplace is not merely a metaphor, and the essays include a welcome emphasis on the economics determining scientific productions of various kinds. In terms of content, *Science in the Marketplace* makes the distinction between 'science' and 'popular science', but, it also opens up the history of popular science to a more diverse range of approaches (including the work of men of church, women and amateur scientists), which have been labelled with the status of mere audience-members of the Victorian popular debate by the previous studies.

In the book, attention is paid to the geographical dimension of the marketplace. According to Jonathan Topham's essay 'there has never been a 'unified' or 'uncontested "popular science"'[12] whose boundaries are clearly demarcated. Instead, in the nineteenth-century, the word 'popular' began to be used to describe publications for those without specialist or expert knowledge and also to describe publications intended for a mass audience. In Aileen Fyfe and Bernard Lightman's work, the two different senses of the term 'popular' did not always coincide, and together with the emergence of 'science' as a

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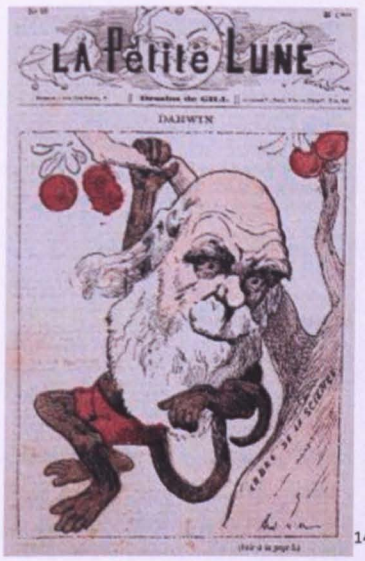
[10] Aileen Fyfe and Bernard Lightman (eds.) *Science in the Marketplace: Nineteenth-century Sites and Experiences,* pp. 2-4.

[11] For projects involving periodical see See Geoffrey Cantor, Gowan Dawson, Graeme Gooday, Richard Noakes, Sally Shuttleworth and Jonathan R. Topham, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*; Geoffrey Cantor and Sally Shuttleworth (eds.) *Science Serialized: Representations of the Sciences in Nineteenth-Century Periodicals* and the Science Periodicals project - http://www.sciper.org/.

[12] Aileen Fyfe and Bernard Lightman (eds.) *Science in the Marketplace: Nineteenth-century Sites and Experiences,* p. 159.

specialist activity they reflected 'a growing sense of the disintegration of a unitary bourgeois public ... and of the diversification of reading audiences'.[13] As a consequence, the collection problematises the idea that the term 'popular science' did not contribute to the creation of new knowledge, and problematises the use of the epithet 'popular' to involve something different from 'science'.



[14]

The popularization of evolution becomes an important methodological problem especially in relation to the terminology used by historians of science. Ten years ago, historians of science used the term 'populariser of science' to describe professional scientists and the popular implications of their work, today 'populariser of science' has become a term for of any type of Victorian popularization.[15]

The same conclusion is clearly explained in the recent *Victorian Popularizers of Science: Designing Nature for New Audiences*. However, Lightman finally explains how to use the label 'popularization'. He adopts the term 'populariser' although he is conscious of its negative connotation.[16] In his analysis, starting from the problems relating to the term

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[13] *Ibid.*, p.136.
[14] Caricature of Charles Darwin as a monkey on the cover of La Petite Lune, a Parisian satirical magazine published by André Gill from 1878 to 1879.
[15] Aileen Fyfe and Bernard Lightman (eds.) *Science in the Marketplace: Nineteenth-century Sites and Experiences*, pp. 3-4.
[16] Bernard Lightman, *Victorian Popularizers of Science: Designing Nature for New Audiences*, p. 9.

'popularization', which include different distortions in the nineteenth-century scene, and the new terminology experimented by historians such as 'vernacular', 'commercial science' and its French translation as 'vulgarization', Lightman retains the label 'popularization of science' as the best possible choice.[17]

The reason behind this is that the label 'popularization', can be applied to questions regarding authorship, authority and audience. Additionally, the term becomes useful as opposed to the label 'practitioner of science'. In the Victorian context, the populariser was the one whose activities were mainly focused on writing about nature. In contrast, the activities of the practitioner of science were, instead, conducted through experiments analyzing the natural world.[18] According to Lightman 'the main reason for fussing about all of these labels is to underscore that what later came to be known as professional and popular science in the twentieth century and thereafter were not yet in existence in the latter half of the nineteenth century.'[19]

Following this definition, the world popularization still represents a problem. Consequently we need to understand how to use it beneficially. In this perspective, the phrase 'populariser of science' is used in a manner that is directly linked to the concept of marketplace. As clearly explained in *Science in the Marketplace* the word 'popularization' describes the vehicle and the 'marketplace' describes the place in which this popularization is embedded. In my analysis of Butler's scientific writing I adopt this distinction.

The general aim of this chapter is to critically discuss the Victorian circulation of scientific ideas by looking at the Victorian marketplace. In discussing the circulation of alternative evolutionistic hypotheses in England between 1870 and 1890 (with a specific reference to Butler's work), it provides answers to the following questions: What was the

[17] *Ibid.*, pp. 9-10.
[18] *Ibid.*, p. 13.
[19] *Ibid.*, p. 13.

Victorian marketplace of science? In what ways can we talk about Butler as one of the popularisers inhabiting the marketplace?

4.1.2 Samuel Butler's place in the Victorian popularisation of natural science

To answer the two-part question put forward in the introduction to this chapter, two points have to first be established. Firstly, the concept of marketplace of science has to be unpacked, in relation to evolutionary theory from 1860 to 1890. This unpacking becomes necessary in order to have a better understanding of how historians of science consider the circulation of scientific hypotheses within Victorian popular culture. It also demonstrates the limits of this approach in relation to difficult cases such as Samuel Butler and George Mivart.

Secondly, there is the need to understand Butler's popularization of science and its place in the Victorian marketplace. Using his writings, I aim to understand why Butler was considered controversial and his 'popularization' of evolution criticised and neglected by Victorians and by contemporary historians.

4.1.2.1 Mapping the Marketplace

The Victorian age was a time when men and women of culture were given the opportunity to participate in science alongside specialists; for education, entertainment, or both. As explained in *Science in the Marketplace,* Victorian science was ensconced in myriad forms and locations: in panoramic shows, exhibitions, and galleries; in city museums and country houses; in popular lectures; and even in domestic conversations that revolved around the latest books and periodicals.[20]

In demarcating the Victorian popularization of science, Bernard Lightman's *Victorian Popularisers of Science* divides the nineteenth-century into three different stages.

[20] Aileen Fyfe and Bernard Lightman (eds.), *Science in the Marketplace: Nineteenth-century Sites and Experiences,* pp. 10-14.

The first one lasted until 1840, and was the phase in which the distinctive character of the rest of the century was forming. In this first stage, British people became interested in the growth of science and its effects upon their lives. This stage was also marked by the publications of cheap books series called 'popular science'.[21]

The second stage was the mid-century scene which was characterized by books like *The Vestiges of the Natural History of Creation* (1844). In this stage, the popularization of science was not a question of expertise. The populariser of science was someone who was able to make science clear and fulfil the demands of a growing public.[22]

The final stage, started after 1859, was the 'marketplace of science' where scientific theories became fully culturally embedded.[23] The Victorian marketplace of science was created by three different events. The first of these was the revolution brought about by editors and publishing industries. In developing the marketplace, first of all, there was the revolution of publishing led by editors. Publishers in the nineteenth-century were the protagonists of a two-part industrial revolution in printing and selling books. The first phase took place between 1830 and 1850 and was characterized by the introduction of the steam-driven press, case binding, foundrinier machine and the birth of reading and discussion circles.[24] The second phase started around 1855 and involved a revolution in the number of books published per year and the consequent increase of sales.[25] Two examples were particularly relevant from a scientific perspective: *The Origin of Species* and the *Vestiges of the Natural History of Creation*. Chambers' book sold, by the end of the century, 39,000 copies,[26] and the Darwin's a total of 56,000 copies.[27]

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[21] Bernard Lightman, *Victorian Popularizers of Science: Designing Nature for New Audiences*, pp. 17-24.
[22] *Ibid.*, pp. 26-29.
[23] *Ibid.*, pp. 29-31.
[24] *ibid.*, pp. 34-35.
[25] *Ibid.*, p. 35.
[26] James Secord, *Victorian Sensation: the Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation*, pp. 32-40 and 131.
[27] *Ibid.*., pp. 32-34.

A second aspect of the marketplace was the rise of scientific journals, and the exchange of ideas among scientists, novelists and men of culture. Its geography involved museums, circles, libraries, public squares and any place in which it was possible to discuss science and its cultural consequences.[28]

Apart from these major publications, many scientific book series started up in the second half of the century: *Series of Natural History for Beginners* (1866), *The International Scientific Series* (1872), *Science Primers* (1872), *Nature Series* and *Manual of Elementary science* (1873), *Chambers Elementary Science Manuals* (1875), *Simple Lesson for Home Use* (1877), *Natural History Ramblers* (1879), *Contemporary Science Series* (1889), *Modern Science* (1891) and *Naturalist's Library* (1891).

Outside the simple perspective of publishing, the marketplace involved a variety of people from different levels of Victorian culture. First, there were scientists, doctors and physiologists including Huxley, Wallace, Darwin and Tyndall who publicly championed the rise of the professionalization of science.[29] This was, in effect, one key aim of the 'men of science' who promoted, in contrast to the post-modern concept of 'marketplace', the

[28] Aileen Fyfe and Bernard Lightman (eds.), *Science in the Marketplace: Nineteenth-century Sites and Experiences*, pp. 10-12.
[29] Paul White, *Thomas Huxley: Making the 'Man of Science'*, pp. 32-58.

orthodoxy of science as an object for a selected group of people.[30] In metaphorical terms, they formed a shield protecting Darwin and his ideas criticism.[31] There, Darwinism was positioned within the rigour of the persona of the Victorian man of science.[32]

Second in the marketplace, evolution and science were the domain of *non*-scientists. Novelists, philosophers and writers such as Charles Kingsley, Charles Alexander Johns, Francis Orpen Morris, Thomas Willian Webb, George Henslow and William Houghton were all religious men who proposed readings of evolution according to the Anglican tradition.[33] Novelists including George Eliot, William Morris, Charles Dickens and later H.G. Wells and Bram Stoker treated evolutionary problems in a literary perspective.[34] Men of culture, like Mivart and Butler, who directed their attention towards pursuing alternative ideas/hypotheses of evolution in contrast with Darwin's natural selection, were a part of the Victorian marketplace.

Although possessing different ideas and backgrounds, these writers discussed, argued and sold ideas regarding evolution and its consequences. For them the marketplace, exactly like a public market, was a social gathering of people and thoughts. There, different evolutionistic ideas were sold and bought by anyone who shared interests in science or in its cultural developments. For these popularisers, both men and women, nature was full of meanings which were charged with religious and cultural significance.[35] Popularisers of

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[30] Refer to Barton, Ruth, ""Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X Club, 1851-1864" *Isis* 89 (1998) pp. 410–444; Ruth Barton, "'An Influential Set of Chaps': The X-Club and Royal Society Politics 1864–85", *The British Journal for the History of Science* 23 (1) (1990) pp. 53–81 and James D. Desmond, "Redefining the X Axis: "Professionals," "Amateurs" and the Making of Mid-Victorian Biology – A Progress Report", *Journal of the History of Biology* 34 (1) (2001) pp. 3–50.

[31] Paul White, *Thomas Huxley: Making the 'Man of Science'*, p. 98.

[32] *Ibid.*, pp. 97-100.

[33] Lightman Bernard, *Victorian Popularizers of Science: Designing Nature for new Audiences*, pp. 39-95.

[34] To have a general introduction about these authors refer to *Gillian Beer, Darwin's Plots: Evolutionary Narrative in Darwin, George Eliot and Nineteenth-Century Fiction*, pp. 1-22 and George Levine, *Darwin and the Novelists: Patterns of Science in Victorian Fiction*, pp. 2-23.

[35] Bernard Lightman, *Victorian Popularisers of Science: Designing Nature for New Audiences*, p. 9.

science looked back to natural theological tradition and beyond the limits of science throughout scientific literature.

Additionally, the idea of the marketplace has brought new insight into the role of women in scientific enquiry. It addressed readings of Arabella Buckley, Phebe Lankester, Mary Ward, Anne Pratt, Anne Wright, Rosina Zronlin, Mary Roberts, Jane Loudon, Elizabeth Twining and their engagement with the scientific debate.[36] These authors, exactly like men of science, represented an important step towards the process of making science popular.

Scholars have come to recognize that the popularization of science during this period is central to an understanding of Victorian culture. It involves the study of evolution as an emerging social factor in the hands of both scientists and men of culture. Part of this new understanding involves Butler and his popularization of science. As part of this, Bernard Lightman's essay 'A Conspiracy of One': Butler, Natural Theology, and Victorian Popularization'[37] has recently adjusted the view of the English writer as a member of the Victorian marketplace.

However, it is my contention that Samuel Butler represents a case which is not compatible within the model of the marketplace. First, Butler's 'marketplace' was different from his peers in that (to stay with the marketplace model) he bought and even sold beyond the local stalls (e.g. the British and European markets). Butler's popularization of evolution, as a criticism made of Darwinian authority, linked British evolutionary theory with French and German interpretations with regard to psychology, physiology and philosophy. Second, Butler's psychophysiology was not just a method of interpretation but represented a genuine theoretical innovation connected with empirical research done in Europe. Thirdly, his infamy in regard to the quarrel with Darwin was out of proportion in the economic value of his sales.

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[36] Refer to Bernard Lightman, *Victorian Popularisers of Science: Designing Nature for New Audiences*, pp. 97-116.

[37] Bernard Lightman, 'A Conspiracy of One': Butler, Natural Theology, and Victorian Popularization' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp.113-142.

In the next section my intention is to dissect the three difficulties regarding Butler as a populariser of science. Starting from Butler's writing and use of different sources in shaping his hypothesis, my argument suggests going beyond the perspective proposed by Fyfe and Lightman. In doing so, I need to point out two conceptual questions: why was Butler not a member of the marketplace of science? And, moreover, which were the aspects that made him different?

4.2 Butler's popularisation of science: a new type of Marketplace

In 1876, Butler started the writing of his first scientific books aimed at a general audience: *Life and Habit*. Butler wrote:

> It is plain, therefore, that my book cannot be intended for the perusal of scientific people; it is intended for the general public only, with whom I believe myself to be in harmony, as knowing neither much more nor much less than they do.[38]

Life and Habit proposed an implementation of Butler's hypothesis of unconscious evolution, early discussed in the articles 'Darwin Among the Machines' (1863), 'Lucubratio Ebria' (1865) published in the New Zealand journal *The Press* and 'The Book of the Machines' (chapters of the novel *Erewhon*) published in 1872. The book also provided a historical justification of Butler's own hypothesis. It combined analytical research with an immense comparative work between protagonists of British natural history and scientist, philosophers and psychophysiologists working on the continent.

In the Victorian age, scientists, instead of comparing their own theories with others, preferred a more scientific approach focused on the report of empirical evidences strong enough to be considered scientifically valuable. In contrast, the methodology adopted by Butler was not based on empirical research. He instead used an old fashioned approach utilising archives and comparative work. As an example, in *Life and Habit*, as with any other of Butler's scientific books, there was a large use of quotations. They came from pre-

[38] Samuel Butler, *Life and Habit*, p. 2.

Darwinian scientific authors (e.g. Lamarck, Buffon, Erasmus Darwin and Isidore Geoffroy Saint Hilaire) and contemporary theories published in England and abroad. In reading *Life and Habit*, a Victorian could find reference to the work of Charles Darwin, Wallace, Mivart and Huxley, and at the same time French authors like Claude Bernard, Théodule Ribot and Pierre Huber.

By using this approach, Butler was able to provide the reader with a comprehensive 'behind the scenes' account of the evolutionary debate, thus enabling a better understanding of his (Butler's) own hypothesis of evolution. As Butler explained, he had no 'wish to instruct, and not much to be instructed; my aim is simply to entertain and interest the numerous class of people who, like myself, know nothing of science, but who enjoy speculating and reflecting (not too deeply) upon the phenomena around them'.[39]

On the other hand, Butler's work tried to tell a new history to its readers by looking back to the past in order to understand the roots of the new discoveries. In describing this intention, the author wrote in *Life and Habit*:

> I have therefore allowed myself a loose rein, to run on with whatever came uppermost, without regard to whether it was new or old; feeling sure that if true, it must be very old or it never could have occurred to one so little versed in science as myself; and knowing that it is sometimes pleasanter to meet the old under slightly changed conditions, than to go through the formalities and uncertainties of making new acquaintance.[40]

As the two quotations suggest, the intention of Butler, in writing his scientific book, was to popularize science to his contemporaries but, also, to show them the mysteries and errors of current and past ideas of evolution.

In strong disagreement with the idea of natural selection, Butler used his popularization for showing the fallacies of Darwin's idea and proposing his own hypothesis of a psychophysiological process of evolution. In doing so, he used two methods: he translated foreign theories of evolution in support of his own hypothesis and he also developed his study of evolution into his literary production.

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[39] *Ibid.*, p. 2.
[40] *Ibid.*, p. 2.

4.2.1 Butler's popularisation of continental evolution: the work of translation

In reading Butler's scientific books, one of the first things that a reader notices immediately is the large use of quotations and the complex referencing system he adopts in structuring his work. In chapter two, I discussed Butler's use of different genres and the complexity of his writing in terms of the links he makes between literature, philosophy, theology and science. At the time, I did not focus on the use of scientific quotations and their role in the development of Butler's knowledge of evolution.

In unpacking the work of Butler as a translator, one should start with his biography. One of the best conclusions of Henry Festing Jones' *Memoir* was the assumption that Butler's knowledge of continental languages helped him on several occasions in making his own criticism of evolution. Butler, during his life, had the chance to learn different languages. He was trained in ancient Greek and Latin thanks to his studies at St John's College, Cambridge[41] and also trained in modern languages, including Italian, French and German.

In the field of literature, Butler used his knowledge of Greek and Latin for translating the classics.[42] He wrote several contributions in Italian, mostly concerning literature and art, published in several Italian periodicals.[43] With respect to science, Butler developed studies in German and French. From Butler's own perspective, naturalists and scientists from these two countries offered concrete alternatives to Darwin's idea of natural selection. Not only Lamarck but many others including Georges-Louis Leclerc Buffon, Claude Bernard, Théodule Ribot, Charles Bonnet, Étienne Geoffroy Saint-Hilaire and his son

[41] On 1858 he bracketed 12th in the first class of the Classical Tripos and took his degree. See Peter Raby, *Samuel Butler: A Biography*, pp. 43-54.

[42] References of Butler as a translator of Greek are addressed in Peter Raby, *Samuel Butler: A Biography*, pp. 238-249 and 251-265.

[43] Butler published in Italian (Tipografia Donzuso, Trapani): 'L'Origine Siciliana dell' Odissea' (Estratto dalla Rassegna della Letteratura Siciliana) in 1893 and 'Ancora sull' Origine Siciliana dell' Odissea'. (Estratto dalla Rassegna della Letteratura Siciliana) in 1894.

Isidore Geoffroy Saint-Hilaire were considered relevant by the author in writing his books. In writing *Life and Habit* and *Evolution Old and New,* the translation of French occupied a large part of Butler's time.

The figure of the Victorian translator rose, in cultural, scientific and medical circles, alongside the growing publications of periodicals.[44] As described by Adrian Desmond the newly predominant role of science in the cultural scene, in England and abroad, was partially facilitated by the circulation of translated ideas. There was in Desmond's study a great deal of literature available in England regarding the circulation of French evolutionary ideas in the decade 1830-40.[45] In medical schools and private circles, new scientific ideas from the Paris debate were discussed, gaining more and more recognition.

The work of the translator played an important scientific and cultural role. By translating foreign perspectives on issues concerning evolution and natural history, the translator widened the debate and became, inevitably, the English spokesman for these ideas. This job put the translator in the position of having the power to mediate, reinterpret and lead European views on scientific authority and its circles. A famous and extreme (foreign) example of this power was the 1862 translation into French of the *Origin of Species.*

From the original title of *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life,* it became *De l'Origine des Espèces ou des Lois du Progrès Chez les êtres Organisés,* meaning that the references to 'natural selection' and the 'struggle for life' had disappeared in the French translations.[46] Additionally, the preface of the French translation of Darwin's *Origin,* written by the

[44] Lesa Scholl, *Translation, Authorship and the Victorian Professional Woman: Charlotte Bronte, Harriet Martineau and George Eliot,* pp. 1-5.
[45] This point has been exhaustively pointed out in Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London,* pp. 276-280.
[46] Giulio Barsanti, *Una Lunga Pazienza Cieca, Storia dell'Evoluzionismo,* pp. 307-308.

translator Clémence Royer, promoted a concept of progressive evolution which had more in common with the ideas of Lamarck than with those of Darwin.[47]

In France, the concept of natural selection was even refused by scientific associations. *L'Academie des Scences*, the French version of the Royal Society, rejected Darwin and his idea of natural selection for the first time in 1870 and definitively in 1878. Darwin's theory of evolution began to take root in France only between 1933 and 1937.[48]

Returning to the British situation, the overall profile of the Victorian translator went beyond the simple dimension of natural science. Lawrence Venuti's *A History of Translation*[49] describes the figure of the Victorian translator as a person who worked within the cultural community (even members of royalty, editors and scientists), who had gained significant experience outside the kingdom, even in far-flung colonies, and who was used to speaking foreign languages.[50] In other words, according to Jean Delisle and Judith Woodswort, the Victorian translator was 'Beyond the prerogatives of patrons, clients and editors, beyond the materiality of Texts, beyond the cost of their labour, translators cross and blur the lines between foreign cultural values and those of their own society'.[51] The question arises: how can we talk about Butler as a Victorian scientific translator? In giving an answer to this question I need to provide some examples from Butler's writings. In his publications, European science was used as an alternative to British Darwinian science. From 1878 to 1890, there was a growing use of translated passages in Butler's books. An example of this comes from Butler's translation of German.

Butler did not study German during his childhood as he did with French and Italian. He learned German mostly out of necessity. As reported in *Unconscious Memory,* when

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[47] Harvey Joy, *Almost a Man of Genius: Clémence Royer, Feminism and Nineteenth-Century Science* (New Brunswick, 1997), p. 79 and Robert E Stebbins, 'France', in Thomas E Glick, *The Comparative Reception of Darwinism*, pp. 117–167.
[48] Giulio Barsanti, *Una Lunga Pazienza Cieca, Storia dell'Evoluzionismo*, pp. 306-308.
[49] Lawrence Venuti, *A History of Translation*, p. 95.
[50] *Ibid.*, pp. 95-96.
[51] Jean Delisle and Judith Woodswort, *Translator Through History,* p. 191.

Evolution Old and New was published, Butler's contribution on Erasmus Darwin was not acknowledged by the German journal *Kosmos* in its long essay about Charles Darwin's grandfather.[52] Due to this lack of acknowledgment, Butler started learning German by himself in order to be able to interact with the editor of *Kosmos*. He wrote in *Unconscious Memory*, referring to this:

> At this time I knew not one word of German. On the same day, therefore, that I sent for *Kosmos* I began to acquire that language, and in the fortnight before *Kosmos* came had got far enough forward for all practical purposes - that is to say, with the help of a translation and a dictionary, I could see whether or no a German passage was the same as what purported to be its translation.[53]

However, *Unconscious Memory* was something more than that. In this book, describing his hypothesis of memory as a form of heredity, Butler linked it with the research done by the German Ewald Hering. He also used the book for explaining the necessity to translate and propagate Hering's hypothesis into the British debate.

> I shall presently give a translation of a lecture by Professor Ewald Hering of Prague, which appeared ten years ago, and which contains so exactly the theory I subsequently advocated myself, that I am half uneasy lest it should be supposed that I knew of Professor Hering's work and made no reference to it.[54]

Reading this quotation we can infer two important things. First, Butler tried to legitimise the originality of his psychophysiological hypothesis of evolution, developed independently in *Life and Habit*. Second, he used Hering's research as a justification for his own hypothesis. *Unconscious Memory* offered the first English translation of Ewald Hering's lecture entitled *Das Gedächtniss als allgemeine Funktion der organisirter Substanz* (Memory as a Universal Function of Organised Matter, 1870), promoting the psychophysiological hypothesis of the German scientist in the British marketplace of science. Apart from Hering's Lecture, the writer also translated selected passages of Von Hartmann's *Philosophy of the*

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[52] For more information about the quarrel between Butler, Darwin and Krause see Nora Barlow (ed.), *The Autobiography of Charles Darwin 1809-1882. With the original omissions restored. Edited and with appendix and notes by his grand-daughter Nora Barlow,* pp. 167-221 and Samuel Butler, *Unconscious Memory*, pp. 38-51. Additionally refer to the work Janet Browne, especially, *Charles Darwin: The Power of Place* , pp. 472-475 where this is discussed in details.

[53] Samuel Butler, *Unconscious Memory*, p.42.

[54] *Ibid.*, p. 3.

Unconscious.[55] Without going into detail now (Butler's hypothesis of unconscious memory will be fully discussed in chapter five), it is important to notice how the fact of translating and then comparing large sections of foreign books became an important part of Butler's work.

By 1859, the monopoly of 'formal' science was in the hands of Darwin's circles. Continuing with the metaphor of the market, it seems that Butler was a trader who tried to sell continental products in a market full of national goods. Butler's method for imposing his own hypothesis was to find similar conceptions in Europe and translate them for the British audience. From the publication of *Unconscious Memory,* Butler started the popularization of German outcomes of evolutionism

In *Luck or Cunning?* Butler went back to the work of scientists such as Hering, Haeckel, Jäger and Nussbaum, discussing whilst translating their criticism of natural selection and showing how psychophysiology was the only acceptable alternative to natural selection. Additionally, Butler brought out, still more forcibly, the Hering-Butler doctrine of continued personality from generation to generation. His work of translation here was conducted in two ways. First, he explained, through further translation of Hering, the working of unconscious memory throughout. Second, he compared German evolutionism with the work of Herbert Spencer and Romanes. Finally, in the 'The Deadlock of Darwinism', the English writer discussed the problem of the germ-plasm hypothesis of Weismann and responded to minor German physiologists focusing on the new use of biochemistry in the process of acquiring memory.

In conclusion, the work of Butler as a translator was far from our contemporary interpretation of the professional translator. However, although Butler did not possess enough experience and he was not trained in translating German, he did his best for

[55]Karl Robert Eduard von Hartmann, *Die Philosophie des Unbewussten* Eng. trans. by William Chatterton Coupland.

producing an accurate work. As evidence of this, referring to the translation of Hering's *lecture he wrote:*

> *I will now lay before the reader a translation of Professor Hering's own words. I have had it* carefully revised throughout by a gentleman whose native language is German, *but who has* resided in England for many years past.[56]

Looking back at Butler's scientific publications following a chronological order, two aspects appear immediately important. First, Butler's books were one of the major representatives of French and German natural science in Britain before the rise of Neo-Lamarckism and the popularization of German embryology around 1890. Second, they represented the best way for understanding the training of Victorian amateur scientists. They provided a chronological description of Butler's readings and opinions regarding the relevance of different evolutionistic hypotheses in the British marketplace.

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Peter Raby defined Butler as one of the most unclassifiable minds of the nineteenth-century, with a reputation that rises and falls but obstinately resists definition.[58] The impossibility of giving a definition to the reputation of the writer also seems to describe his relationship with Victorian science. It is very clear from Raby's biography how Butler's

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[56] Samuel Butler, *Unconscious Memory*, p.63.

[57] 'Interested in everything... Samuel Butler in his rooms at Clifford's Inn', Picture stored in the Samuel Butler's Collection at the St. John College Library, Cambridge.

[58] Peter Raby, *Samuel Butler: A Biography*, p. 1.

scientific work was just a parenthetical production in a broader oeuvre.[59] I disagree with this perspective. The scientific research of Butler is an aspect of his oeuvres which needs major attention. In his scientific writing there is a great deal that has yet to be unpacked.

