The Unitarian Physiologist: Science and Religion in the Life and Work of William Benjamin Carpenter (1813-1885)

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Short Abstract

The Unitarian Physiologist: science and religion in the life and work of William Benjamin Carpenter (1813-1885).

This thesis provides the first comprehensive study of an eminent but oft-overlooked Victorian polymath, with the overarching aims of assessing his contributions to nineteenth-century intellectual life and of exploring the mutual relations between science and religion in his work. One of the towering figures of the Victorian scientific establishment, William Carpenter (1813-1885), F.R.S, was a famous physiologist and public figure. He is most remembered for his concept of 'unconscious cerebration' which contributed to the emergence of the disciplines of neurology and modern psychology, but Carpenter was also noted amongst his peers for his evolutionary approach to the study of the unicellular marine invertebrates known as the foraminifera. As a lifelong practicing Unitarian, Carpenter's outspoken support for evolutionary theory made him an exemplary advocate of the compatibility between rational thought and Christian belief amidst the Victorian debate about science and religion. As the Registrar of the University of London during its formative years, Carpenter also had a nationwide impact on the fortunes of scientific education and secondary education as a whole. Finally, as a populariser of science and public moralist, "Dr. Carpenter" was also well known to the Victorian public as one of the most outspoken critics of spiritualism, alleged paranormal phenomena, and superstition more generally. Nevertheless, no systematic study of Carpenter's work had until now been carried out, and the commonly held view that he lacked originality as a scientist had not been fully questioned. The current study therefore aims to review Carpenter's achievements and trace his intellectual legacy. As an intellectual biography, it argues that focusing on the now lesser-known members of the British intelligentsia can shine new light on the context of the professionalization of science in Victorian Britain.

In its focus on science and religion, this thesis argues that a deeper understanding of Carpenter's Unitarianism must feature at the heart of any endeavour to analyse his work. Previous references to Carpenter either bypassed Unitarianism and its nineteenth-century transformations, or reduced Unitarian thought to certain core tenets that fell short of uncovering Carpenter's philosophical pursuits. Carpenter's Unitarianism is still often equated with the rationalism and mortalism that defined late eighteenth-century Unitarianism, and this failure to recognise how much Carpenter's own faith had departed from earlier strands of Unitarian belief has led to some misinterpretations of his motives. The current thesis therefore offers fresh interpretations of Carpenter's work, based on new archival material and recent historical studies of the shifting priorities shaping the more romantic and emotional spirituality of nineteenth-century Unitarianism. Taking an integrative approach to Carpenter's various projects makes it possible to show how seminal many of his ideas were, and how his Unitarianism, both in its social and spiritual dimensions, influenced his professional, political and intellectual choices. The biographical angle taken in this thesis also makes it possible to uncover a degree of epistemological coherence underpinning Carpenter's thought, and to argue that Carpenter's efforts to transcend conflicting viewpoints partook of his wider social and metaphysical aims.

Long Abstract

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This thesis provides the first comprehensive study of an eminent but oft-overlooked Victorian polymath, with the overarching aims of assessing his contributions to nineteenth-century intellectual life and of exploring the mutual relations between science and religion in his work. One of the towering figures of the Victorian scientific establishment, William Carpenter (1813-1885), F.R.S, was a famous physiologist and public figure. He is most remembered for his concept of 'unconscious cerebration' which contributed to the emergence of the disciplines of neurology and modern psychology, but Carpenter was also noted amongst his peers for his evolutionary approach to the study of the unicellular marine invertebrates known as the foraminifera. As a lifelong practicing Unitarian, Carpenter's outspoken support for evolutionary theory made him an exemplary advocate of the compatibility between rational thought and Christian belief amidst the Victorian debate about science and religion. As the Registrar of the University of London during its formative years, Carpenter also had a nationwide impact on the fortunes of scientific education and secondary education as a whole. Finally, as a populariser of science and public moralist, "Dr. Carpenter" was also well known to the Victorian public as one of the most outspoken critics of spiritualism, alleged paranormal phenomena, and superstition more generally. Nevertheless, no systematic study of Carpenter's work had until now been carried out, and the commonly held view that he lacked originality as a scientist had not been fully questioned. The current study therefore aims to review Carpenter's achievements and trace his intellectual legacy. As an intellectual biography, it argues that focusing on the now lesser-known members of the British intelligentsia can shine new light on the context of the professionalization of science in Victorian Britain.

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This study falls into three main chrono-thematic units. The first part is devoted to William Carpenter as a Unitarian educator and public moralist, asking

what place the scientist managed to take within the institutional, political and denominational context of his time. I argue that the physiologist can be viewed as a figure of compromise, constantly balancing reform and conformism in a careful act of social entryism. Carpenter's formative years and early professional life are studied in detail, providing archival material that strengthens our understanding of his activities and political manoeuvres. The role Carpenter played in the setting up of new universities and scientific curricula in Britain is also analysed in the light of his Unitarian background. Carpenter's activities within a number of learned societies also reveal what an influential figure he was in London society, and what sort of personal strategies he employed to navigate that environment.

The second part of this study deals with William Carpenter's morphological and evolutionary ideas. This section therefore offers the first detailed and systematic study of Carpenter's ideas on living organisms within the context of the development of transformism and of cell-theory in Europe. In detailing Carpenter's unique synthesis of new continental theories and his understanding of evolution as providing evidence of a world ordained by a superior creative entity, this part confirms and enlarges the hypotheses suggested by previous historians, that the physiologist played a central role in the dissemination of evolutionary theories in Britain. Carpenter's major study of the minute marine invertebrates known as Foraminifera, his consequent involvement in the Eozoön Canadense controversy, as well as his central influence in setting up the Challenger oceanographic mission of 1872, are reviewed in detail in order to add more perspectives to the history of the British and European reception of 'transcendental' natural history. These many endeavours are analysed from the angle of Carpenter's anti-dualistic understanding of nature as "one harmonious whole", and are shown to be co-extensive with his metaphysics.

The third part of this thesis focuses on Carpenter's defining work as a neurophysiologist and early psychologist. Carpenter's conciliatory approach is evidenced in relation to the ongoing mind-matter debate in nineteenth-century European thought. Through analysing Carpenter's central concepts of 'cerebral reflex' and 'unconscious cerebration' in the context of the emerging fields of neurophysiology and electrophysiology, this section discusses Carpenter's moral position in Victorian debates about Free Will. This analysis leads to a reappraisal of Carpenter's life-long opposition to spiritualism and other alleged psychical phenomena based on new archival material. It is argued that Carpenter, rather than remaining the virulent anti-spiritualist that he has been described as by most historians so far, became increasingly partial to the possibility of telepathy or 'thought-transference'. Carpenter's interest in this phenomenon is shown to tie in with his move towards what could be labelled 'scientific monism' following his intense fascination with the laws of conservation of energy and his energeticist understanding of matter as a manifestation of an all-encompassing divine force. The possible links between Carpenter's monism and his Unitarian metaphysics are explored.

As a whole, this analysis demonstrates that Carpenter's personal version of the Unitarian faith had a strong influence on his scientific interests, and conversely, that his scientific research determined his interpretation of Unitarian spirituality. In exploring these mutual influences, this study throws more light on the scientific and institutional contributions of a major Victorian intellectual whose work was often seminal, and whose achievements help identify the changing dynamics in nineteenth-century British society.

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I am deeply grateful to the many librarians and archivists without whose professionalism and kindness I could not have carried out this research. I owe much to the staff at the Radcliffe Science Library in Oxford, as well as to their colleagues at various institutions in Edinburgh, Bristol, London, Paris and Boston who often went the extra mile to help. I also wish to thank the History Faculty staff in Oxford for their help with administrative matters throughout the course of this work. For financial support I am very grateful to the Arts and Humanities Research Council as well as to New College in Oxford.

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Introduction:

1. A religious naturalist

> "So far from being in opposition, I affirm that science is in the fullest harmony with all that is essential and true in Christianity; for whilst it is every day contributing to the *material* welfare of man, it is even more certainly benefiting him by the enlargement of his intellect, the elevation of his morale, and the strengthening of his power of spiritual discernment –all which contribute their respective shares to the development of his religious nature; and last, but by no means least, it is undermining, one by one, those props on which have rested those unsightly and repulsive additions built up by the perverted ingenuity of theologians around the original edifice: so that, when the time is at last come, the blast of common sense, the flood of public opinion, shall overthrow all that has its foundation in the sand, and leave in its majestic simplicity and beauty that temple, founded upon a rock, in which all mankind shall one day gather themselves for the worship of their common Father and the recognition of their mutual brotherhood as His children" [1].

William Benjamin Carpenter, a life-long practising Unitarian, was a devout Christian as well as a physiologist and naturalist. On Sundays he performed the psalms he had composed for the organ to his fellow-worshippers in Hampstead, but he also championed scientific education as a much-needed social remedy to dispel superstition and bigotry, two universal psychological tendencies which he regarded as akin to medical pathologies. The extract above, taken from one of Carpenter's popular lectures delivered in 1866, is characteristic of his militant tone in favour of rational religion. In Carpenter's view, science and religion were not only compatible but deeply interdependent: objective methods of enquiry were the true means by which religion could offer fuller divine revelation. Carpenter owed much of this vision to his Unitarian background and upbringing. Born into one of the most active and influential Unitarian families of the age, Carpenter's early education was steeped in the rational theology formulated during the previous century by the leading Unitarian scientist Joseph Priestly (1733-1804). Indebted to the principles of

[1] Extract taken from William Benjamin Carpenter's lectures for the National Sunday League, delivered at Saint Martin's Hall in 1866 and cited in J. E. Carpenter, "Memorial Sketch," *Nature and Man*, ed. Joseph Estlin Carpenter (London, 1888). p. 88. Carpenter was also president of the Sunday Lecture Society, founded by T.H. Huxley and his colleagues, from 1869 until his death in 1885.

the enlightenment and to Newtonian science, the dissenting Unitarians under Priestley's guidance had placed new emphasis on reason as a means of understanding God's creation, making natural religion a fundamental element of the anti-Trinitarian creed[2]. Carpenter's exalted Protestant rhetoric in the citation above, summoning science to help purify and revive a Christian faith buried under the fallacious sediment of dogma, exemplifies the metaphysical thrust that underpinned his entire career: to uncover the fundamental, most irreducible laws of creation and the oneness of the Deity.

William Carpenter was not unique in combining his scientific career with a faith in a "Great First Cause[3]", nor was he alone in trying to publicly appease the tensions and frustrations being voiced by defensive believers and militant rationalists alike. Many historical works over the past few decades have convincingly shown how much more diverse and pliant than previously portrayed the attitudes of Victorian Christians who embraced new scientific truths were, as well as those of firm defenders of scientific naturalism who rejected materialist conclusions[4].

The present thesis adds to those studies and aims to demonstrate that Carpenter's understanding of both science and religion owed much to his Unitarian

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[2] R. K. Webb, "The Faith of Nineteenth-Century Unitarians: A Curious Incident," *Victorian Faith In Crisis*, ed. Richard J. ; Lightman Helmstadter, Bernard V. (Stanford, 1990).

[3] William Carpenter frequently used the term, as did his father Lant Carpenter. See for example L. Carpenter, *Sermons on Practical Subjects by the Late Lant Carpenter*, ed. W. B. Carpenter (Bristol, 1840).

[4] The reference study of naturalism in nineteenth-century England is: F. M. Turner, *Between Science and Religion: The Reaction to Scientific Naturalism in Late Victorian England* (New Haven and London, 1974). For an overview of the Victorian crisis of faith, see R. J. Helmstadter and B. V. Lightman, eds., *Victorian Faith in Crisis: Essays on Continuity and Change in Nineteenth-century Religious Belief* (Stanford, 1990), B. Lightman, *The Origins of Agnosticism, Victorian Unbelief and the Limits of Knowledge* (Baltimore & London, 1987). For a study of the close relationship between science and religion from the sixteenth century onwards, see J. H. Brooke, *Science and Religion : Some Historical Perspectives* (Cambridge, 1991), J. H. Brooke and G. Cantor, *Reconstructing Nature : the Engagement of Science and Religion* (Edinburgh, 1998). For a description of the Anglican response to science in the first half of the nineteenth century see P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860* (Cambridge, 1988).

faith and culture, and that his stance throws important light on the state of theological flux that characterised Unitarian thinking in the nineteenth century. Many scholars, especially in the field of the history of psychology, have drawn attention to Carpenter's faith as a Unitarian[5] in order to explain both his naturalistic and his moral posture in relation to continental morphology and to neurophysiology in particular. However, few of these studies accurately define Carpenter's personal faith or nineteenth-century Unitarianism as a whole before using them as explanatory tools. Two reasons for these limitations can be identified: firstly, references to William Carpenter's work-- though numerous in twentieth and twenty-first-century scholarship --have only ever been cursory within the context of a wider topic and thus necessarily short. Secondly, as will be outlined again in the section on methodology, in-depth studies of Unitarian thought in the Nineteenth-Century are still scarce. What is more, it emerges that nineteenth-century Unitarianism was undergoing a series of changes and re-definitions, and this fact makes it all the more difficult to arrive at a clear understanding of the exact beliefs that individuals subscribed to. To this factor, one must also add the deliberate refusal of any clear dogmatic outline which characterised eighteenth-century Unitarian thought. I therefore argue in this thesis that taking into account the climate of nineteenth-century Unitarianism is a pre-requisite when trying to understand William Carpenter's thought, and outlining Carpenter's own particular beliefs will help throw light on the diversity of intellectual postures observable in nineteenth-century Unitarianism. In doing so, I will lean on the analyses by R.K. Webb and Alison

[5] See for example K. Danzinger, "Constructing the Subject: Historical Origins of Psychological Research," *The Problematic Science: Psychology in Nineteenth-Century Thought*, ed. eds. Woodward & Ash (New York, 1982).

Kennedy[6] who have underlined the shifting emphases within Unitarian thought in the nineteenth century. I also argue that, just as Carpenter's Unitarian beliefs had a strong influence on his scientific outlook, his scientific research determined his interpretation of the Christian faith in a way that contributed to the new dynamics shaping Unitarian thought at the time. In exploring these mutual influences through the case study of a much discussed but little-known scientist, this study seeks to throw more light on the scientific and institutional activities of a major Victorian intellectual, and thus on his intellectual and social context.

2. Who was William Benjamin Carpenter?

In Wilkie Collins' 1868 novel *The Moonstone*, the character of Ezra Jennings devises a plan to prove that his friend Franklin was unwittingly placed under the influence of opium and manipulated into stealing the famous Indian diamond whilst sleep-walking. Relying on contemporary neuro-physiological studies to argue that a subject's will-power –and therefore moral responsibility— could become suspended in certain states or under the influence of certain substances, Jennings quotes William Carpenter to suggest that Franklin should be drugged a second time so as to unconsciously replicate the actions he carried out on the fateful night:

> "Don't suppose that I am going to weary you with a lecture on physiology," he said. "I think myself bound to prove, in justice to both of us, that I am not asking you to try this experiment in deference to any theory of my own devising. Admitted principles, and recognised authorities, justify me in the view that I take. (…) Here, in the first place, is the physiological principle on which I am acting, stated by no less a person than Dr. Carpenter."[7]

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[6] See A. Kennedy and W. Thomson, "*John Kenrick and the Transformation of Unitarian Thought*," University of Stirling, 2006. R. K. Webb, "The Faith of Nineteenth-Century Unitarians: A Curious Incident."

[7] W. Collins, *The Moonstone* (New York, 1868).190. The character of Jennings goes on to cite Carpenter's own writings directly. For a full analysis and other references of Collin's use of Carpenter's ideas, see V. L. Ryan, *Thinking without Thinking in the Victorian Novel* (Baltimore, 2012). pp. 29-59. See also A. Winter, *Mesmerized* (Chicago& London, 1998). Chapter 12, pp. 323-

Similarly, thirty years later, the characters of Bram Stoker's 1897 novel *Dracula* refer on at least two occasions to the term "unconscious cerebration" coined by William Carpenter[8]. These two examples highlight the wide currency enjoyed by Carpenter's ideas in the second half of the century and confirm indications found in the periodical press that by the second half of the Century 'Dr. Carpenter' had become a household name.

Renowned during his lifetime for updating and improving the teaching of human physiology in Britain as well as for opening up new avenues in the nascent fields of neurophysiology and psychology, the physiologist and polymath William Benjamin Carpenter (1813-1885) was indeed something of a national celebrity amongst professional scientists and the general public alike. Most famous in the public gaze for being a vocal detractor of spiritualism and other alleged psychical phenomena, Carpenter was especially famous as a neurophysiologist for his concept of 'unconscious cerebration', and was also widely respected among marine zoologists who hailed as unprecedented his extensive work on the class of unicellular microscopic seashells known as Foraminifera. Present-day specialists of these microorganisms still hold him as one of their prime references and most admired forbearers[9], and Carpenter remains a frequent reference in the modern field

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330 on the physiological concepts used by Wilkie Collins in writing *The Woman in White* in 1859, as well as the physiological notions of 'altered states' cited by readers and critics of the novel at the time.

8 For example, in chapter VI, the entry of Mina Murray's journal dated "8th of July" reads: "There is a method in his madness, and the rudimentary idea in my mind is growing. It will be a whole idea soon, and then, oh, unconscious cerebration! You will have to give the wall to your conscious brother." See B. Stoker, *Dracula* (London, 1994). p. 88

9 See in particular M. Brasier, *Secret Chambers : the Inside Story of Cells and Complex Life* (Oxford, 2012), M. Brasier, *Darwin's Lost World : the Hidden History of Animal life* (Oxford, 2010). Also see the work of Dr. Samuel Bowser, cell biologist at the Wadsworth Center, New York State Department of Health, who specialises in the study of the Foraminifera and who kindly agreed to tell me on August the 7th 2012 that: "W.B. Carpenter is an icon of biology. (…) I often quote his statement about agglutinated forams as "masons," and the need to understand the mechanism of shell construction. In the context of biomimetics, it seems very pertinent to modern science." (private communication)

of neurology, as will be discussed in the course of this study. More generally, the wide spectrum of Carpenter's scientific interests and activities, which spanned the realms of physiology, neurophysiology, marine biology, microscopy and oceanography, made him an internationally recognised naturalist and a well-regarded specialist on topics ranging from reflex-action to the worldwide circulation of oceanic currents. Finally, Carpenter's involvement in public health discussions and his work as one of the main administrators of University College London, made him a charismatic figure to be reckoned with in more than one area of Victorian intellectual life.

From the mid 1840s to the mid-1880s, Carpenter was at the centre of metropolitan scientific circles: member of the Royal College of Surgeons, member and twice vice-president of the Royal Society, president of the Microscopical Society, member of the Geological and Linnaean Societies, member of the Council of the Athenaeum Club, he was also awarded the Royal Medal of the Royal Society in 1861 as well as the Lyell Medal by the Geological Society in 1883. In 1879, when he retired from his duty as the Registrar of the University of London, and upon suggestion to Benjamin Disraeli by Joseph Dalton Hooker, William Carpenter was made a Companion of the order of the Bath. Carpenter was one of the early members of the Metaphysical Society, the elite intellectual discussion group founded in 1869 by the architect and later editor James Knowles[10], and was an active and assiduous member of the Philosophical Dining Club of the Royal Society[11]. Carpenter was also approached by T.H. Huxley and John Tyndall to join

[10] See A. W. Brown, *The Metaphysical Society* (New York, 1947).

[11] See Royal Society archives, and T. G. Bonney, ed., *Annals of the Philosophical Club of the Royal Society* (London, 1919).

the X-club in 1864, an invitation which he turned down most probably on account of his serious illness at the time[12].

Carpenter's vast network of friendships and professional acquaintances bears further witness to his central position in British intellectual circles. In addition to his friendships with the likes of John Stuart Mill (whose younger brother lived for a year with the Carpenters in London), James Martineau, Thomas Henry Huxley, Edward Forbes, Robert Chambers, James Paget, Karl Siemens –to name but a few, Carpenter was also on close professional terms with Richard Owen, Charles Lyell, Archibald Geikie, Henry Ackland, Charles Darwin, Joseph Hooker, John Tyndall, John Herschel, Alfred Russel Wallace, Albert Kölliker, Henri Milne-Edwards, Sir Wyville Thomson, Thomas Carlyle, Edwin Lankester and many other major intellectual figures both in Britain and abroad.

William Carpenter was also very active as an institutional reformer during his twenty-three years of employment as the Registrar of the University of London and has been described by Alan Willard Brown as "the man who more than any other single person had made its scientific faculties the best in England[13]." At a time of nation-wide concern about the future of English universities and of deep reform of the traditional curricula in higher education, Carpenter's competency and advice as an educator were highly valued. The ideas and experience he acquired through drawing up a scientific curriculum and examination system for University College were sought after from Oxford to Bombay.

To these elements one must finally add the long list of publications characteristic of Carpenter's prolific pen. "Dr. Carpenter" or "Le Docteur

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[12] See p.412 in R. Barton, ""Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X Club, 1851-1864," *Isis* Vol. 89 3 (1998).

[13] A. W. Brown, *The Metaphysical Society*. p. 25

Carpenter", as he was unequivocally referred to in periodicals both in England and in France, contributed to at least seven important journals[14] and wrote numerous reports, reviews and articles for the Royal Society and the BAAS.[15] His main works were his 1839 *Principles of General and Comparative Physiology*[16], his 1842 *Principles of Human Physiology*[17] (which had reached its ninth edition by 1881), his 1856 *The Microscope and its Revelations*[18] (which went through six editions), his 1862 *Introduction to the Study of the Foraminifera*[19] for which he was awarded the Royal Medal, and his widely popular 1874 *Principles of Mental Physiology*[20]. Without including the letters on various controversial topics which he occasionally published in newspapers, there are at least 295 printed works by Carpenter, as well as –to this day– over thirty five newly listed correspondences held in a number of archives both in Britain and abroad.

Today however, William Carpenter's contributions to science and society are little remembered. In the history of nineteenth-century biology, narrow focal lenses have led depictions of British scientists to crystallise around the figures of Darwin, Huxley, Tyndall and a few other anachronistically elected protagonists. To this day, therefore, no comprehensive or in-depth study of Carpenter's works and influence has yet been carried out, though several historians have suggested his probable role in promoting continental idealist theories in Britain as well as his likely influence on Robert Chambers, Charles Darwin and Herbert Spencer for

[14] *British Quarterly Review, Contemporary Review, Edinburgh Review, Modern Review, Westminster Review, Nineteenth Century Review, British and Foreign Medical Review.*

[15] British Association for the Advancement of Science.

[16] W. B. Carpenter, *Principles of General and Comparative Physiology*, 1st ed. (London, 1839). Reached 4 editions by 1854.

[17] W. B. Carpenter, *Principles of Human Physiology*, 5th ed. (London, 1855).

[18] W. B. Carpenter, *The Microscope and its Revelations*, 6th ed. (London, 1881).

[19] W. B. Carpenter, *Introduction to the Study of the Foraminifera* (London, 1862).

[20] W. B. Carpenter, *Principles of Mental Physiology*, 4th ed. (London, 1876).

example. The work of Toby Appel, Dov Ospovat, Philip Rehbock and Stephen J. Gould has underlined Carpenter's potential importance in the dissemination of these new ideas[21], while historians such as Adrian Desmond and Ruth Barton have placed Carpenter in the social and institutional context of London-based professional science[22]. Historians of psychology and psychical research, most notably Alison Winter, Janet Oppenheim and Kurt Danzinger[23], have given detailed attention to Carpenter due to his public position as one of the most outspoken critics of Spiritualism.

Nevertheless, all these studies remain only partially devoted to Carpenter's thought, and none of them examine his contributions within the wider context of his complete body of work, of his long-term intellectual trajectory, his wider social circle or his exact religious beliefs. Many of the hypotheses suggested, such as that of Carpenter's role in spreading continental morphology in Britain in the 1830s, have not been carefully assessed and require more extensive examination. The aim of this thesis is to offer the first comprehensive analysis of Carpenter's thought within his wider personal and institutional context, and thereby to participate in drawing up a more detailed collective portrait of the scientific community of the age.

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[21] T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin* (Oxford, 1987). D. Ospovat, "The Influence of Karl Ernst Von Baer's Embryology, 1828-1859: A Reappraisal in Light of Richard Owen's and William B. Carpenter's "Paleontological Application of Von Baer's Law"'," *Journal of the History of Biology* 9.1 (1976). P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*, Wisconsin Publications in the History of Science and Medicine, n° 3 (Madison, 1983), S. J. Gould, *Ontogeny and Phylogeny* (Cambridge, Massachussetts, 1977).

[22] R. Barton, ""Huxley, Lubbock, and Half a Dozen Others": Professionals and Gentlemen in the Formation of the X Club, 1851-1864.", A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London* (London, 1989).

[23] K. Danzinger, "Constructing the Subject: Historical Origins of Psychological Research.", J. Oppenheim, *The other world : spiritualism and psychical research in England, 1850-1914* (Cambridge, 1985), A. Winter, *Mesmerized*.

3. Academic Amnesia: questioning the "Darwin Industry"

> "In Dr. Carpenter we have lost a true leader of science, a man of rare character, whose example is of the most ennobling tendency, and whose influence has been and will remain, so long as the memory of British men of science endures, one of the brightest and best." (Edwin Ray Lankester, *The Academy*, Nov. 21st 1885)

Edwin Ray Lankester's eulogy, biased and emphatic as it may be, highlights by contrast how little recognised the great scientist is today. Once a national icon of British science, Carpenter is now nationally forgotten, and as far as academic scholarship is concerned it seems fair to observe that "the memory of British men of science" has only endured for a few select protagonists. For instance, when Carpenter's name was recently put forward for a London Blue Plaque[24], it was turned down on account of being too little known. This assumption that Carpenter's present anonymity reflects a lack of significance *per se* is symptomatic of the way in which a form of 'selective historical memory' has distorted the picture of what the vibrant mid-century scientific community really resembled.

In his 1832 essay entitled *"Boswell's Life of Johnson[25]"*, Thomas Carlyle vehemently bemoaned the dry data of political and institutional histories, and called for the advent of what we would now label social history. By pleading to exchange " ten ordinary Histories of Kings and Courtiers" against "the tenth part of one good History of Booksellers", the Victorian critic was heralding a shift in disciplinary focus and a widening of the definition of culture. The revision of hierarchies and values advocated by Carlyle has to a large extent successfully taken place, and is still opening new methodological pathways within the history of science and medicine. Reference points have shifted and a more dynamic, participative definition of knowledge has begun to emerge: over the past few decades, historians of science and medicine have turned their attention to patients rather than just to practitioners, to the general public rather than to

[24] Information obtained through personal communication.
[25] T. Carlyle, ed., *Essays* (London, 1883).19

learned societies only, to women, to popularisers, to quacks and entertainers, museum keepers, teachers, publishers and booksellers, and material objects themselves. Consequently, a host of new figures that once made up the fabric of Victorian intellectual life, has started to advance into the light. Studies like Jim Secord's account of the reception of the evolutionary pamphlet *Vestiges of the Natural History of Creation*[26], anonymously published in 1844 by the Scottish journalist Robert Chambers, have begun to make evident the complexity of popular scientific culture in the nineteenth century, whilst pointing out the limitations of the 'Darwin Industry', as some critics have named the overemphasis on Charles Darwin's life and work.

Somewhat paradoxically however, while progress has been made in the direction of a more inclusive social approach to the history of science --be it in the history of popularisation or in the history of scientific instruments for example-- scholars continue to neglect a whole series of important figures amongst the Victorian intelligentsia itself. The small nucleus of scientists seen as representative of the scientific elite appears to be ever limited to Darwin and his close friends. This is undoubtedly the result of the methodological pendulum swinging too far away from the previous 'cult of heroes', the limited amount of students in the history of science now preferring to expend their energy on more 'modern' approaches. However this leaves the discipline to contend with a restricted canon of 'elite' scientists. The picture might be skewed merely by the lack of current history students, but it appears skewed nonetheless.

Researchers do of course provide many insights into the rich network of Victorian scientists, an impressive example being the Darwin Correspondence Project based in Cambridge, which makes available online the letters between

[26] J. A. Secord, *Victorian Sensation : the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation* (London, 2000).