In unpacking Butler's knowledge of evolution, the first sources to use are his own writings. In *Life and Habit* Butler's knowledge of evolution was only related to the work of Darwin and the British scene; at the end of his career his engagement with, the translation and popularization of European science had become rich in meaning.

Thus, the beginning of *Life and Habit*, Butler went out of his way to heap scorn on the respected names of Marcus Aurelius, Francis Bacon, Johann Wolfgang von Goethe, Thomas Arnold, and William B. Carpenter. He also expressed the lowest of opinions regarding the Fellows of the Royal Society. To him, to paraphrase, the professional man of science - with a self-conscious knowledge of his ideals and aims, was a medicine-man, a priest, an augur - useful, perhaps, in his way, but to be carefully watched by all who value freedom of thought and person, lest with opportunity he develop into a persecutor of the worst type.[60]

Ten years later, in *Luck of Cunning?* Butler put his own hypothesis of evolution next to the research of Mivart, Spencer, Wallace, Romanes, Hering, Ribot and Weismann. The change of names, exactly like the change of scene, shows a more mature, Butler who refers to a completely different network. In the volume, the writer critically discusses the main evolutionistic discoveries of his generation, linking the work of British scientists with European colleagues. The author developed his hypothesis starting from his engagement with the surrounding scientific community. As an example, in the preface of *Luck of Cunning?* he made this point, clearly saying:

> This book, as I have said in my concluding chapter, has turned out very different from the one I had it in my mind to write when I began it. It arose out of a conversation with the late Mr. Alfred Tylor soon after his paper on the growth of trees and protoplasmic continuity

[59] *Ibid.*, pp. 151-168.
[60] Samuel Butler, *Unconscious Memory*, p. xii-xiii.

> was read before the Linnean Society - that is to say, in December, 1884 - and I proposed to make the theory concerning the subdivision of organic life into animal and vegetable, which I have broached in my concluding chapter, the main feature of the book.[61]

Thus, the structure of *Luck or Cunning?* arose from Butler's desire to be involved in the current scientific research of the 1880s. Additionally, the structure of the book can also be read as evidence for Butler's knowledge of evolution. If in *Life and Habit* there were not many quotations of scientists from outside England (apart from Lamarck), in *Unconscious Memory* and *Luck or Cunning?*, these scientists and their claims become an integral part of Butler's argumentation.

The same situation can be seen in Butler's novel. If in *Erewhon* the idea of evolution was only at the stage of a naive example of philosophy of unconscious, in his next novels Butler's engagement with the scientific culture of the late nineteenth-century had become deeper. According to Sally Shuttleworth, Butler's late novel *The Way of All Flesh* is an example of Lamarckian psychology, even an anticipation of the Freudian one.[62] Written during the period of his scientific research but published only after Butler's death, the novel proposed an analysis of the psychological mechanism of the human mind in contrast to the one planned by Spencer and later on by Romanes.[63] *The Way of All Flesh* presented an intricate psychological game between the desires of the child and the behaviours of the parents.[64]

Samuel Butler read, criticised and popularised not only British science but also theorization and experimentation of evolution outside the domain of the British materialistic evolution. He discovered many alternatives to natural selection as the dominant account of evolution. From his selection of sources we can understand that

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[61] Samuel Butler, *Luck or Cunning?*, p. 7.
[62] Refer to Sally Shuttleworth, 'Samuel Butler as Late-Victorian Bachelor: Regulating and Representing the Homoerotic / Herbert Sussman', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview,* p. 155: 'The Freudian struggle between father and son is played out in The Way of all Flesh through Butler's engagement with the evolutionary theory.'
[63] *Ibid.*, pp. 146-149.
[64] *Ibid.*, pp. 147-150.

Butler's own hypothesis of evolution was a work in progress which developed alongside his progressive usage of sources. He started with Darwinian evolution and the British scene (1860-1878) and arrived at French and German psychophysiology (1879-1890).

4.3 Butler's view of evolution: the past, the present and the future

In the previous sections, I discussed the role of natural history in Butler's scientific volumes. My argument started from the idea of the marketplace and the circulation of evolution within the Victorian debate. I described how Butler was unusual in 'buying and selling' foreign evolutionary ideas. Now, I move on to the actual models of evolution which Butler encountered and discussed during his thirty year career. These can be divided into three evolutionary models that could act as alternatives to the Darwinian monopoly.

First, there were Mivart, Spencer and Romanes. They worked, as Butler did, using Darwin's idea of natural selection and applying it to philosophy and social science (Spencer); in relation to natural teleology and design (Mivart); and to psychology of mental evolution (Romanes). They also shared with Butler the identity of working across different disciplines.

Second, there were the historical heroes of evolution located in the pre-Darwinian evolutionists as addressed in *Evolution Old and New*. The book reported Butler's historical revision of the history of evolution showing how Darwin's idea of natural selection was not original as supposed by his Victorian followers.

Third, there were the French and German debates concerning psychophysiology which had developed since 1870. They proposed a hypothesis in some parts identical with the one proposed by Butler in *Life and Habit*, reshaping evolution in relation to the new categories of psychology and medical physiology.

4.3.1 The other protagonists: Mivart, Spencer and Romanes.

In this section, my aim is to discuss the work of Mivart, Spencer and Romanes as it was discussed (and criticised) in Butler's book. I try to keep as close as possible to Butler's opinions, and present Mivart, Spencer and Romanes in the light of their relationship with the writer.

4.3.1.1 St George Mivart

In 1871, St George Mivart published *On the Genesis of Species*, a book which soon became the main criticism made of Darwin's hypothesis of natural selection. Mivart tried to reconcile the idea of natural selection with the metaphysical use of design proper to the Catholic Church. He was famous, as Butler, for becoming an ardent believer in natural selection, only to later become one of its fiercest critics.


ON

THE GENESIS OF SPECIES.

BY

ST. GEORGE MIVART, F.R.S.

MACMILLAN AND CO.

1871.

As reported in the article 'Evolution and Its consequences'[65] published in *The Contemporary Review* in January 1872, Mivart pointed:

> My " Genesis of Species" was written with two main objects: My first object was to show that the Darwinian theory is untenable, and that natural selection is not the origin of species. This was and is my conviction purely as a man of science, and I maintain it upon scientific grounds only. My second object was to demonstrate that nothing even in Mr. Darwin's

[65] St George Mivart, 'Evolution and its Consequences: A Reply to Professor Huxley', *The Contemporary Review*, Vol. XIX, (December 1871/May 1872), pp. 168-197.

> theory, as then put forth, and *a fortiori* in evolution generally, was necessarily antagonistic to Christianity.[66]

Mivart's hypothesis tried to reconcile Darwin's theory of evolution with the beliefs of the Catholic Church but ended up being condemned by both parties.[67] In the Introduction of *On the Genesis of Species* Mivart wrote:

> Remarkable is the rapidity with which an interest in the question of specific origination has spread. But a few years ago it scarcely occupied the minds of any but naturalists. Then the crude theory put forth by Lamarck, and by his English interpreter, the author of the " Vestiges of Creation," had rather discredited than helped on a belief in organic evolution a belief, that is, in new kinds being produced from older, ones by the ordinary and constant operation of natural laws. Now, however, this notion is widely diffused. Indeed, there are few drawing-rooms where it is not the subject of occasional discussion, and artisans and schoolboys have their views as to the permanence of organic forms. Moreover, the reception of this doctrine tends actually, though by no means necessarily, to be accompanied by certain beliefs with regard to quite distinct and very momentous subject-matter. So that the question of the " Genesis of Species " is not only one of great interest, but also of much consequence.[68]

Mivart, in his work, started form the assumption that 'The special Darwinian hypothesis, however, is beset with certain scientific difficulties, which must by no means be ignored, and some of which, the author ventures to think, are absolutely insuperable'.[69] These scientific difficulties, in the shape of several methodological errors, became the object of *The Genesis of Species*. Mivart tried to maintain 'the position that "Natural Selection" acts, and indeed must act; but that still, in order to account for the production of known kinds of animals and plants, it requires to be supplemented by the action of some other natural law or laws as yet undiscovered. Also, that the consequences which have been drawn from Evolution, whether exclusively Darwinian or not, to the prejudice of religion, by no means follow from it, and are in fact illegitimate'.[70]

From Mivart's point of view, a secular form of teleology was the constructive answer to Darwinian evolution. In the *Genesis of* Species, Mivart clearly pointed out the necessity of finding a natural law and not another religious prejudice. Partially making

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[66] *Ibid.*, pp. 168-170.
[67] Adrian Desmond, *Archetypes and Ancestors: Palaeontology in Victorian London*, pp. 137-142.
[68] St. George Mivart, *On the Genesis of Species*, p. 4.
[69] *Ibid.*, p. 5.
[70] *Ibid.*, pp. 5-6.

criticism of Darwin's natural selection and partially accepting it, Mivart was in the difficult position of being in the middle of a theoretical battle as asserted by T.H. Huxley's article 'Mr Darwin's Critics' in the *Contemporary Review* (1871). This article, 42 pages long, defended the idea of Darwinian evolution and discussed the hypotheses of Mivart and Wallace. Huxley wrote:

> Thus Mr. Mivart is less of a Darwinian than Mr. Wallace, for he has less faith in the power of natural selection. But he is more of an evolutionist than Mr. Wallace, because Mr. Wallace thinks it necessary to call in an intelligent agent a sort of supernatural Sir John Sebright to produce even the animal frame of man ; while Mr. Mivart requires no Divine assistance till he comes to man's soul.[71]

Suggesting and neglecting the role of a super-agent in relation to living things and souls, Mivart's position was, according to Huxley, controversial and contradictory. Furthermore, the article also provides more details about the religious nature of Mivart's approach. Huxley wrote:

> I may assume, then, that the Quarterly Reviewer and Mr. Mivart admit that there is no necessary opposition between "evolution, whether exclusively Darwinian or not," and religion. But then, what do they mean by this last much-abused term ? On this point the Quarterly Reviewer is silent. Mr. Mivart, on the contrary, is perfectly explicit, and the whole tenor of his remarks leaves no doubt that by "religion " he means theology ; and by theology, that particular variety of the great Proteus, which is expounded by the doctors of the Roman Catholic Church, and held by the members of that religious community to be the sole form of absolute truth and of saving faith.[72]

Assuming that the aim of Huxley was to fight the 'enemy' of Darwinism, he also provided information about Mivart's interpretation of design. Starting from the contextualization of the metaphysics/ontology of Suarez and moving on to his interpretation of the Genesis, Huxley described the roots of Mivart's idea. Darwin's bulldog aimed to demonstrate the issues of a religious approach regarding evolution and natural selection, showing its main limits in particular respect to the metaphysical difference between the mind of men and lower animals. In the conclusion of the article it became clear that both 'The Quarterly Reviewer and Mr. Mivart base their objections to the evolution of the mental faculties of

[71] Thomas H. Huxley, 'Mr Darwin's Critics', *Contemporary Review,* vol. 18, (1871) pp. 442-476, esp. 444.
[72] Thomas H. Huxley, *Darwiniana*, p. 69.

man from those of some lower animal form upon what they maintain to be a difference in kind between the mental and moral faculties of men and brutes; and I have endeavoured to show, by exposing the utter unsoundness of their philosophical basis, that these objections are devoid of importance.'[73]

Although, from Huxley's point of view, the criticism made by Mivart and *The Quarterly Reviewer* were 'devoid of importance', for Darwin the situation was different. In 1872, giving answers to the number of criticisms and objections Darwin pointed out in the *Origin of Species* the following questions:

> First, why, if species have descended from other species by fine gradations, do we not everywhere see innumerable transitional forms? Why is not all nature in confusion, instead of the species being, as we see them, well defined? Secondly, is it possible that an animal having, for instance, the structure and habits of a bat, could have been formed by the modification of some other animal with widely-different habits and structure? Can we believe that natural selection could produce, on the one hand, an organ of trifling importance, such as the tail of a giraffe, which serves as a fly-flapper, and, on the other hand, an organ so wonderful as the eye? Thirdly, can instincts be acquired and modified through natural selection? What shall we say to the instinct which leads the bee to make cells, and which has practically anticipated the discoveries of profound mathematicians? Fourthly, how can we account for species, when crossed, being sterile and producing sterile offspring, whereas, when varieties are crossed, their fertility is unimpaired?[74]

In the sixth edition of *The Origin of Species*, Darwin seemed to be aware of the main issues of his hypothesis of evolution. The four points explained at the beginning of the *Origin*'s chapter six opened up a large discussion regarding the position of the principal detractors of his idea. About Mivart, Darwin said 'A distinguished zoologist, Mr. St. George Mivart, has recently collected all the objections which have ever been advanced by myself and others against the theory of natural selection, as propounded by Mr. Wallace and myself, and has illustrated them with admirable art and force'.[75] From Darwin's point of view Mivart's criticism seemed to highlight two objections. First, 'that natural selection is incompetent to account for the incipient stages of useful structures'.[76] The second objection regarded the

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[73] *Ibid.*, pp. 70-71.
[74] Charles Darwin, *On the Origin of Species*, p. 133.
[75] *Ibid.*, p. 176.
[76] *Ibid.*, p. 177.

increased size of the body into the process of evolution (the famous neck of the giraffe) and, as reported in the *Origin,* a series of case studies acting in the demonstration of the fallacies of natural selection. For more than 30 pages Darwin discussed precisely any single objective case reported by Mivart's criticism arriving finally at the central point of the discussion. In the very conclusion of the chapter, Darwin wrote referring to Mivart's work:

> He who believes that some ancient form was transformed suddenly through an internal force or tendency into, for instance, one furnished with wings, will be almost compelled to assume, in opposition to all analogy, that many individuals varied simultaneously. It cannot be denied that such abrupt and great changes of structure are widely different from those which most species apparently have undergone. He will further be compelled to believe that many structures beautifully adapted to all the other parts of the same creature and to the surrounding conditions, have been suddenly produced; and of such complex and wonderful co-adaptations, he will not be able to assign a shadow of an explanation. He will be forced to admit that these great and sudden transformations have left no trace of their action on the embryo. To admit all this is, as it seems to me, to enter into the realms of miracle, and to leave those of Science.[77]

As seen, the work of Mivart represented the most concrete criticism of Darwin's hypothesis of natural selection before the one made by Butler. However, the question that has to be addressed now is: what was the active role of Mivart's hypothesis in the shaping of Butler's own criticism? Alongside similar conclusions concerning teleology and design in evolution, Butler and Mivart shared a common destiny. First, both of them rejected Darwin's theory (natural selection) and, in this regard, they rejected Darwin himself. Second, they went through a quarrel and the consequent isolation from the scientific community. [78]

Mivart in the last chapter of *On the Genesis of Species* faced many of the issues concerning the role of natural selection in the process of evolution.[79] His aim was to mix the conclusions of Darwin in with the doctrine of Catholic religion. Linking the position of classic theology with Victorian science he attempted to show how, where and when it is

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[77] *Ibid.*, p. 204.

[78] In the case of Mivart, the quarrel started after the publication of *The Genesis of Species* and the consequent criticism received by Darwin and his circles.

[79] In particular, the last chapter of Mivart's *Genesis of* Species is particularly relevant if referred to Butler. Mivart's conclusive chapter discussed topics including 'Creation', The unknowable; Herbert Spencer's objections to theism; Meanings of term "creation"; Darwin's Natural selection; Bearing of Christianity on evolution; Theological authority not opposed to evolution; the work of St. Augustin and St. Thomas; The parallel between Christianity and natural theology; the work of Agassiz, Huxley, Owen, Wallace, Darwin and Wallace.

possible to discuss evolution in relation to design. However, the structure of the chapter itself is interesting. In it, Mivart discussed the work of philosophers and fathers of the church such as Augustine of Hippo, Thomas Aquinas and Suarez alongside the work of Darwin, Wallace and Huxley showing the strengths and weaknesses of both approaches.

Mivart's conclusion became very important for anyone interested in re-establishing a finalistic role into the evolutionary process. Thus, for Butler the work of Mivart represented the only concrete alternative to the materialistic approach of Darwin in Britain during the first decades after 1859.

In *Life and Habit*, Butler discussed the work of Mivart for the first time. In the book he introduced the work of the British zoologist in a chapter dedicated to Lamarck's hypothesis of evolution. According to Butler, Mivart's work represented the best (contemporary) way for understanding the necessity of re-thinking evolution in terms of design. As reported in *Life and Habit*, 'Mr. Mivart urges with much force the difficulty of starting any modification on which "natural selection" is to work, and of getting a creature to vary in any definite direction.'[80] The 'definite direction' proposed by Mivart seemed to be adopted by Butler as an implementation of Lamarck's hypothesis of 'Le pouvoir de la vie or la force qui tend sans cesse à composer l'organisation' (The power of life or the force that perpetually tends to make order).

In the chapter, Butler focused on the comparison between Darwin's *The Origin of Species* and Mivart's *On The Genesis of Species*. The writer reported quotations from both of the books, relating them to one another. The central point of Butler's comparison concerned the significance of the term variation in evolution.

> And when we bear in mind that the variations, being supposed by Mr. Darwin to be indefinite, or devoid of aim, will appear in every direction, we cannot forget what Mr. Mivart insists upon, namely, that the chances of many favourable variations being counteracted by other unfavourable ones in the same creature are not inconsiderable. Nor, again, is it likely that the favourable variation would make its mark upon the race, and escape being absorbed in the course of a few generations, unless - as Mr. Mivart elsewhere

[80] Samuel Butler, *Life and Habit*, p. 277.

> points out, in a passage to which I shall call the reader's attention presently - a larger number of similarly varying creatures made their appearance at the same time than there seems sufficient reason to anticipate, if the variations can be called fortuitous.[81]

According to Butler, Darwin with his hypothesis of natural selection insisted on a random system of variation. Mivart, instead, preferred to consider variations as a part of 'a power in nature which would preserve and accumulate further beneficial resemblance.'[82] Therefore, in Butler's own words:

> He [Mivart] thinks - and I believe the reader will agree with him - that this process is too slow and too risky. What he wants to know is, how the insect came even rudely to resemble the object, and how, if its variations are indefinite, we are ever to get into such a condition as to be able to report progress, owing to the constant liability of the creature which has varied favourably, to play the part of Penelope and undo its work, by varying in some one of the infinite number of other directions which are open to it - all of which, except this one, tend to destroy the resemblance, and yet may be in some other respect even more advantageous to the creature, and so tend to its preservation.[83]

From Butler's point of view, Mivart's criticism became decisive in demonstrating the fallacies of Darwin's natural selection. Additionally, it also was a strong source of support for *Life and Habit*'s conclusion that evolution is nothing else than a form of memory. In the conclusion of *Life and Habit*'s chapter dedicated to the *Genesis of Species*, Butler pointed out: 'Evolution entirely unaided by inherent intelligence must be a very slow, if not quite inconceivable, process. Evolution helped by intelligence would still be slow, but not so desperately slow. One can conceive that there has been sufficient time for the second, but one cannot conceive it for the first.'[84]

As seen, Butler expressed solidarity with Mivart's criticism of natural selection. However, he also found some points of disagreement. He wrote:

> When Mr. Mivart deals with evolution and ethics, I am afraid that I differ from him even more widely than I have done from Mr. Darwin. He writes ("Genesis of Species," p. 234): "That 'natural selection' could not have produced from the sensations of pleasure and pain experienced by brutes a higher degree of morality than was useful; therefore it could have

[81] *Ibid.*, pp. 179-180.
[82] *Ibid.*, p. 280.
[83] *Ibid.*, pp. 280-281.
[84] *Ibid.*, p. 284.

> produced any amount of 'beneficial habits,' but not abhorrence of certain acts as impure and sinful."[85]

Butler seemed to agree with Mivart's methodological criticism of natural selection, but being in strong disagreement with the ethical implication of his approach. Unfortunately, Butler did not go further in his explanation regarding this point. However, the quotation presented above shows an interesting aspect of Butler's approach. The writer agrees with Mivart's use of design, but because of his disagreement with Christian religion, Butler did not share the ethical implications of Mivart's criticism of natural selection.

In *Unconscious Memory*, Butler referred to Mivart's work only briefly. In the book, Butler's attention was given to Ewald Hering's hypothesis and German evolutionism; however, some reference to the work of the British zoologist occurred in the conclusion of chapter 2. Butler returns to what was written in *Life and Habit* about Mivart's criticism and recognised, once again, how the *Genesis of Species* provided an example of Darwin's incoherent usage of variation.

> When I had finished the "Genesis of Species," I felt that something was certainly wanted which should give a definite aim to the variations whose accumulation was to amount ultimately to specific and generic differences, and that without this there could have been no progress in organic development. I got the latest edition of the "Origin of Species" in order to see how Mr. Darwin met Professor Mivart, and found his answers in many respects unsatisfactory.[86]

Luck or Cunning? presented a similar discussion. In the introduction of the 1886 book, Butler, describing his work in the evolutionary field, wrote about the influence of Mivart in *Life and Habit*: 'Before I had finished writing this book I fell in with Professor Mivart's "Genesis of Species," and for the first time understood the distinction between the Lamarckian and Charles-Darwinian systems of evolution.'[87]

In summarising, the *Genesis of Species* offered the best starting point for obtaining evidence of the difficulties of natural selection. Additionally, it provided a scientific

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[85] *Ibid.*, p. 290.
[86] Samuel Butler, *Unconscious Memory*, pp. 22-23.
[87] Samuel Butler, *Luck or Cunning?*, p. 16.

evidence used by Butler in discussing the role of Lamarckism in contrast to Darwin's work. Butler used the research done by Mivart in support of his hypothesis of memory as a form of heredity. In concluding this section, I would like to show one final quotation from *Luck or Cunning?* written by Butler as a comment on Mivart's place into the debate of evolution.

> Mivart was, as I have said, among the first to awaken us to Mr. Darwin's denial of design, and to the absurdity involved therein. He well showed how incredible Mr Darwin's system was found to be, as soon as it was fully realised, but there he rather left us. He seemed to say that we must have our descent and our design too, but he did not show how we were to manage this with rudimentary organs still staring us in the face.[88]

The presence of Mivart in Butler's work was limited to the aspects reported above. Nonetheless, at the time Mivart's work represented the best theoretical alliance then available with Butler's investigation of evolution.

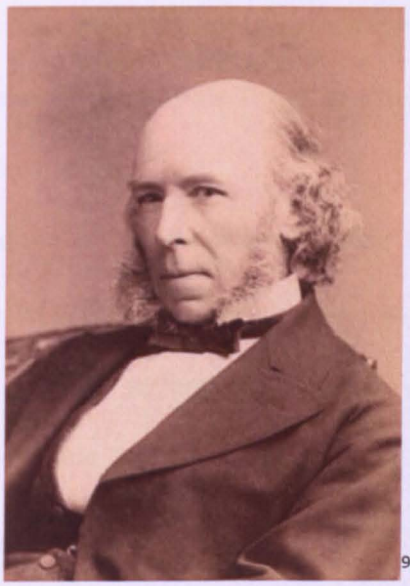
4.3.1.2 Herbert Spencer

The second personality strongly related to the work of Butler was Herbert Spencer, author of the *Principles of Biology* (1864 - 1867), *Principles of Psychology* (1870 - 1872), and *Principles of Sociology* (1876 - 1896). The work of Spencer was largely used by Butler in his book. In this section, I aim to look at Butler's interpretation of Spencer following the track proposed by the writer. First, I will look at Butler's reading of Spencer from a chronological perspective. Second, I will analyse Spencer's philosophy of evolution highlighting its role in Butler's books.

Trained as a philosopher, Spencer developed an all-embracing concept of evolution as the progressive development of the physical world, biological organisms, the human mind, culture and societies. He considered evolution as a fully-comprehensive way for understanding the whole world. Spencer was one of the most influential figures in sociology and psychology. From the beginning of his career, he was interested in evolution. He

[88] *Ibid.*, p. 19.

published *The Developmental Hypothesis* in 1852, seven years before Darwin's *Origin Of Species*. However, this theory was not taken into serious consideration largely because of a lack of an effective mechanism for change. Spencer was also a 'professional amateur', being part of the famous X-Club, which gave him the chance to be part of the most important scientific community of the period.[89]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The first of Spencer's evolutionary essays (considered relevant by the scientific community) was 'Progress: Its Law and Cause',[91] published in Chapman's *Westminster Review* in 1857, and which later formed the basis of the *First Principles of a New System of Philosophy* (1862). In it, the philosopher structured a hypothesis of evolution which combined insights from Samuel Taylor Coleridge's essay 'The Theory of Life' linked with Karl Ernst Ritter von Baer's law of embryological development.[92] Spencer suggested that all structures in the

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[89] Ruth Barton, '"Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X Club, 1851–1864', *Isis* 89 (3) (1998), pp. 410–444, esp. 411, 417, 421-423.

[90] Depicting Herbert Spencer in the 1880s.

[91] Herbert Spencer, 'Progress: Its Law and Cause' in Chapman's *Westminster Review* (London, 1857) and Herbert Spencer, 'Progress: Its Law and Cause', in Herbert Spencer, *Essays, Scientific, Political, and Speculative*, pp. 8-63.

[92] Karl Ernst Ritter von Baer formulated what would later be called Baer's laws of embryology structured in four points: 1. General characteristics of the group to which an embryo belongs develop before special characteristics. 2. General structural relations are likewise formed before the most specific appear. 3. The form of any given embryo does not converge upon other definite forms

universe, form a cell to a galaxy, develop from a simple, undifferentiated, homogeneity to a complex, differentiated, heterogeneity, while being part of a process of greater integration of the differentiated parts. Spencer's hypothesis was a universal law, applying to the greater system as much as to detailed and small biological organisms. However, it also involved human social organization as much as the human mind. The work of Spencer has normally been considered the philosophical transcription of the scientific hypothesis of natural selection. However, Spencer's attempt to explain the evolution of complexity was radically different from the one of Darwin's *Origin of Species* which explained a mere scientific and materialistic mechanism.

The primary mechanism of species transformation that Spencer recognized was Lamarckian use-inheritance, based on the use or disuse system, whereby the resulting changes are transmitted to future generations. Spencer argued that the Lamarckian approach was necessary to explain 'higher' evolution, especially in relation to the social development of humanity.

In contrast to Darwin, Spencer held the viewpoint that evolution has a direction and an end-point and involves a final state of equilibrium. According to Mike Hawkins's *Social Darwinism in European and American Thought, 1860--1945*, Spencer insisted on professing a strong role to the idea of equilibrium as a basic part of the process of evolution, but he also recognised the importance of natural selection.[93] As reported in his autobiography, Spencer recognised the role of Darwin in developing evolution only after the publication of the *Origin of Species*. He wrote at the end of the first of the two volumes:

> At that time I ascribed all modifications to direct adaptation to changing conditions; and was unconscious that in the absence of that indirect adaptation effected by the natural

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but, on the contrary, separates itself from them. 4. Fundamentally, the embryo of a higher animal form never resembles the adult of another animal form, such as one less evolved, but only its embryo.

[93]Mike Hawkins, *Social Darwinism in European and American Thought, 1860–1945 Nature as Model and Nature as Threat*, pp. 83-85.

> selection of favourable variations, the explanation left the larger part of the facts unaccounted for.[94]

In the following section, I will briefly introduce the main topics of Spencer's research of evolution and I will link them to the work done by Butler. In particular, I will look at the presence of Spencer's work in Butler's book, thereby showing how the English philosopher influenced the hypothesis of unconscious memory.

Talking about Butler and Spencer is not an easy task. Butler's own engagement with Spencer went through all his publications. Even indirectly, traces of Spencer's philosophy were present in his notes, novels, lectures and articles. Especially in *Evolution Old and New* and *Luck or Cunning?*, many chapters were drafted to discuss the philosophy of Spencer alongside the concept of instinct (*Life and Habit*) and in relation to the hypotheses of Patrick Matthew and Etienne and Isodore Geoffroy St Hilaire (*Evolution Old and New*).