Darwin and his numerous correspondents across the globe, or the monumental biography of Charles Darwin by Janet Browne[27] which offers a wealth of details about the personalities, careers and connections of several important scientists. Both endeavours reveal the vast extent of interests, connections and actors in nineteenth-century science. However, they do so first and foremost to highlight the importance of Darwin's work. Jack Meadows, in his 2004 book entitled *The Victorian Scientist, the Growth of a Profession*[28], takes the interesting approach of creating a collective portrait of about forty important Victorian scientists, most of them comparatively little known. Meadows makes a point of reminding the reader of how busy the Victorian scientific milieu was, while underlining the importance of national and international scientific networks in the nineteenth century. However, the characteristics and significance of the many scientists discussed are mainly assessed in comparison to Charles Darwin's particularities, in spite of the fact that Darwin's secluded lifestyle in Kent was not representative of British intellectual and institutional life. Meadows explains in his introduction that:

> "Both Crookes and Frankland were members of the small group of eminent nineteenth-century scientists, but they are hardly household names today. The one name that everybody does remember is Charles Darwin. I have therefore used Darwin as my recurring example in this book. Exploring to what extent he was a typical nineteenth-century scientist, and to what extent he differed from his fellows, helps build up a picture of the group to which he belonged."[29]

This thesis posits that Charles Darwin's work must not be the perpetual mark against which Victorian scientific culture is measured, and will try to show on the contrary that a now obscure scientist like William Benjamin Carpenter, through his long list of contacts and collaborators and through his central place in Victorian debates —be they about education, alcoholism,

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[27] J. E. Browne, *Charles Darwin: Voyaging*, vol. 1 (London, 1995).
[28] J. Meadows, *The Victorian Scientist, the Growth of a Profession.* (London, 2004).
[29] Ibid. p.3

evolution, the human soul, free-will, vitalism, religion, vaccination, vivisection or the need to explore the world's oceans--, provides a new angle and a rich window into the mid-century Victorian intellectual climate. The naturalists who have been overshadowed by the 'Darwin Industry' throughout the twentieth century, when given centre-stage, also have some valuable lines to deliver. I will argue that figures such as Carpenter, when placed back into the intellectual context and priorities of their time-- rather than when measured against our own modern priorities—provide a rich and accurate picture of nineteenth-century British life, as well as new perspectives on the values and hierarchies that we have defined retrospectively. This work thereby aspires to provoke renewed questioning into what is currently considered to be the Victorian scientific establishment, and follows in the footsteps of historians critical of the Darwin-centred point of view.

Several historians have indeed pointed out the somewhat black and white –or at least slightly anachronistic—isolation of details from the wider fresco of nineteenth-century scientific society. Though it is of course understandable that the history of science as a discipline should have at first concentrated on major paradigm shifts, a problem arises when several decades later scholarly attention is still being repeatedly and disproportionately bestowed on the same areas of study, at the expense of greater historical accuracy in reconstructing the fuller, more complex picture. In continuing to ignore other renowned scientists of the age, historians are implicitly positing the notions of perceived genius or originality as the main criteria by which to assess the significance of a scientist's career. Pietro Corsi and Adrian Desmond were already voicing this concern in the 1980s and urged historians to widen their approach:

> “The excessive –albeit understandable—concentration on such unquestionably key figures as Charles Darwin, John Stuart Mill, Samuel Taylor Coleridge and John Henry Newman, has produced a picture distorted by hagiographical overemphasis on singlehanded achievements.”[30]

Echoing the above statement, Adrian Desmond warned that:

> “we have brilliant studies of Darwin’s day-to-day jottings, but this close reading has caused a kind of myopia: the larger picture has gone out of focus.”[31]

And it is not just the narrowing of the cast of historical actors that is being criticised by some scholars, but the narrowing --within the selected canon-- of the definition of the very concepts used. Robert J. Richards expressed this concern in his 1987 book *Darwin and the Emergence of Evolutionary Theories of Mind and Behaviour*[32], stating that the reconstruction of what nineteenth-century Darwinism as a theoretical framework really was, had itself become distorted:

> “The received view has taken on a life of its own, irrespective of how adequately it represents what early evolutionists actually believed, wrote and accomplished. But the historian must continuously test such errant creatures of collective memory by reconstructing the past and pressing them against its sharpened edges. I do not wish to deny that the received view incorporates aspects of scientific thought in the last century. I do reject, though, the presumption that it embodies the essence of nineteenth-century Darwinism.”

Almost thirty years on, this historiographical diagnosis remains largely true. This thesis consequently aims to demonstrate that William Carpenter was one of the foremost scientific figures of his age despite his current absence from the historical roll of honour, and that his interests, activities and renown shed valuable light on Victorian culture.

4. Methods used

> It might, perhaps, not be saying too much were we to affirm that he was almost the last of the Naturalists. There are plenty of specialists at work, and preparing for work. But the period when one capacious mind, one iron memory, could take-in the entire compass of Natural Science is past. We shall soon have no more zoologists or botanists or geologists, or

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[30] P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. p. 290

[31] A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London*. p. 379

[32] R. J. Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior* (Chicago, 1987). p. 5

> even palaeontologists. In place of these workers there are annelidists, pteridologists, laborious triflers over the development of a conferva (…) Nature is one harmonious whole, and it is no more possible for the man who studies merely a little crevice in one of its by-ways to understand the relation of one part to another, than it is for the mechanic who files its cogwheels to master the construction of a calculating machine.
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> *The Standard*, November 11th, 1885.

The extract above, taken from *The Standard*'s obituary of William Benjamin Carpenter in 1885, is emblematic of the descriptions generally given of the man. Carpenter's contemporaries were awed by the wide range of subjects to which he contributed with erudite authority, and it is indeed difficult not to be impressed today by the sheer spectrum, volume and detail of Carpenter's publications—many of which were spawned by the need to earn a living through writing. Victorian articles and testimonies often referred to Carpenter's relentless energy, enthusiasm, passion for acquiring and sharing knowledge and above all, to his "omniscient mind[33]" and ability to "weave" "scattered facts" "into something of a connected whole[34]". In addition to drawing up a portrait of the scientist himself, when Victorian commentators spoke of Carpenter as "the last of the naturalists", they were conveying a message about what they perceived the intellectual establishment to be and how they felt it was changing. Indeed Carpenter belonged to an era where one's status and intellectual authority, though gained in one particular disciplinary field or through one particular piece of work, were still sufficient to give one the legitimacy to comment on most aspects of intellectual and social affairs. Studying Carpenter's career therefore amounts to taking a closer look at the role of the public intellectual in Britain, and at how it changed throughout the period[35].

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[33] Obituary in *The Lancet*, November 14th 1885 in: "Memorials of William Benjamin Carpenter," *Printed for Private Circulation* (London, 1885), vol.
[34] Obituary in *The Times*, November 11th, 1885 in: *ibid.*
[35] On this particular topic, see R. Barton, ""Men of Science": Language, Identity and Professionalization in the Mid-Victorian Scientific Community'." *History of Science* 20.March, 2003 (2003).

The methodological choice behind the present study is to use the particular case of William Carpenter as an entry point to explore the wider social, intellectual and religious circles to which he belonged. Because of the lack of any comprehensive studies devoted to him, this work is written as an intellectual biography that aims to offer a thematic review of Carpenter's ideas, against the backdrop of what is already known in the history of nineteenth-century biology. This thesis is therefore placed under the symbolic patronage of Carlyle's famous statement, that "history is the essence of innumerable biographies[36]". Indeed, research that consists in reviewing the achievements and contributions of a single individual, like Franziska. A. Augstein's D.Phil on James Cowles Prichard[37] or Rosemary Ashton's recent book on the radical printer John Chapman[38], are not only the most convenient way of filling in gaps in historic research when no previous studies have been carried out, but they also –especially in the case of such an active thinker and prolific writer as Carpenter—offer particularly rich glimpses into the ideas, networks and political tensions which made up the lifeblood of Victorian natural history.

The notion of biographies being reliable tools for historical research is sometimes received with skepticism, because it is felt that when concentrating on the life of a single individual, historians inevitably run the risk of lapsing into hagiography. I argue that the same risk exists with any type of topic and approach, since historians can just as easily become hagiographical about concepts or themes as they can about individuals. Tethering the analysis of ideas and social dynamics to the particular parameters, events and obstacles experienced by an individual

[36] T. Carlyle, "On History," *Fraser's Magazine* II.10 (1830).
[37] F. A. Augstein, "*James James C. Prichard's Of Mankind: an Anthropologist between the Enlightenment and the Victorian age.*," UCL, 1996.
[38] R. Ashton, *182 Strand* (London, 2006).

throughout his career can on the contrary be viewed as an efficient safeguard against the dangers of becoming so detached from the personal and institutional contexts of those ideas, as to deliver an erroneous interpretation of them. Both Thomas Hankins[39] and Thomas Söderqvist[40] –among others– have highlighted the little consideration given to the biographical genre as well as the absence of recognition of scientific biographies within the worldwide community of historians of science. The present thesis takes a thematic approach to reconstructing and analysing the work of William Carpenter and hopes in doing so to support the legitimacy of biography as a valid historical approach.

The analysis of Carpenter's place in mid-Victorian London science requires incursions into several themes in the history of the natural sciences. The many distinct fields of study to which Carpenter devoted his unstoppable intellectual ardour require a somewhat daunting level of knowledge across a large spectrum of topics and the present study does not claim to offer a specialist's analysis of every aspect of Carpenter's scientific achievements. This thesis rather aspires to map out Carpenter's intellectual interests and concentrate on a few salient aspects of his work, so as to offer an integrative study of the motivations that determined his undertakings.

Whenever possible, a particular effort will also be made to underline Carpenter's place within the network of international scientific collaboration. Some historians of science, among them Josep Simon in the introduction to his book devoted to transnational scientific communication[41], have criticised what they call

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[39] T. L. Hankins, "In Defence of Biography: The Use of Biography in the History of Science," *History of Science* 17.1 (1979).
[40] T. Söderqvist, "Introduction," *The History and Poetics of Scientific Biography* (Aldershot, 2007).
[41] J. Simon and N. Herran, eds., *Beyond Borders: Fresh Perspectives in History of Science* (Newcastle, 2008).

the parochial nature of Anglo-Saxon history of science. According to Simon, the emphasis recently placed on socio-constructivist approaches to the history of science is partly responsible for a narrowing down of scholarship into local micro-histories and strictly national perspectives. Whilst this criticism evidently does not apply to all recent work, it flags up some valuable points. It can indeed seem strange that in an age of globalisation and increasingly shared digital resources, taking an international or comparative approach is not yet as common as might be expected. Carpenter, as a typical product of nineteenth-century middle-class education, read both German and French and was a fluent speaker of the latter, making several trips to the continent throughout his lifetime. The present study will therefore try to integrate the notion of a European and transatlantic intellectual community, asking what international influences and exchanges contributed to Carpenter's work.

This research has relied heavily on previously-uncatalogued primary material. Correspondences in particular, which were located through the registered papers of better-known Victorian figures, have played a fundamental role in this study. The biographical sketch published by Carpenter's son Joseph Estlin Carpenter in 1888[42] provided an extremely useful starting point for this archival quest, as well as a detailed panorama of Carpenter's private life. Using this source, crossed with the contents of the many –though certainly not exhaustive—correspondences, periodicals and international reviews of Carpenter's works, made it possible to take a detailed look at Carpenter's networks of scientific collaborators.

With these goals in mind, studying William Carpenter more specifically as a Unitarian intellectual will not only provide keys to understanding his thinking, but will also help shed some light on how the denomination itself evolved throughout

[42] See 'Memorial Sketch' by J.E Carpenter in W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical* (London, 1888).

the period. Alison Kennedy pointed out the lack of comprehensive studies of nineteenth-century Unitarians in her 2006 D.Phil thesis on '*John Kenrick and the Transformation of Unitarian Thought'*[43]. Indeed, the *Transactions of the Unitarian Historical Society,* published since 1915, do not hold many articles devoted to Victorian Unitarians, and monographs on the topic are few and far-between. Similarly, in the first chapter of a collective volume dedicated to various aspects of Unitarian history produced in 1986 to celebrate the bicentenary of Manchester College in Oxford, Asa Briggs declared that: "Now, almost two hundred years later, Unitarians are scarcely known. The misunderstandings that persist owe more to ignorance than to zeal.[44]" Boyd Hilton has recently devoted a few paragraphs to the intellectual and political weight of Unitarians in his monumental work *A Mad, Bad and Dangerous People?*[45], and an American monograph published in 2012 spans the history of the denomination from the Reformation to the present day[46]. Kathryn Gleadle's interesting study of Unitarian feminists[47] also highlighted the importance of the denomination in the history of democracy in Britain and pointed out the need for more studies on the topic. However few extensive studies of Unitarianism in the nineteenth century have yet come forth, apart from the excellent thesis on James Martineau by Martin Wauck in 2007[48]. Indeed most works published on this

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[43] See A. Kennedy and W. Thomson, "*John Kenrick and the Transformation of Unitarian Thought*." p. 417

[44] B. Smith, ed., *Truth, Liberty, Religion, Essays celebrating Two Hundred Years of Manchester College* (Oxford, 1986).

[45] B. Hilton, *A mad, bad, and dangerous people? : England 1783-1846*, New Oxford History of England (Oxford, 2006). p. 464

[46] A. Greenwood and M. W. Harris, *An Introduction to the Unitarian and Universalist Traditions* (Cambridge, 2011).

[47] K. Gleadle, *The early feminists : radical Unitarians and the emergence of the women's rights movement, 1831-51* (Basingstoke, 1995).

[48] M. P. Wauck, "*Religion, reason, responsibility: James Martineau and the transformation of theological radicalism in Victorian Britain, 1830--1900*," Rice University, 2007.

interesting and influential protestant group date back to the 1970s and 1980s, and most of them were written by Unitarians themselves[49].

This relative historical vacuum makes it all the more necessary to assess the influence of Carpenter's religious background on his professional and intellectual development. The present thesis will therefore centre round an analysis of the relationship between science and religion in Carpenter's thinking and in doing so will test R.K Webb's argument that Victorian Unitarianism significantly evolved away from its eighteenth-century rational roots under the influence of thinkers such as James Martineau and Richard Price[50]. Alison Kennedy showed that in the context of a new idealist interpretation of the Unitarian faith, John Kenrick eschewed the importance of scientific enquiry. Carpenter, as will be shown, represents another stance in this re-interpretation of the Unitarian standpoint, keeping science at the heart of the creed.

5. Outline and main arguments

This thesis falls into three main chrono-thematic units dealing firstly with Carpenter's personal and institutional identity as a Unitarian and public intellectual, secondly with Carpenter's work as a comparative physiologist and marine biologist, and finally, with Carpenter's contributions to the budding sciences of neurology and psychology. By taking an integrative approach to the various areas encompassed by Carpenter's career, this analysis seeks to demonstrate firstly that Carpenter was one of the most active and renowned scientific figures of his age, and secondly, that –by

[49] It is notable that all the histories of Unitarianism written so far are the work of Unitarian scholars. See: J. E. Carpenter, *Unitarianism, an historic survey* (London, 1922), J. Goring and R. Goring, *The Unitarians*, Christian Denominations (Exeter, 1984), R. V. Holt, *The Unitarian contribution to social progress in England* (London, 1952), B. Smith, ed., *Truth, Liberty, Religion, Essays celebrating Two Hundred Years of Manchester College*, L. Smith, *The Unitarians, A Short History* (Kendal, 2006).
[50] Webb detailed this argument in his seminal article: R. K. Webb, "The Faith of Nineteenth-Century Unitarians: A Curious Incident."

and large-- a coherent social and epistemological strategy underpinned most of Carpenter's endeavours: that of a quest for social equilibrium as well as intellectual consensus based on a conception of the Deity that both inspired and was inspired by his scientific work. By calling into question the widely accepted definition of Unitarianism as characterised by its eighteenth-century tradition of materialist philosophy and political dissidence, and despite Carpenter's notoriously pugnacious attitude in certain public debates, I argue in this section that Carpenter's Unitarianism was politically and theologically moderate. The following chapters will suggest that what could be called Carpenter's 'mediatory Unitarianism' developed due to the particular socio-professional and metaphysical considerations that underpinned Carpenter's individual trajectory.

The first chapter of this thesis is thus devoted to William Carpenter the Unitarian educator and public moralist, asking what place the scientist managed to occupy in the shifting institutional, political and denominational context of his time. Throughout his career, following what was a family tradition, Carpenter became involved in a number of educational ventures. It will be argued that the physiologist can be viewed as a figure of compromise, constantly balancing reform and conformism in a careful act of social entryism. The role he played in one of the main nineteenth-century educational turning-points, namely the setting up of new universities and the reform of scientific curricula, will be analysed in the light of his Unitarian background and of the various national and international networks he belonged to. Carpenter's interest in promoting public health and morals which led him to campaign actively in favour of teetotalism and vaccination, his central role within a range of learned London Societies, will also make up part of this analysis. Thus, the main aim of this chapter is to clarify certain biographical circumstances while contributing to current analyses of the integration of Unitarians into the British intellectual establishment[51].

The second part of this study deals with William Carpenter's morphological and evolutionary ideas. When Robert Chambers anonymously published his evolutionary book *Vestiges of the Natural History of Creation* in 1844, Carpenter was immediately suspected of being its author. In 1859 after the publication of Darwin's *Origin of Species*, he was one of the earliest scientists to review the book positively and remained for the duration of his life an outspoken advocate of the theory. This section offers the first detailed study of Carpenter's ideas on living organisms and of his unique synthesis of new continental theories, confirming and enlarging the hypothesis suggested by Appel, Desmond, Rupke and Ospovat, that the physiologist played a central role in the communication of continental idealist biology in Britain. Carpenter's major study of the minute marine invertebrates known as Foraminifera, his consequent involvement in the Eozoön Canadense controversy, as well as his oceanographic work will be reviewed in detail in order to add more perspectives to the history of the British and international reception of transformism and 'transcendental' natural history. Carpenter's understanding of nature as "one harmonious whole" --in the words of the Standard's obituary cited above-- as well as his arguments in defence of comparative anatomy and evolutionary theory will be analysed in relation to his Unitarian philosophy. His anti-dualistic approach to reality and conciliatory approach to reforming the scientific method will also be linked to his Unitarianism.

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[51] Rosmary Ashton's "Bloomsbury Project" has successfully mapped the large network of individuals and institutions that developed in the area around the University of London in the nineteenth-century. See R. Ashton, *UCL Bloomsbury Project*, 2007, Available: www.ucl.ac.uk/bloomsbury-project/articles/events/events.htm.

The third part of this thesis focuses on Carpenter's defining work as a neurophysiologist. Once again, Carpenter's eagerness to bring together seemingly opposite intellectual standpoints will be exemplified though his attempt to blend Scottish Common Sense philosophy with German idealism, and through his defence of the indivisible relationship of body and mind. Through analysing the core notion of 'unconscious cerebreation' underpinning Carpenter's 'Mental Physiology', this study will discuss Carpenter's position in contemporary debates about the supremacy of the 'will' that have been analysed in the work of historians such as Roger Smith, Loraine Daston[52], Kurt Danzinger and others. A reappraisal of Carpenter's life-long opposition to spiritualism and other alleged psychical phenomena will also be put forward in the light of what I argue was Carpenter's increasing partiality to the possibility of thought-reading, and to philosophical monism more generally.

[52] See for example: L. Daston, "The Theory of Will versus the Science of Mind," *The Problematic Science. Psychology in Nineteenth-Century Thought* ed. eds. Woodward & Ash (New York, 1982).

Part I: The making of a moderate: Carpenter's personal networks and professional trajectory

Introduction: defining William Carpenter as an object of study

> It is inadequate to use dissent as some unified and unchanging entity. Religious dissent was clearly in 1770 quite different from what it had been in 1740, 1714 or 1689. Similarly the components of dissent - baptists, independents, presbyterians - were diverse and often sharply opposed. Even a single religious grouping had different social and political meanings according to the local context[53].

In his study of the spread and political power of British Unitarianism in the second half of the eighteenth century, John Seed underlined the multiplicity of trends that made up the collective identity of what was becoming an increasingly influential denomination. His warning about the dangers of taking any definition of religious Dissent for granted applies to the analysis of Unitarianism in the nineteenth century and is one of the central premises underpinning this thesis as a whole. Studying William Carpenter as a "Unitarian physiologist", which is the label commonly ascribed to the scientist, therefore implies a measured definition of both these adjectives in the particular context of the social networks to which Carpenter belonged, and in accordance with his individual trajectory as a markedly metaphysical thinker. Because Carpenter left very few traces of his political and theological thought however –hardly any of the correspondence studied for this analysis provided much insight into Carpenter's precise political and religious opinions, and the vast majority of his publications were either scientific or philosophical--, only two means of assessing the tenets and extent of his Unitarian views can be relied on: the first are his close personal ties with other thinkers, and the second are the contents of his scientific writings.

[53] J. Seed, "Gentlemen Dissenters: The Social and Political Meanings of Rational Dissent in the 1770s and 1780s," *The Historical Journal* 28.2 (1985). p. 301

The present chapter aims to refine existing portraits of Carpenter as a Unitarian scientist in the light of known and less well known biographical facts. It centres on Carpenter's professional trajectory as a public scientist and educator, and analyses his opportunities, choices and progression. In providing a contextual analysis of Carpenter's life and career as a whole, it lays the foundations for the two following sections of this thesis which detail the contents of Carpenter's thought and seek to underline the mutual influences of Carpenter's faith and scientific work. This initial chronological approach is necessary if one is to provide a detailed and accurate analysis of Carpenter's work and offer a glimpse into the mosaic of Unitarian belief in the nineteenth century.

The contours of Carpenter's identity can be etched thanks to two main primary sources of biographical data, along with the letters addressed by Carpenter to his many correspondents. The first source consists of the many obituaries published at the time of Carpenter's death in November 1885, the most detailed one being the laudatory account penned for *Nature* by Edwin Ray Lankester (1847-1929), the son of Edwin Lankester (1814-1874) who was a friend as well as a colleague of Carpenter's at the University of London. Lankester's article, being the longest obituary published at the time, served as a starting point for many subsequent biographical entries, notably those in the *DNB* and the *Dictionary of Scientific Biography*. However, it remains a hagiographical piece and must be read accordingly.

The second and most important document is the *Memorial Sketch*[54] published in 1888 by Carpenter's second oldest son Joseph Estlin Carpenter (1844-1927). This extensive portrait is the most valuable source of first-hand information

[54] J. E. Carpenter, "Memorial Sketch."

available: in addition to being a thorough account of the highlights of Carpenter's career, it draws on a precious body of correspondence consisting of letters written by Carpenter to his close family as well as of letters sent to Carpenter by his national and international correspondents. The extracts of letters cited by Joseph E. Carpenter are all the more valuable as the original correspondence from which they are drawn remains missing to this day, leaving researchers only with traces of what Carpenter wrote but rarely of what he himself received.

The picture given by Joseph Estlin Carpenter provides many valuable insights into Carpenter's personal and professional life and effectively stands as the only existing biography of Carpenter to this day, though it cannot be considered an objective testimony. What this study aims to achieve, by drawing on these previous documents as well as on a variety of additional archival sources, is a critical overview of the main events of Carpenter's personal and public life. It does not intend to be all-inclusive but rather to emphasise –and in some cases to bring to light for the first time-- facts or events that are key to understanding Carpenter's circumstances, choices, and reputation at the time. I argue that understanding Carpenter's identity as a Unitarian offers valuable insights into his thought and actions.

1. Defining William Carpenter as a physiologist

The most frequent label granted to Carpenter is that of "physiologist", and this attribution calls for a brief preliminary overview of Carpenter's place within the fast-developing field of physiology in the Nineteenth-Century. Shortly after Carpenter's death and as far afield as the Southern hemisphere, the New-Zealand Taranaki Herald of the 11th of January 1886 stated that "even at the present day, and long after the important discoveries of such men as Müller, Huxley and Foster, Carpenter's *Human Physiology*[55] is still an acknowledged authority of no mean order." [56] Indeed, it was unanimously reported in the Victorian press that Carpenter's physiology manuals had rendered a much needed service to British medical training by bringing the science of physiology up-to date with its most recent developments. In its obituary of November the 18th 1885, the *Medical Press and Circular* expressed the common view that Carpenter's *Human Physiology* had served as a springboard from which British physiological science had been able to soar once more. According to the article, Carpenter's book

> ha(d) probably exerted a greater influence on the progress of physiological science than any treatise every written; it ha(d) certainly served, more or less, as the model of all the more valuable of its successors; and it long held its place unrivalled, until advancing years and the introduction of the experimental method by younger labourers in the field already illuminated by its teachings, led to the production of text-books which, though modelled still on its lines, were more in consonance with modern ideas of the manner in which the physiologist's labours should be pursued. But notwithstanding, Carpenter's "Principles" have never yet been relegated to the literary lumber-room (…) and is to this day regarded as a standard work of reference[57].

Before Carpenter's books came onto the market, the most authoritative manuals of physiology in the country were the British physiologist Hebert Mayo's 1827 *Outlines of Human Physiology*[58], John Elliotson's 1835 *Physiology*[59], and the translation of Johannes Müller's *Elements of Physiology*[60] which appeared in 1838, shortly before Carpenter's own first published work. Carpenter drew heavily on these manuals, as well as on a host of other authors, which he listed in his preface to the first edition of his 1839 *Principles of General and Comparative Physiology*[61]. As

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55 W. B. Carpenter, *Principles of Human Physiology* (London, 1842).
56 R.H.G, "The Late Dr. Carpenter, M.D., F.R.S, C.B.," *The Taranaki Herald* 35.6961 (1886). p.4
57 *Memorials of William Benjamin Carpenter*, Printed for Private Circulation (London, 1885). p. 28
58 H. Mayo, *Outlines of Human Physiology* (London, 1827).
59 J. Elliotson, *Human Physiology*, 5th ed. (London, 1835). The four previous editions consisted of Elliotson's translation of Johann Friedrich Blumenbach's 1787 *Institutiones Physiologicae* with a body of notes which by the 4th edition of 1824, outweighed Blumenbach's initial content.
60 J. Müller, *Elements of Physiology*, vol. 1 (London, 1838).
61 W. B. Carpenter, *Principles of General and Comparative Physiology*.pp. vi-vii. The names of Alison, Carus, Decandolle, Tiedmann, Cuvier, Meckel, Blainville, Magendie, Henslow, Grant and Roget are but a few examples of the range of sources consulted by Carpenter to give his general

will be explained in part II of this thesis, Carpenter was instrumental in refashioning British comparative physiology by pushing new theoretical frameworks to the forefront of the science. His understanding of French and German morphology, which he aligned with British traditions of Natural Theology, was influential in giving Physiology as a discipline a new authority and centrality in the medical curriculum.

However, as is apparent in the extracts cited above, Carpenter was rarely spoken of as a fully-fledged physiologist, and did not benefit during his career from the scientific reputation that a William Sharpey and later a Michael Foster could boast. Indeed, the very label of physiologist could appear problematic when applied to Carpenter, as he never again occupied the official post of physiologist during the several decades during which he worked as a university lecturer after his first London position as the Fullerian Professor of Physiology at the Royal Institution in 1844. This fact can be explained both by the lack of institutional openings for the emerging discipline at the time, and by Carpenter's need to combine several different writing, teaching and administrative jobs to make ends meet. Furthermore, as will be detailed in part III of this thesis, Carpenter's own research interests lead him down the path of psychology rather than towards the increasingly specialised discipline of experimental physiology, to the extent that he himself did not accept the label of physiologist by the end of his career. Writing the Preface to the ninth edition of Carpenter's *Principles of Human Physiology* in 1881, the editor and

overview of the science. Carpenter also mentions Karl Friedrich Burdach's *Treatise of Physiology* which he read in the French translation by Jourdain, Burdach being credited with coining the terms "morphology" and "biology" in 1800. Carpenter's *Principles of General and Comparative Physiology* would go through four editions until 1854 and his *Principles of Human Physiology* went through nine successive editions between 1842 and 1881. These editions can be estimated to consist on average of 1000-volumes print runs. For indications about average Victorian print runs, see: A. Weedon, *Victorian Publishing: The Economics of Book Production for a Mass Market 1836-1916* (Ashgate, 2003).

physiologist Henry Power issued a disclaimer warning students that Carpenter's manual no longer fitted the requirements of a modern course in Physiology:

> The student must not expect to learn Physiology from such a work as this. Physiology is now, as Anatomy has always been, a practical subject, and just as a competent knowledge of Anatomy has to be acquired in the dissecting room, so Physiology can only be learned in the laboratory.[62]

When the general context of the practice of physiology in Victorian Britain is examined from an institutional point of view, Carpenter's professional trajectory-- which essentially by-passed experimental physiology—does not fully fit the increasingly accepted definition from the 1860s onwards of the physiologist as an experimental scientist. As the "last of the naturalists", Carpenter belonged to a generation where being an 'armchair physiologist' was still possible, while becoming a professional physiologist was not yet easy due to the lack of job opportunities. In other words, though Carpenter established his scientific reputation through his writings on physiology, the development of the very science that he had promoted soon divested him of his claim to it. At the beginning of the Twentieth Century, the physiologist and historian of the Physiological Society Sir Edward Sharpey-Schafer --one of the fervent disciples of Carpenter's famous colleague William Sharpey[63]--- concluded that nineteenth-century British physiology "could show no names worthy to be mentioned with those of Magendie, Bernard, Müller, Helmohltz, or Ludwig, to mention but a few of the brilliant physiologists of France and Germany[64]". Sharpey-Schafer's verdict was later expressed again by Karl Rothschuh[65] who -- quoting Schafer's introduction-- stated that:

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[62] See p. iv in Carpenter's *Principles of Human Physiology*, 9th ed, London: J & A Churchill, 1881

[63] Edward Schäfer held his master in high regard to the point of adducing his name to his own surname.