Within the works of Spencer, Butler found a strong alliance with his own hypothesis. As he already had done with Mivart's opus, Butler used (and was influenced by) Spencer's work to justify some aspects of his hypothesis of psychophysiological evolution. However, it must also be noted that both Spencer and Butler independently developed a psychological interpretation of evolution. Unfortunately, none of Butler's detractors noticed the similarity between his conclusions and that of the philosopher. Both Butler and Spencer tried to move the focus of evolution from the realm of natural science to that of human society, in terms of psychology and then sociology (Spencer) and psychophysiology (Butler).[95] One might broadly describe Spencer's sociology as socially Darwinist (though strictly speaking he was a proponent of Lamarckism rather than Darwinism).[96] He proposed a version of evolution that tried to mediate (like Mivart and Butler) the idea of *trasnformisme* with the

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[94] Herbert Spencer, *An Autobiography, vol. I*, p. 502.

[95] *Erewhon* as a novel must be considered as a sociological analysis of evolution applied to the human society.

[96] See Richard Hofstadter, *Social Darwinism in American Thought*.

one of natural selection.[97] Butler's interpretation of Spencer can be discussed in relation to two main aspects. First, there was the theoretical relationship between the philosophies of Spencer and the work of Lamarck. Second, there was Spencer's research in the field of psychological evolution.

The biological work of Spencer was discussed by Butler for the first time in *Evolution Old and New*. In the book, the aim of the writer was to link Spencer's study of evolution with a scientific tradition preceding Darwin's natural selection. Although Butler's *Evolution Old and New* reported only some quotations of Spencer's writing, it tried to show the presence of Lamarckian ideas in Spencer's pre-Darwinian evolutionary hypothesis. Therefore, Butler's interpretation was limited to what was stated in Spencer's essay 'The Development Hypothesis' (1852), published in the journal *The Leader*. The essays discussed the 'Development hypothesis' before Darwin's natural selection, starting from the assumption that anyone interested in evolution could not avoid the hypothesis of transformisme proposed by Lamarck. Butler's reading started form a single sentence written by Spencer in 'The Haythorne Papers':

> Those who cavalierly reject the theory of Lamarck and his followers as not adequately supported by facts," wrote Mr. Herbert Spencer, "seem quite to forget that their own theory is supported by no facts at all.[98]

As reported in the above quotation, it appears immediately clear as to why Butler considered this essay interesting. When Butler was writing *Evolution Old and New*, his aim was to find support for Lamarck's theory in order to justify his criticism towards Darwin's natural selection. The first paragraph of the essay highlighted the fact that:

> Those who cavalierly reject the Theory of Evolution as not being adequately supported by facts, seem to forget that their own theory is supported by no facts at all. Like the majority of men who are born to a given belief, they demand the most rigorous proof of any adverse belief, but assume that their own needs none. Here we find, scattered over the globe, vegetable and animal organisms numbering, of the one kind (according to Humboldt), some 320,000 species, and of the other, some 2,000,000 species (see Carpenter) and if to these

[97] Refer to Giorgio Lanaro, *L'evoluzione, il progresso e la società industriale. Un profilo di Herbert Spencer*, pp. 93-100.
[98] Samuel Butler, *Evolution Old and New*, p. 330.

> we add the numbers of animal and vegetable species which have become extinct, we may safely estimate the number of species that have existed, and are existing, on the Earth, at not less than ten millions. Well, which is the most rational theory about these ten millions of species? Is it most likely that there have been ten millions of special creations? or is it most likely that, by continual modifications due to change of circumstances, ten millions of varieties have been produced, as varieties are being produced still?[99]

Through the use of Lamarckian terminology ('continual modification' and 'change of circumstances'), we can see the influence of the French evolutionist on Spencer. Butler's choice of Spencer's essay was obviously due to this. He tried to demonstrate how the explanation of Spencer 'leaves nothing to be desired. It is Buffon, Dr. Darwin, and Lamarck, well expressed.'[100]

In *Evolution Old and New*, Butler also tried to show how the concept of the 'struggle for existence', although introduced by Spencer and largely used by Darwin, was actually first thought of someone else. In relation to this, Butler wrote in *Evolution Old and New* the following passage: 'the essence of what Mr. Herbert Spencer and Mr. Charles Darwin have termed the survival of the fittest in the struggle for existence, as was necessary for Lamarck's purpose.'[101] As stated by Butler, the idea of the 'struggle for existence' was used by French and English naturalists before Darwin and Spencer. To Lamarck, Erasmus Darwin and Buffon, it was perfectly clear that animals have to find their food under varying circumstances and that they must defend themselves against other creatures which would eat them if they could. According to Butler these facts 'were simply some of the conditions of their existence.'[102] Butler declared in the text, using an example from Mivart's *Genesis of Species*, that:

> 'Mr. Spencer's theory—so Mr. Mivart tells us—and certainly that of Lamarck, whose disciple Mr. Spencer would appear to be, admits "a certain peculiar, but limited power of response and adaptation in each animal and plant"—to the conditions of their existence. "Such theories," says Mr. Mivart, "have not to contend against the difficulty proposed, and it has been urged that even very complex extremely similar structures have again and again been developed quite independently one of the other, and this because the process has taken place not by merely haphazard, indefinite variations in all directions, but by the concurrence

[99] Herbert Spencer, 'The Haythorne Papers', *The Leader* (1852), pp. 1-7 esp. 1.
[100] Samuel Butler, *Evolution Old and New*, p. 332.
[101] *Ibid.*, p. 281.
[102] *Ibid.*, p. 281.

> of some other internal natural law or laws co-operating with external influences and with Natural Selection in the evolution of organic forms.'[103]

In *Unconscious Memory* Butler returned briefly to the relationship between Spencer and Lamarck. At the conclusion of the book he wrote:

> Did Mr. Herbert Spencer, for example, "repeatedly and easily refute" Lamarck's hypothesis in his brilliant article in the Leader, March 20, 1852? On the contrary, that article is expressly directed against those "who cavalierly reject the hypothesis of Lamarck and his followers." This article was written six years before the words last quoted from Mr. Wallace; how absolutely, however, does the word "cavalierly" apply to them![104]

In concluding the first aspect of Butler's interpretation of Spencer's research, we can say that, especially in *Evolution Old and New*, it was developed by Butler with the intention of supporting his hypothesis of the non-originality of Darwin's natural selection. In doing so, Butler did not fully discuss Spencer's work. He merely used it, instead, as ammunition in support of his own argument.

The second aspect which linked Butler's research with Spencer was his philosophical interpretation of evolution. The evolutionary hypothesis of Spencer involved not only the organic kingdom, but also inorganic and super-organic evolution. Published in 1864, the *Principles of Biology* aimed 'to set forth the general truths of Biology, as illustrative of, and as interpreted by, the laws of Evolution: the special truths being introduced only so far as is needful for elucidation of the general truths.'[105] Spencer was also involved in the study of mental evolution. In the *Principle of Psychology* (1870-72) he approached the problem regarding the psychological dimension of the evolutionary hypothesis. The reason behind the publication and the investigation of mental evolution is clear in the first page of the preface of the second edition written in 1880. There, Spencer wrote:

> When, in 1855, the First Edition of The Principles of Psychology was issued, it had to encounter a public opinion almost universally adverse. The Doctrine of Evolution everywhere implied in it, was at that time ridiculed in the world at large, and frowned upon

[103] Samuel Butler, *Evolution Old and New*, p. 343.
[104] Samuel Butler, *Unconscious Memory*, p. 183.
[105] Herbert Spencer, *Principles of Biology*, p. iii.

> even in the scientific world. Naturally, therefore, the work, passed over, or treated with but small respect, by reviewers, received scarcely any attention; and its contents remained unknown save to the select few. The great change of attitude towards the Doctrine of Evolution in general, which has taken place during the last ten years, has made the Doctrine of Mental Evolution seem less unacceptable; and one result has been that the leading conceptions set forth in the First Edition of this work, have of late obtained considerable currency. In France, some of them have been made known incidentally by the treatise of M. Taine, De Intelligence and the lucid exposition of Prof. Ribot in his *Psychologie Anglaise Contemporaine* has presented them all in a systematic form.[106]

As stated in the quotation, two points seem to be important. First, according to Spencer, the hypothesis of 'mental evolution' achieved scientific value only in the decade between 1870-1880 - although it was already implied in evolution in the 1860s. Second, in France more than in England, Spencer's hypothesis became embedded in a pre-existing discussion concerning the role of the brain in the process of evolution.[107]

Spencer's evolutionary hypothesis was discussed specifically in *Luck or Cunning?*. In the book, the writer's aim was to demarcate the structural connection with his hypothesis of mental evolution (unconscious memory) and that of Spencer. [108] As reported in the text, Butler wrote, regarding the topic of mental evolution, 'The only writer in connection with "Life and Habit" to whom I am anxious to reply is Mr. Herbert Spencer.'[109]

Butler's 1886 book presented two chapters dedicated to the work of the British philosopher. Through them, Butler wished to make the reader clear about the natural link between his idea of memory as a form of heredity, the work of the German Ewald Hering, and the hypothesis of psychological evolution contained within the *Principles of Psychology*. From Butler's point of view Spencer's interpretation of memory was very close to that of Hering (and consequently his own hypothesis), although presenting some errors. In the *Principles of Psychology* Spencer made abundant use of expressions such as 'the experience

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[106] Herbert Spencer, *Principles of Psychology*, pp. iii-iv.
[107] Laurent Mucchielli, 'Aux origines de la psychologie universitaire en France (1870-1900): enjeux intellectuels, contexte politique, reseaux et strategies d'alliance autour de la Revue philosophique de Theodule Ribot', *Annals of Science*, 55 (1998), pp. 263-289 esp. 266.
[108] Samuel Butler, *Luck or Cunning?*, p. 24.
[109] *Ibid.*, p. 24.

of the race' and 'accumulated experiences' – yet Butler doubted that a race could have any experience at all. Spencer, in the *Principles of Psychology* defined memory in the following way:

> Memory, then, pertains to all that class of psychical states which are in process of being organised. It continues so long as the organising of them continues; and disappears when the organisation of them is complete. In the advance of the correspondence, each more complex class of phenomena which the organism acquires the power of recognising is responded to at first irregularly and uncertainly; and there is then a weak remembrance of the relations. By multiplication of experiences this remembrance becomes stronger, and the response more certain. By further multiplication of experiences the internal relations are at last automatically organised in correspondence with the external ones; and so conscious memory passes into unconscious or organic memory. At the same time, a new and still more complex order of experiences is thus rendered appreciable; the relations they present occupy the memory in place of the simpler one; they become gradually organised; and, like the previous ones, are succeeded by others more complex still.[110]

Although the act of repeating experience recalled the hypothesis of acquiring habits proposed by Butler in *Life and Habit*, Spencer did not consider memory as the key factor of heredity. In the *Principles of Psychology*, the act of repetition became the justification of a philosophical analysis of memory which did not involve experience.

> Just as we saw that the establishment of those compound reflex actions which we call instincts is comprehensible on the principle that inner relations are, by perpetual repetition, organised into correspondence with outer relations; so the establishment of those consolidated, those indissoluble, those instinctive mental relations constituting our ideas of Space and Time, is comprehensible on the same principle.[111]

This explanation did not satisfy Butler. In *Luck or Cunning?* the writer suggested that 'personality and memory are the elements that constitute experience; where these are present there may, and commonly will, be experience; where they are absent the word "experience" cannot properly be used.'[112] Following this conclusion, the whole psychological evolution proposed by Spencer became immediately unclear, losing the key role of experience in the process. Therefore, Butler concluded that:

> '"Principles of Psychology" can hardly be called clear, even now that Professor Hering and others have thrown light upon them. If, indeed, they had been clear Mr. Spencer would

[110] Herbert Spencer, *Principles of Psychology*, p. 563.
[111] *Ibid.*, p. 579.
[112] Samuel Butler, *Luck or Cunning?*, p. 30.

> probably have seen what they necesitated, and found the way of meeting the difficulties of the case which occurred to Professor Hering and myself.[113]

According to Butler, it was not possible for anyone to obtain a clear conception of Spencer's meaning. Apparently, Spencer did not mean to make memory the keystone of his system and he did not arrive at the point of binding the force of memory which Hering so well expressed, nor did 'he show any signs of perceiving the far-reaching consequences that ensue if the phenomena of heredity are considered as phenomena of memory.'[114]

A few pages later, Butler commenced the second point of his analysis. His attention moved from the examination of Spencer's use of the word 'experience', to a discussion of the place of Hering's organic memory in Spencer's work. Thus, Butler demonstrated that not only he but also Spencer approached Hering's view.

> In his chapter on Memory, Mr. Spencer certainly approaches the Heringian view. He says, "On the one hand, Instinct may be regarded as a kind of organised memory; on the other, Memory may be regarded as a kind of incipient instinct" ("Principles of Psychology," ed. 2, vol. i. p. 445). Here the ball has fallen into his hands, but if he had got firm hold of it he could not have written, "Instinct *may be* regarded as *a kind of,* &c.;" to us there is neither "may be regarded as" nor "kind of" about it; we require, "Instinct is inherited memory," with an explanation making it intelligible how memory can come to be inherited at all. I do not like, again, calling memory "a kind of incipient instinct;" as Mr. Spencer puts them the words have a pleasant antithesis, but "instinct is inherited memory" covers all the ground, and to say that memory is inherited instinct is surplusage[115]

Although Spencer accepted Hering's hypothesis, he was, in Butler's opinion, unable to work it out properly. If in *Life and Habit* 'instinct is [was] inherited memory', in Spencer's principles memory was considered 'a kind of incipient instinct'. In Spencer's work, the role of memory was subordinated to instinct. Therefore, he could not make Butler's last step in moving from pure physical evolution to a new mental evolution. According to Butler, Spencer was, indeed, influenced by the work of Hering in establishing the role of memory in his psychological evolution but he was not able to achieve the final goal suggested by the German scientist. Two aspects become particularly relevant: first, for Butler, Spencer did

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[113] *Ibid.*, pp. 39-40.
[114] *Ibid.*, p. 49.
[115] *Ibid.*, pp. 46-47.

not go far enough with his cultural concept of memory. Second, Spencer's concept of memory was incoherent if compared to the work of Hering.

Concluding this section, we can observe how important Butler considered Spencer's work. First, Spencer recognised the importance of Lamarck's hypothesis of evolution in developing his idea of the 'struggle for existence'. Second, Butler linked the work of Spencer with Hering and the psychophysiological European debate of the late nineteenth-century. As a final quotation, let me report a sentence which can summarise the whole section. Butler wrote in *Luck or Cunning?*: 'I can, however, have no hesitation in saying that if I had known the "Principles of Psychology" earlier, as well as I know the work now, I should have used it largely.'[116]

4.3.1.3 George John Romanes

Romanes was a Canadian-born, but English, naturalised evolutionary biologist and physiologist, who laid the foundations for what he called 'comparative psychology', postulating a similarity of cognitive processes and mechanisms between humans and other animals. He was one of the favourite pupils of Darwin.[117] The scientific career of Romanes has been characterised by several books concerning the main issues of evolution in relation to psychology and organic memory. In Butler's work, Romanes (as Mivart and Spencer) had a prominent role due to his research on psychological evolution. Butler dedicated to Romanes' research a collection of essays entitled 'Remarks on Romanes' *Mental Evolution in Animals*' published in *Selections from Previous Works* (1884) and drafted as a chapter in *Luck or Cunning?*.

[116] *Ibid.*, p. 49.
[117] Peter Zaller, *Romanes. Un Discepolo di Darwin alla Ricerca delle Origine del Pensiero*, pp. 15-20.

 [118]

In his career, Romanes focused on two main topics: organic evolution and mental evolution. In his opus they were intrinsically connected, and the passage from one to the other best represented Romanes' own interpretation of Evolution. The work on Organic Evolution belongs to the first part of Romanes' scientific activity. Published in 1882, *The Scientific Evidences of Organic Evolution*[119] was Romanes' first attempt at explaining organic evolution, starting from the *Origin of Species*. In this volume, Romanes aimed to explain Darwin's evolutionism to Victorian scientists, showing how Darwin's natural selection was the best approach for understanding the complexity of evolution.

However, at the end of the volume, Romanes moved natural selection forward into the domain of psychology. In determining the link between natural selection and mental evolution, Romanes asserted that 'the theory was first devised to explain the facts of biology, and proving so successful in that region, Mr. Darwin proceeded to test it in the region of psychology. The result has been to show that large classes of phenomena in this region, which were previously unaccountable, become fully intelligible. This is especially the case with the phenomena of instinct, and in a lesser degree with those of reason and

[118] Ethel Ducan Romanes (ed.), *The Life and Letters of George John Romanes*, frontispiece.
[119] George Romanes, *The Scientific Evidences of Organic Evolution* (1882).

conscience.'[120] Romanes was very aware of the necessity to implement Darwin's natural selection within the new fringes of psychological and physiological research.

This further step, without neglecting the conclusions of Darwin, was shaped in order to open new doors and give new life to the (old) mechanism of random variation combined with natural selection. Romanes even came to talk about the philosophy of animal intelligence, showing a rejection for the materialistic approach which characterized Darwin's work.

> For the theory shows that if structures admit of being moulded to their special uses by natural selection, the same must be true of instincts; and it is found an easy matter to understand how, by seizing upon and fixing, through hereditary beneficial variations of habit (whether instinctive or intelligent), natural selection is as competent to fashion the mental structure of an animal as it is to shape its bodily structure into agreement with the external conditions of life. Thus the whole philosophy of animal intelligence is greatly elucidated, and this fact may justly be regarded as lending much additional credence to the theory.[121]

This change of perspective developed in two main publications: *Animal Intelligence* (1882) and *Mental Evolution in Animals* (1883). In *Animal Intelligence*, Romanes pointed out that 'there must be a psychological, no less than a physiological, continuity extending throughout the length and breadth of the animal kingdom',[122] in turn moving evolution from the materialism of natural selection to the study of psychology and medical physiology. The same was later re-discussed and enlarged by Romanes in *Mental Evolution in Animals*. This point became particularly clear in the first pages of the book. Romanes wrote:

> I hold that if the doctrine of Organic Evolution is accepted, it carries with it, as a necessary corollary, the doctrine of Mental Evolution, at all events as far as the brute creation is concerned. For throughout the brute creation, from wholly unintelligent animals to the most highly intelligent, we can trace one continuous gradation ; so that if already believe that all specific forms of animal life have had a derivative origin, we cannot refuse to believe that all the mental faculties which these various forms present must likewise have had a derivative origin. And, as a matter of fact, we do not find anyone so unreasonable as to maintain, or even to suggest, that if the evidence of Organic Evolution is accepted, the evidence of Mental Evolution, within the limits which I have named, can consistently be rejected.[123]

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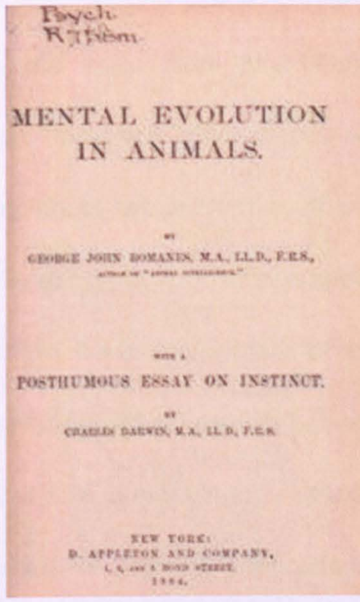
[120] *Ibid.*, pp. 70-71.
[121] *Ibid.*, pp. 71-72.
[122] George Romanes, *Animal Intelligence*, p. 10.
[123] George Romanes, *Mental Evolution in Animals. With a Posthumous Essay on Instinct by Charles Darwin* , p.8.


MENTAL EVOLUTION
IN ANIMALS.

GEORGE JOHN ROMANES, M.A., LL.D., F.R.S.,

POSTHUMOUS ESSAY ON INSTINCT.

CHARLES DARWIN, M.A., LL.D., F.R.S.

NEW YORK:
D. APPLETON AND COMPANY,

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From Romanes' point of view, 'hereditary memory' had the same role as 'instinct' in the process of evolution. In accepting this, he stated two important points. First, according to his point of view 'It makes no essential difference whether the past sensation was actually experienced by the individual itself, or bequeathed it, so to speak, by its ancestors. For it makes no essential difference whether the nervous changes were occasioned during the lifetime of the individual or during that of the species, and afterwards impressed by heredity on the individual.'[125] Second, throughout the hypothesis of mental evolution he explained how close the connection was between hereditary memory and instinct.[126]

In Butler's work, Romanes held a prominent position due to his research on mental psychology and its influence in evolutionary science. According to the writer, in 1883, Romanes' *Mental Evolution in Animals* pointed out a hypothesis not dissimilar from the main conception of psycho-physiology promoted in England and Europe in the decades 1870-1890. As discussed at the beginning of this section, although Romanes shared in his writing Hering's perspective, he did not give the work of the German physicist proper

[124] Cover of D. Appleton (ed.) George Roamanes, *Mental evolution in Animals. With a Posthumous Essay on Instinct* (1884).

[125] George Romanes, *Mental Evolution in Animals. With a Posthumous Essay on Instinct by Charles Darwin*, pp. 177-178.

[126] *Ibid., p. 178.*

acknowledgment. In Romanes' *Mental Evolution in Animals*, the mechanism of natural selection was changed into the one called 'physiological selection'. Designed as an implement of natural selection, Romanes' 'physiological selection' stated that variation in reproductive ability, caused mainly by the prevention of inter-crossing with parental forms, was the primary driving force in the production of new species. The majority view then (and now) was geographical separation. It was the primary force in species splitting (or allopatry) and secondarily was the increased sterility of crosses between incipient species.

The main point of Butler's *Remarks* was related to Romanes' interpretation of memory and experience before and after the publication of *Mental Evolution in Animals* (1883). Butler started his analysis from the explanation of the role of memory as used by Spencer in the *Principles of Psychology* (instinct as 'organised memory'[127]) and by the philosopher George Henry Lewes in *Problems of Life and Mind* ('lapsing of intelligence'[128]) in relation to Romanes' work. Butler tried to determine (critically) the place of Romanes in the 1870-1880 debate on memory and heredity.

> It is here that Mr. Herbert Spencer, the late Mr. G. H. Lewes, and Mr. Romanes fail. Mr. Herbert Spencer does indeed go so far in one place as to call instinct "organised memory," and Mr. G. H. Lewes attributes many instincts to what he calls the "lapsing of intelligence." So does Mr. Herbert Spencer, whom Mr. Romanes should have known that Mr. Lewes was following. Mr. Romanes, in his recent work, Mental Evolution in Animals (November, 1883), endorses this, and frequently uses such expressions as "the lifetime of the species," "hereditary experience," and "hereditary memory and instinct," but none of these writers (and indeed no writer that I know of except Professor Hering of Prague, for a translation of whose address on this subject I must refer the reader to my book Unconscious Memory) 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.[129]

From Butler's point of view, neither Spencer, Lewes nor Romanes came to an adequate level of understanding of the concepts of memory and heredity as Hering and himself (especially in *Life and Habit*) did.

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[127] Herbert Spencer, *Principles of Psychology, Vol. I.*. p. 445.
[128] George Henry Lewes, *Problems of Life and Mind*, p. 141
[129] Samuel Butler, *Selections from Previous Works and Remarks on Romanes' Mental Evolution in Animals*, pp. 228-229.

In order to make his point clear, Butler compared Hering's definition of memory with that of Romanes, Spencer and Lewes. According to Hering 'It is to memory [..] that we owe almost all that we have or are; our ideas and conceptions are its work; our every thought and movement are derived from this source.'[130] Beginning with this assumption, Butler arrived at the conclusion that memory connects any aspect of our existence into a single whole and our bodies would be scattered into the dust of their component atoms if they were not held together by the cohesion of matter. In the same way, 'our consciousness would be broken up into as many moments as we had lived seconds, but for the binding and unifying force of Memory.'[131] As a consequence of this, memory, in Butler's view, had to be considered the key factor for understanding evolution and Spencer's, Lewes' and Romanes' (before *Mental Evolution in Animals*) interpretation of memory had to be classified as a misunderstanding.

However, according to Butler, Romanes in 'his recent work, Mental Evolution in Animals, shows that he is well aware of the direction which modern opinion is taking, and in several places he so writes as to warrant me in claiming his authority in support of the views which I have been insisting on for several years past'.[132] In Butler's opinion, Romanes's hypothesis of mental evolution was nothing more than a repetition of the hypothesis proposed by Hering in 1870 and by himself in 1878. In particular, the terminology adopted by Romanes (from *Mental Evolution in Animals*) recalled exactly the vocabulary adopted by Hering and then also used in *Life and Habit*. Furthermore, the growing importance of the place of memory in the process of reproduction belonged to himself (Butler) and Hering and not to Darwin and Romanes.

In order to demonstrate the validity of his argument, Butler reported several passages of Romanes' 1883 book, where Darwin's pupil presented arguments similar to

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[130] Samuel Butler, *Unconscious Memory*, p. 116.
[131] *Ibid.*, p. 116.
[132] Samuel Butler, *Selections from Previous Works and Remarks on Romanes' Mental Evolution in Animals*, p. 231.

that of Butler and Hering. First, Butler reported that Romanes wrote regarding the role that heredity has played in forming the perceptive faculty of the individual prior to its own experience.[133] Second, Romanes assumed of the acceptance that the second mode of Darwinian evolution (apart from natural selection) was the act frequent repetition and its effects on the nervous system.[134] Finally, Romanes made the assumption that 'Now upon our own theory it can only be met by taking it to be due to inherited memory.'[135]

In light of this, the main point of Butler's remarks became that of showing how Romanes' mental evolution was related to, and developed from, that of Hering. In Romanes' framework, it was heredity which impressed nervous changes on the individual. However, as claimed by Butler:

> He [Romanes] nowhere tells us what heredity is any more than Messrs. Herbert Spencer, Darwin, and Lewes have done. This, however, is, exactly what Professor Hering, whom I have unwittingly followed, does. He resolves all phenomena of heredity, whether in respect of body or mind, into phenomena of memory. He says in effect, "A man grows his body as he does, and a bird makes her nest as she does, because both man and bird remember having grown body and made nest as they now do, or very nearly so, on innumerable past occasions." He thus reduces life from an equation of say 100 unknown quantities to one of 99 only by showing that heredity and memory, two of the original 100 unknown quantities, are in reality part of one and the same thing.[136]

As reported by Butler, apparently Romanes, although pretending that mental evolution was a necessary implement of Darwin's natural selection, also misunderstood the role of Darwin in the development of the idea. Butler in his remarks declared that in *Mental Evolution in Animals*, Romanes quotes a letter written by Darwin in the last year of his life, in which the author of the *Origin* speaks about an intelligent action gradually becoming 'instinctive, i.e., memory transmitted from one generation to another.'[137] According to the remarks, it seemed that Romanes considered Darwin as the (unconscious) architect of mental

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[133] George Romanes, *Mental Evolution in Animals. With a Posthumous Essay on Instinct by Charles Darwin*, p. 131.
[134] *Ibid.*, p. 177-178.
[135] *Ibid.*, p. 192.
[136] Samuel Butler, *Selections from Previous Works and Remarks on Romanes' Mental Evolution in Animals*, p. 236.
[137] George Romanes, *Mental Evolution in Animals. With a Posthumous Essay on Instinct by Charles Darwin*, p. 193.

evolution instead of Hering. Additionally, Romanes in his book also defined Kingsley as the first to advance the theory connecting heredity and memory, in *Nature,* January 18th, 1867.