[64] E. Sharpey-Schäfer, *History of the Physiological Society during its First Fifty Years 1876-1926*, supplement to the Journal of Physiology (London, 1927). p.1

[65] K. E. Rothschuh, *History of Physiology*, trans. Guenter B. Risse (New York, 1973).

> In the middle part of the nineteenth century Great Britain was far behind France and Germany in the development of Physiology. We had no pure physiologists and it was considered that any surgeon or physician was competent to teach the science[66].

Historians such as Gerald Geison and Stella Butler[67] have analysed the reasons for the "stagnation" of British physiology when compared to the French and German schools of experimental physiology in the second half of the nineteenth century. Butler, stressing the lack of funding devoted to medical schools throughout the country in the first half of the century, as well as the fact that physiology courses were generally taught by young medical practitioners seeking to supplement their income, states that:

> In 1860, experimental physiology was virtually unknown in Britain. In contrast to the well-equipped laboratories of Germany and France, where many physiologists produced large numbers of scientific papers, little research was carried out anywhere in Britain. By 1900, however, the physiology departments of Cambridge, University College London, and Oxford, had become internationally recognised as centres of excellence.[68]

Picking up on Karl Rothschuh's view, Butler also argues that the British tradition of functionalism encouraged an intellectualised practise of physiology[69]. Carpenter's early career does indeed support this analysis, since he began work as a physiologist to a large degree for the practical reasons stated above. Nevertheless, though he did not go on to embrace experimental physiology, Carpenter worked in the shadows to promote the science in the University curricula, a role that has been largely ignored due to the lack of research into the history of formal education in the nineteenth century. Part I of this thesis will therefore highlight Carpenter's behind-the-scenes involvement in modernising the practice of physiology through the strong

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[66] E. Sharpey-Schäfer, *History of the Physiological Society during its First Fifty Years 1876-1926*. p.1

[67] G. Geison, "Social and Institutional Factors in the Stagnancy of English Physiology 1840–1870," *Bull. Hist. Med.* 46 (1972). S. V. F. Butler, "Centers and Peripheries: The Development of British Physiology, 1870–1914," *Journal of the History of Biology* 21.3 (1988).

[68] S. V. F. Butler, "Centers and Peripheries: The Development of British Physiology, 1870–1914." P. 473

[69] Ibid. p. 474

administrative role he played within the University of London, and Part II will deal with the theoretical tenets of Carpenter's early physiological writings.

What can be concluded therefore, as far as Carpenter's label as a physiologist is concerned, is that his career straddled the relatively short moment in time when the definition and modalities of the science of physiology were emerging in Britain. Though instrumental in bringing this change about, Carpenter must be viewed as a catalyst and as an educator, as a professional medical textbook writer rather than as a fully-fledged physiologist in the modern sense. The modalities of Carpenter's early involvement with physiology are also closely intertwined with the history of the medical book trade itself: the fact that, as a young scientist in need of earning a living, Carpenter turned to the practice of textbook-writing, reflects the growing importance of the international scientific book trade in the early Nineteenth-Century. In recent years, scholars such as Jonathan Topham and Josep Simon have ably demonstrated the value of studies devoted to the construction, dissemination, circulation and reception of scientific knowledge from the point of view of the history of the book[70]. Josep Simon has discussed the wide-ranging international networks of Parisian booksellers at the beginning of the nineteenth century and the influence of the Baillère family both on the nature of medical teaching itself through their involvement in supervising and editing their authors' work, and on the dissemination of continental medical knowledge as a whole, notably through their translation of many Italian, Spanish and German works. Through their London branch, which opened in 1826, the Baillière brothers further expanded their influence in Britain and became an important agent in the

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70 See for example: J. Topham, "BJHS special section: book history and the sciences," *British Journal for the History of Science* 33 (2000). And: J. Simon, *Communicating Physics: the Production, Circulation and Appropriation of Ganot's Textbooks in France and England, 1851-1887.*, Science and Culture in the Nineteenth Century, ed. Bernard Lightman, vol. 13 (London, 2011). pp. 1-9

dissemination of continental scientific and medical knowledge. Their catalogue boasted a comprehensive collection of the most up-to-date scientific manuals and periodicals produced at the time on the continent[71].

Carpenter's knowledge of continental science and his consequent realisation of a relative British vacuum where up-to-date physiological manuals were concerned, as well as his prolific writing of manual-type literature, are thus symptomatic of a period characterised by the expansion of the international book trade[72]. With a new print market driven by the opening of the book trade after the end of the Napoleonic wars, and the increasingly efficient and affordable printing technology provided by the steam press from the 1820s onwards[73], a new mode of investing the scientific sphere was becoming possible. It is in this new cultural and economic context that Carpenter's entry into the professional scientific world must be considered.

2. Framing the Unitarian question: concepts and questions in recent historiography

By the end of the eighteenth century, Unitarians in England had acquired the reputation of being strongly sympathetic to both the American and French revolutions and to the notion of a secular state more generally[74]. Their perceived

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[71] J. Simon, *Communicating Physics: the Production, Circulation and Appropriation of Ganot's Textbooks in France and England, 1851-1887.* pp. 139-140. Josep Simon notes the involvement of Jean-Baptiste Baillière --who had been the Publisher for the Académie des Sciences-- in the 1851 Great Exhibition in London, a fact that further demonstrates the family's central influence in the British book-trade by the middle of the nineteenth century.

[72] See also: C. Berkvens-Stevelinck, *Histoire de l'édition française*, ed. Chartier; Martin, vol. 2 (L'édition et le commerce du livre français en Europe). And G. Barber, *Studies in the Booktrade of the European Enlightenment* (London, 1994). Chapter XVIII.

[73] A. Weedon, *Victorian Publishing: The Economics of Book Production for a Mass Market 1836-1916*. p. 71

[74] For an in-depth study of the connection between Unitarianism and political radicalism at the end of the eighteenth century and based on anti-Establishment rhetoric found in archival material, see: S. Andrews, *Unitarian Radicalism: Political Rhetoric, 1770-1814* (New York and Hampshire, 2003).

radicalism was considered a threat to the stability of the Establishment and to the alliance between Church and State, famously prompting an angry mob to burn down Joseph Priestley's home in 1791 in Birmingham, and inspiring Edmund Burke's inflammatory speech to Parliament in response to a petition by the Unitarian Society presented to Parliament in May 1792 by the Whig politician Charles James Fox[75]. Comparing the Unitarians to "insect reptiles[76]" whose numbers would not cease to grow if their progress was left unchecked, Burke lambasted the petitioners as traitors whose religious ideas were kept deliberately vague in order to conceal their true intentions as a political faction bent on implementing the "French model."[77]

The effect of the American and French revolutions on the interactions between Dissenters and the English Establishment have also been studied by several historians of science. In his famous work on "the politics of evolution", Adrian Desmond explored how this revolutionary context determined the type of scientific ideas that were favoured by various intellectual groups, defending the thesis that:

> Progressive evolutionary theories and related naturalistic sciences (…) served to legitimate the radicals' democratic convictions. They were adopted by outsider groups set on breaking the old religious authority and transferring its power to the secular state. (…) Geoffroy and Lamarck became symbols of resistance; they were the tricolour banners waved by the medical democrats massing outside the corporations porticos. [78]

According to Desmond, for the traditional intellectual elite faced with the radical agitation of the beginning of the century, accepting these new continental ideas became a necessary strategy of compromise to retain their hold on political power. This point was also demonstrated by Pietro Corsi, who, starting from the other end

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See also: M. P. Wauck, "*Religion, reason, responsibility: James Martineau and the transformation of theological radicalism in Victorian Britain, 1830--1900*."

[75] See: E. Burke, "Speech on a Motion made in the House of Commons by the Right Hon. C.J. Fox for Leave to Bring in a Bill to repeal and Alter certain Acts respecting Religious Opinions upon the Occasion of a Petition of the Unitarian Society," *The writings and speeches of Edmund Burke* vol. 7 (Boston, 1901). pp. 39-58

[76] Ibid. p. 51

[77] Ibid. p. 47

[78] A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London*. p. 23

of the political and religious spectrum, analysed the intellectual and theological itinerary of the Anglican thinker Reverend Baden Powell (1796-1860). Corsi showed how the Oxford scholar moved away from his initial Anglican apologetic stance towards new ideas about speciation, the relationship between science and religion and educational reform. Powell shared these ideas with moderate Dissenters such as Francis Newman and William Carpenter[79]. Powell's shifting opinions about the methods of modern science and his advocacy of the integration of naturalistic science into the Anglican world-view were also a means of strengthening the authority of the scriptures and of the Anglican establishment. This type of strategy reveals the ebb and flow of the revolutionary fear amongst the ruling elite since the beginning of the Century, and stands as a testimony of how certain ideas that seemed unquestionably radical in one political context could be interpreted as acceptable in another a few decades later.

This first part aims to examine Pietro Corsi and Adrian Desmond's complementary theses that scientific ideas served as political levers in the context of Carpenter's personal and professional development. It postulates that Carpenter's career was defined by an effort to integrate the Establishment rather than to resist it, and that his integration was helped by the new climate of assimilation of dissenting agendas. If according to Pietro Corsi, Baden Powell understood that resisting the methods of inductive science would do more harm than good to the religious establishment, and if, according to Adrian Desmond, not alienating the "Gower Street radicals" was of strategic interest to the Tory elite, how in practice did moderate Dissenters such as William Carpenter navigate these political waters and find their place within the shifting agendas of the main British intellectual

[79] See P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*.

institutions? The fact that William Carpenter's life and career spanned this crucial mid-century period when --as Boyd Hilton put it, the "mad bad and dangerous people" of Britain avoided revolution and transitioned towards a more democratic bi-partite political system, "waking up one morning to find themselves respectable"[80]-- enables us to test the notion of a centre-right shift of previously radical actors, and conversely of a centre-left shift of the ruling elite through the integration of previously radical actors and ideas.

In *The Politics of Evolution*, Adrian Desmond identified two different types of Unitarian reformers: the radical anti-establishment militants on the one hand, and the more moderate, placid Whigs on the other—a category which Carpenter undoubtedly falls into. However, despite dwelling on Carpenter's education in the radical London of the 1830s, Desmond does not identify Carpenter's views precisely[81]. It must also be noted that it is still somewhat problematic to speak in unqualified terms of 'radicalism', perhaps even more so of the "middle class" itself. Historians such as John Seed and more specifically David Nicholls[82], while charting the various trends in social history that have used the concept uncritically, have underlined this issue in the context of post-modernist historiography and its distrust of all-embracing concepts[83]. Although it is not possible to propose a clear-cut definition of 'class' that can be used as an analytical concept, many scholars agree

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80 B. Hilton, *A mad, bad, and dangerous people? : England 1783-1846*. p. 38

81 Adrian Desmond's hypothesis that evolutionary ideas were embraced by radicals because they helped justify their ideal of an upwardly mobile society, will be examined in chapter II of this thesis, which deals more specifically with the contents of Carpenter's work as a naturalist and with his take on evolutionary ideas in particular.

82 See: D. Nicholls, "The English Middle Class and the Ideological Significance of Radicalism, 1760-1886," *Journal of British Studies* 24.4 (1985), J. Seed, "Unitarianism, Political Economy and the Antinomies of Liberal Culture in Manchester, 1830-50," *Social History* 7.1 (1982), A. Kidd and D. Nicholls, eds., *The Making of the British Middle Class?* (Stroud, 1998).

83 For a thorough analysis of these trends in historiography, in relation to the concept of the British "middle classes", see the introduction (pp. xi-xxxix) in A. Kidd and D. Nicholls, eds., *The Making of the British Middle Class?*

as to a certain approach that must be taken when handling the term, so as to avoid anachronism and artificial categorisations: so long as historians acknowledge the fluidity of the term and the many overlapping factors and networks –local, national, international, economic, cultural, personal-- that come into play in the construction of a particular group or person, it is a concept that may still be used for the sake of simplicity. It is in this spirit that the current analysis uses the term 'middle-class' and studies the various influences and factors that made William Carpenter the personality and thinker that he was.

Where the term 'radical' is concerned, the main criticism that has been voiced since the 1980s by John Seed and Paul Adelman is that historians have tended to concentrate more particularly on working-class radicalism, much less so on middle-class radicalism. In the case of middle-class Dissenters more precisely, the label of 'radicalism' can be additionally complicated by the fact that:

> In the early years of the nineteenth century, the English Dissenting communities were, at least politically, largely quiescent. This was partly due to their attempt to dissociate themselves from the charges of subversion in an age of war and social unrest; partly because of a renewed concentration on their evangelical mission.[84]

These various considerations must therefore be taken into account in order to offer a more accurate and objective portrait of Carpenter as a member of a wealthy middle-class Unitarian congregation from the 1820s until the 1840s in Bristol, and subsequently in Hampstead, London.

The most important parameter to bear in mind as a preliminary overview of the question is the fact that nineteenth-century Unitarianism does not fall under any straightforward definition. Writing to Joseph Estlin Carpenter in 1884, James Martineau explained how difficult it was to give a clear-cut description of the community:

[84] P. Adelman, *Victorian Radicalism* (London, 1984). p. 67

> The uniting principle, in virtue of which this has been possible without prejudice to the continuous identity of the congregation, is a profound faith in Christian communion unconditioned by concurrence in the articles of a distinctive theology; and a consequent conviction that it is the duty of churches to close no question on which Christians are divided, but to leave open to the future the progressive thought. (…) The historical result has been, that Religious Sympathy (…) has proved compatible with a wide range of divergence in opinion, not only successive, but contemporaneous. When I was a Minister in Liverpool, there were Trinitarians among the regular members of the congregation; and though I always called myself a "Unitarian" when I had occasion to define my theological position, I would never, without protest, allow the congregation or the Chapel to be called so. "Unitarians" are, in fact, like "Necessarians" or "Molinists," or "Republicans", a scattered set of individual thinkers, who may be found in many ecclesiastical connections, and not an organised sect, for which there is any medium of authoritative speech. These scattered and unorganised people have, no doubt, one point of belief in common, the Unipersonality of God; and on all other points, as well as on the interpretation of this, they have a various literature, all of it unorthodox, but in different degrees and directions.[85]

In addition to this disparate nature of the community, Unitarian theologians were promoting what R. K. Webb has called a "doctrinal revolution[86]". Indeed, by the end of the first third of the century especially, influential Unitarian theologians such as James Martineau and John Hamilton Thom (who were close friends) were resisting the eighteenth-century Priestleyian rationalism that had come to characterise the creed, developing a 'new school' of Unitarian thought that strove to rehabilitate the power of emotion over that of the truth-seeking intellect. According to Thom, the scientific religion that Unitarianism had become laid too much emphasis on law and intellect, instead of giving the Christian worshipper the status of a 'conscious and spiritual child' in front of God the Father. The only light worth seeking was not the objective light of truth but "the light that warms, the light of life and sacrifice."[87] A rift between more 'traditional' rationalist Unitarians who remained attached to the materialist doctrine of necessitarianism[88] on the one hand, and the new idealistic

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[85] J. Drummond, *The Life and Letters of James Martineau*, vol. 2 (Hong Kong, 2013). pp. 70-71

[86] R. K. Webb, "The Unitarian Background," *Truth, Liberty, Religion. Essays celebrating Two Hundred Years of Manchester College*, ed. Barbara Smith (Oxford, 1986). p. 18

[87] R. K. Webb, "John Hamilton Thom: Intellect and Conscience in Liverpool'," *The View from the Pulpit: Victorian Ministers and Society*, ed. P. T. Phillips (Toronto, 1978).

[88] Many Unitarians, including Carpenter's father Lant, adhered to David Hartley's (and consequently also Joseph Priestley's) necessitarian views. Hartley's philosophy posited a deterministic model in which the world obeyed laws of nature, and similarly, the human will was determined by a combination of motives rather than by free choice. This postulate is discussed at length in chapter 3 of this thesis.

Unitarians who sought a more emotionally satisfying interpretation of the creed rapidly developed from the 1830s onwards.

Pietro Corsi has demonstrated the important role played by the former Catholic theologian and religious refugee Joseph Blanco White (1775-1841) at the beginning of the nineteenth century in the movement of Anglican reform led in Oxford by the "Oriel Noetics" [89]. Having left Spain for England after coming to reject several Catholic dogmas, Blanco White embraced Anglicanism and was seminal in shaping the thought of the Noetic circle at Oriel College which comprised thinkers such as John Henry Newman, Edward Pusey and Richard Whately[90]. Though Blanco White's intellectual trajectory has not yet been studied in detail, it appears that he distanced himself from the Oxford circle in the early 1830s as the Tractarian movement took shape, and sought refuge from his Oriel friends' increasing Catholic leanings among the Unitarian community of Liverpool. It is known that by 1835 he had developed a close friendship with John Hamilton Thom, with whom he corresponded. Blanco White's position can be taken as a yardstick to measure the shifting views of reformist trends within both the Anglican and Unitarian Churches. The alliances he formed both with the Oriel Noetics on the one hand, and the Liverpool Unitarians on the other, seem to reflect a certain degree of convergence of both groups towards a more philosophical and a more elitist interpretation of their respective denominations, in the hope of reviving them. A

[89] The Oriel Noetics were a group of free-thinking Anglican High-Church proponents who sought to reform Anglican theology in the early decades of the nineteenth century. Uniquely, they blended Natural Theology and Political Economy. One of Whateley's pupils, Nassau William Senior, became the first Drummond Professor of Political Economy upon the creation of the professorship in Oxford in 1825.

[90] P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. p. 85-86 For an analysis of the influence of the ideas of Dugald Stewart and Scottish Common Sense philosophy on the Noetic Circle, see: P. Corsi, "The Heritage of Dugald Stewart: Oxford Philosophy and the Method of Political Economy," (1988), <http://hsmt.history.ox.ac.uk/staff/documents/dugald_stewart_pol_econ.pdf>.

future study of the exchange of ideas between Blanco White and Thom following the splintering of the Oriel Noetics into Tractarians and non-Tractarians, would provide stimulating insights into the influences shaping Thom and Martineau's new Unitarianism.

R. K. Webb attributes this dramatic bifurcation in the Unitarian creed to two main factors. The first one is the influence of German biblical criticism and the threat it represented for a faith based on biblical revelation, which was considered by many to be a problematic claim to Christianity on the part of the Unitarians to begin with. If they maintained the emphasis on rational criticism as one of the central pillars of the Unitarian faith in this new intellectual context, Unitarians risked destroying the very edifice it was meant to support. The second reason identified by Webb, was the fact that Unitarians were no longer discriminated against[91]. After the Doctrine of the Trinity Act of 1813, the repeal of the Test and Corporation Acts in 1828 and the Dissenters' Chapel Act of 1844[92], it became easier for Unitarians to enjoy social mobility and many began moving (and marrying) into Anglican networks, whose religious practice also began to rhyme with wealth and social ascension for the newly socially mobile Unitarians. Thus, from the end of the eighteenth century, and more specifically after the legalisation of Unitarian belief at the beginning of the nineteenth century, the traditional Anglican establishment began actively absorbing Unitarian elements. It was to stem this potential haemorrhage, Webb argues, that thinkers such as Martineau strove both to enrich and to tighten the main tenets of their creed.

[91] R. K. Webb, "The Unitarian Background."p. 19

[92] This act can in itself be taken as a sign of the growing political influence of the ever-wealthier Unitarians by the end of the eighteenth century.

Carpenter's particular evolution exemplifies these many parameters that need to be taken into account when examining Unitarian thinkers in the nineteenth century. Caught between dissenting pride and the wish to become integrated into the Mid-Victorian social and intellectual establishment, Carpenter's personal and professional itinerary chart the type of progression that was increasingly becoming possible for middle-class dissenters by the first third of the Century. Brought up by his influential father along the lines of Eighteenth-Century rational religion, and himself father to a son who would in turn open up and profoundly re-define Unitarianism[93], Carpenter is an interesting starting-point from which to analyse the spectrum of Unitarian beliefs that fanned out during the century[94]. Inspired by James Martineau on the one hand, and by Theodore Parker's biblical criticism on the other, at times troubled by religious doubts and worldly temptations, and working within changing institutional parameters, Carpenter's case illustrates one of many possible stances at a time of denominational flux.

Chapter 1. A short definition and historical overview of Unitarianism

Before analysing Carpenter's scientific career in the light of the specifically Victorian social and ideological dynamics outlined above, it seems essential to give a brief summary of the history of the Unitarian denomination itself. Scholarship on the question, which is limited compared to studies devoted to other Protestant

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[93] Carpenter's son Joseph Estlin Carpenter (1844-1927) became the principal of Manchester College in Oxford in 1906. His comparative approach to religions influenced the ecumenical approach taken by present-day Unitarianism.

[94] A recent study by Stephen Burley of William Hazlitt (1778-1830)'s work and writing also addresses the need to recognise "denominational difference and theological nuance" within the Unitarian community by the end of the eighteenth century. Comparing Hazlitt's writing and style to that of his influential father, Burley charts the generational gap and intellectual legacy between the rational Unitarianism of the eighteenth century and Hazlitt's own romanticism. See: S. Burley, *Hazlitt the Dissenter. Religion, Philosophy and Politics, 1766-1816*, Studies in Modern History, ed. J.C.D. Clark (New York and Hampshire, 2014).

denominations, would greatly benefit from more research into the roots and the spread of the denomination in Europe from the Reformation onwards. Such additional research did not fit into the scope of the present study however, and the sketch presented here is based on the work of other researchers from the late nineteenth century until today, in particular that of Gaston Bonet-Maury, David B. Parke, Leonard Smith, Andrea Greenwood and Mark W. Harris[95].

When stripped down to its simplest stance, Unitarianism amounts to the belief that the Christian God is one, and thus cannot be divided into various substances. Consequently, Unitarians consider Jesus to be human rather than divine, and hold the Holy Spirit to be a synonym and manifestation of the deity. This standpoint is based on the argument that when placed under close scrutiny, the earliest known version of the Bible does not offer any clear ground for Trinitarian belief. According to this view, Jesus's nature was purely human, but his superior moral qualities and ability to reveal the truths that lead to salvation have gained him the *honorific* status of "Son of God". Eighteenth and nineteenth-century Unitarian writings define God's main attributes as being universal love, as well as the ultimate power behind all phenomena through the workings of natural laws. The Bible is seen to offer scriptural Revelation, but this Revelation must be guided by each individual Christian's ability to reason and discern the truth critically. Finally, and in stark contrast with Calvinist doctrines for example, Unitarians consider man to be free and responsible before God and not predestined, nor in any way prisoner of sin. The worth of each Christian believer is judged according to their moral efforts,

[95] G. Bonet-Maury, *Des Origines du Christianisme Unitaire chez les Anglais* (Paris, 1881). D. B. Parke, *The Epic of Unitarianism* (Boston, 1957). L. Smith, *The Unitarians, A Short History*. A. Greenwood and M. W. Harris, *An Introduction to the Unitarian and Universalist Traditions*.

rather than according to their adherence to dogma or any prescribed opinion, and infant baptism was thus generally not practised[96].

Strands of liberal Christianity more generally, as well as evidence of anti-trinitarian thought more specifically, can be traced back to the earliest periods in the history of Christianity. Writers usually refer to the Alexandrian priest Arius (256-336) as the earliest outspoken critic of the belief in the divinity of Christ because Arius rejected the notion that Jesus was God and hence co-eternal, claiming the lack of clear scriptural evidence of this notion in the Bible and supporting the belief that Jesus was merely a human being --albeit a morally perfect one. Arius's ideas were officially rejected as heresy during the First Council of Nicea in 325 AD under the Roman Emperor Constantine I. This event, known as the 'Arian Controversy', features as the earliest reference to a dispute over the divinity of Christ and led to the formal adoption by the early Church of the 'Nicene Creed'[97] according to which the Father and Son were of the same divine substance.

The next overt references to anti-trinitarian views date back to the Sixteenth Century amidst the theological turmoil of the Reformation. Such ideas can be found first of all in the writings of the Spaniard Michael Servetus (1511-1553)[98]. His 1531 accusatory book *On the Errors of the Trinity* in which he called for the "blasphemous and philosophical distinction of three beings in one God" to be

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[96] Bonet-Maury argued that Dutch Anabaptists inspired by Erasmus may have had an influence on early Unitarian thought during the Reformation and that both denominations shared many principles. See: G. Bonet-Maury, *Des Origines du Christianisme Unitaire chez les Anglais*. Chapter 2, p. 50

[97] This Creed was reaffirmed during the Council of Constantinople in 381 AD, the second ecumenical council in Christianity. It can be noted that Arianism –by contesting certain ideas--played no small part in shaping and consolidating some of the most fundamental dogmas of the early Church. Greenwood states that "After this, Arianism disappeared among the Romans, but persisted among the Visigoths and other tribal invaders. It was firmly rooted in what later became the Eastern Orthodox Church, perhaps contributing to the split with the Latin West." See: A. Greenwood and M. W. Harris, *An Introduction to the Unitarian and Universalist Traditions*. p. 16

[98] Greenwood and Harris suggest that reticence towards the concept of the Trinity must have been fairly widespread in Spain at the time due to the high portion of Jews and Muslims who had converted to Christianity.

"rooted out from the minds of men[99]" earned him a life of exile in France[100]. The rise of the Inquisition in Italy in the second half of the Sixteenth Century also forced Italian reformers to flee the country, and many followed ancient Italian trade routes as far as Poland. One of these Italian free thinkers who settled in Krakow (where Italian Renaissance culture was very much in vogue at the time) and who read the work of Servetus, was Laelius Socinius (1525-1562), from a family of influential jurists in Sienna. His nephew, Faustus Socinius (1539-1604) who settled in Poland in 1580, inherited his library and developed his own Unitarian views, causing the denomination to be referred to "Socinianism" up until the eighteenth century thanks to his influential theological treatise known as the *Racovian Catechism* published in 1605[101].

In the meantime, Unitarianism had spread to Transylvania, most probably under the influence of another Italian humanist and reader of Servetus, Giorgio Biandrata (1516-1588). A physician and expert on women's diseases, Biandrata had initially moved to Poland to serve the Milanese Bona Sforza who was married to the King of Poland Sigismund the First. Biandrata then moved to Eastern Hungary (also known as Transylvania), when the Queen's daughter Isabella married the King of Transylvania. Isabella soon became the regent of the kingdom when her husband

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[99] See the extracts of Servetus's original works presented by D. B. Parke, *The Epic of Unitarianism*. p. 6

[100] In France Servetus worked as an editor, going by the pseudonym "Michael Villanovanus". In 1546 he published a second controversial book, *The Restoration of Christianity,* which caused his true identity to be recognised, and let him to be questioned in Paris by the Inquisition. Attempting to flee to Italy, Servetus was later arrested in Geneva where he died on the stake at the hands of Calvin (with whom he had been engaged in theological debate since the publication of his *Restoration*). His death caused great consternation to other liberal protestants such as the Frenchman Sebastian Castellio (1515-1563) who was also living in exile in Basel and who deplored Calvin's dogmatic rigidity.