Obviously, Butler did not accept Romanes' argument of Darwin's paternity upon psychological evolution. Indeed Butler's *Remarks on Romanes' Mental Evolution in Animals* aimed to demonstrate the opposite. In the text, he reported a selection of passages from Darwin's books. According to the writer, Darwin, from the publication of the *Origin of Species* in 1859, changed his opinion regarding the role of memory in the process of heredity through four different steps:

> 1859. "It would be the most serious error to suppose that the greater number of instincts have been acquired by habit in one generation and transmitted by inheritance to succeeding generations." And this more especially applies to the instincts of many ants.
> 1876. "It would be a serious error to suppose" &c., as before.
> 1881. "We should remember what a mass of inherited knowledge is crowded into the minute brain of a worker ant."
> 1881 or 1882. Speaking of a given habitual action Mr. Darwin writes:—"It does not seem to me at all incredible that this action [and why this more than any other habitual action?] should then become instinctive:" i.e., memory transmitted from one generation to another.[138]

If Butler was correct, Darwin moved from a categorical refuse of unconscious memory in 1859, to an acceptance of the idea before his death in 1882. However, accepting the hypothesis of memory transmitted from one generation to another did not give Darwin the patronage of the idea. This belonged instead to Butler himself and Hering.

Besides the *Remarks*, Butler dedicated some letters to the themes of Romanes' misinterpretation on the genealogy of the idea behind mental evolution. In January 1884, Butler wrote to Ann Savage:

> I was doing this when Romanes' new book Mental Evolution in Animals came out. He has calmly cribbed my Life and Habit theory--of course without acknowledgement, so I have put in a chapter after the extracts from Life and Habit, Evolution Old and New, and Unconscious Memory, quoting the passages in his book in which he says what I have been saying, and chaffing him for the way in which he abused this very theory not three years since. I have been very nasty to him.[139]

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[138] Samuel Butler, *Selections from Previous Works and Remarks on Romanes' Mental Evolution in Animals*, pp. 243-244.
[139] Butler to Ann Savage, Jan. 20th, 1884 in J. Cape (ed.), *Letters between Samuel Butler and Miss E.M.A. Savage, 1871-1885*,p. 319.

In the letter, Butler stated that the compilation of the *Remarks* was the only viable resolution of this misunderstanding. He went back to the same problem one month later, recalling the attention on the chronology of the hypothesis of mental evolution. In this second letter, Butler made a specific criticism of Romanes' interpretation of Kingsley as the father of the theory connecting heredity and memory. Butler wrote:

> The three chapters of remarks on Romanes are as nasty as anything can well be, and the preface is also very nasty. I cannot send them as I have only one copy, as soon as I get more I will do so. You saw perhaps my letter in the *Athenaeum* 4 weeks ago--re Romanes. He said Canon Kingsley was the first to advance the theory connecting heredity and memory, in *Nature,* January 18th, 1867. I wrote and pointed out that *Nature* did not exist till November, 1869, and that Canon Kingsley never said anything in *Nature* at all, in any way bearing on memory and heredity and asked for the right reference. Romanes did not answer--so I have given it him hot. We don't think Canon Kingsley ever said anything at all about it. His (Romanes') new book adopts the *Life and Habit* theory--but of course never mentions me. This I have pointed sufficiently, and quoted the passages in which he scoffed at this theory three years ago. I have had a good square go in at old Darwin, G. H. Lewes, Romanes, Grant Allen, and Herbert Spencer--much in the same key as the opening chapters of *Unconscious Memory.*[140]

This letter provided more evidence of Romanes' 'incoherent' idea about the origin of mental evolution. As reported in the letter, the author of *Mental Evolution in Animals* claimed that Kingsley was the first in 1867 to talk about memory as a form of heredity in the British debate. As demonstrated by the writer, Romanes was wrong once again. Butler's own words serve as a conclusion to his perspectives on Romanes:

> I may perhaps deal with Mr. Romanes' recent work more fully in the sequel to *Life and Habit* on which I am now engaged. For the present it is enough to say that if he does not mean what Professor Hering and, *longo intervallo,* myself do, he should not talk about habit or experience as between successive generations, and that if he does mean what we do—which I suppose he does—he should have said so much more clearly and consistently than he has.[141]

Butler found George Romanes' *Mental Evolution in Animals* useful insofar as a possible sequel to his *Life and Habit,* but disagreed with him because of his 'incoherent' use of the concept of memory and experience in the process of heredity. In conclusion, it must be said

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[140] *Ibid.,* pp. 319-320.

[141] Samuel Butler, *Selections from Previous Works and Remarks on Romanes' Mental Evolution in Animals,* p. 254.

that for Butler, Romanes' work represented both the 'good' and the 'wrong' of the British debate on psychological evolution.

4.3.2 *Evolution Old and New* and Butler's historical heroes

Evolution, Old & New Or the Theories of Buffon, Dr. Erasmus Darwin and Lamarck, as compared with that of Charles Darwin appeared in London on the 1st May 1879. Butler defined *Evolution Old and New* in a letter written to Ann Savage on 5th November 1878 as follows:

> [..]I am writing my Lamarck book [*Evolution Old and New*] and am very full of it--but it is hard work, as it must be done very delicately, or I shall do old Darwin more good than harm. I shall never be happy till I have done it.[142]

Written by Butler within a year, the book proposed a historical reading of the development of evolution before Charles Darwin. *Evolution Old and New* had two editions during Butler's lifetime. The second edition was published in 1882 and re-issued with a new title-page in 1890. It was merely a re-issue of the first edition with a new preface, an appendix, and an index.[143]

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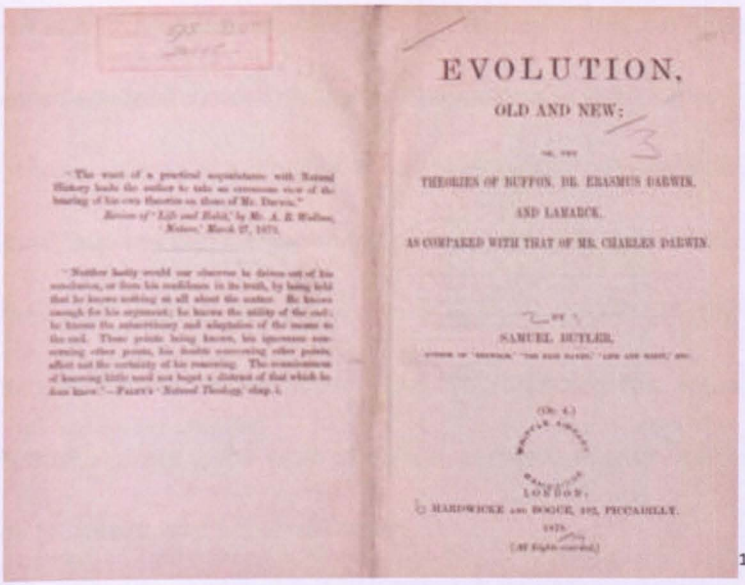
[142] J. Cape (ed.), *Letters between Samuel Butler and Miss E.M.A. Savage, 1871-1885*, pp. 195-196

[143] Particularly relevant of the second edition of *Evolution Old and New* was the preface. There Butler wrote referring to Darwin's departure: 'Since the proof-sheets of the Appendix to this book left my hands, finally corrected, and too late for me to be able to recast the first of the two chapters that compose it, I hear, with the most profound regret, of the death of Mr. Charles Darwin. It being still possible for me to refer to this event in a preface, I hasten to say how much it grates upon me to appear to renew my attack upon Mr. Darwin under the present circumstances.' *Evolution Old and New*, Preface.



"The want of a practical acquaintance with Natural History leads the author to take an erroneous view of the bearing of his own theories on those of Mr. Darwin."
Review of "Life and Habit," by Mr. A. R. Wallace, 'Nature,' March 27, 1879.

"Neither lastly would our observer be driven out of his confidence, or from his confidence in its truth, by being told that he knows nothing at all about the matter. He knows enough for his enjoyment; he knows the utility of the end; he knows the subserviency and adaptation of the means to the end. These points being known, his ignorance surrounding other points, his doubts concerning other points, affect not the certainty of his reasoning. The consciousness of knowing little need not beget a distrust of that which he does know."—PALEY'S 'Natural Theology' chap. i.

EVOLUTION,

OLD AND NEW:

OR, THE

THEORIES OF BUFFON, DR. ERASMUS DARWIN,

AND LAMARCK.

AS COMPARED WITH THAT OF MR. CHARLES DARWIN.

BY

SAMUEL BUTLER,

AUTHOR OF "EREWHON," "THE FAIR HAVEN," "LIFE AND HABIT," ETC.

LONDON:

R. HARDWICKE AND BOGUE, 192, PICCADILLY.

1879.

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144

Evolution Old and New was, as written in Butler's notebooks, 'the tidying up the earlier history of the theory of evolution'[145] and 'the exposure and discomfiture of Charles Darwin and Wallace and their followers'.[146] Partially a history of evolution and partially a popularization of science, Butler's aim was to inform Victorians that only 'few know that there are other great works upon descent with modification besides Mr. Darwin's. Not one person in ten thousand has any distinct idea of what Buffon, Dr. Darwin, and Lamarck propounded'.[147]

Evolution Old and New, therefore, took the shape of a popularization of pre-Darwinian evolution. However, two points must be clarified: what was the real nature of the book? And was it an *'ad hominem' attack* on Darwin and his hypothesis, or perhaps an effort of reframing evolutionary knowledge? *Evolution Old and New* was not the first book written with the intention of telling the history of evolution. Nor it was the only one that aimed to show the fallacies of Darwin's hypothesis in relation to previous theories. As previously mentioned, Mivart did a similar thing in his *Genesis of Species* and Spencer had also tried to discuss the work done by Darwin in the *Origin of Species* in relation to Lamarck.

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144 Picture stored at the Whipple Library, Rare books collection at the University of Cambridge.
145 Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 375.
146 *Ibid.*, p. 375.
147 Samuel Butler, *Evolution Old and New*, p. 61.

The new aspect proposed by *Evolution Old and New* was the historical criticism of Darwin's natural selection. According to Butler, Darwin was nothing other than an illusionist who tried 'to throw dust in the eyes of those who would oppose the measure'.[148] The *Origin,* he claimed, was not clear about many points, especially in relation to the originality of the hypothesis of natural selection. From Butler's point of view, the Victorian evolutionary debate had to be revisited (especially regarding the argument of design), looking at its historical roots in the work of Buffon, Lamarck, Patrick Matthew, Etienne and Isidore Geoffroy St. Hilaire, and Erasmus Darwin.

Evolution Old and New tried to jointly discuss two generations of naturalists, putting together different hypotheses and approaches. Therefore, Butler's aim was to critically compare two different systems of evolution: evolution as a form of natural philosophy and evolution as experimental science. This complex task was achieved by Butler, structuring his book as a chronology and biography of the history of evolution from Buffon to Charles Darwin. This approach was aimed to be historically relevant but, at the same time, to justify Butler's idea of design as a key factor of evolution. As an example, the chapters on Lamarck were structured as follows. First, Butler provided a memoir of the French naturalist, translating it from its original in French. Second, the writer moved onto the analysis of Lamarck's reception among his contemporaries (including Darwin and Haeckel), introducing also his own opinion. Third, Butler stated and then commented on selected passages of Lamarck's *Philosophie Zoologique* in order to make his interpretation clear.

Adopting this approach, the writer aimed to persuade his readers about the existence of a pre-Darwinian hypothesis of evolution, through rhetorical means. Additionally, Butler tried to demonstrate the need to think of evolution, once again, in

[148] *Ibid.*, p. 358.

terms of design. Design became, in the book of 1879, the key factor for explaining and motivating Butler's hypothesis of unconscious memory as explicated in *Life and Habit.*

> I therefore wrote "Evolution Old and New," with the object partly of backing up "Life and Habit," and showing the easy rider it admitted, partly to show how superior the old view of descent had been to Mr. Darwin's, and partly to reintroduce design into organism. 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.[149]

Butler's book presented the work of three naturalists: Buffon, Erasmus Darwin and Lamarck. For each of them, Butler highlighted how, where and when these thinkers anticipated Charles Darwin's hypothesis of evolution. Published in 1879, *Evolution Old and New* inevitably became a controversial book.

4.3.2.1 *Evolution Old and New*: criticisms, reception and the next steps

Biographers of Darwin and historians of science have agreed in dismissing Butler as a Victorian who tormented the great 'Man of science' with slanderous accusations of dishonesty.[150] For most of the last century, historians of science saw Butler as this type of detractor. As an example, William Irvine, in *Apes angels and Victorians*, defined Butler of *Evolution Old and New,* as:

> By a very romantic logic of his own, Butler had found Darwin to be first superhuman, then human, and finally inhuman. That inhumanity needed only to be demonstrated by an overt act. Of course it was, almost at once.[151]

Irvine's description recalls exactly the reception obtained by *Evolution Old and New* from its Victorian readers. After its publication *Evolution Old and New* was reviewed by the main journals of the period, obtaining very negative feedback.

Stored in Butler's collection at St John's College library Cambridge, there are reviews of *Evolution Old and New* from journals such as *The Academy, The Examiner, The Field, The Daily Review, Nature, The Scotsman, The Daily News* and *The Athenaeum*. The

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[149] Samuel Butler, *Luck or Cunning?*, pp. 22-23.
[150] Refer to Peter Raby, *Samuel Butler: A Biography*, pp. 161-178.
[151] William Irvine, *Apes, Angels and Victorianism, the story of Darwin, Huxley and Evolution*, p. 249.

general opinion of Butler's book was negative as confirmed by the list of signatures of the reviews, which included many of Darwin's devoted disciples such as Grant Allen, George Romanes, Alfred R. Wallace and Thomas Huxley.

The first review of *Evolution Old and New,* signed by Grant Allen, was published by *The Academy* on the 17th May 1879. The long review looked at Butler's book starting from the fame of its author. The aim of Allen's review questioned the integrity of Butler as a scientist (even as a writer) and without referring to the weakest (or perhaps strongest) points of his hypothesis dismissed him as a simple satirical writer.

> Mr. Butler comes forward, as it were, to proclaim himself a professional satirist, and a mystifier who will do his best to leave you utterly in the dark with regard to his system of juggling. Is he a teleological theologian making fun of evolution? Is he an evolutionist making fun of teleology? Is he a man of letters making fun of science? Or is he a master of pure irony making fun of all three, and of his audience as well? For our part we decline to commit ourselves, and prefer to observe, as Mr. Butler observes of Von Hartmann, that if his meaning is anything like what he says it is, we can only say that it has not been given us to form any definite conception whatever as to what that meaning may be.[152]

According to the quotation, Grant Allen pointed out two important aspects of Butler's work. First there was the impossibility of understanding Butler's intention in the book. Starting from Butler's style of writing (translations, quotations and comments), it seemed to be impossible, as stated by Allen, to determine his methodology (e.g. science, literature, theology or teleology). Second, the fact that the book did not provide evidence (or anything recognizable as evidence to Allen), made Butler's book unclear to any expert reader.

On the same day as *The Academy, The Examiner* also published a review of Butler's book. The review, although published unsigned, was written, once again, by Grant Allen[153] and, as Allen had already done in *The Academy,* dismissed Butler's book. This time Allen decided to make fun of Butler's hypothesis:

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[152] Extract from Grant Allen, 'Review of Evolution Old and New', *Academy,* Vol. 15, (1879) p. 426.

[153] In the edited edition of his correspondence Butler added as a Post Scriptum the following sentence: [I had sent her two reviews of *Evolution Old and New* –one in the Academy signed by Grant Allen. The other in the Examiner unsigned, but also (so D'Avigdor, the then editor, told me) by Grant Allen. Both reviews appeared on the same day, May 17th--and they led off the reviews. S.B.], Miss Savage to Samuel Butler *May* 22nd, 1879 see J. Cape (ed.), *Letters between Samuel Butler and Miss E.M.A. Savage, 1871-1885,* p. 203.

> "As to his (Mr. Butler's) main argument, it comes briefly to this: natural selection does not originate favourable varieties, it only passively permits them to exist; therefore it is the unknown cause which produced the variations, not the natural selection which spared them, that ought to count as the mainspring of evolution. That unknown cause Mr. Butler boldly declares to be the will of the organism itself. An intelligent ascidian wanted a pair of eyes, so set to work and made itself a pair, exactly as a man makes a microscope; a talented fish conceived the idea of walking on dry land, so it developed legs, turned its swim bladder into a pair of lungs, and became an amphibian; an æsthetic guinea-fowl admired bright colours, so it bought a paint-box, studied Mr. Whistler's ornamental designs, and, painting itself a gilded and ocellated tail, was thenceforth a peacock. But how about plants? Mr. Butler does not shirk even this difficulty. The theory must be maintained at all hazards.... This is the sort of mystical nonsense from which we had hoped Mr. Darwin had for ever saved us."—'Examiner,' May 17, 1879[154]

This review highlighted the second problem of *Evolution Old and New*: Butler's use of design. According to Allen, it was not clear how Butler used design in the process of evolution. In the review, Allen clarified that the 'unknown cause' postulated by Butler did not satisfy any scientific requirement and became, consequently, mystical nonsense. Behind these comments I think there are few points that have to be clarified. In *Evolution Old and New,* Butler's interpretation of design belong to a different philosophical level of analysis. Design was not part of a physical mechanism as nature was considered by Darwin. It was instead something behind the physical scene. The next review was published by *The Saturday Review*. This review, as the one before, presented Butler's work in a negative light. Let me provide an extract to illustrate my point: according to the review Butler was

> not professing to have any particular competence in biology, natural history, or the scientific study of evidence in any shape whatever, and, indeed, rather glorying in his freedom from any such superfluities, he undertakes to assure the overwhelming majority of men of science, and the educated public who have followed their lead, that, while they have done well to be converted to the doctrine of the evolution and transmutation of species, they have been converted on entirely wrong grounds.[155]

However, aside from the general criticism, on the 12th June 1879, *Nature* published a conciliatory review signed by Alfred Russel Wallace. In his commentary, Wallace defined *Evolution Old and New* 'interesting and useful.[156] He also declared that Butler's 'hypotheses,

[154] Extract of a 'Review of Evolution Old and New', *Examiner* (May 17th 1879), pp. 646-647.
[155] Extract of a 'Review of Evolution Old and New', *Saturday Review* (May 31st 1879), pp. 682-684, esp. 682.
[156] Alfred Russel Wallace, 'Review of Evolution Old and New', *Nature*, Vol. 20, (1879), pp. 141-144.

thus supported, form an important and even a necessary supplement to the theory advocated by Mr. Darwin.'[157]

However, Wallace's review misunderstood completely Butler's intention. Instead of seeing in *Evolution Old and New* a methodological revolution based on the re-introduction of design, he looked at it only as a complement (or perhaps a support) to Darwin's theory.

> 'not add the reputation of the author of Life and Habit. It is, nevertheless, an interesting and useful book, inasmuch as it gives a pretty full account of the theories and opinions of several authors whose writing are almost unknown to the present generation of naturalist'[158]

Coming to a conclusion, *Evolution Old and New,* as the rest of Butler's opus, did not gain recognition and fame from Victorians. However, Butler's work on the theory of evolution in France did not end up with the publication of *Evolution Old and New.* In the lecture *On Memory as a Key to the Phenomena of Heredity,* Butler used the Lamarckian idea of *Trasformisme* showing how design represents a significant gradient in the determination of the place of memory in the process of heredity. The importance of the Lamarkian hypothesis became even more central in the shaping of some of Butler's other books: *Unconscious Memory* and *Lucky or Cunning?.* Before concluding this section there is a final point to make about Butler's *Evolution Old and New.* This book anticipated some of the contemporary conclusions of historians of science.

It has been shown by recent historians how French evolutionism was well known in England even before 1859. The work of Adrian Desmond *The Politics of Evolution* and of Peter Bowler *Evolution: History of an Idea* demonstrated an early penetration of the idea of *Transformisme* in London and Edinburgh in the 1830s.[159] This, alongside the circulation of books and the rise of criticism of Darwinian evolutionism opened up a large discussion concerning questions about teleology, design and their consequences. In historical terms,

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[157] *Ibid.*, p. 141.
[158] *Ibid.*, p. 142.
[159] The argument of design has been a center of growing interest in last few years. See Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London*, pp. 276-235 and Peter Bowler, *Evolution: The History of an Idea*, pp. 222-228.

since the 1950s, Lamarck has received increasing attention.[160] Especially in recent years, through the studies proposed by historians such as Richard Wellington Burkhardt, Peter Bowler, Charles Gillispie, Pietro Corsi, Ludmilla Jordanova, Janet Browne and Giulio Barsanti, the position of Lamarck and his role within the cultural debate of the nineteenth-century has been completely re-thought. Adrian Desmond has suggested that Lamarck was deliberately expunged from the history of biology by the evolutionary heroes of the 1880s (Huxley et al.) in order to assert their own importance and also the responsibility of their endeavours, which was undermined by French-evolutionary science. The first claim is at least close to Butler. An example of this comes from the work of Peter Bowler. The British historian of biology has, whilst discussing the history of evolution, reframed Lamarck and his theory within the development of Darwinian evolution in many of his books.[161] He has suggested that *Neo*-Lamarckism, in contrast to the Darwinian natural selection, offered the most obvious alternative for understanding evolution in the period 1880-1920.[162]

However, Bowler is wrong in claiming that neo-Lamarckism was a phenomenon mostly located in the early decades of the twentieth century. In *The Eclipse of Darwinism,* Bowler suggested that many outcomes of social Darwinism such as Herbert Spencer's philosophy, Heackel's *History of Life,*[163] the philosophy of Hering, Marcus Hartog, Francis Darwin, August Weismann could be partially read from the Lamarckian perspective,[164] however, without being proper examples of Neo-Lamarckism.

Neo-Lamarckism was, indeed, a specific movement of the *fin de siècle*. Nonetheless Lamarck and his *trasformisme* were also present between 1860 and 1880. The French

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[160] The new scholarship concerning Lamarck and evolution in France has been opened by the historian Charles Coulston Gillispie. To have more information please refer to Charles Coulston Gillispie, *Science and Polity in France: the End of the Old Regime.*

[161] Peter Bowler, *Evolution History of an Idea*, pp. 257-268.

[162] *Ibid.*, p. 257.

[163] In Bowler the reference to the publications of Haeckel is only marginal. For more information refer to Robert John Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought*, pp. 113-168.

[164] Peter Bowler, *The Eclipse of Darwinism: Anti-Darwinian Evolution Theories in the Decades Around 1900*, pp. 69-72.

naturalist was appreciated for his systematic methodology rather than for his speculative endeavours.[165] Later in the century, once the idea of organic evolution became even more accepted among scientists, Lamarck started to be described as the man who lived in a time in which his ideas were not ripe for appreciation.[166]

4.3.2.2 The Outsider

In conclusion, this chapter has discussed: Butler's popularization of science, his interpretation of Mivart, Spencer and Romanes' work on evolution, and the book *Evolution Old and New* as a small case study used for illustrating Butler's opinion on Lamarckian evolutionism. At first glance, the reader can notice that this chapter does not possess the linear structure of the first part of this thesis. However, after a deeper reading, the real nature of its argument comes out.

In this chapter, my aim has been to talk about Butler's writing in the Victorian scientific debate focusing on the difficult reception of his popularization of science. Through choice, I have not illustrated Butler's hypothesis of evolution but I have limited my approach to its dissemination.

At the beginning of the chapter, I have discussed the role of the popularization of science in the second half of the nineteenth-century, showing why Butler's approach was different. Then, I have moved onto Butler's view of evolution focusing on two main points. First, I have discussed his comments about the work of three of the main personalities of his time: Mivart, Spencer and Romanes. Second, I have looked back at the historical past of natural science focusing on the 'heroes' of evolution presented in Butler's *Evolution Old and New*.

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[165] See Richard Burkhardt, *The Spirit of System: Lamarck and Evolutionary Biology: Now with Lamarck*, p. 26.
[166] *Ibid.*, pp. 143-186.

My aim has therefore been to see why Butler was the outsider of the scientific debate and in which way he was the anti-hero of Victorian evolution. Nonetheless this chapter has also illustrated a different portrait of the writer. Butler was, yes, an outsider but he was also a curious populariser of science who tried to look over the national barriers. Second, for Butler, writing about science was not a corollary of his artistic career. He strongly believed in his own ideas, and his writing about Spencer, Romanes, Mivart and the 'heroes' of evolution is a confirmation of this point. However, the point that has still to be discussed is Butler's hypothesis of evolution. In the next and final chapter, my aim will be to critically discuss and historically contextualise Butler's hypothesis of unconscious memory.

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]
Samuel Butler, *The Notebooks of Samuel Butler*[1]

CHAPTER FIVE:

Samuel Butler and unconscious memory: a pioneer of psycho-physiology

Between 1870 and 1910 a large movement tried to link the physiological study of the human body and the philosophical/psychological conception of the human brain developed in Europe. From different parts of Europe, scientists, psychologists and philosophers started an investigation which involved theoretical and practical approaches. Samuel Butler was one of the pioneers of that movement. Through his idea of unconscious memory, he introduced the substantial identity of memory and heredity opening the debate on organic memory.

Butler's hypothesis of unconscious memory developed through his whole opus. He used the word 'unconscious' in relation to evolution for the first time in 1863 in 'Darwin among the Machines'. It then became the base of his whole scientific and philosophical investigation on evolution.[2] In this chapter, my aim is to look at Butler's use of content, examples, language and metaphors as he popularized evolution in his opus. However, before going into the analysis of Butler's work, the late nineteenth-century psychophysiological debate must be introduced.

[1] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 66.
[2] By 'scientific' I mean the discussion of scientific themes (typical of) the second part of the nineteenth-century. It is important to notice that (as previously discussed in chapter one) the word 'scientific' is not part of Victorian terminology. Therefore, in this case, the label 'scientific' retrospectively defines the content.

5.1 The European psycho-physiological movement: a brief history of a forgotten movement

The hypothesis of organic memory has been rediscovered as an object *for historians of* science in the last few decades. One of the major contributions in the field was published in 1994 by the historian of science and literary scholar Laura Otis. In the book *Organic Memory* she put forward the idea of memory as a form of heredity tracking its developments from a historical perspective. At the core of *Organic Memory* there is the study of a large series of case studies, both historical and cultural, Otis says: 'The association of heredity with memory in the nineteenth-century grew out of a fascination with origins that manifested itself with the simultaneous rise of nationalism, philology, biology'.[3]

Additionally, *Organic Memory* opens the possibility of considering the consequences of the psychophysiological movement beyond a scientific perspective. The plan structured by Otis divided the study of psychophysiology on two levels. On the one hand, there is the scientific debate concerning the idea of organic memory and its developments in Germany and France (and England as demonstrated by Butler's scientific books). On the other, there is the literary engagement of organic memory in novels and stories throughout the nineteenth and twentieth centuries. How can Otis' historical map of organic memory be embedded in Butler's concept of unconscious memory?

The only answer to this question is to be found in the pan-European history of psychophysiology. In reconstructing the historical idea of organic memory, we have to think of it as a line dividing nineteenth-century biological science and recent developments in twentieth-century biology and philosophy of biology.[4] It does not only involve scientific

[3] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, p. 3.

[4] See Peter Bowler, *Evolution: the History of an Idea*, pp. 243-270; Peter Bowler, *The Eclipse of Darwinism: Anti-Darwinian Evolution Theories in the Decades Around 1900*, pp. 58-98 and Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, p. 3-18.

facts but also a series of different levels of understanding of the concept of the human being, moving from the domain of the metaphysical (the philosophical interpretation of human kind[5]) to the domain of physics. In other words, this discipline involved the study of science, philosophy and their popularization in the cultural debate. Although the historical core of organic memory recalls Victorian evolutionism, the starting point for these theories was situated outside the British context.[6]

Chronologically speaking, organic memory was proposed even before Victorian age but was only given a structured biological hypothesis after 1870. It continued throughout the twentieth-century, and adopted different shapes and theorizations. As a matter of fact, even before 1870, it rested on two biological laws: Lamarckism and Haeckel's biogenetic law. These laws were both very popular in the nineteenth-century's scientific debate but simultaneously neglected by Darwin's circle.

The first naturalist who approached the concept of organic memory was Lamarck in his *Philosophie Zoologique*. Published in 1809, Lamarck's book proposed that as: 'new modifications will necessarily continue to operate, however slowly, not only will there continually be found new species, new genera, and new orders, but each species will vary in some part of its structure and form [...] individuals which from special causes are transported into very different situations from those where the others occur, and then constantly submitted to other influences - the former, I say, assume new forms, and then they constitute a new species'.[7]

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[5] Especially in Germany during the nineteenth century evolution was mixed up with philosophical ideas recalling a less empirical concepts.

[6] This point has been sorted out in Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, pp. 3-18.

[7] Jean-Baptiste Lamarck, *Philosophie Zoologique ou Exposition des Considérations Relatives à l'Histoire Naturelle des Animaux*, p. 250 or Alpheus Spring Packard, *Lamarck, the Founder of Evolution. His Life and Work*, p. 240.

The same conclusion was also addressed in his previous volume: *Recherches sur l'Organisation des Corps Vivants* (1802), in which the idea of memory and the concept of transformisme were, for the first time, discussed. In the *Recherches*, Lamarck wrote:

> A la vérité, l'on observe une sorte de gradation dans l'intelligence des animaux, comme il en existe une dans le perfectionnement de leur organisation, et on remarque qu'ils ont des idées, de la mémoire qu'ils pensent, qu'ils choisissent, qu'ils aiment, qu'ils haïssent, qu'ils sont susceptibles de jalousie, et que par diverses inflexions de leur voix et par des signes, ils se communiquent et s'entendent. Il n'en est pas moins évident que l'homme seul est doué de la raison, et que par cette considération il est bien distingué de toutes les autres productions de la nature.[8]

Lamarck's hypothesis suggested in 1802 was then re-shaped in *Philosophie Zoologique*. However in a lecture at the Musée National d'Histoire Naturelle Lamarck said:

> Do we not therefore perceive that by the action of the laws of organization . . . nature has in favorable times, places, and climates multiplied her first germs of animality, given place to developments of their organizations, . . . and increased and diversified their organs? Then. . . aided by much time and by a slow but constant diversity of circumstances, she has gradually brought about in this respect the state of things which we now observe. How grand is this consideration, and especially how remote is it from all that is generally thought on this subject!".[9]

Lamarck's conclusion penetrated the European debate and shaped the study of natural science and physiology. It even developed in disciplines such as geology, biology, palaeontology and geography.[10] According to Jordanova, in *Zoological Philosophy*, Lamarck located the source of vital stimulation within the nervous system.[11] Following the eighteenth-century physiological tradition, the French naturalist considered the nervous fluids as the principle link existing between living things and the environment.[12]

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[8] Jean-Baptiste Lamarck, *Recherches sur l'Organisation des Corps Vivants*, p. 124.
[9] Extract from a lecture given by Lamarck at the Musée National d'Histoire Naturelle, Paris, May 1803.
[10] Pietro Corsi, *The Age of Lamarck: Evolutionary Theories in France 1790-1830*, pp. 207-230, also published in Pietro Corsi, *Oltre il mito: Lamarck e le scienze naturali del suo tempo* (Milano, 1983).
[11] Ludmilla Jordanova, *Lamarck*, pp. 76-77.
[12] *Ibid.*, p. 76.

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Fifty years later, Haeckel's biogenetic law addressed the same hypothesis but in a different way. The German biologist was an energetic defender of Darwinism and attempted to demonstrate that all multi-cellular organisms evolved from a common ancestor.[14] A résumé of his scientific position can be found in the volume *Generelle Morphologie,* where he wrote:

> The History of the Evolution of Organisms consists of two kindred and closely connected parts: Ontogeny, which is the history of the evolution of individual organisms, and Phylogeny, which is the history of the evolution of organic tribes. Ontogeny is a brief and rapid recapitulation of Phylogeny, dependent on the physiological functions of heredity (reproduction) and adaptation (nutrition). The individual organism reproduces in the rapid and short course of its own evolution the most important of the changes in form through which its ancestors, according to laws of heredity and adaptation, have passed in the slow and long course of their palaeontological evolution.[15]

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[13] Mikhail Dmitrievich Ezuchevsky, Jean-Baptiste De Lamarck Handing the Book 'Zoological Philosophy' to Emperor Napoleon Bonaparte.

[14] This point has been largely explained by Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, pp. 3-18.

[15] Ernst Heinrich Haeckel, *Generelle Morphologie der Organismen* (1866) refer to Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, p.7.

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Haeckel's physiology considered the process of evolution as being directly related to the organism, and suggested a strong link between the work of Darwin (especially the *Origin*) and Lamarck. Haeckel's *Generelle Morphologie*, published in 1866, presented a revolutionary synthesis of Darwin's ideas in the light of the German tradition of *Naturphilosophie*, which went back to Goethe, and in the light of Lamarck's progressive evolutionism, called Darwinismus.[17] In other words, Haeckel made use of his biological background to shape his philosophical monism which he introduced in his *The Riddle of The Universe* (1899).[18] There Haeckel wrote:

> The series of forms through which the Individual Organism passes during its progress from the egg cell to its fully developed state, is a brief, compressed reproduction of the long series of forms through which the animal ancestors of that organism (or ancestor forms of its species) have passed from the earliest periods of so-called organic creation down to the present time [19]

As the last passage demonstrates, the idea of organic memory, even within a scientific structure, still used a philosophical vocabulary. *Unlike* Darwin, who concentred on the

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[16] The picture represents a scheme of Haeckel's Interpretation of Heredity in relation to different species.

[17] See Robert W. Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought*, pp. VII-X.

[18] Ernst Heinrich Haeckel, *Die Welträtsel* (Berlin, 1895–1899), in English *The Riddle of The Universe* (1901) Translated by Joseph McCabe.

[19] *Ibid.*, pp. 6-7.

materialistic side of evolution, Haeckel considered the topic of evolution with a metaphysical spirit and influenced both scientists and philosophers.

From a theoretical point of view, Haeckel proposed the idea of returning to a concept of evolution as a metaphysical theory in accordance with the German philosophical tradition (vide Leibniz). Haeckel's idea was to put forward an evolutionary metaphysics in order to offer a monistic unified account of our reality. This approach, in re-shaping Darwin's work, sought to embed the developments of psychology within a theory of evolutionary developments. Through it, evolution not only became the evolution of nature but the evolution of the psyche.

The psychophysiological movement, departing from the Lamarck's and Haeckel's conclusions, developed between 1870-1900, in Germany and France especially. In these two countries, scientists and philosophers discussed and experimented with the human body and developed physical/medical and psychological laboratories.

5.1.1 Germany

Darwinian evolution in Germany has a long tradition. From 1860, which was the year in which the first German edition of the *Origin of Species* was published, Darwinism became the main topic of discussion in scientific circles.[20] In his contribution to *The Comparative Reception of Darwinism* (1972), William M. Montgomery suggested that one of the reasons of the success of the evolutionary theory in Germany was the large number of translations by foreign authors.[21] Not only Charles Darwin, but Robert Chambers, T.H. Huxley, Charles Lyell and Alfred Wallace were also being discussed in Germany in the development of different evolutionistic hypotheses. One of these hypotheses was the application of evolution to the domain of experimental psychology.

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[20] See William M. Montgomery, 'Germany', in Thomas F. Glick (ed.), *The Comparative Reception of Darwinism*, pp. 81-114.
[21] *Ibid.*, pp. 82-90.

Ewald Hering was the first to promote the idea of organic/unconscious memory with a biological hypothesis and to conduct experiments in the field of psychophysiology.[22] Educated as a physicist in Leipzig, he worked as a physiologist at the University of Vienna between 1865 and 1870, in Prague between 1870 and 1899 and in Leipzig between 1895 and 1908.[23]

Throughout his career, Hering worked at the heart of a dynamic debate and conducted different types of research. In Vienna, he challenged physiologist Hermann von Helmholtz's colour-vision theory, proposing three types of receptors, each capable of a dual response to pairs of colours (yellow–blue, red–green, or black–white).[24] In the same university, Hering also conducted research on respiration and, in 1868, with psychoanalyst Josef Breuer demonstrated the role of the vagus nerve in the regulation of breathing. This neural pathway was later referred to as the Hering-Breuer reflex. Hering connected the study of optics and the theory of colours to study of psychology, philosophy and physiology.

Hering worked within a debate which recalled the philosophies of Kant, Goethe (scientific theory of colours), Schelling and Fichte, alongside other physiologists and scientists like Johannes Muller and Haeckel, and delivered his own ideas in a materialistic shape.[25] According to Laura Otis' *Müller's Lab*, the generation of physiologists working between 1860 and 1880 was a generation of detectives of the physiological world who had to structure and develop their own laboratories.[26] As one of these detectives, Hering had to

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[22] See Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, pp. 20-39.
[23] See Roy Steven Turner, *In the Eye's Mind: Vision and the Helmholtz-Hering Controversy* (Princeton, 1994); Roy StevenTurner, 'Vision studies in Germany: Helmholtz versus Hering', *Osiris* 8 (1993), pp. 80–103; Baumann, C. 'Der Ophthalmologe: Zeitschrift der Deutschen Ophthalmologischen' [Ewald Hering's opponent colors. History of an idea] Gesellschaft 89 (3) (1992), pp. 249-252 and J. Janko 'Mach and Hering's physiology of the senses' *Clio Medica* 33 (1995), pp. 89–96.
[24] See R. M. Turner, 'Vision studies in Germany: Helmholtz versus Hering'. *Osiris* 8 (1993), pp. 80–103.
[25] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries* , pp. 9-14.
[26] Laura Otis, *Muller's Lab*, pp. xiv-xvi.

combine innovative methodologies and scientific techniques and share them with colleagues.

At the University of Prague, he worked with the physicist and philosopher Ernst Mach. Mach studied the relationship of our sensations to external stimuli. Thanks to him, concepts which were once in the domain of physics, such as space, time, colour and sound, were now also being studied by psychologists becoming elements of our inner experience. Although Mach made no direct contributions to evolutionary theory, his study of psychology and physics was conducted within an evolutionary framework. He worked across physics and philosophy and became one of the first experimental psychologists of the period. Between 1865 and 1868, he published five critical articles concerning psychology.

Mach's research developed in between empiricism and theoretical philosophy and blended the two disciplines.[27] In doing this, Mach was influenced by Hering's hypothesis of heredity as a form of memory and by Hering and Breuer's 1868 physiological research.[28] Vice versa, Hering shared both Mach's bio-psychological orientation and nativist theories of spatial intuition which developed in his first public exposition of his psychophysiological hypothesis.

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, in which he introduced his own hypothesis of organic memory. Hering's paper identified memory as a fundamental reproductive capability of living matter. The lecture rapidly became one of the most frequently quoted texts in the field. It gave rise

[27] In order to understand Mach please refer to: Katherine Arens, 'Mach's Psychology of Investigation' *Journal of the History of Ideas*, 21 (2006): pp. 151–168; Erik C. Banks, 'Machian Elements and Psychophysical Relations' in S. Mori (ed.), *Proceedings of the 23rd Int'l Conference in Psychophysics: International Society of Psychophysics* (2007).

[28] In 1873, independently from each other, Mach and Breuer discovered how the sense of balance (i.e., the perception of the head's imbalance) functions, tracing its management by information which the brain receives from the movement of a fluid in the semicircular canals of the inner ear.

to a series of translations and was even used by the next generation of psychologists and scientists. Traces of this lecture were still present in the first decades of the twentieth century in France, England and Italy. Such an example is J. Beard's 1912 article 'The Mnemic Theory of Heredity', in *Nature*. This article, which discussed the history of embryological research upon germ-cells, circles of life and the work of Richard Semon, referred directly to the work of Hering as the founder of the mnemic theory. Beard wrote:

> The founder of this mnemic theory, or ``memory as a general function of organised matter,'' has indeed written very little upon the subject, which he first broached in a public lecture in 1870. At the date named, when Prof. Ewald Hering, now of the University of Leipzig, gave his classic address, I imagine that the question of the inheritance or non-inheritance of acquired characters had hardly been raised.[29]

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The main scientific hypothesis enclosed in Hering's lecture was the necessity to link materialistic science (physiology) with philosophy of mind (psychology). As reported in Butler's translation of the lecture, Hering made this point clear at the very beginning of his explanation:

> There can be no question as to the answer; and hence it comes that psychology is such an indispensable help to physiology, whose fault it only in small part is that she has hitherto made such little use of this assistance; for psychology has been late in beginning to till her

[29] Extract from J. Beard, 'The Mnemic Theory of Heredity' in *Nature*, Volume 88, (1912) pp. 482-483.
[30] Source: U.S. National Library of Medicine, History of Medicine Division http://ihm.nlm.nih.gov/luna/servlet/view/search?q=B014320.

> fertile field with the plough of the inductive method, and it is only from ground so tilled that fruits can spring which can be of service to physiology.[31]

As the quotation suggests this study focused on memory linked to the body, moving it into the realms of physiological processes, and involved concepts such as reproduction and conservation changes. From Hering's perspective, human memory, and that of animals and plants, had its origin in reflexes and instincts of primitive ancestors.[32] In his opinion, physiology had the task of re-discussing the role of memory. According to Hering:

> the word "memory" is often understood as meaning nothing more than our faculty of intentionally reproducing ideas or a series of ideas. But when the figures and events of bygone days rise up again unprompted 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 its boundaries that it proves to be an ultimate and original power, the source, and at the same time the unifying bond, of our whole conscious life.[33]

This new physiological conception of memory, according to Hering, developed perfectly into the research of the human nerve system. The act of repeating and memorising actions and their habits became the base of the study of nervous communication. It concluded that 'the power of this memory is what is called "the force of habit."'[34] According to this definition, Hering said:

> Memory collects the countless phenomena of our existence into a single whole; and as our bodies would be scattered into the dust of their component atoms if they were not held together by the attraction of matter, so our consciousness would be broken up into as many fragments as we had lived seconds but for the binding and unifying force of memory.[35]

Thus, memory became part of a new physiological interpretation of the human body in which the brain and the nervous system were considered as the base of the new physiological interpretation of medicine. Apart from this aspect, memory also became the

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[31] Samuel Butler, *Unconscious Memory*, p. 66.
[32] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, p. 13.
[33] Samuel Butler, *Unconscious Memory*, p. 68.
[34] *Ibid.*, p. 74.
[35] *Ibid.*, p. 74.

key factor of the process of heredity explaining the continuity between generations. On this point, Hering became particularly critical and said:

> Theories concerning the development of individual consciousness which deny heredity or the power of transmission, and insist upon an entirely fresh start for every human soul, as though the infinite number of generations that have gone before us might as well have never lived for all the effect they have had upon ourselves, - such theories will contradict the facts of our daily experience at every touch and turn.[36]

Thus, Hering tried to re-insert the finalistic concept of design, attacked by Darwinian science, into the process of evolution. Darwin's idea of natural selection suggested that evolution was a directionless process having no guiding factor or end point. Design, instead, was used to provide a teleological explanation of nature. They were part of a tradition which suggested the presence of an inner *telos* in nature.[37]

5.1.2 France

The situation in France was different. If in Germany, the theory of natural selection developed with much enthusiasm and Darwin's work was very much acclaimed by both philosophers and scientists, in France Darwin's natural selection was met with resistance. After Lamarck, the history of natural science was conducted as a form of Neo-Lamarckism which involved philosophy, physiology and psychology and bore consequences in both science and literature.

Although the idea of organic memory developed in different forms at the end of the nineteenth-century, one name appears to be more important than others: Théodule-Armand Ribot. He was the founder of experimental psychology in France. After his appointment as Professor at the *College de France*, he opened up the first laboratory of experimental psychology. Although he trained as a philosopher, Ribot moved the study of the mind into the field of empiricism.

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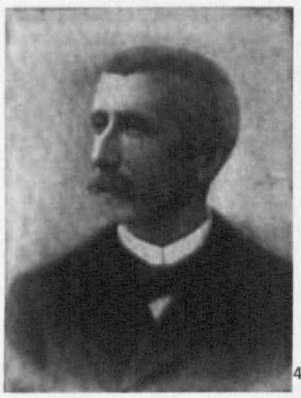
[36] *Ibid.*, p. 84.

[37] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, pp. 4-8.

In books such as *L'Hérédité: étude Psychologique* (1869), *Les Maladies de la Mémoire* (1881), *De la Volonté* (1883), *De la Personnalité* (1885), *La Psychologie de l'Attention* (1888) and *La Psychologie des Sentiments* (1896), Ribot defined memory and heredity along the same lines as Hering, and influenced many twentieth century psychologists in France and abroad.

The philosopher spent three weeks in England, between May and June 1877. During these weeks, he had the chance to meet Herbert Spencer at *The Athenaeum Club*, where he also met George Romanes.[38] Ribot, moreover, worked as a populariser of science, publishing volumes on the English and German psychological debates, including the work of Hartley, James Mill, Herbert Spencer, Georges Lewes, Johann Friedrich Herbart, Hermann Lotze, Hermann von Helmholtz, Wilhelm Maximilian Wundt and Ewald Hering.[39] In sequence, he published *La Psychologie Anglaise Contemporaine* (1870), *Philosophie de Schopenhauer* (1874) and *La Psychologie Allemande Contemporaine* (1879).

 [40]

In his research, the French philosopher tried to fit memory with new studies on biology and psychology, rather than with the old domain of metaphysical science. In his books, Ribot even referred to concepts of the conscious and the unconscious in Lamarckian terms.[41] His

[38] *Ibid.*, 16-18.
[39] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries,* pp. 16-18.
[40] Photograph of Theodule-Armand Ribot (1906), French psychologist, Source *The Open Court*, Volume 20.
[41] Laura Otis, and Serge Nicolas, *Théodule Ribot: Philosophe breton, fondateur de la psychologie française*, and S. Nicolas, A. Charvillat, 'Introducing Psychology as an Academic Discipline in France:

introduction to *La Revue Philosophique de la France et de l'étranger,*[42] was, in this way, emblematic:

> Tout d'abord l'ensemble des études qui ont pour but la connaissance théorique de l'homme. La psychologie est une des parties les plus anciennes de la philosophie ; Socrate, avant tout, engageait l'homme à s'étudier. Mais ce qui alors paraissait assez simple est devenu pour nous un problème très-complexe. Nous n'en sommes plus au temps où l'on soutenait que la psychologie était à peu près faite. On n'oserait plus prétendre qu'il suffît pour la faire de s'étudier intérieurement et l'on reconnaît, en général, que l'anatomie, la physiologie, la pathologie mentale, l'histoire, l'anthropologie sont pour elle d'une utilité directe et immédiate. Il y a donc là un ample champ de recherches, surtout si l'on y joint la logique et l'esthétique qui ne sont guère que des parties de la psychologie, l'une étudiant le mécanisme de la raison humaine, l'autre une certaine forme de plaisir, celui que nous cause le beau.[43]

This quotation contains the core of Ribot's work. He did not only open up experimental psychology in France but, he also re-shaped the study of natural science in relation to 'l'anatomie, la physiologie, la pathologie mentale, l'histoire, l'anthropologie sont pour elle d'une utilité directe et immédiate'.[44] Although he was trained in philosophy, he studied clinical and experimental psychology between 1873-1885, becoming the first French protagonist of the new European psychophysiological debate. According to Otis, the French philosopher's main scholarly mission was to incorporate memory, which was a metaphysical subject, into the new psychophysiological discussion.[45]

Memory, for Ribot, made sense only when it was merged with heredity, instinct and habit.[46] His hypothesis criticised the orthodoxy of biology which privileged conscious memory and cut it off from the domains of unconscious and organic memory. In doing so, he once again opened up the debate to include the nature of memory, although delivering

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Theodule Ribot and the College de France (1888-1901)' *Journal of the History of the Behavioral Sciences*, Vol. 37 (2001), pp. 143-164.

[42] La Revue philosophique de la France et de l'étranger was a philosophical, psychological journal opened up by Theodule Ribot in Paris in 1876.

[43] Théodule Ribot, *Revue Philosophique de la France et de l'Etranger*, Présentation 1re année (Paris, 1876), pp. 1-4.

[44] See V. Guillin, 'Théodule Ribot's Ambiguous Positivism: Philosophical and Epistemological Strategies in the Founding of French Scientific Psychology,' *Journal of the History of the Behavioral Sciences*. Vol. 40 (2004), pp. 165–181.

[45] Laura Otis, *Organic Memory History and the Body in the Late Nineteenth and Early Twentieth Centuries*, p. 15.

[46] *Ibid.*, pp. 14-18.

the message that memory was biologically close related to the concept of heredity. The psychophysiology of Ribot was half cultural/philosophical and half experimental. From his point of view, memory consisted of traces of physiochemical changes produced by exposure to repeated patterns of stimulations. A quotation from his best known book, *L'Hérédité. Étude Psychologique*, demonstrates this:

> Malgré ces faits, la transmission séminale des modifications acquises parait très-restreinte, même quand elle se rencontre dans les deux parents. Un sourd-muet épousant une sourde-muette a des enfants qui peuvent entendre et parler. La nécessité de la circoncision, chez les Juife, montre qu'une modification acquise et souvent répétée, peut n'être pas héréditaire. Les déviations du type, après avoir duré quelques générations^ reviennent à l'état normal ; en sorte que beaucoup de naturalistes affirment que la règle : c'est que les accidents ne se perpétuent pas.[47]

Ribot's study of biology became directly connected to the study derived from the psychological and cultural debate. Experimental psychology in France was not only relevant to the scientific field, but also largely developed in literature, unlike from Hering in Germany (i.e Emile Zola, Jules Verne). This overture provided, especially at the beginning of the twentieth-century, a return to metaphysics, particularly through Bergson's philosophy.

5.1.3 England

The situation in England was different. Psychophysiology and, on the whole, non-Darwinian accounts of evolution, were not investigated until the end of the century. Experimental psychology only began to be studied in 1897 in British academia with the opening of the first laboratory at Cambridge University by James Ward and the one at University College London by James Sully.[48] The main reason for this delay was due to the refusal of the philosophical community to accept a non-theoretical study of the mind, and the scientific faith in Darwinian evolution as the only acceptable theory. In scientific terms, any other

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[47] Théodule Ribot, *L'Hérédité. Étude psychologique : sur ses phénomènes, ses lois, ses causes, ses conséquences* (1873) p. 14.

[48] Refer to G.C. Bunn, A.D. Lovie and G.D. Richards (eds.), *Psychology in Britain : Historical Essays and Personal Reflections* and George Mandler, *A History of Modern Experimental Psychology: from James and Wundt to Cognitive Science*.

idea different from Darwinism was considered as a sort of *a priori* acceptance of concepts such as creation, design and miracles. Therefore any attempt to talk about psychology of evolution was immediately rejected because it was far from the widely accepted Darwinian biology.[49]

Between 1860 and 1890 the history of psychophysiology in England was a history of a theoretical movement rather than an experimental one. From 1860 onwards, a few thinkers including William Benjamin Carpenter, Herbert Spencer, George Romanes, and Samuel Butler tried to grapple with the non-directed developments of biological evolution without receiving much response. They were a tangent which dislocated evolution in favour of metaphysical memories, experimental medicine and physiology. They started the study of psychophysiology even before their colleagues in Germany and France, but never made it fully scientific.

In England, the first scientist who approached the study of the human mind as a physiological object was William Benjamin Carpenter. He was one of the founders of the modern theory of the adaptive unconscious. Together with William Hamilton and Thomas Laycock, Carpenter provided the foundations of the studies of neurology and medical psychology. Carpenter's research can be divided into two areas. Before the rise of Darwinian evolution he worked as a physiologist investigating the medical nature of the human body. In this period, books such as *The Principles of General and Comparative Physiology (*1838), *The Principles of Human Physiology* (1842), and a *Popular Cyclopaedia of Natural Science* (3 vols., 1841–3) were all published by Carpenter. After Darwin's *Origin of Species*, Carpenter systematically moved his attention from the medical physiology of the body to the physiology of the human mind. In *The Principles of Mental Physiology* (1874), Carpenter worked on the psychology of human nature, sense impression, automatic mental activity and physiological mechanisms in relation to the idea of mental evolution. In

[49] Peter Bowler, *Evolution: The History of an Idea*, p. 1-10.

particular, his ideas on the nervous system, which brought together new experimental knowledge (reflex action) and a stress on moral will, mediated the development of a physiological and psychological science of human nature.

Carpenter also worked on instinct and its relation with habit, memory, unconscious cerebration and their influences on human emotions.[50] He observed that the human perceptual system operates almost completely outside of conscious awareness. This conclusion was also shared by Hermann von Helmholtz in Germany.[51] In 1874, Carpenter noticed that the more he studied the mechanism of thought the clearer it became that it operates largely outside awareness. He became aware of the fact that unconscious prejudices can be stronger than conscious thought and that they are more dangerous since they happen outside of consciousness. He also noticed that emotional reactions can occur outside of consciousness until attention is drawn to them:

> Our feelings towards persons and objects may undergo most important changes, without our being in the least degree aware, until we have our attention directed to our own mental state, of the alteration which has taken place in them.[52]

Carpenter's work was not unique in the United Kingdom. Following his example, Spencer and Romanes, as previously discussed, developed natural selection in terms of mental evolution and philosophical biology. Although they made a major contribution in establishing natural selection as philosophical and psychological discipline, their work never became completely experimental like Ribot's in France or Hering's in Germany.

Romanes, in particular, designed the process of evolution as psycho-physiological isolation ending up in a new interpretation of natural selection which was far from the one originally described by Darwin.[53] Romanes was also influenced by similar European

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[50] William Benjamin Carpenter, *The Principles of Mental Physiology*, pp. 24-8, 516-7, 519-20, 539-41.
[51] See Stephan Vogel, 'Sensation of Tone, Perception of Sound, and Empiricism: Helmholtz's Physiological Acoustic' in David Cahan (ed.), *Hermann von Helmholtz and the Foundations of Nineteenth-Century Science*, pp. 206-258.
[52] William Benjamin Carpenter, *Principles of Mental Physiology*, p. 589.
[53] George Romanes, *Darwin, and after Darwin* V. 3. *Post-Darwinian Questions: Isolation and Physiological Selection*, pp. 161-168.

conclusions. An extract from his notebook is particularly relevant in explaining his point. In 'Bearing of Weismannism on Physiological Selection' part of his *Darwin, and after Darwin,* he wrote:

> If in view of other considerations I could fully accept Professor Weismann's theory of heredity, it would appear to me in no small measure to strengthen my own theory of physiological selection. For Weismann's theory supposes that all changes of specific type must have their origin in variations of a continuous germ-plasm. But *the more the origin of species is referred directly to variations arising in the sexual elements, the greater is the play given to the principles of physiological selection*; while, on the other hand, the less standing-ground is furnished to the theory that cross-infertility between allied species is due to "external conditions of life," "prolonged exposure to uniform change of conditions," "structural modifications re-acting on the sexual functions"; or, in short, that "somatogenetic" changes of any kind can of themselves induce the "blastogenetic" change of cross-infertility between progeny of the same parental stock.[54]

Romanes accepted Weismann's theory of heredity in 1897, opening up his work to similar physiological hypotheses in Europe. Before this episode, the only psychophysiologist in England who tried to connect Darwinian evolution with the European debate was Samuel Butler. The main point of Butler's work was the necessity of shifting the attention of evolutionary science from the whole organism (e.g. natural selection) to the brain and memory in relation to heredity. What was Butler's hypothesis of unconscious memory? And what was its role into the psychophysiological European debate of 1870-1890?

5.2 Butler's hypothesis of unconscious memory

The idea of unconscious memory was Butler's main contribution to the European psychophysiological debate. Butler wrote many notes, comments and letters in defining the idea of memory and its role alongside the concept of heredity. Going through his correspondence and books, in the period in between 1863 and 1890, we see that Butler's engagement with the hypothesis of unconscious memory moved rapidly, regarding questions concerning literary and scientific identities. David Amigoni recently highlighted this in defining Butler's style of writing in relation to evolution as an ethnographic symbolic

[54] *Ibid.*, p. 169.

work.[55] According to his reading, Butler 'radically re-inscribed and defamiliarized the hierarchical relationship between biological race, European material culture and the formation of identity as received from evolutionary anthropology'.[56] In these terms, Butler's unconscious memory represents the glue which links science with culture and anthropology with teleological design. According to Amigoni, for Butler 'evolutionary theory depends on an assumption that there is unbroken continuity between the earliest known life and the human life, an assumption that is strangely troubling for the human concept of individual identity as absolute uniqueness'.[57] This unbroken continuity was marked by the writer with the hypothesis of unconscious memory.