[101] Faustus Socinius was instrumental in federating the growing number of Polish Unitarians amidst a climate of religious toleration established in Poland by the Confederation of Warsaw, which had issued a new coronation oath in 1573 stating that no person should be oppressed by reason of his religion. By the 1660s however, this climate of peaceful religious cohabitation had evaporated and Polish Unitarians came under fire both from Jesuits and from Calvinists, thus having to convert or go into exile.

died only a few weeks after their son's birth in 1540, and was guided in her new task by Biandrata, amongst others. When old enough to rule, Sigismund the Second (1540-1571) became the first and only Unitarian monarch in history, and upheld his mother's ethic of religious tolerance, promulgating for example an edict of religious tolerance in 1563 to back Isabella's Diet of Kolozsvar which had placed Lutheran and other Protestant faiths on an equal footing in 1557. Biandrata also served as physician and counsellor to the young king. It is also important to note that both Queen Isabella and her son had the favour of the Ottoman emperor Suleiman the First, which raises questions about the influence of Muslim ideas in a country at the crossroads between two major empires of East and West[102]. Greenwood and Harris note that:

> Suleiman then controlled much of lower Hungary, but allowed Isabella and her son to rule Transylvania. He likely preferred a small independent country on the border to a much stronger empire that might threaten him militarily. A further relationship has been suggested by the British Unitarian historian Alexander Gordon, who claimed the word "Unitarian" was commonly applied to Islam, and may have been used to associate the anti-Trinitarians with the Muslims as believers in "an onely Sovereign God", or Unitarian in it broadest scope.[103]

The most famous Transylvanian Unitarian, who became Bishop of Kolsozsvar in 1565, was Francis David (1510-1579), also a pupil of Biandrata's. However, the Golden era of Unitarianism in the country ended with his death in 1579, and the denomination was weakened by the Jesuit leaders of the Catholic Counter-Reformation as well as by the battles between Austrians and Turks over Transylvanian territory. Despite an agitated history, the denomination nevertheless managed to survive until today in present-day Romania.

Gaston Bonet-Maury, the late-nineteenth-century French Protestant historian of freedom of consciousness in European Christianity, has argued that Unitarianism

[102] The same questions about the influence of the Muslim creed on early Unitarian thought can be asked about Servetus's own ideas, due to the pervasive influence of Muslim culture in Spain at the time.
[103] A. Greenwood and M. W. Harris, *An Introduction to the Unitarian and Universalist Traditions*. p.26

-- though probably indigenous to Britain too-- might have spread geographically through Europe to Britain. This view goes against the one taken by certain British historians, such as for example the Unitarian historian Alexander Gordon who held that Unitarian views emerged entirely independently in Britain. Indeed, opponents of Maury's theory argue that Britain offered fertile ground for the independent emergence of Unitarian ideas due to the heritage of religious sects such as John Wycliffe (1320-1384)'s Lollards in fourtheenth-century England. The Lollards are usually described as pre-Reformation reformists, a rebellious group who were suspicious of the doctrine of the Trinity and insisted on the priority of the scriptures over other religious authorities, prompting Wycliffe to translate the Bible into the vernacular.

The other thinker associated with early British anti-trinitarianism is John Biddle (1615-1662). Though he later translated some of Socinius's works from Latin into English, Biddle claimed to have arrived at his own anti-trinitarian views simply through reading the Bible, before becoming aware of any other Unitarian literature[104]. Between being imprisoned and later banished to the Isles of Scilly by Oliver Cromwell, Biddle organised a congregation in London, which is considered to have been the first Unitarian meeting in Britain.

As Bonet-Maury and Leonard Smith suggest however[105], it seems likely that British Unitarianism was inspired both by native and foreign ideas, and that Unitarian writings as well as individuals circulating in Europe due to the Socinian diaspora of the mid Seventeenth Century, enabled British homegrown Unitarianism to gain followers and theological substance. Maury's most compelling argument in

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[104] In 1647, Biddle published J. Biddle, *XII Arguments Drawn out of the Scripture: wherein the Commonly Received Opinion touching the Deity of the Holy Spirit, is clearly and fully refuted* (London, 1647). In this book, Biddle sought to establish the unity of God by arguing that, based on the scriptures, the Holy Spirit must be understood not as God, but only as a manifestation of God.

[105] L. Smith, *The Unitarians, A Short History*. Chapter 9, pp. 59-64

favour of the cross-fertilisation of continental and English Unitarian views is his study of the population of European Protestant refugees who made up the congregation of the "Strangers'Church" in London[106]. Bonet-Maury estimated that there were some 3 000 foreign Protestants in London in 1550, chiefly from Holland, France, Italy and Spain. Laelius Socinius was one of the members of the Stranger's Church, as were the Arian Giacomo Aconzo and the follower of Servetus Cassiodoro de Reyna.

The Seventeenth and Eighteenth Centuries were two centuries of theological development and refinement of British Unitarianism. Despite tumultuous political times, the denomination was able to continue growing, to establish its own identity, and to set up training academies for Unitarian ministers, especially after the passing of the Act of Indulgence in 1687 under James the Second, shortly followed by the 1689 Act of Tolerance ushered in by the new Hanoverian rulers upon their arrival to power. This act allowed the building of meeting houses and chapels and is usually understood as an attempt to improve the situation of Dissenters who had been driven underground by the 1662 Act of Uniformity passed upon the restoration of the Monarchy. John Locke, who is said by many Unitarian Historians to have had Unitarian leanings[107], with his 1689 *Letters concerning Toleration*, is considered

[106] This congregation had been founded in 1547 at Austin Friar's Church by the Italian Protestant community in London under the leadership of Bernardino Ochino, and received the backing of the Archbishop of Canterbury and leader of the English Reformation Thomas Cranmer in 1548. Bonet-Maury, relying on a typically French metaphor, called this church the " yeast that made the dough of English Unitarianism rise". (My translation from: "a été, dans le corps de l'Eglise d'Angleterre, le levain qui a fait lever toute la pâte"), see: G. Bonet-Maury, *Des Origines du Christianisme Unitaire chez les Anglais*. p. 82

[107] The same is also said about Isaac Newton, whose Arianism has been discussed by several scholars. See for example: E. B. Davis, "Newton's Rejection of the "Newtonian World View": the Role of the Divine Will in Newton's Natural Philosophy," *Science and Christian Belief* 3.2 (1991). See also the classic works: F. E. Manuel, *The Religion of Isaac Newton* (Oxford, 1974). And R. S. Westfall, *Never at Rest. A Biography of Isaac Newton* (Cambridge, 1983).

instrumental in promoting the general spirit of religious freedom and rational enquiry which gave renewed momentum to Unitarian thought[108].

Excluded from the ancient universities by the Test Acts, the main dissenting denominations formed their own centres of intellectual training and excellence in the twenty-three or so Dissenting Academies that flourished throughout the country at the end of the Seventeenth Century. From the onset, these academies distinguished themselves from the old universities by offering adaptable and innovative curricula in which modern languages, science and applied mathematics found their place and were taught in English as well as in Latin. The fact that many of these academies also served to educate students for the professions as well as for commerce and industry, ensured that the curricula were kept up-to-date with the scientific and technical needs of a new industrial society. It was in the last quarter of the eighteenth century, no doubt thanks to these rising intellectual centres, that British Unitarian theology crystallised under the influence of thinkers such as Joseph Priestley (1733-1804), Theophilus Lindsey (1723-1808) and Thomas Belsham (1750-1829). As has been pointed out by John Seed, those intellectuals, who had been trained in dissenting academies, had been heavily influenced by the rationalist undercurrents that were increasingly stirring debate within the Presbytarian and General Baptist congregations in England during the first two quarters of the eighteenth century (as would also be the case in Methodist congregations during the last decades of the Century). According to John Seed, the rise in theological debate

[108] René Pomeau, writing about Voltaire's deism, argues that the French philosopher was also a great admirer of Unitarianism, citing his letter n° 7 (*Lettres Philosophiques ou Lettres Anglaises*) published in 1734 and entitled *Sur les Sociniens, our Ariens, ou Anti-trinitaires*. See: R. Pomeau, *La Religion de Voltaire* (Paris, 1974). p. 116. It seems that several of the French "Philosophes des Lumières" held the Unitarians in high regard as fellow-deists and rationalists, as the article entitled *Les Unitaires* in Diderot and D'Alembert's famous Encyclopedia demonstrates. Written by Diderot's collaborator Jacques-André Naigeon, the entry claims the British Unitarians as fellow deists, who have chosen to keep their deism secret ("un pur déisme assez artificieusement déguisé") so as not to become social outcasts. See: J.-A. Naigeon, "Les Unitaires," *L'Encyclopédie*, ed. Diderot; D'Alembert, vol. 17 (Paris, 1765).

within these congregations due to rational interpretations of the creed mostly led to the gradual shedding of ministers and members, many of whom were absorbed by Unitarian meetings when they did not found separate Unitarian congregations themselves[109]. The watershed moment in the emergence of a visible Unitarian community in England is often considered to be the 1719 Salter's Hall Controversy during which two Quaker ministers, most notably James Peirce (1674-1726) of St James's Meeting in Exeter, were taken to task for allegedly supporting Arianism. The failure to reach a compromise led to theological splits within Dissent that accelerated the transition towards Unitarianism for many individuals.

Leonard Smith mentions the ultimate decline of the Dissenting Academies at the end of the eighteenth century without suggesting any reasons for this phenomenon[110]. Drawing on John Seed and R.K Webb's hypotheses of a slow absorption of many Dissenters into Anglican circles by the end of the eighteenth century, it may be conjectured that these social dynamics were the reason behind the gradual closure of eighteenth-century Dissenting institutions of higher education. It was due to the closure in 1786 of one of the most renowned Academies, the Warrington Academy in Cheshire where Joseph Priestley (1733-1804) worked as a tutor, that the Manchester Unitarian Academy was founded that same year. This institution would go on to be the most important centre of Unitarian learning up to today, where it now forms part of the University of Oxford under the name of Harris Manchester College.

Due to the political upheaval of the Seventeenth Century, and due to the revolutionary agitation among Unitarians towards the end of the eighteenth century,

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[109] J. Seed, "*The Role of Unitarianism in the Formation of Liberal Culture 1775-1851: a Social History*," University of Hull, 1981. See especially pp. 7-23.
[110] L. Smith, *The Unitarians, A Short History*. pp. 76-77

Dissenters became viewed as a destabilizing force in the country[111]. Forced to flee to the United States in 1791 after the riots against him in Birmingham, Joseph Priestly contributed to strengthening the movement on the other side of the Atlantic. Unitarianism in the United States had grown out of the Arminian movement in New England and was spearheaded by William Ellery Channing and Joseph Tuckerman at Harvard. This largely rational Unitarianism, which was indebted both to local puritan theology and to British Unitarianism (preachers such as William Hazlitt Senior had contributed to its influence[112]), would later split at the beginning of the nineteenth century into rationalist Unitarians on the one hand and Transcendentalists (often referred to as the "Boston Transcendentalists", led by figures such as Theodore Parker, Ralph Waldo Emmerson, Henry David Thoreau and Margaret Fuller) on the other. Leonard Smith notes that:

> The conflict was in part generational. (…) The religion of Channing's generation had been scriptural, ethical, and rational (…) Now, under the influence of German philosophy and emerging Biblical criticism, new and broad questions were being asked. (…) The new school of thought began to suggest that religion was properly a matter of intuition, emotion, and faith[113].

The mutual influences of American Unitarianism and British Unitarianism in the nineteenth century have been discussed in detail by scholars such as J. D. Bowers[114], who have shown that although indebted to British thinkers initially, American Unitarianism was in turn able to shape British minds.

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[111] For a brief but thorough overview of Unitarian political agitation at the end of the eighteenth century, see the introduction in: R. Watts, *Gender, Power and the Unitarians in England, 1760-1860* (London, 1998).

[112] See: S. Burley, *Hazlitt the Dissenter. Religion, Philosophy and Politics, 1766-1816.*

[113] L. Smith, *The Unitarians, A Short History*. p. 140

[114] See: J. D. Bowers, *Joseph Priestley and English Unitarianism in America* (University Park, 2007).

Chapter 2. Carpenter's Unitarian background and education

In the light of the denominational history outlined above, and in order to understand the course of Carpenter's career, it is vital to begin by giving an account of the various influences and networks that shaped the scientist from his early upbringing to his later work as one of the most respected intellectuals and educators in London. The following section therefore highlights the major influences and turning points in William Carpenter's life by focusing on the events, individuals and ideas that made the strongest impression on Carpenter's thinking. It thus asks to what extent Carpenter's Unitarian background came into play in his social ascension, arguing that Carpenter's rise to professional prominence coincided with a shift in social and political acceptability of Dissenting groups in the second half of the Century.

2.1- The influence of Lant Carpenter

Carpenter's upbringing in one of the most notable Unitarian families of the early nineteenth century in Britain was a determining factor behind many of the scientist's later thoughts and choices. He was born in Exeter on the 29th of October 1813 to Anna Carpenter (d.1856), née Penn, and Lant Carpenter (1780-1840), a young Unitarian pastor who would go on to become one of the most influential Unitarian preachers in the first half of the Century, as well as the author of several books on education and theology[115]. Lant Carpenter needs to be presented in greater detail at the start of this analysis, since his towering intellect and powerful personality are the most obvious factors that influenced the development of William Carpenter's own ideas and undertakings.

[115] See for example: L. Carpenter, *Sermons on Practical Subjects by the Late Lant Carpenter*, W. B. Carpenter, ed., *Sermons on Practical Subjects by the Late Lant Carptner* (Bristol, 1840).

After leaving his hometown of Kidderminster for the town of Stourbridge to study under the guidance of his Unitarian uncle Benjamin Carpenter, the young Lant was sent to the Daventry Academy in Northampton, where amongst other tutors he was instructed by the famous Unitarian theologian Thomas Belsham (1750-1829). In 1798, at the age of 18, Lant Carpenter entered the University of Glasgow to study for the Ministry, and –prompted by his disagreement with the Calvinist theology that surrounded him-- undertook to study and question the evidences of Christianity contained in the Bible. His inquisitive and independent mind are what his son, the Reverend Russell Lant Carpenter, took most care to describe in his 1876 '*Memoir of the Reverend Lant Carpenter'*[116] and these qualities soon made Lant Carpenter emerge as one of the new Unitarian leaders of the Century. His analysis and defence of the scriptural grounds for Unitarianism, written in 1810[117] in response to an anti-Unitarian tract by the fellow of Oriel College (and royal Preacher at Whitehall) Daniel Veysie, prompted a public theological debate and established Lant's authority as a capable defender of the Unitarian creed.