Samuel Butler developed unconscious memory in novels, scientific books and articles. From the New Zealand period, he started a long battle against the orthodoxy of evolution as a form of natural selection. The idea of unconscious memory was the basis of this criticism in which the link between physical and mental evolution was found in the development of psychophysiology. In defining this memory, Butler wrote in his notebook referring to his work in 1872:

> Memory is a kind of way (or weight - whichever it should be) that the mind has got upon it, in virtue of which the sensation excited endures a little longer than the cause which excited it. There is thus induced a state of things in which mental images, and even physical sensations (if there can be such a thing as a physical sensation) exist by virtue of association, though the conditions which originally called them into existence no longer continue.[58]

This definition recalls memory as a concept falling between psychological and physical realities. In other words, Butler's attempt was to reshape memory as something between matter and metaphysics. In particular, he defined this link with the following words:

> 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

[55] David Amigoni, 'Samuel Butler and the writing of evolutionary theory' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: a Critical Overview*, pp. 91-113.
[56] *Ibid.*, p. 109.
[57] *Ibid.*, p. 97.
[58] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 58.

> reproduction that we can follow are based directly or indirectly upon memory. It is only the one great act of reproduction that we cannot follow which we disconnect from memory.[59]

Nonetheless, to have a scientific definition of unconscious memory, one has to wait until the publication of *Life and Habit* in 1878. In this book, the idea of unconscious memory finally became scientifically structured. Through the use of different sources (English and European authors), Butler tried to demonstrate how evolution, instead of being simply matter, was a psychophysiological problem. In 1893, Butler wrote a list of points concerning the different aspects of his psychophysiological hypothesis. One of these points was identified in *Life and Habit* as:

> 1. 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].[60]

Along the same lines as Hering in Germany and Ribot in France, Butler referred to memory in connection with the process of heredity. This connection drew attention to the missing link between offspring and ancestors in the process of reproduction. Memory for Butler was something more than a simple ability; it was the element which linked the physical structure of the brain with its metaphysical nature:

> To be is to think and to be thinkable. To live is to continue thinking and to remember having done so. Memory is to mind as viscosity is to protoplasm, it gives a tenacity to thought - a kind of *pied à terre* from which it can, and without which it could not, advance.
> Thought, in fact, and memory seem inseparable; no thought, no memory; and no memory, no thought. And, as conscious thought and conscious memory are functions one of another, so also are unconscious thought and unconscious memory. Memory is, as it were, the body of thought, and it is through memory that body and mind are linked together in rhythm or vibration; for body is such as it is by reason of the characteristics of the vibrations that are going on in it, and memory is only due to the fact that the vibrations are of such characteristics as to catch on to and be caught on to by other vibrations that flow into them from without - no catch, no memory.[61]

In Butler's hypothesis, memory and body are linked together, as well as memory and heredity. Paraphrasing Butler's own words in *Life and Habit,* memory and heredity are the

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[59] *Ibid.*, p. 59.
[60] *Ibid.*, p. 66.
[61] *Ibid.*, p. 58.

means of preserving experiences, of building them together, of uniting a mass of often confused detail into homogeneous and consistent mind and matter.

In reintroducing metaphysics into the chain of evolution, Butler justified the teleological use of design. Assuming that memory and heredity work together in preserving experience, what is the role of design in this process? Butler's argument in *Life and Habit* also gives an answer to this question saying:

> Design comes in at the moment that a living being either feels a want and forecasts for its gratification, or utilises some waif or stray of accident on the principle, which underlies all development, that enough is a little more than what one has. It is the business of memory and heredity to conserve and to transmit from one generation to another that which has been furnished by design, or by accident designedly turned to account.[62]

In *Unconscious Memory* Butler, like Hering in his 'Das Gedächtniss als allgemeine Funktion der organisirter Substanz', proposed a new justification of heredity, introducing a process of vibration as an explanation for the accumulation of memory. In *Unconscious Memory*, vibration indicated the mode of accumulating memory into the brain by a series of bio-chemical changes. Thanks to biochemistry, Butler's unconscious memory finally became totally scientific.[63]

In 1885, in his book *Luck or Cunning?*, Butler took a further step. There, he made clear his intention to connect vibrations not only with memory but with the physical constitution of the body in which the memory resides. He suggested, through the adoption of 'Newland's law (sometimes called Mendelejeff's law) that there is only one substance, and that the characteristics of the vibrations going on within it at any given time will determine whether it will appear to us as (say) hydrogen, or sodium, or chicken doing this, or chicken doing the other'.[64] In making this hypothesis clear, Butler referred to the application of accumulation of memory in chickens and eggs, saying:

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[62] *Ibid.*, pp. 61-62.

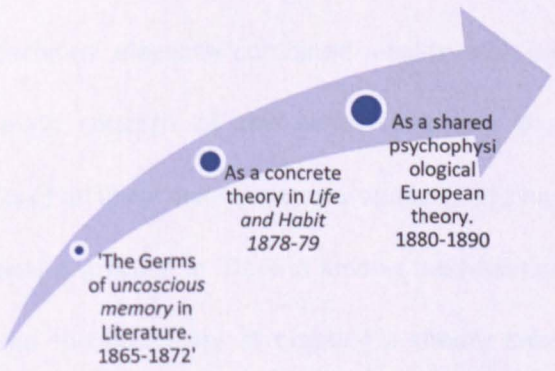
[63] The use of the word 'scientific' here describes the passage from a philosophical discussion of the hypothesis of unconscious memory, to an hypothesis characterized by the use of contemporary (nineteenth-century) scientific discovery.

[64] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 66.

> I want to connect the actual manufacture of the things a chicken makes inside an egg with the desire and memory of the chickens, so as to show that one and the same set of vibrations at once change the universal substratum into the particular phase of it required and awaken a consciousness of, and a memory of and a desire towards, this particular phase on the part of the molecules which are being vibrated into it. So, for example, that a set of vibrations shall at once turn plain white and yolk of egg into the feathers, blood and bones of a chicken and, at the same time, make the mind of the embryo to be such or such as it is.[65]

In 1880s, the identification of memory and heredity became, for Butler, a mode of transferring memory from one generation to the other through a biochemical process called vibration. The point that has to be established now is how Butler arrived at this hypothesis.

Butler's hypothesis of unconscious memory developed through his career in three different stages. First, it started as a literary idea in 'Darwin among the Machines', 'Lucubratio Ebria' and *Erewhon*. Second, it took a scientific shape in *Life and Habit*. Third, it became part of a European psychophysiological shared theory in *Unscosious Memory* and *Luck or Cunning?*.



[66]

Unconscious memory was the thread which connected all of Butler's books together. It also linked literature with science, science with music, and art and theology with everything else. In the next two sections, my aim is to discuss the role of unconscious memory in Butler's works concerning evolutionary ideas and the hypothesis of 'memory as heredity' in *Life and Habit*, *Unconscious Memory* and *Luck or Cunning?*

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[65] *Ibid.*, p. 69.

[66] The graphic shows the evolution of Butler's hypothesis of unconscious memory during the three period of his life. First, 1862-1872, second 1872-1880 and third 1880-1890.

5.2.1 Butler's hypothetical structure of unconscious memory

In 1863, in an article entitled 'Darwin Among the Machines' published in *The Press,* Samuel Butler approached the idea of a possible unconscious memory for the first time. Due to his passion for science and evolution, he wrote about memory and heredity, referring to a 'Mechanical Kingdom' or 'Mechanical Life' in literary terms. They were two widely discussed concepts in the scientific and literary cultures of the time.

Although, in 1863, the writer was working as a shepherd in New Zealand (with a degree in classics) without any formal link to the British scientific community of the time (he only possessed a copy of *The Origin of Species*[67]), Butler created one of the major late nineteenth-century criticisms of Darwinism.[68] Through the idea of unconscious memory, in 'Darwin among the Machines', Butler proposed a 'naive' form of Design as a justification of evolution.

Written as a letter to the editor of a journal and signed with the name *Cellarious,* 'Darwin among the Machines' elegantly combined religion with technology and literature with science.[69] The main concern of the article was the desire to concretise the evolutionary hypothesis of an unconscious memory applicable to any form of life.

The philosophical discussion in 'Darwin among the Machines' contained two main points. First, it explored the possibility of creating a theory based on the evolution of machines. Second, it discussed the argument of supremacy in the struggle for existence by asking: 'what sort of creature man's next successor in the supremacy of the earth is likely to be.'[70] According to the text, the only way of answering this question is through the examination of mechanical evolution in relation to that of the humankind.

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[67] Roger Robinson, 'From Canterbury-Settlement to Erewhon', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 21-45, esp. 32.
[68] *Ibid.*, pp. 32-36.
[69] See Ispano Roventi, *Lucubratio Ebria: Evoluzionismo e Tecnologia* (Bologna, 1987).
[70] Henry Festing Jones (ed.), *Samuel Butler, The Notebooks of Samuel Butler*, p. 44.

In the article, Butler did not focus directly on the process of evolution but instead directed his attention to machines and discussed how they could become the next 'superior' race. From here, Butler moved onto the second important aspect of the article: the justification of evolution in machines and its consequences for humankind. According to the writer, machines can evolve like any other living species due to the presence of a sort of 'memory' which could justify the evolution from one generation to the other.[71] It follows that in Butler's view, unconscious memory determines the track followed by evolution from one generation to the other not only in living species, but also in the kingdom of mechanical life. The article also raised the possibility that machines were a kind of 'mechanical life' undergoing constant evolution and that eventually machines might supplant humans as the dominant species.

> We refer to the question: What sort of creature man's next successor in the supremacy of the earth is likely to be. We have often heard this debated; but it appears to us that we are ourselves creating our own successors; we are daily adding to the beauty and delicacy of their physical organisation; we are daily giving them greater power and supplying by all sorts of ingenious contrivances that self-regulating, self-acting power which will be to them what intellect has been to the human race. In the course of ages we shall find ourselves the inferior race. [...] Day by day, however, the machines are gaining ground upon us; day by day we are becoming more subservient to them; more men are daily bound down as slaves to tend them, more men are daily devoting the energies of their whole lives to the development of mechanical life. The upshot is simply a question of time, but that the time will come when the machines will hold the real supremacy over the world and its inhabitants is what no person of a truly philosophic mind can for a moment question.[72]

In terms of content, 'Darwin among the Machines' served as a preliminary introduction for Butler into the evolutionary debate. The style of writing, as shown in Chapter three, linked Darwinian evolutionism with literary patterns mixing scientific terminology with moral issues. An example of this was reported by Butler:

> We have used the words "mechanical life," "the mechanical kingdom," "the mechanical world" and so forth, and we have done so advisedly, for as the vegetable kingdom was slowly developed from the mineral, and as in like manner the animal supervened upon the vegetable, so now in these last few ages an entirely new kingdom has sprung up, of which

[71] It must be said that this aspect is not clear in the article but becomes clear in *Erewhon* where Butler first uses the term 'unconscious memory'.
[72] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 44.

> we as yet have only seen what will one day be considered the antediluvian prototypes of the race.[73]

As demonstrated in the previous quotations, in 'Darwin Among the Machines' the language and tone were far from being critical, as characteristically seen in Butler's later writings. However, the content introduced a few ideas that were going to become the basis of Butler's scientific views. On the one, the article discussed evolution starting from the contrast between natural and artificial life using the metaphor of evolving machines. On the other hand, the terminology adopted was a mix of scientific, philosophical and literary languages. The nature of the article itself, as a result, is open to different interpretations. Is it a scientific article written as a letter or, perhaps, it is a literary paper naively peppered with pseudo-scientific terminology?

In my opinion, the idea of 'Mechanical life, kingdom and world' represented the evolutionary first attempt of an amateur writer to promote his own hypothesis. However, it must also be noted that Butler's attempt was part of a larger Victorian debate concerning the generation of life for *non-living* forms. According to James E. Stric's work on Victorian spontaneous generation, the idea that living things can suddenly arise from non-living materials largely developed in the Victorian cultural debate between 1860 and 1870.[74] However, 'Darwin among the Machines' represented, although unconsciously, something more than a simple literature of spontaneous generation. This conclusion was justified by the next stage of Butler's scientific writing which improved the scientific pregnancy of his hypothesis without losing the literary style.

In 1865, the article 'Lucubratio Ebria', which was also published in *The Press*, provided some more clarifications on Butler's hypothesis of unconscious memory and on his theory regarding the relationship between machines and humankind. The main topic of the article was moved from the hypothesis of mechanical evolution to one of an evolution

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[73] *Ibid.*, p. 43.
[74] James E. Strick, *Sparks of Life: Darwinism and the Victorian Debates over Spontaneous Generation*, pp. 2-4.

tout court presented with a shadow of Lamarckism.[75] In other words, the article developed a hypothesis of evolution founded on the use or disuse of technological artefacts taking Darwinism, according to the words of Roger Robinson, to its absurd extremes.[76] In this article, Butler did not explicitly use the word 'unconscious memory' but nevertheless referred to the presence of a 'force' which introduced a sense of identity to any species. Butler wrote at the beginning of the article:

> Recent researches have thrown absolutely no light upon the origin of life - upon the initial force which introduced a sense of identity, and a deliberate faculty into the world; but they do certainly appear to show very clearly that each species of the animal and vegetable kingdom has been moulded into its present shape by chances and changes of many millions of years, by chances and changes over which the creature modified had no control whatever, and concerning whose aim it was alike unconscious and indifferent, by forces which seem insensate to the pain which they inflict, but by whose inexorably beneficent cruelty the brave and strong keep coming to the fore, while the weak and bad drop behind and perish.[77]

In 'Lucubratio Ebria', unconscious memory became a process of evolving while learning and memorizing actions through the use of technological artifacts. In this second article, Butler changed the content of his writing. In 'Darwin Among the Machines', artificial life was the central core of his argument, but in 'Lucubratio Ebria' machines became an instrument in the hands of humankind. Even the metaphor of technological evolution, which was used as a philosophical message for the humankind in the first paper, shifted to that of humanity evolving only because of its relation to machinery. It must be noted that in 'Lucubratio Ebria', a stronger correlation exists with Darwin's work in terms of its ethical and anthropological implications. As Butler discusses the evolution of humankind in relation to its use of machines, he tries to compare the evolution of different human races in relation to their use of 'mechanical appliances'.[78] From monkeys and apes to the modern

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[75] Refer to Ispano Roventi, *Lucubratio Ebria: Evoluzionismo e Tecnologia*, pp. 5-15

[76] Roger Robinson, 'From Canterbury-Settlement to Erewhon' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 33 and Ispano Roveti, *Lucubratio Ebria: Evoluzionismo e Tecnologia*, pp. 12.

[77] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 48.

[78] *Ibid.*, p. 50.

humankind the key factor of evolution becomes the use of machines and the storing of actions.

> Good apes begat good apes, and at last when human intelligence stole like a late spring upon the mimicry of our semi-simious ancestry, the creature learnt how he could, of his own forethought, add extra-corporaneous limbs to the members of his body and become not only a vertebrate mammal, but a vertebrate machinate mammal into the bargain.[79]

The language and tone did not change from 'Darwin Among the Machines' but the examples used and the terminology became more scientific. The cause of this was probably located in the sources used by Butler in designing his argument. In both of the articles, the only term of reference with specialist science was the *Origin of Species*. However, in this second paper, a shift in vocabulary must be noted. If in 'Darwin among the Machines', Butler wrote a 'prophetical' message using mostly a philosophical terminology, in 'Lucubratio Ebria' Butler's writing became more 'scientific' (becoming influenced by Darwin's and Lamarck's work).

Since the publication of 'Lucubratio Ebria', concepts and linguistic expressions such as 'creature modified', 'chances and changes of many millions of years' and 'mind grew because the body grew - more things were perceived - more things were handled, and being handled became familiar' began to be part of Butler's scientific vocabulary. Additionally, the introduction of versatility in relation to the use and disuse (conscious and unconscious) of technology made this article innovative and, at the same time, paradoxically extreme. Butler wrote:

> For the race of man has learned to walk uprightly much as a child learns the same thing. At first he crawls on all fours, then he clambers, laying hold of whatever he can; and lastly he stands upright alone and walks, but for a long time with an unsteady step. So when the human race was in its gorilla-hood it generally carried a stick; from carrying a stick for many million years it became accustomed and modified to an upright position. The stick wherewith it had learned to walk would now serve it to beat its younger brothers and then it found out its service as a lever. Man would thus learn that the limbs of his body were not the only limbs that he could command. His body was already the most versatile in existence, but he could render it more versatile still. With the improvement in his body his mind improved also. He learnt to perceive the moral government under which he held the feudal

[79] *Ibid.*, p. 48.

> tenure of his life - perceiving it he symbolised it, and to this day our poets and prophets still strive to symbolise it more and more completely.[80]

The versatility of the body determines, according to Butler's point of view, the ability to learn and memorize actions and habits. Unconscious memory in 'Darwin Among the Machines' and 'Lucubratio Ebria' was still a simple theoretical intuition without any formal scientific shape. As proof of this, the expression 'unconscious memory' was never directly used in these two articles despite Butler's suggestion of a similar concept. The publication of *Erewhon* and its 'The Book of the Machines' was the first pseudo-scientific acknowledgment of it.

In 1872, *Erewhon or Over the Range* was published in London by the editor Trubner. At the beginning of the book, Butler quoted *The Politics* of Aristotle: του γαρ ειναι δοκουντος αγαθου χαριν παντα πραττουσι παντες.[81] Like the Greek philosopher, Butler's intention was to consider and criticise (ironically), in this case, Victorian society. In particular referring to the scientific debate, *Erewhon* like More's *Utopia and* Swift's *Gulliver's Travels*, was able to listen to new scientific voices giving articulated answers.[82]

In terms of content, the novel is something in between the naive scientific intuitions of 'Darwin among the Machine' and 'Lucubratio Ebria', and the psychophysiological hypothesis of *Life and habit*. In the three chapters entitled 'The Book of the Machines' the writer, while applying evolution to the kingdom of machines, expanded the hypothesis of unconscious memory although still in a purely literary way. As discussed in Chapter three, 'The Book of the Machines' can be seen as a philosophical essay embedded inside the novel, or a sort of non-fictional essay in which Butler tried to discuss his ideas from 'Darwin among the Machines' in a new form. In order to make his reader aware of the striking developments relating to the theory of evolution, Butler started facing

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[80] *Ibid.*, p. 49.
[81] Samuel Butler, *Erewhon or Over the Range*, FrontPage. It is paraphrase of *The Politics of Aristotle* which can be translated as *There is no action save upon a balance of considerations*.
[82] Samuel Butler has been ascribed alongside Swift and More by George Bernard Shaw within the introduction of his Major Barbara.

up to social/philosophical issues. This aspect, linked with the novel's narrative plot, decreed the scientific inefficacy of 'The Book of the Machines'.

In terms of scholarly relevance, many studies regarding *Erewhon* have been written regarding the nature of the novel as an intrinsic criticism of the Victorian authority (for example the recent article 'Erewhon and the End of Utopian Humanism' (2002)).[83] Butler worked on the margins of the subjects of literature and science, and thus, any such classification becomes pointless. In relation to this point, Elinor Shaffer suggests, in interpreting *Erewhon*, that alongside Butler's scientific temperament there is also his attitude towards theology and religion to consider. Butler's theological ideas, along with his faith in evolution and natural history, proposed an organic interpretation in which all of the different levels of his analyses are worked together in his novels.[84] Butler's literature becomes an object of multilevel analysis making *Erewhon* its main example.

In *Erewhon*, the literary rendezvous with science became more complex. Instead of being a simple literary commentary as it was introduced in 'Darwin among the Machines', the idea of mechanical evolution became a concrete philosophical possibility. Due to the concept of modification in favour of use and disuse of limbs already explained in 'Lucrubatio Ebria', Butler's 'The Book of the Machines' faced a new application of evolutionism within the mechanical kingdom. Additionally, *Erewhon* also improved the ideas of consciousness and unconsciousness while giving expression to science in a literary context. Two revolutionary aspects in Butler's work are noticeable in the 'The Book of the Machines'. The first aspect concerns the length of the essay. Both 'Darwin among the Machines' and 'Lucrubatio Ebria' were short articles (3-4 pages), but the 'The Book of the Machines' became a proper essay (25 pages) in which the author structured a complex philosophical argument. The second aspect concerns Butler's confidence in writing. If in his

[83] Sue Zemka, 'Erewhon and the End of Utopian Humanism', *ELH*, 69 (2) (2002), pp. 439-72, esp. 444.
[84] Elinor Shaffer, 'The Ironies of Biblical Criticism: From Samuel Butler's 'Resurrection' Essay and The Fair Haven to Erewhon Revisited' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, pp. 58-90, esp. 59.

New Zealand articles, Butler's vision of evolution was simply a commentary of the work of others intermixed with his own ideas, in the 'The Book of the Machines', he finally presents his own thoughts to the reader, becoming more independent (although still in a pure literary form).

According to the main reviews, *Erewhon* was considered as a criticism of natural selection ironically transplanted to a literary plot. Being aware of this misunderstanding, in the second edition of the novel, Butler came back to this point saying:

> I regret that reviewers have in some cases been inclined to treat the chapters on Machines as an attempt to reduce Mr. Darwin's theory to an absurdity. Nothing could be further from my intention, and few things would be more distasteful to me than any attempt to laugh at Mr. Darwin; but I must own that I have myself to thank for the misconception, for I felt sure that my intention would be missed, but preferred not to weaken the chapters by explanation, and knew very well that Mr. Darwin's theory would take no harm. The only question in my mind was how far I could afford to be misrepresented as laughing at that for which I have the most profound admiration. I am surprised, however, that the book at which such an example of the specious misuse of analogy would seem most naturally levelled should have occurred to no reviewer; neither shall I mention the name of the book here, though I should fancy that the hint given will suffice.[85]

As the note suggests, in *Erewhon*, Butler did not make any jokes on natural selection. Instead, he used a sarcastic style of writing in showing the real and intrinsic force of Darwin's argument. Moreover, on the 11th of May 1872, he wrote to Charles Darwin to explain the real significance of 'The Book of the Machines': "I am sincerely sorry that some of the critics should have thought I was laughing at your theory, a thing which I never meant to do and should be shocked at having done".[86] Soon after the letter, Butler was invited to Down and paid two visits to Darwin's house.

Returning to the book itself, 'The Book of the Machines' discusses concepts already presented in 'Darwin among the Machines'. However, it places more emphasis on its prophetical nature. Gillian Beer in 'Butler, Memory and the Future' points out, in relation to *Erewhon*, the possible vitality and prophecies that evolution must take place through their

[85] Samuel Butler, *Erewhon or Over the Range*, p. vii.
[86] Samuel Butler to Charles Darwin, 11th May 1872. Darwin Correspondence Project Letter 8318.

means.[87] It also carried on the hypothesis suggesting a connection between human kind and machines. A similar hypothesis has also been discussed in recent French philosophy. In his collaboration with Félix Guattari, *Anti-Oedipus* (1972), Gilles Deleuze draws on Butler's 'The Book of the Machines' and goes beyond the usual polemic between vitalism and mechanism as it relates to their concept of "desiring-machines".

> For one thing, Butler is not content to say that machines extend the organism, but asserts that they are really limbs and organs lying on the body without organs of a society, which men will appropriate according to their power and their wealth, and whose poverty deprives them as if they were mutilated organisms. For another, he is not content to say that organisms are machines, but asserts that they contain such an abundance of parts that they must be compared to very different parts of distinct machines, each relating to the others, engendered in combination with the others. [...] He shatters the vitalist argument by calling in question the specific or personal unity of the organism, and the mechanist argument even more decisively, by calling in question the structural unity of the machine.[88]

In the novel, Butler spoke about Man as a 'machinate mammal' or 'machines as a supplementary limb'.[89] In doing so, Butler tried to link his opinion about the 'race' for supremacy and the danger posed by the machines (proposed in 'Darwin Among the Machines') with the anthropological vision of evolution he drafted in 'Lucubratio Ebria'. Nevertheless, he also introduced the application of Darwinism as a sort of social political philosophy in relation to society (and its roles) in the land of Erewhon. Butler wrote:

> Man has now many extra-corporeal members, which are of more importance to him than a good deal of his hair, or at any rate than his whiskers. His memory goes in his pocket-book. He becomes more and more complex as he grows older; he will then be seen with see-engines, or perhaps with artificial teeth and hair: if he be a really well-developed specimen of his race, he will be furnished with a large box upon wheels, two horses, and a coachman.[90]

Assuming that the primary aim of *Erewhon* was to interpret evolution from a utopian perspective, the second important point of 'The Book of the Machines' was the idea of unconscious memory. When and where can we talk about psychophysiology in the novel?

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[87] Gillian Beer, 'Butler, Memory and the Future', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 55.
[88] Gilles Deleuze Félix Guattari, *Anti-Oedipus*, pp. 313-314.
[89] *Ibid.*, p. 313.
[90] Samuel Butler, *Erewhon or Over the Range*, p. 272, also quoted in Gillian Beer, 'Butler, Memory and the Future' in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 55

Alongside the prophetical argument, in *Erewhon*, Butler set up a new and concretized definition of unconscious memory. In opening 'The Book of the Machines', Butler wrote: 'Consciousness, in anything like the present acceptance of the term, having been once a new thing—a thing, as far as we can see, subsequent even to an individual centre of action and to a reproductive system (which we see existing in plants without apparent consciousness)'.[91] In saying this, Butler, for the first time, linked memory directly with heredity. In the novel, memory became the guideline justifying the process of reproduction used by machines in developing themselves generation after generation. Referring to this, in one of the conclusive chapters of *Erewhon*, Butler went back to his concept of memory saying:

> By the action which each generation takes—an action which repeats all the phenomena that we commonly associate with memory—which is explicable on the supposition that it has been guided by memory—and which has neither been explained, nor seems ever likely to be explained on any other theory than the supposition that there is an abiding memory between successive generations.[92]

Although, once again, this extract does not provide, a concrete definition of unconscious memory, it seems to grasp the preliminary nature of the idea that will be shaped later on. Before concluding this part, I must discuss one final point. As evidenced by the differences in content between 'Darwin among the Machines', 'Lucubratio Ebria' and 'The Book of the Machines', it is clear to see how Butler's academic thoughts evolved through time. In 1863, in 'Darwin among the Machines' evolution was drafted as a pure philosophical examination and the metaphor of 'artificial life' was prophetically described as a potential risk for the future of humankind. In 1865, with 'Lucubratio Ebria' Butler's metaphor of 'evolving machines' changed into an anthropological interpretation of human evolution, where the human body was able to evolve only in relation to the use of 'artificial limbs'. In 1872, with the publication of *Erewhon* Butler moved a step further. With 'The Book of the Machines', he deconstructed the idea of 'mechanical evolution' finding the presence of a 'memory'

[91] Samuel Butler, *Erewhon or Over the Range*, p. 272.
[92] *Ibid.*, p. 294.

which could justify 'artificial life'. However, what happened to Butler's hypothesis of evolution after the 1872 novel?

In the coming section, the idea of memory and heredity will be discussed in relation to Butler's scientific tomes. In terms of content, they re-structured the ideas to be found in 'The Book of the Machines'. As a novel, *Erewhon* was the right middle-point between the articles in *The Press* and *Life and Habit*. Evidence of this is provided by Butler's correspondence. On February 18th 1876, Butler wrote to his father referring to the early draft of *Life and Habit*: 'My present literary business is a little essay some 25 or 30 pp. long'[93] and provided a list of ideas concerning his own scientific theory. The primary aim of the list was to identify 'Actions which we have acquired with difficulty and now perform almost unconsciously - as in playing a difficult piece of music, reading, talking, walking and the multitude of actions which escape our notice inside other actions, etc.'. Then, the 'General deduction that we never do anything in this unconscious or semi-conscious manner unless we know how to do it exceedingly well and have had long practice'.[94] The letter, written at the beginning of the writing of *Life and Habit,* shows a methodological connection between the novel and the consequent books.

In the next section, I aim to explain Butler's psychophysiological hypothesis as structured in his scientific books and essays.

5.2.2 The hypothesis of 'memory as heredity' in *Life and Habit, Unconscious Memory* and *Luck or Cunning?*

In a sentence, *Life and Habit* certifies the 'identification of heredity and memory, and the corollaries relating to sports, the reversion to remote ancestors, the phenomena of old age,

[93] An extract of a letter from Samuel Butler to Thomas Butler February 18th 1876, in Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 53.
[94] *Ibid.*, p. 53.

the causes of the sterility of hybrids, and the principles underlying longevity - all of which follow as a matter of course'.[95]

In *Life and Habit*, Butler introduced the theme of the continuity of identity, life and memory between parents and offspring through different generations. His aim was to build up a new hypothesis of evolution where the idea of instinct was considered as a sort of inherited memory. This inherited memory also represents the re-introduction of design in the process of evolution as an alternative to natural selection. As Mivart had done before, Butler tried to mediate a meeting between natural selection (pure matter) and a philosophical conception of evolution in relation to a final cause.

Butler's point was to talk about unconscious and conscious memory and their role in the acquisition of habits. As this meditation, this methodology concerned the process of memorising actions. Activities like walking, reading and speaking, in order to become habits, have to be acquired through continuous exercise. The hypothesis was, obviously, linked to what written in Carpenter's *Principles of Mental Physiology* (1875). An example from Butler's book can better illustrate the similar methodology. He wrote:

> He [Carpenter] raised any number consisting of *one* figure progressively to the tenth power, giving the results (by actual multiplication and not by memory) *faster than they could be set down in figures* by the person appointed to record them. He raised the number 8 progressively to the *sixteenth* power, and in naming the last result, which consisted of 15 figures, he was right in every one. Some numbers consisting of *two* figures he raised as high as the eighth power, though he found a difficulty in proceeding when the products became very large.[96]

As the note suggested, moving the attention to experimentation and memory, Carpenter designed the perfect background for Butler. In terms of content, *Life and Habit* combined elements from Darwin's natural selection, Carpenter's physiology and Lamarckian design. In particular, whereas Darwin forced a choice between theology and evolution, *Life and Habit*,

[95] Samuel Butler, *Life and Habit*, p. II or Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 66.
[96] Samuel Butler, *Life and Habit*, p. 14.

according to the historian Lightman, argued that embracing evolution did not require the sacrifice of the theological idea of design in the name of science.[97]

Butler's attempt in *Life and Habit* was to show how evolution could also be thought of in terms of unconscious memory. This tenet of the book was set from the opening of the first chapter. Butler wrote:

> It will be our business in the following chapters to consider whether the unconsciousness, or quasi-unconsciousness, with which we perform certain acquired actions, would seem to throw any light upon Embryology and inherited instincts, and otherwise to follow the train of thought which the class of actions above-mentioned would suggest; more especially in so far as they appear to bear upon the origin of species and the continuation of life by successive generations, whether in the animal or vegetable kingdoms.[98]

Thus, unconscious memory became the link between one generation and the other but also became a mechanism used in acquiring habits. The conscious and unconscious repetition of an action, in Butler's point of view, followed a specific mechanism. He described it saying:

> I. That we are most conscious of, and have most control over, such habits as speech, the upright position, the arts and sciences, which are acquisitions peculiar to the human race, always acquired after birth, and not common to ourselves and any ancestor who had not become entirely human.
> II. That we are less conscious of, and have less control over, eating and drinking, swallowing, breathing, seeing and hearing, which were acquisitions of our pre-human ancestry, and for which we had provided ourselves with all the necessary apparatus before we saw light, but which are still, geologically speaking, recent, or comparatively recent.
> III. That we are most unconscious of, and have least control over, our digestion and circulation, which belonged even to our invertebrate ancestry, and which are habits, geologically speaking, of extreme antiquity.[99]

In describing the difference between actions, Butler arrived at the point of considering memory as a form of corporal volition. On the topic of unconscious actions he pointed out: 'Take again the processes of digestion, the action of the heart, and the oxygenisation of the blood - processes of extreme intricacy, done almost entirely unconsciously, and quite

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[97] Bernard Lightman, 'A Conspiracy of One': Butler, Natural Theology, and Victorian Popularization', in James Paradis (ed.), *Samuel Butler, Victorian Against the Grain: A Critical Overview*, p. 121.
[98] *Ibid.*, p. 121.
[99] Samuel Butler, *Life and Habit*, p. 51.

beyond the control of our volition'.[100] Butler's point was to demonstrate his theory while giving an answer to the following questions:

- Is it possible that our unconsciousness in consideration of our own performance of all these processes arises from over-experience?
- Is there anything in digestion, or the oxygenisation of the blood, which is different in kind to the rapid unconscious action of a man playing a difficult piece of music on the piano?
- Is the application of the idea of unconscious memory applicable to actions and habits acquired before birth?

Unfortunately Butler's hypothesis in *Life and Habit* was still written with a terminology not professional enough to be considered scientifically relevant by the scientific community of the time. In relation to philosophy, Butler's point was to put 'theology on one side, and to deal only with the common daily experience of mankind'[101] but he inevitably returned to metaphysics saying:

> They are composed of parts, some of them so unessential as to be hardly included in personality at all, and to be separable from ourselves without perceptible effect, as the hair, nails, and daily waste of tissue. Again, other parts are very important, as our hands, feet, arms, legs, &c., but still are no essential parts of our "self" or "soul," which continues to exist in spite of their amputation. Other parts, as the brain, heart, and blood, are so essential that they cannot be dispensed with, yet it is impossible to say that personality consists in any one of them.[102]

The link with philosophy placed Butler's hypothesis far from Carpenter's physiology, instead suggesting a commonality with Spencer, Mivart and Ribot. The non-scientific nature of it becomes particularly clear at the end of the book, where Butler himself promoted the publication of further books, trying to persuade sceptical readers. He wrote:

> I admit that when I began to write upon my subject I did not seriously believe in it. I saw, as it were, a pebble upon the ground, with a sheen that pleased me; taking it up, I turned it over and over for my amusement, and found it always grow brighter and brighter the more I examined it.[...] Will the reader bid me wake with him to a world of chance and blindness? Or can I persuade him to dream with me of a more living faith than either he or I had as yet conceived as possible? As I have said, reason points remorselessly to an awakening, but faith and hope still beckon to the dream.[103]

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[100] *Ibid.*, p. 51.
[101] *Ibid.*, p. 79.
[102] *Ibid.*, pp. 79-80.
[103] *Ibid.*, p. 306.

Not completely satisfied by the reception of *Life and Habit* in 1880, Butler decided to work again on the hypothesis of psychophysiology in a second book entitled *Unconscious Memory*. Although *Unconscious Memory* was more critical than the previous *Life and Habit*, there he linked his hypothesis to similar ones in Europe. In terms of content, a résumé of the main point of the book was provided at the beginning of the volume. Butler pointed out:

> (1) the oneness of personality between parent and offspring; (2) memory on the part of the offspring of certain actions which it did when in the persons of its forefathers; (3) the latency of that memory until it is rekindled by a recurrence of the associated ideas; (4) the unconsciousness with which habitual actions come to be performed.[104]

Additionally, *Unconscious Memory* also reported a translation of Ewald Hering's 'Das Gedächtniss als allgemeine Funktion der organisierter Substanz' ("Memory as a Universal Function of Organised Matter") and some extracts from Eduard von Hartmann's philosophy of unconscious. Methodologically speaking, *Unconscious Memory* did not represent an implementation of Butler's hypothesis but instead provided a description of the idea of unconscious memory in a pan-European context. Thus, looking back to his previous book, Butler wrote:

> In "Life and Habit" I did not touch upon these vibrations, knowing nothing about them. Here, then, is one important point of difference, not between the conclusions arrived at, but between the aim and scope of the work that Professor Hering and I severally attempted. Another difference consists in the points at which we have left off. Professor Hering, having established his main thesis, is content. I, on the other hand, went on to maintain that if vigour was due to memory, want of vigour was due to want of memory.[105]

Returning to Butler's translation of Hering's and von Hartmann's work, *Unconscious Memory* provided a view of the 1870-1880 German debate on organic memory. Butler's argument worked in this way. He discussed the conclusion of the 'Unconscious in Instinct' an extract of Von Hartmann's book the *Philosophy of the Unconscious* showing the incompatibly between the philosophy of unconscious and psychophysiology. By Butler's point of view, Von Hartmann's position was reducible to three points suggesting the existence of instinctive action (unconscious memory):

[104] Samuel Butler, *Unconscious Memory*, p. xi-xii.
[105] *Ibid.*, p. 61.

I. A mere necessary consequence of bodily organisation.

II. A mechanism of brain or mind contrived by nature.

III. The outcome of an unconscious activity of mind.[106]

In Von Hartmann's hypothesis, the unconscious is both Will and Reason (the latter concept also interpreted as Idea) and the absolute all-embracing ground of all existence. The philosopher combines pantheism with panlogism in a manner outlined by Schelling in his positive philosophy. Nevertheless, Will, not Reason, is the primary aspect of the *Unconscious, whose melancholy* career is determined by the primacy of Will and the latency of Reason. Will is void of reason when it passes from *potentiality to actual willing.* The original state of the Unconscious is one of potentiality, in which, by pure chance, Will begins to strive. In the transition state, called that of the empty Will, there is no definite end. Acting on its own, Will creates absolute misery.

Von Hartmann's position became irreconcilable with Butler's (more scientific and less philosophical). From Butler's point of view, unconscious memory could not be considered in a pure philosophical perspective, it instead involved the use of science as a justification. This point became clear in the conclusion of the volume where Butler said that 'the true theory of unconscious action, then, is that of Professor Hering [..] This involves the older "Darwinism" and the theory of Lamarck, according to which the modification of living forms has been effected mainly through the needs of the living forms themselves, which vary with varying conditions, the survival of the fittest'.[107]

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On 10th November 1886, Butler published his final scientific book, *Luck or Cunning?,* in which he emphasised two main points: first, the substantial identity existing between heredity and memory as a criticism of natural selection; second, the reintroduction of

[106] In the Original 1. Eine blosse Folge der körperlichen Organisation.2. Ein von der Natur eingerichteter Gehirn-oder Geistesmechanismus. 3. Eine Folge unbewusster Geistesthiitigkeit." See Eduard von Hartmann, *Philosophy of the Unconscious*, p. 70.
[107] Samuel Butler, *Unconscious Memory*, p. 146.

design into organic developed in terms of physiology and Neo-Lamarckism. He treated these two points as if they had something of that physical life with which they are so closely associated.

Luck or Cunning? has been largely read as a simple and violent criticism of the Darwinian conclusion. After a first reading, the book looks like the last shot of man overwhelmed and obsessed by his own ideas. Butler's main argument seems to be an eccentric comment and complaint about himself, his identity as an evolutionist and the rejection of his idea by the British scientific community. The book seems to also be aware of its nature of being open to the future of the scientific debate. Butler himself explicitly declared that his work would prove of more interest to future generations than to its immediate public, 'but any book that desires to see out a literary three-score years and ten must offer something to future generations as well as to its own'.[108]

However, the second face of *Luck or Cunning?* is completely different. The book went through the complexity of unconscious memory, discussing it in relation to the hypotheses of Spencer, Romanes, Wallace, Darwin, Huxley, Grant Allen and Ray Lankaster. The hypothesis in this volume finally leaves the metaphysical realm to become fully scientific.

In *Luck or Cunning?*, Butler concluded that unconscious memory could only be understood in relation to the new scientific notion of 'protoplasm'. In his view, protoplasm is a biochemical structure which has to be considered as the base of any vital phenomena. On the origin of the notion of protoplasm, Butler is not very clear in the text. He described it in a small paragraph saying:

> On this the question arises, "Which are the most living parts?" The answer to this was given a few years ago with a flourish of trumpets, and our biologists shouted with one voice, "Great is protoplasm. There is no life but protoplasm, and Huxley is its prophet." Read Huxley's "Physical Basis of Mind." Read Professor Mivart's article, "What are Living Beings?" in the Contemporary Review, July, 1879. Read Dr. Andrew Wilson's article in the Gentleman's Magazine, October, 1879. Remember Professor Allman's address to the British

[108] Samuel Butler, *Luck or Cunning?*, pp. 13-14.

> Association, 1879; ask, again, any medical man what is the most approved scientific attitude as regards the protoplasmic and non-protoplasmic parts of the body, and he will say that the thinly veiled conclusion arrived at by all of them is, that the protoplasmic parts are alone truly living, and that the non-protoplasmic are non-living.[109]

Apparently, Butler seemed to agree with G. J Allman's 'Protoplasm and Life', published in the *Popular Science Monthly*, in October 1879:

> Protoplasm lies at the base of all the phenomena of life, whether in the animal or the vegetable kingdom. Thus has arisen the most important and significant generalization in the whole domain of biological science.[110]

Protoplasm became the base of Butler's hypothesis of unconscious memory. He defined it as mainly made of oxygen, hydrogen, nitrogen, and carbon, and also suggested that 'if we do not keep a sharp look out, we shall have it going the way of the rest of the body, and being declared dead in respect, at any rate, of these inorganic components'. The science of the time had not, in Butler's opinion, '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.'[111]

The second part of *Luck or Cunning?* is devoted to the explanation of the role of the mind. Starting with a criticism of Darwinian evolutionism which suggested the reduction of any possible organic evolution, Butler instead suggested the opposite point. In the conclusion in particular he proposed major engagement (in relation to the previous books) with experimental science. In his notebooks, referring to *Luck or Cunning?,* Butler wrote: 'What I want to do now (1885) is to connect vibrations not only with memory but with the physical constitution of that body in which the memory resides, thus adopting Newland's law (sometimes called Mendelejeff's law) that there is only one substance, and that the characteristics of the vibrations going on within it at any given time will determine whether it will appear to us as, we will say, hydrogen, or sodium, or chicken doing this, or chicken

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[109] Samuel Butler, *Luck or Cunning?,* p. 121.
[110] G. J Allman, 'Protoplasm and Life', *The Popular science Monthly,* Vol. XV (1879), pp. 721-749, esp. 722.
[111] Samuel Butler, *Luck or Cunning?,* p. 125.

doing the other.'[112] As the note indicates in *Luck, or Cunning?* Butler demarcated a strong advance in his monistic views and a yet more marked development in the vibration hypothesis of memory given by Hering and only adopted with the greatest reserve in *Unconscious Memory*.

The final engagement with unconscious memory was made in 'The Deadlock of Darwinism'. Although these articles only marginally touched upon Butler's theory, they explained something more about his position between Lamarckism and the new development of Darwinian evolutionism in terms of Weismanism. As the title of the articles suggest, Butler's scope was to show to his readers the deadlock of Darwin's hypothesis of natural selection in the late nineteenth-century debate.

In these articles, the author tried to reply to the question 'What, let me ask, are the principal phenomena of heredity?'[113] by answering 'there must be physical continuity between parent, or parents, and offspring, so that the offspring is, as Erasmus Darwin well said, a kind of elongation of the life of the parent'.[114]In 'The Deadlock of Darwinism', Butler discussed two main points. First, he worked on the idea of Lamarckism from a historical and scientific point of view. Second, he moved his attention to Lamarckism in relation to the work of August Weismann. In doing this, the work of Weismann became particularly relevant to Butler's own view. In describing Weismann's work, Butler wrote at the beginning of the second article:

> Professor Weismann is the foremost exponent of those who take this line. He has naturally been welcomed by English Charles-Darwinians; for if his view can be sustained, then it can be contended that use and disuse produce no transmissible effect, and the ground is cut from under Lamarck's feet; if, on the other hand, his view is unfounded, the Lamarckian reaction, already strong, will gain still further strength. The issue, therefore, is important, and is being fiercely contested by those who have invested their all of reputation for discernment in Charles-Darwinian securities.[115]

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[112] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 66.
[113] Samuel Butler, 'The Deadlock of Darwinism', *Universal Review* and then reprinted in the volume R. A. Streatfeild (ed.), *Essays on Life, Art and Science by Samuel Butler*.
[114] *Ibid.*, pp. 316-317.
[115] *Ibid.*, p. 277.

Although Weismann's work was considered as an example of German Darwinism, Butler proposed a asymmetrical interpretation of it in which Weismann's theory developed as a necessary critical consequence of Lamarckism.[116] In improving his criticisms of Darwinian authority, Butler used the reception of Weismann's Germ-plasm theory as an example. He wrote that 'Mr. Wallace, who does not appear to have read Professor Weismann's essays themselves'[117] did not consider the work of the German scientist in his research on evolution. Additionally, Butler also referred to Romanes' 'incoherent' use of Weismann's essays by stating that 'Mr. Romanes, writing in Nature, March 13, 1890, and opposing certain details of Professor Weismann's theory, so far supports it as to say that "there is the gravest possible doubt lying against the supposition that any really inherited decrease is due to the inherited effects of disuse."'[118]

Apart from Weismann's Darwinism, the other aim of the article was to discuss Lamarck's growing fame. At the beginning of the last chapter Butler wrote: 'Ten years ago Lamarck's name was mentioned only as a byword for extravagance; now, we cannot take up a number of Nature without seeing how hot the contention is between his followers and those of Weismann.'[119] This also gave Butler the chance to come back to the *Life and Habit*'s theory trying to reframe it in the light of new discoveries made in recent years. He wrote a long list of differences between the hypothesis of *Life and Habit* and his new and more mature position set out in his next book. In relation to this Butler wrote:

> if heredity and memory are essentially the same, we should expect that no animal would develop new structures of importance after the age at which its species begins ordinarily to continue its race; for we cannot suppose offspring to remember anything that happens to the parent subsequently to the parent's ceasing to contain the offspring within itself. From the average age, therefore, of reproduction, offspring should cease to have any farther steady, continuous memory to fall back upon; what memory there is should be full of faults, and as such unreliable. An organism ought to develop as long as it is backed by memory—that is to say, until the average age at which reproduction begins; it should then continue to

[116] *Ibid.*, pp. 277-278.
[117] *Ibid.*, p. 279.
[118] *Ibid.*, p. 291.
[119] *Ibid.*, p. 307.

> go for a time on the impetus already received, and should eventually decay through failure of any memory to support it, and tell it what to do.[120]

Thus, the hypothesis of unconscious memory became the missing link of the theory of evolution. It developed from a literary plot applied to machines into a theory of protoplasm in terms of biochemical changes of the human body. The point that must be established now is how the hypothesis of unconscious memory worked.

5.3 Butler's unconscious memory: mechanism, structure and examples used

Butler's hypothesis of unconscious memory developed, during his career, in variety of different shapes. From *Erewhon* to *Luck or Cunning?*, the writer developed the study of organic evolution in different fields merging them in obscure ways.

Although recent studies have highlighted new evidence about the scientific validity of his idea, in both the history of evolution and history of psychology, the hypothesis itself remains obscure. But why should this be? Was it obscure because of the examples used, the style of writing, or the scientific authority of the time?

In answering these questions, I have to refer to the reception of Butler's hypothesis as well as to the hypothesis itself. First, Butler's unconscious memory was not unique in Europe. Both Ribot in Paris and Hering at the University of Prague developed the same experimental theory using similar examples. Second, unconscious memory, due to its nature as half-scientific and half-metaphysical, did not fit in either the scientific or the philosophical debate.

The idea of unconscious memory was developed using a range of examples by Butler. Many of these were originally introduced in *Erewhon* and then developed in *Life and Habit, Unconscious Memory, Luck or Cunning?* and 'The Deadlock of Darwinism'. Thanks to these examples, Butler provided a list of points concerning: voluntary and involuntary actions, the ability of learning and memorising languages, playing complex pieces of music,

[120] *Ibid.*, p. 112.

memory in relation to instinct, reproduction as a type of design in terms of protoplasm and biochemical changes. His second goal, especially after 1880, was also to create links with the work of the three scientists Théodule-Armand Ribot, Ewald Hering and William Benjamin Carpenter.

Butler's idea of unconscious memory was a philosophical investigation of evolution, and it did not have any concrete evidence in practical terms. The reason for this lack of success and the consequent reduction of his scientific credibility was derived from the selection of case studies used in the texts but Butler's choice of theoretical case-studies was also idiosyncratic. From 'Darwin among the Machines' to 'The Deadlock of Darwinism', Butler wrote about evolution using his own style, examples and metaphors. With potatoes, children learning languages, eggs, chickens, players of piano, cells, germs, parents and offspring, Butler outlined a hypothesis of memory as heredity involving topics such as biology, psychology and evolution but, at the same time, art, literature and philosophy.

In chapter two, it was explained in theory but not in practice, how the architecture of Butler's use of genres sanctioned his failure as a writer and a scientist. To find the first concrete example in Butler's writing we have to wait until 1872 and the publication of *Erewhon*. Here, the idea of unconscious memory was shaped using the theoretical study of a potato and its involuntary tendency of growing in a dark room. Recalling ideas just proposed in 'Darwin Among the Machine' and 'Lucubration Ebria', machines and potatoes have in themselves a gradient of unconsciousness which drive them to evolve (in an internally designed way). Butler wrote:

> Even a potato in a dark cellar has a certain low cunning about him which serves him in excellent stead. He knows perfectly well what he wants and how to get it. He sees the light coming from the cellar window and sends his shoots crawling straight thereto: they will crawl along the floor and up the wall and out at the cellar window; if there be a little earth anywhere on the journey he will find it and use it for his own ends. What deliberation he may exercise in the matter of his roots when he is planted in the earth is a thing unknown to us, but we can imagine him saying, 'I will have a tuber here and a tuber there, and I will suck whatsoever advantage I can from all my surroundings. This neighbour I will overshadow, and that I will undermine; and what I can do shall be the limit of what I will do.

> He that is stronger and better placed than I shall overcome me, and him that is weaker I will overcome.[121]

Although the style of writing is obscure because of its literary and philosophical terminology, the case of the potato in *Erewhon* represented an anticipation of what unconscious memory is in Butler's next volumes. The use of reproduction as an example of memory, design and heredity was then reused in *Life and Habit*. In this book, Butler moved from the potato to the egg, suggesting a deeper interpretation of consciousness and unconsciousness and even related them to instinct and habit. In addressing this he wrote:

> A chicken, for example, is never so full of consciousness, activity, reasoning faculty, and volition, as when it is an embryo in the eggshell, making bones, and flesh, and feathers, and eyes, and claws, with nothing but a little warmth and white of egg to make them from . This is indeed to make bricks with but a small modicum of straw. There is no man in the whole world who knows consciously and articulately as much as a half-hatched hen's egg knows unconsciously. Surely the egg in its own way must know quite as much as the chicken does. We say of the chicken that it knows how to run about as soon as it is hatched.[122]

The example of the egg provided Butler with a link to the study of psychophysiology. *Life and Habit* was written between 1876 and 1878. Its writing was influenced by the works of Mivart, Carpenter and Spencer, authors who discussed evolution very often in contrast with Darwin's hypothesis of natural selection.

Life and Habit also provided a link with the idea of design as a structured process of evolution, which involves the whole history of life. Thereby, Butler arrived at the conclusion that 'it seems impossible to refrain from thinking that there must be a closer continuity of

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[121] *Ibid.*, pp. 334-335.
[122] Samuel Butler, *Life and Habit,* pp. 60-61.

identity, life, and memory, between successive generations than we generally imagine'.[123] According to this reading, Butler provided, as evidence, a series of quotations from Carpenter's *Mental Physiology*. One of the most important examples was about the role of unconscious in actions related to instinct:

> The simplest type of an animal consists of a minute mass of 'protoplasm,' or living jelly, which is not yet differentiated into 'organs;' every part having the same endowments, and taking an equal share in every action which the creature performs. One of these 'jelly specks,' the amœba, moves itself about by changing the form of its body, extemporising a foot (or pseudopodium), first in one direction, and then in another; and then, when it has met with a nutritive particle, extemporises a stomach for its reception, by wrapping its soft body around it. Another, instead of going about in search of food, remains in one place, but projects its protoplasmic substance into long pseudopodia, which entrap and draw in very minute particles, or absorb nutrient material from the liquid through which they extend themselves, and are continually becoming fused (as it were) into the central body, which is itself continually giving off new pseudopodia.[124]

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The next step in Butler's discussion was the publication of *Unconscious Memory*. In this book, alongside the translation of Hering, he arrived at the conclusion of a 'subsidiary hypothesis that memory has for its mechanism special vibrations of the protoplasm, and the acquired capacity to respond to such vibrations once felt upon their repetition'.[125] This hypothesis was, once again, explained by the author with the example of chickens and eggs. He wrote referring to memory:

> Memory, therefore, is supposed to guide the chicken not only in respect of the main design, but in respect also of every atomic action, so to speak, which goes to make up the execution of this design. It is not only the suggestion of a plan which is due to memory, but, as Professor Hering has so well said, it is the binding power of memory.[126]

Thus, Hering's hypothesis became the European link between Butler's hypothesis and other similar ones from the continent. Hering a professor at the University of Prague used evidence not far from that used by Butler in his lecture. In particular, he wrote:

> The chicken on emerging from the eggshell runs off as its mother ran off before it; yet what an extraordinary complication of emotions and sensations is necessary in order to preserve equilibrium in running. Surely the supposition of an inborn capacity for the reproduction of these intricate actions can alone explain the facts. As habitual practice becomes a second

[123] *Ibid.*, p. 61.
[124] *Ibid.*, p. 66.
[125] Samuel Butler, *Unconscious Memory*, p. xv.
[126] *Ibid.*, p. 175.

> nature to the individual during his single lifetime, so the often-repeated action of each generation becomes a second nature to the race.[127]

Hering, like Butler, explained the process of reproduction in terms of repetition of action. The example of chicken and egg also proposed this process of acquiring habit in the shape of Lamarckian evolution: 'Daily experience teaches us that a muscle becomes the stronger the more we use it. The muscular fibre, which in the first instance may have answered but feebly to the stimulus conducted to it by the motor nerve, does so with the greater energy the more often it is stimulated, provided, of course, that reasonable times are allowed for repose.'[128]

The acquisition of habits in Butler's examples was thus a question of *Transformisme* sealing the use of the idea of a chain of leaving as a justification of a final cause. Once again, Hering arrived at the same conclusion. He wrote:

> We must bear in mind that every organised being now in existence represents the last link of an inconceivably long series of organisms, which come down in a direct line of descent, and of which each has inherited a part of the acquired characteristics of its predecessor. Everything, furthermore, points in the direction of our believing that at the beginning of this chain there existed an organism of the very simplest kind, something, in fact, like those which we call organised germs. The chain of living beings thus appears to be the magnificent achievement of the reproductive power of the original organic structure from which they have all descended. As this subdivided itself and transmitted its characteristics to its descendants, these acquired new ones, and in their turn transmitted them - all new germs transmitting the chief part of what had happened to their predecessors, while the remaining part lapsed out of their memory, circumstances not stimulating it to reproduce itself.[129]

The Lamarckian idea of design here acquired more importance than before as the interconnection between the sublimate idea of memory and its journey from one generation to another seemed to be finally more oriented in psychophysiological terms. From Butler's point of view, there is a continuum between the history of life and the evolution of the organism which developed thanks to unconscious memory.

In concluding *Unconscious Memory*, Butler reframed his opinion about memory. He wrote: 'When I wrote "Life and Habit," I had arrived at the conclusion that memory was the

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[127] *Ibid.*, p. 81.
[128] *Ibid.*, p. 75.
[129] *Ibid.*, p. 80.

most essential characteristic of life, and went so far as to say, "Life is that property of matter whereby it can remember - matter which can remember is living." I should perhaps have written, "Life is the being possessed of a memory - the life of a thing at any moment is the memories which at that moment it retains"'.[130]

Next came *Luck or Cunning?* here, Butler tried to bring out still more forcibly the Hering-Butler doctrine of continued personality from generation to generation. The book, presenting the working process of unconscious memory through the teaching of Herbert Spencer, Romanes, Hering and others, focused on biochemical protoplasm.

Instead of being a simple critical and unprejudiced attack against Darwinian evolutionism, *Luck or Cunning?* demonstrated a significant advance in Butler's monistic views. In terms of examples, Butler did not use chickens, eggs and potatoes anymore in favour of a more marked development in the vibration hypothesis of memory offered by Hering, and only adopted with reserve in *Unconscious Memory*. In particular, the concept of vibration assumed a prominent importance as a physical action. In the final part of the book Butler wrote:

> The exterior object vibrating in a certain way imparts some of its vibrations to our brain; but if the state of the thing itself depends upon its vibrations, it [the thing] must be considered as to all intents and purposes the vibrations themselves - plus, of course, the underlying substance that is vibrating[..]The same vibrations, therefore, form the substance remembered, introduce an infinitesimal dose of it within the brain, modify the substance remembering, and, in the course of time, create and further modify the mechanism of both the sensory and the motor nerves. Thought and thing are one.[131]

With the use of the mechanism of vibration, Butler can fully accept the conclusion of Hering. That made his hypothesis finally scientifically structured. Let me quote anther extract of Hering's lecture as translated in *Unconscious Memory*:

> The memory of organised substance displays itself here in the most surprising fashion. The gentle stimulus of the light proceeding from the grain that affects the retina of the chicken, gives occasion for the reproduction of a many-linked chain of sensations, perceptions, and emotions, which were never yet brought together in the case of the individual before us. We are accustomed to regard these surprising performances of animals as manifestations of

[130] *Ibid.*, p. 175.
[131] Samuel Butler, *Luck or Cunning?*, pp. 262-263.

> what we call instinct, and the mysticism of natural philosophy has ever shown a predilection for this theme; but if we regard instinct as the outcome of the memory or reproductive power of organised substance, and if we ascribe a memory to the race as we already ascribe it to the individual, then instinct becomes at once intelligible, and the physiologist at the same time finds a point of contact which will bring it into connection with the great series of facts indicated above as phenomena of the reproductive faculty. Here, then, we have a physical explanation which has not, indeed, been given yet, but the time for which appears to be rapidly approaching.[132]

Thanks to this, Butler's acceptance of Hering's methodology, in *Luck of Cunning?*, showed the change from a literary/metaphysical interpretation to a physiological/physical methodology linked with biochemistry and the study of the nervous system. In other words, if the idea of unconscious memory, as addressed in Butler's literary opus (*Erewhon*, New Zealand articles), was an inexperienced reading of evolution with some Lamarckian memories and in *Life and Habit* and *Unconscious Memory* it was scientifically structured with some philosophical links, the methodology in *Luck or Cunning?* became finally scientifically contextualised especially thanks to the Butler/Hering hypothesis.

After *Luck or Cunning?*, Butler did not return to his hypothesis. He left it, instead, in the hands of the next generation of scientists, psychologists and philosophers.

5.4 Epilogue: the Butler/Hering theory

At the beginning of this critical work, I introduced Butler as a populariser of science who published evolutionary thoughts and hypotheses in the wrong place and at the wrong time. He was the Victorian outsider and author of prophetical theories in both literature and science. Butler was an anti-hero and, exactly like Nietzsche did a decade before, he was hoping for the positive response of future scientists and men of culture. For over a decade, Butler fought back claiming he was writing for 'future students of the literature of descent' rather than for 'my immediate public'. As stated in this chapter, Butler's unconscious memory could be considered as an example of this writing for the future.

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[132] Samuel Butler, *Unconscious Memory*, pp. 82-83.

After his death, Butler left to the next generation of scientists his hypothesis of psychophysiological evolution, which started to be known as the 'Butler/Hering theory.'[133]The Butler/Hering theory, as reported by Hartog's 'The Fundamental Principles of Heredity', was:

> This theory [Hering-Butler's] has, indeed, a tentative character, and lacks symmetrical completeness, but is the more welcome as not aiming at the impossible. A whole series of phenomena in organic beings are correlated under the term of *memory, conscious and unconscious, patent and latent*. . . . Of the order of unconscious memory, latent till the arrival of the appropriate stimulus, is all the co-operative growth and work of the organism, including its development from the reproductive cells. Concerning the *modus operandi* we know nothing: the phenomena may be due, as Hering suggests, to molecular vibrations, which must be at least as distinct from ordinary physical disturbances as Röntgen's rays are from ordinary light; or it may be correlated, as we ourselves are inclined to think, with complex chemical changes in an intricate but orderly succession. For the present, at least, the problem of heredity can only be elucidated by the light of mental, and not material processes.[134]

As mentioned in the above quotation, the term 'Butler/Hering' started to be used by early twentieth-century scientists in indicating concepts such as molecular vibration, the acquisition of inherited memory and the idea of the living cell. Additionally, although Butler and Hering's psychophysiological approach only influenced the fields of psychology and biology, the hypothesis nevertheless became famous throughout Europe (especially in France, Italy and Germany), and the US. Several international articles and books were published by scientists, zoologists and anthropologists, such as Marcus Hartog, Henry P. Orr, Hans Driesch, Eugenio Rignano, Frederick Wollaston Hutton, James Mark Baldwin, H. S. Jennings, Valery Larbaud and Richard Semon.[135]

Hartog's work essentially consisted of a development of Butler's hypothesis in the twentieth-century. Hartog worked as a scientist in England and Ireland, publishing several papers in the field of natural history. He was also one of the major followers of Butler's scientific psychophysiological hypothesis, as demonstrated by his articles 'Samuel Butler

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[133] The term 'Butler/Hering' was used for the first time by Marcus Hartog in his introduction to *Unconscious Memory* (London, 1910).

[134] Marcus Hartog, 'The Fundamental Principles of Heredity', *Natural Science*, Vol.11 (1897) pp. 233-39,305-16, esp. 316.

[135]This list of names has been written by Marcus Hartog in his introduction to Samuel Butler, *Unconscious Memory*.

and recent Mnemonic Theories', 'The Fundamental Principles of Heredity' and his critical introduction to *Unconscious Memory* (1910 edition). Thanks to Hartog's work, Samuel Butler finally became fully recognised as a scientific author but only by some members of the early twentieth-century scientific community. However, let's take a look at Hartog's interpretation of Butler's unconscious memory.

Hartog's interpretation of Butler's work focused on the assumption that Butler's hypothesis of unconscious memory was part of an 'informal' European community. As an example, in his introduction of the 1910 edition of *Unconscious Memory*, Hartog explained how Butler's psychophysiological hypothesis resembled Hering's. 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. Hering does, indeed, anticipate Butler and that in language far more suitable to the persuasion of the scientific public.'[136]

It must be noticed that Butler himself was aware of the strong relation between his hypothesis and that of Hering. In *Unconscious Memory*, he wrote '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.'[137] Furthermore, in the same volume, he also demonstrated how both he and Hering reached the same conclusion independently without any interaction. He wrote:

> 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. It seems to me that the theory which Professor Hering and I are supporting in common, is one the importance of which is hardly inferior to that of the theory of evolution itself - for it puts the backbone, as it were, into the theory of evolution.[138]

[136] Samuel Butler, *Unconscious Memory*, pp. xv-xvi.
[137] *Ibid.*, p. 53.
[138] *Ibid.*, p. 53.

In the 'Deadlock of Darwinism', Butler finally presented his theory independently from the one of Hering, suggesting the presence of Lamarckism in both of their visions of evolution. He wrote:

> Those who accept the theory put forward independently by Professor Hering of Prague (whose work on this subject is translated in my book, "Unconscious Memory") and by myself in "Life and Habit," believe in cognizance, as do Lamarckians generally.[139]

Returning to Hartog, in the article 'Samuel Butler et les Recentes theories Biologique de la Memoire' he defined Butler as one of the most versatile spirits of the whole Victorian period.[140] In the article, Hartog highlighted that the best merit of Butler was that of being able to explain and propose scientific facts to the general audience and to be an inspiration for the science of the twentieth-century.[141] Unfortunately, Hartog's view on the renaissance of Butler's science did not obtain the expected success. After the 1910s Butler returned to being just the Victorian novelist who had the quarrel with the father of evolution.

To see a new beginning of Butler's scientific scheme, one needs to wait until the end of the twentieth-century. Recent studies, in particular, in the field of epigenetics seems to give new light upon Butler's work on organic memory.[142] Epigeneticists are currently re-discussing the role of memory in relation to DNA. In light of this, the definition of Robin Holliday seems to fit perfectly with Butler's hypothesis of unconscious memory. Holliday defined epigenetics as 'the study of the mechanisms of temporal and spatial control of gene activity during the development of complex organisms'[143] a definition not dissimilar to what Butler said about the role of memory in the process of heredity. Despite the existence of many readings of Butler's science produced by historians of science and literary scholars,

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[139] Samuel Butler, 'The Deadlock of Darwinism', in R. A. Streatfeild (ed.), *Essays on Life, Art and Science by Samuel Butler*, p. 321.
[140] Marcus Hartog, 'Samuel Butler et les Recentes Theories Biologiques de la Memoire', *Scientia* vol. XV (1914), p. 40.
[141] *Ibid.*, p. 55.
[142] Epigenetics, in biology, is the study of changes in gene expression or cellular phenotype, caused by mechanisms other than changes in the underlying DNA sequence.
[143] Robin Holliday, 'Mechanisms for the Control of Gene Activity during Development', *Biol Rev Camb Philos Soc* 65 (1990), pp. 431–71.

only two contributions, one from a philosopher and one from a biochemist, have shed new scientific relevance on Butler's theory of unconscious memory.

In 1995, Umberto Galimberti, an Italian philosopher and psychologist, quoted Butler in his volume *Psiche e Techne. L'Uomo nell'età della Tecnica.* Galimberti alluded to the Butlerian example of the chicken alongside the socio-biological theory of E. O. Wilson.

> In a Darwinian sense the organism does not live for itself. Its primary function is not even to reproduce other organisms; it reproduces genes, and it serves as their temporary carrier... Samuel Butler's famous aphorism, that the chicken is only an egg's way of making another egg, has been modernized: The organism is only DNA's way of making more DNA.

Within this parallel, Butler's literary interpretation of design seems to assume a different shape. The example, proposed by E. O. Wilson and then discussed by Galimberti, shows from a philosophical perspective how Butler's work can fit with the contemporary developments of DNA research.

Another recent example of a new interpretation of Butler's work was provided by the biochemist Donald R. Forsdyke. In his 'Samuel Butler and human long term memory: Is the cupboard bare?'[144] and 'Heredity as Transmission of Information: Butlerian 'Intelligent Design''[145], Forsdyke re-discussed the Butler/Hering theory by comparing it with recent studies on DNA and organic examples of memory. The aim of Forsdyke's work is to show the scientific relevance of the Hering/Butler theory in relation to contemporary biochemistry. Forsdyke wrote:

> In the nineteenth century Ewald Hering and Samuel Butler held that heredity and brain memory both involved the storage of information and that the two forms of storage were the same. Hering specified storage as 'molecular vibrations' but, while making a fuller case, Butler was less committal. In the twentieth century, the ablation studies of Karl Lashley failed to identify unique sites for storage of brain information, and Donald Hebb's 'synaptic plasticity' hypothesis of distributed storage over a neuronal network won favor. In the twenty first century this has come under attack, and the idea that brain and hereditary information are stored as DNA is advocated. Thus, albeit without attribution, Butler's idea is reinstated.[146]

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[144] Donald R. Forsdyke, 'Samuel Butler and Human long term Memory Is the Cupboard bare?', *Journal of Theoretical Biology* 258 (2009), pp. 156-164.

[145] Donald R. Forsdyke, 'Heredity as Transmission of Information: Butlerian 'Intelligent Design'', *Centaurus,* Vol. 48 (2006), pp. 133–148.

[146] Donald R. Forsdyke, 'Samuel Butler and Human long term Memory Is the Cupboard bare?', *Journal of Theoretical Biology,* 258 (2009), p. 156.

As stated by the quotation, Forsdyke considered Butler's interpretation of memory as an anticipation of the concept of DNA and the concept of the brain as storage space for memory. Without going into details, it is interesting to note how Butler's work is still central to the human understanding of memory.

In conclusion, we can see how over hundred years later, Samuel Butler and his hypothesis of unconscious memory are still being discussed. This is an unexpected conclusion to a story, beginning in the middle of the nineteenth-century, fated as unsuccessful. The writer who was once considered an outsider became recognised as the author of relevant contributions to both literature and science. In concluding this chapter I must quote a sentence that Butler wrote about posthumous fame: 'He who wants posthumous fame is as one who would entail land, and tie up his money after his death as tightly and for as long a time as possible. Still we each of us in our own small way try to get what little posthumous fame we can.'[147]

[147] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 360.

Argument is generally waste of time and trouble. It is better to present one's opinion and leave it to stick or no as it may happen. If sound, it will probably in the end stick, and the sticking is the main thing.
Samuel Butler, *The Notebooks of Samuel Butler*[1]

CONCLUSION:

The awaking of a pioneer of science

The history of science is a discipline based on the re-discovery and re-discussion of consolidated truths. Historians of science work with primary sources that enable their research to be focused on facts within a specific historical context. Particularly in the UK, the history of science is very often a type of cultural history.

As an example, historians of science have examined natural history and its development into a field of professionalism in the second part of the nineteenth-century. Thus, it has opened up a number of problems relating to the understanding of the role of science in society. This dynamic period of history has proved attractive to many historians of science, and over the past twenty years there has been preference to focus research on the major protagonists of the scientific debate at that time. Consequently, some Victorian amateur scientists have been overshadowed and have featured rather little in our contemporary historical discussion.

Samuel Butler, as discussed in this thesis, has been one of these overshadowed Victorian amateur scientists. During his thirty year career, he never found fame and his work was neglected by Victorians. However, the cultural implications of his scientific hypotheses, philosophical essays and utopian novels largely influenced the late Victorian debate and beyond. As highlighted in this doctoral thesis, Butler always tried to work at the boundaries between science and literature.

[1] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 165.

One such example was Butler's study of the origin of the Odyssey. In his research on the poem by Homer, Butler looked at literary questions regarding ancient Greek literature but also endorsed archeological research adopting 'scientific' techniques. Around the Sicilian town of Trapani Butler took measurements and pictures in order to scientifically justify his hypothesis about Nausicaa. In 1897, Butler, in describing his work on the Odyssey, wrote in his notebook the following paragraph:

> I am elderly, grey-bearded and, according to my clerk, Alfred, disgustingly fat; I wear spectacles and get more and more bronchitic as I grow older. Still no young prince in a fairy story ever found an invisible princess more effectually hidden behind a hedge of dullness or more fast asleep than Nausicaa was when I woke her and hailed her as Authoress of the *Odyssey*. And there was no difficulty about it either - all one had to do was to go up to the front door and ring the bell.[2]

According to the quotation, the writer defined himself as the one who (through his work) was able to wake up a sleeping secret inscribed into the history of ancient Greek literature. Although the style of writing in the quotation seems to dismiss any 'professional' intention, Butler's work on the origin of the Odyssey was performed with a 'scientific' approach. According to the author himself, he started researching the Odyssey in the 1890s. In his hypothesis most of the adventures of Odysseus, the protagonist of the poem, could be located around Sicily and consequently the author of the poem hailed from the town of Trapani. The work of Butler was obviously inscribed in that tradition of studies which considered the Odyssey outside the classic interpretation. By his point of view the whole of Odysseus' journey had to be entirely reinterpreted.

Apart from this interesting aspect of Butler's study of the Odyssey, the act of waking up a sleeping secret appears to be rich in significance. Leaving to one side Butler's opinion concerning the origin of the Odyssey, the type of research adopted by the writer is significant for understanding the type of work conducted in this doctoral thesis. Especially so, the metaphor used by Butler regarding the act of discovering a sleeping secret, has some similarities with the research undertaken here. Far from any pretentious desire of

[2] *Ibid.*, p. 193.

waking up old princesses, this research has tried to re-construct Butler's scientific activity. In discussing the history of evolution between 1870 and 1890, my work has awoken an unknown side of the nineteenth-century evolutionary debate. Butler worked in a period in which the public audience became the place where scientists and men and women of culture were debating. Therefore, his work was more focused on communication rather than 'professional' research. As evidence, Butler's publications were all examples of a type of writing focused on a process of 'persuasion' through the use of logical evidence, rather than the simple presentation of 'scientific facts'. For example, Butler wrote in his notebook:

> The more unpopular an opinion is, the more necessary is it that the holder should be somewhat punctilious in his observance of conventionalities generally, and that, if possible, he should get the reputation of being well-to-do in the world.[3]

It must be noted that Butler's approach was not dissimilar to our new trends of history of science. In writing the book *History in Practice* the historian Ludmilla Jordanova showed how history in general, and the history of science in particular, have changed during the past few decades. The practice of history should be identified not only with the archive but with the written results of research and their audiences.[4] Jordanova emphasises therefore that attention should be focused on interpretation as much as on sources. Written in 2000, *History in Practice* showed how the work of historians has to become something more than the work of a professional antiquarian. The main duty of the historian of science has to be the skill to explain and culturally contextualize the scientific debate of the past.

My work on Samuel Butler has tried, in its own way, to look at the writer's scientific career keeping in mind Jordanova's advice. My intention has been to present Butler's scientific hypotheses, contextualizing them in the nineteenth and early twentieth-century European scientific debate. Butler, as many others of his generation, considered the public audience as the primary context in which to discuss evolution. Looking at Butler's writing style, we have discovered how his use of vocabulary, metaphors and examples were always

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[3] *Ibid.*, p. 164.
[4] Ludmilla Jordanova, *History in Practice*, p. 186.

directed to general Victorian readers rather than to scientists. The discussion presented in chapter two shows that Butler was a Victorian polymath who worked in a variety of different genres, using a variety of media. His main ambition was to demonstrate to and influence his contemporaries about the many errors produced by the literary and scientific oligarchies.

In the introduction to this thesis, I adopted the metaphor of the missing link in describing the work of Victorian amateur scientists. The missing link metaphor developed through my analysis in two ways. First my intention has been to spell out the main difficulties of the history of Victorian science, primarily the methodological incompatibility between the figure of men of science and amateur scientists in the second part of the nineteenth-century. This point has been discussed in chapters one and three using methodologies appropriate to the study of both history of science and literature. Consequently, I discussed Butler's work showing how the writer could be considered as a figure straddling literature and science. After discussing the problems regarding literature and science in the contemporary historical and literary debate, I have moved onto the analysis of Butler's use of genres. Additionally, I have also focused on how he was received in England and then in Europe.

Through the analysis of content, style of writing and tone in Butler's books I have highlighted how the writer's use of genres was one of the reasons why he was refused by Victorians. In the introduction, I have presented this aspect of Butler's style of writing as a difficulty. Now, in this conclusion I alter my opinion for two main reasons. First, the style of writing was the aspect that made Butler's work positively unique among other Victorian popularisers of science. Far from any patronage, the writer followed his own way in writing his books, presenting his hypotheses and fighting for them. In chapter one, I have presented the late Victorian scientific debate, grounding my opinion on Paul White's *Thomas Huxley: Making the 'Man of Science'*. Therefore, Butler's opus seemed to be

inadequate for the late nineteenth-century scientific debate which was taking the shape of professionalism. Disagreeing with this, I can now say that Butler was instead a pioneer of the revolution taking place in the scientific field at the beginning of the twentieth-century. His approach was, indeed, far from the professionalisation of science, but also well-grounded in the new generation of post-Darwinian thinkers.

In the second part of this research thesis, as a consequence the investigation of Butler's scientific publications, I have opened up a new way to discuss the English writer in a pan-European context. This was not just a question of extending the range of history of science to a previously neglected aspect of scientific research. It aimed, rather, to understand and consequently solve methodological difficulties belonging to the later Victorian culture. The act of inscribing Butler into the history of psychophysiology represents an important goal in rewriting the history of this Victorian writer. In particular, the description of Butler as a member of a pan-European well-established scientific community re-shapes our understanding of Victorian evolution.

As discussed, psychophysiology represents one of the answers to the big question that remained unsolved with Darwin's hypothesis of natural selection (and later on, sexual selection), how can variation be transferred from parents to offspring? Far from the genetics-based theory of Mendel, the hypothesis of organic memory advocated the use of a code (memory) already inscribed within the living cells. This code, a sort of guideline, provided information from one generation to the next, reestablishing a design previously excluded by natural selection.

As mentioned, psychophysiology provided only one of the possible solutions to the heredity issue. However, differing from the conclusions made by Darwin's disciples, it showed that there was something more than natural selection in the Victorian scientific debate. Psychophysiologists linked the study of the mind as a philosophical/psychological object to that of the study of the brain as a medical and physiological organ. Therefore,

psychophysiologists faced metaphysical problems alongside conducting biochemical experiments.

As stated in chapter five, the psychophysiological revolutionary work (if we can call it revolutionary) changed, at the turn of the twentieth-century, the idea of science. The work of Butler was intermediate to these changes. Through his books, notes and essays, I have shown how it is possible to see the place of the psychophysiological hypothesis in Victorian science. In order to come to a conclusion, let me refer to some examples I have used in this doctoral research. In talking about Butler's science, I have been aware of the difficulties produced by his writing style and his use of quotations. For instance, in Butler's unpublished notebooks the writer wrote about Kant, Hume, Locke and other eighteenth-century philosophers, discussing their works in relation to late nineteenth-century science. I find interesting the fact that Butler, as a Victorian populariser of science, was able to link together old philosophical problems (including epistemology, metaphysics and ethics) with new scientific discoveries.

It must be said that Butler had a very particular relationship with philosophy. According to many of his books, the writer considered himself to be an amateur scientist very well grounded in the real world. However, he was also defined as a philosopher by his reviewers. They considered his use of design, in shaping his hypothesis of evolution, as a form of 'philosophy of life.' Therefore, philosophy had a complex part to play in Butler's work. The writer could not accept being considered as a philosopher *tout court* and consequently in his notebook, he dismissed philosophy as:

> As a general rule philosophy is like stirring mud or not letting a sleeping dog lie. It is an attempt to deny, circumvent or otherwise escape from the consequences of the interlacing of the roots of things with one another. It professes to appease our ultimate "Why?" though in truth it is generally the solution of a simplex ignotum by a complex ignotius. This, at least, is my experience of everything that has been presented to me as philosophy. I have often had my "Why" answered with so much mystifying matter that I have left off pressing it

> through fatigue. But this is not having my ultimate "Why?" appeased. It is being knocked out of time.[5]

As stated by the quotation, it seems that Butler considered philosophy as a simple exercise of questioning the world without any serious repercussion. However, for him philosophy was something more. Especially in *Life and Habit* and *Evolution Old and New*, it became the key factor of Butler's theory on Lamarckian evolution. In particular, the methodology adopted by the writer in his first two scientific books was based on a theoretical approach rather than a scientific one.

From the publication of *Unconscious Memory* Butler shifted his opinion on philosophy. After 1880, Butler started to become more and more grounded in proposing psychophysiology as a scientific subject and less as a philosophical one. This removal from philosophy was, as described in chapter four, due to Butler's studies of the European scientific debate of the time. For instance, in *Unconscious Memory* the writer fully accepted the psychophysiological hypothesis of Hering and refused the philosophy of unconscious of Von Hartmann.

As written in *Luck or Cunning?* 'Our philosophers have made the mistake of forgetting that they cannot carry the rough-and-ready language of common sense into precincts within which politeness and philosophy are supreme'.[6] According to Butler, the only way to understand the scientific world was through 'common sense'. In his opinion, common sense, disagreeing with philosophy, saw life and death as distinct states possessing nothing in common and hence in all respects the antitheses of one another. In *Luck or Cunning?* Butler wrote a paragraph which exactly defined this:

> They say that an amœba is as much a living being as a man is, and do not allow that a well-grown, highly educated man in robust health is more living than an idiot cripple. They say he differs from the cripple in many important respects, but not in degree of livingness. Yet, as we have seen already, even common sense by using the word "dying" admits degrees of life; that is to say, it admits a more and a less; those, then, for whom the superficial aspects of things are insufficient should surely find no difficulty in admitting that the degrees are

[5] Henry Festing Jones (ed.), Samuel Butler, *The Notebooks of Samuel Butler*, p. 327.
[6] Samuel Butler, *Luck or Cunning?*, p. 147.

> more numerous than is dreamed of in the somewhat limited philosophy which common sense alone knows.[7]

As stated in the quotation, Victorian philosophers misunderstood the different meanings and degrees of life, considering them instead to be uniform concepts. In comparison, psychophysiologists were able to understand life using new medical and psychological approaches. Their works represented a revolution.

In its own way, Butler's hypothesis of evolution was also a revolution. In particular, Butler's use of common sense represented a step away from both philosophy and Darwinian science. The writer was able to mix science and philosophy becoming, like Hering in Germany and Ribot in France, a psychophysiologist. Second, as discussed in chapter five, the dissemination of Butler's scientific hypothesis in the early twentieth-century scientific debate was a proof strong enough to be considered relevant. However, it must be said that in the first decades of the twentieth-century the scientific debate changed and there was also a return to philosophy. Butler was then part of that group of thinkers who were re-discovered by the cultural and scientific communities of the time.

To finish, I want to turn my attention to considering the limitations of this work. In conducting my research on Samuel Butler and the European psychophysiological movement, I have been aware of the difficulties generated by the approach I used. Specifically, Butler and his hypothesis of evolution were two very particular Victorian cases and their methodologies cannot be applied to other cases in Europe. According to what I have explained in this work, Butler was indeed a member of the European psychophysiological movement but he was also unique in his own right. Although he largely refers to the work of others, Butler was not part of any scientific framework. Consequently his methodological approach was not shaped by any guidelines apart from the one deliberately chosen by the writer himself.

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[7] *Ibid.*, p. 147.

The psychophysiological European movement was not unified by any role or responsibility. Therefore, any psychologist, scientist or philosopher adopted his own methodology in pursuing his research, making this community vibrant and varied. As stated by Otis' *Organic Memory*, this community was comprised *of novelists, psychologists,* and scientists all talking about the same topic but from different perspectives. This aspect represented the main difficulty for understanding and contextualising psychophysiology, any psychophysiological research was a 'universe' on its own. Therefore, can we talk about the psychophysiological European movement as a 'real' scientific community?

This question remains one of the most important facing historians of science and literary scholars researching Victorian history of biology. It is a question too expansive for a thesis but I have examined some of the major issues, specifically in relation to Samuel Butler's work. My analysis suggests that any response to this question must acknowledge two important issues. First, Butler's hypothesis of psychophysiological evolution had parallels in the 1870-1890 European scientific debate. Second, Butler's work in literature and science offered an opportunity for a better understanding of Victorian cultural history at large.

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Papers including sketches, drawings and paintings: **Cambridge University: St John's College Library,**

Cambridge
CB2 1TP
England

1883-84: notebook: **British Library, Manuscript Collections,**

96 Euston Road
London
NW1 2DB
England

1861-64: letter-book and sketchbook: **Canterbury Museum,**

Rolleston Avenue
Christchurch
Christchurch
New Zealand

1880: MS of Unconscious Memory: **Cambridge University Library, Department of Manuscripts and University Archives,**

West Road
Cambridge
CB3 9DR
England

1887: typescript of Luck or Cunning: **Oxford University: Bodleian Library, Special Collections and Western Manuscripts,**

Broad Street
Oxford
OX1 3BG
England

1865-80: letters to Charles Darwin and related papers: **Cambridge University Library, Department of Manuscripts and University Archives,**

West Road
Cambridge
CB3 9DR
England

1885-99: letters (12) mainly to Henry Festing Jones: **Cambridge University Library, Department of Manuscripts and University Archives,**

West Road
Cambridge
CB3 9DR
England

Darwin Correspondence Project www.darwinproject.ac.uk

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