At the beginning of his career, Lant Carpenter appears to have aligned himself with the eighteenth-century Unitarian spirit of political reform and contestation. When he became a minister of the George's Meeting Congregation in Exeter in 1805, his militant and reformist ardour became evident through his involvement in the political struggles of Dissenters to gain religious freedom and political acceptance. In 1813, the government's proposed Roman Catholic Relief Act, attempting to relax the anti-catholic laws in the country, caused outrage among

[116] See R. L. Carpenter, *Memoir of the Reverend Lant Carpenter* (London, 1875). p. 58

[117] These letters were later published in 1823 in the shape of a volume entitled: L. Carpenter, *Unitarianism and the Doctrine of the Gospel: A View of the Scriptural Grounds of Unitarianism* (Bristol, 1823). Veysie had initially replied to Carpenter's defence of Unitarianism in a volume entitled: D. Veysie, *Defense of the Preservative against Unitarianism including a Vindication of the Genuineness of the Epistle to the Hebrews in a Second Letter to Lant Carpenter, Occasioned by his Letters adressed to the Authpr Entitled "Unitarianism the Doctrine of the Gospel".* (Exeter, 1810).

the inhabitants of Exeter who like many Anglicans across the country rallied in protest "to petition Parliament against the Roman Catholic claims". Lant Carpenter came forward and unsuccessfully tried to negotiate the adjournment of the meeting, a failure which prompted him to engage in a public battle to support Catholic emancipation. The tone of his account of the event, published in the *Monthly Repository*, reveals his determination to oppose religious discrimination:

> Though we have been publicly charged with pursuing 'a crooked and mistaken policy'; though we have been held up to the odium of our fellow-inhabitants, by placards full of the vilest insinuations, and our names posted up as conspirators; I do not hesitate in the belief that we should cheerfully go over again the same track, if similar occasion for our exertion should arise.[118]

Indeed Lant Carpenter continued to "go over the same track" over the next few months and years, undaunted by criticisms often stemming from Dissenters themselves. Following the incident mentioned above, he and his supporters framed a petition for the abolition of all penal statutes respecting religious opinions, which he read to his Congregation, and which was afterwards presented to the House of Lords and the House of Commons. Later that year, a clause of the Religious Toleration Act-- which since 1689 had banned Unitarians from enjoying ecclesiastical, civil or military office-- was repealed by the passing of an Act for the "Relief of Persons who impugn the Doctrine of the Trinity". In response to the uproar triggered by this measure, (from the Anglican bishop of St David's in Wales for example), Lant Carpenter engaged in a long series of public correspondences to defend the cause.

In 1814 he also began to write a response to the anti-Unitarian attacks of the Reverend William Magee, fellow of Trinity College and Professor of Mathematics who was previously the Dean of Cork and would later become Archbishop of Dublin. Magee's *Discourses and Dissertations on the Scriptural Doctrines of*

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[118] See: *The Monthly Repository of Theology and General Literature*, January to December inclusive, vol. 8 (Hackney, 1813). pp. 218-219

Atonement and Sacrifice[119] contained an appendix criticising Thomas Belsham's latest edition of the New Testament[120]. Delayed by his various pastoral duties, his move to the Lewin's Meed Unitarian Meeting, and the setting up of his boarding-school in Bristol, Lant Carpenter was not able to complete the work before 1820. It was received by the *Monthly Repository* as a "triumph", an "*unanswerable* publication" and one of Unitarianism's "most masterly defences"[121]. It provides valuable insights into Lant's understanding of the Unitarian creed as well as into the main differences in opinion then observable among Unitarians. Through defending the thought of Joseph Priestley and Thomas Belsham, the two thinkers most stringently attacked by Magee, Lant Carpenter offered his own interpretation of several pivotal doctrinal points including those of the Atonement and eternal punishment, Revelation, immortality, the practise of baptism and Divine Providence. In constructing such a methodical and impassioned riposte, Carpenter reasserted Unitarianism as quintessentially Christian and Biblicist, while identifying the spirit of evidence-based enquiry and free-thought as the main common denominator of the creed. According to him, the lack of unity of opinion in terms of doctrinal interpretations was not to be taken as a sign of weakness or fragmentation, but as the

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119 W. Magee, *Discourses and Dissertations on the Scriptural Doctrines of Atonement and Sacrifice*, 1st American, from the 3rd and last London ed. (London, 1813).

120 Thomas Belsham had caused controversy by anonymously editing a translation of the New Testament in 1808 on behalf of the Unitarian Society. He was accused of disguising it (by using a confusing affiliation to 'A Society for the Promotion of Christian Knowledge and Virtue') as a book published by the well-known Anglican 'Society for the Promotion of Christian Knowledge', so as to draw readers in who might otherwise have been put off by the Unitarian label. The aim of this translation was to strip the Bible of layers of accumulated dogma by returning to the earliest texts and systematically subjecting them to a historicist reading. In doing so Belsham drew up a distinction between the "received Canon" and the "true Canon" based on a chronological overview of the various translations of the Bible, ultimately classifying some of the texts as having a "disputed" authority, such as the Epistle to the Hebrews or the Book of Revelation, amongst others. See: T. Belsham, *The New Testament in an Improved Version upon the Basis of Newcome's New Translation with Corrected Text and Notes Critical and Explanatory. Published by a Society for Promoting Christian Knowledge and the Practice of Virtue, by the Distribution of Books* (London, 1808).

121 *The Monthy Repository of Theology and General Literature*, vol. 16 (Hackney, 1821). p.p. 109-110.

solid rock on which the very identity of the denomination rested. Agreeing to disagree, or "absolute doctrinal individualism" to use John Seed's expression[122], was thus the main Unitarian safeguard against the perversion of divine Truth by human idolatry and dogmatism. Detaching the belief in Revelation from the notion of *scriptural* Revelation was the best way of remaining faithful to the "Word of God":

> And we cannot recognize, as a criterion by which to try our reverence for the Scriptures, the authority of any Church, or of any individual, pronouncing that a particular book, or a particular passage in it, is genuine. This is a matter of *evidence*; and our belief is to be decided by evidence, and not by authority. We may err in our judgements on such subjects, and yet our errors arise from a conscientious desire not to receive for the declarations of God the doctrines of men; in other words, from the profoundest reverence for the Word of God, and solicitude to know what it really is.[123]

In December 1815, with the same militant spirit, the young pastor preached a sermon in support of the French Protestants, who were then suffering under the 'White Terror' induced by the Bourbon restoration in France. His point of view came under fire again and he once more found himself publicly jousting over the topic of religious toleration. Similarly, one of his other long-standing battles in favour of greater inclusiveness was to have the restrictive clause which denied the label of Unitarians to Arians removed from the preamble to the rules of the Western Unitarian Society. This modification was implemented in 1831. Arians, who derived their name and several of their convictions from the previously-mentioned fourth-century Alexandrian priest Arius, rejected the doctrine of the Trinity and viewed the

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[122] J. Seed, "Unitarianism, Political Economy and the Antinomies of Liberal Culture in Manchester, 1830-50." p.3. This notion was also famously expressed by the Unitarian preacher William Johnson Fox (1786-1864) who exclaimed: "Let sects enforce uniformity, and chain the mouths and the minds of their members – it is for Unitarians to cherish independence of thought by the free expression of individual opinions. (…) The worth of Truth, if not altogether dependent upon, is yet materially enhanced by, its personal acquisition." See: W. J. Fox, *On the Character and Writings of the Rev. T. Belsham* (London, 1830). p. 49 (originally published in the February 1830 issue of the *Monthly Repository*)

[123] L. Carpenter, *An Examination of the Charges Made Against Unitarians and Unitarianism and the Improved Version by the Right Rev. Dr. Magee, Bishop of Raphoe* (Bristol, 1820). p. 83 (original italics) It is interesting to note that the Catholic Church formally separated the notion of Revelation from Scriptural Revelation in 1965, during the Second Vatican Council (see *Dei Verbum*, or the Catholic Constitution on Divine Revelation, 1965, which declares that "God, the beginning and end of all things, can be known with certainty from created reality by the light of human reason" Rom 1.20 DV 6).

Father as more important than the Son in the divine hierarchy. Furthermore, they held that Jesus was not made of the same substance as God, but was the incarnation of another divine pre-existing substance. By contrast, Unitarians held that "Christ had no nature but the human, though highly exalted above the rest of our race, by the perfection of his moral character and of his divine endowments."[124]

Lant's political and theological fervour explain why in August 1816 he was invited to become the pastor of the Lewin's Mead congregation in Bristol, in anticipation of the retirement of the pastor John Prior Estlin[125]. Despite being one of the largest and richest congregations in the country, by the start of the nineteenth century the Bristol Unitarian Meeting was in decline. According to Thomas Belsham, who encouraged him to accept the offer, only a man like Lant Carpenter had the charisma and convictions necessary to restore the Meeting to its previous glory. The following passage taken from the letter of invitation sent to Carpenter by the Lewin's Mead Congregation is an interesting document that gives the measure of the reputation Lant had already acquired by the first quarter of the century:

> Our city has been designated, by an eminent writer, as the nursery and hotbed of English fanaticism; and the particular sentiments which distinguish us as a religious community have to encounter a proportionate degree of misrepresentation and obloquy. We have therefore felt the necessity that our future pastor should not only be sincerely and conscientiously attached to the opinions which we profess, but well prepared also to defend them.[126]

Lant Carpenter accepted the offer and continued to voice his strong opinions after he moved to Bristol. In 1824, campaigning like many other Bristol Dissenters for the abolition of slavery, he drew up a petition addressed to the House of Commons "for

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[124] Citation taken from a letter by the reader J. T. Rutt to the *Monthly Repository* published on September 2, 1818. The author discusses the right of Arians to be considered as Unitarians since they share the "common cause" of Unitarians in opposing "that paradox of Trinity in Unity". See Anonymous, *The Monthly Repository of Theology and General Literature*, January to December inclusive, vol. 13 (Hackney, 1818). p. 615

[125] For another example of the type of public debates which the pastor became involved in, see: L. Carpenter, "Dr. Carpenter's Remarks on Dr. Stock's Letter with Animadversions by the Editor," *The New Evangelical Magazine and Theological Review* December 1817.

[126] R. L. Carpenter, *Memoir of the Reverend Lant Carpenter*. p. 86

the Amelioration of the condition of the Negro Slaves" and kept a copy of the document, addressed to his children, "to show his children how much must often be done before-hand to accomplish things which appear very easy." In 1830, during the three-day revolution in Paris against king Charles X, also known as "Les Trois Glorieuses" (The Three Glorious Days), Lant Carpenter was one of the main instigators of a public meeting in support of the French revolt. In 1831, he wholeheartedly welcomed the country's "Great Struggle for Reform" and spoke in support of the proposed Reform Bill, whilst nevertheless urging his fellow citizens to remain calm as Bristol edged towards civil unrest. It is clear from his various involvements that Lant Carpenter remained very much in line with the eighteenth-century Unitarian emphasis on rational judgement and political contestation.

2.2- The Bristol Unitarian network

Lant Carpenter, his wife Anna and their four young children had thus left Exeter for Bristol in 1817. William Carpenter, aged four at the time of the move, therefore grew up a Bristolian, and was shaped in his intellectual development by the connections he formed in that bustling city, amidst the lively intellectual circle that gravitated around his father's ministry. Archives testify to the central role played by the Carpenter family in the town's intellectual development at the time: they reformed existing Sunday schools, founded several schools themselves (first Lant Carpenter's Academy in 1817, then his wife Anna Carpenter's school for girls in 1829, followed by Mary Carpenter's Ragged School and Reformatory in 1846 and 1854 respectively), took part in popular lecturing and political speeches[127], and were one of the main driving forces behind the creation of the Bristol Scientific and

[127] During the 1831 Bristol riots, Lant Carpenter spoke publicly in favour of parliamentary reform.

Literary Society-- the legacy of which survives nowadays in the shape of the Bristol Museum[128]. The central location of the Carpenter's large family home at n°3 Great George Street, neighbouring the Mayor's house and the house of some of the richest sugar merchants in town, is another sign of the family's integration into what still nowadays remains the heart of the city. Another important episode reveals that Lant Carpenter was closely affiliated to Bristol notables: following the 1831 Bristol riots, he was called to testify as a witness during a court case involving his neighbour, Sir Charles Pinney, who resided at n°7 Great George Street and who was then the Mayor of Bristol. Pinney, along with several other Bristol magistrates, was publicly tried for neglect of duty as officer of the city during a seven-day trial at the Court of the King's bench in London, prosecuted by the Attorney General. The fact that Lant Carpenter was called as a witness, as well as the contents of his testimony[129], reveals how well connected he was to the town magistrates, with whom he was in close communication as they tried to handle the riots in October 1831. Sir Charles Pinney was later acquitted.

After moving to Bristol Lant continued to contribute to the Unitarian journal *The Monthly Repository* and the fact that he was visited by several important guests –most notably the Bengali reformer Rajah Rammohun Roy in 1831 and the Boston Unitarian Joseph Tuckerman in 1833—is a testimony to his wide intellectual influence both at home and abroad. Lynn Zastoupil has underlined the fact that "the

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[128] Lant helped bring this project to fruition in 1822, and his signature features on the sales contract when the Philosophical and Literary Society sold their premises to the Freemasons in 1824.

[129] For a full transcript of Lant Carpenter's testimony, see p. 122 in Guerney, *Trial of Charles Pinney, Esq. in the Court of King's Bench; On an Information, Filed by His Majesty's Attorney-General, Charging Him with Neglect of Duty in his Office of Mayor of Bristol during the Riots.* (London: 1833). In the same volume, Lant Carpenter is described as "a gentleman venerable in the highest degree for all his excellent qualities --well known to the public as one of the first of teachers and the most learned and ingenious of writers (…)", p. 378.

Unitarian movement was always a transnational phenomenon"[130] and has linked the late eighteenth-century vitality of the creed to the development of the British Empire which created renewed global possibilities for the diffusion of anti-Trinitarianism.

William Carpenter received his earliest training from his parents and three older sisters, whose intellectual standards were very high. As enlightened and well-educated members of the dissenting middle-class, they were proficient in French and German (his sisters Ana and Susan lived in Paris for several months in 1830), Latin and Greek, music, and were scientifically and politically literate. Carpenter's mother was described by her children as a woman of considerable intelligence who could advise her husband on any topic, and it is indeed telling of the kind of discussions that must have taken place under the Carpenter roof, that William Carpenter corresponded with his mother until her death to keep her informed in great detail of his most advanced scientific thinking[131]. His sister Mary Carpenter was a strong influence and source of pride from very early on, and remained so throughout William's life. As a young girl she worked as a teacher alongside her mother in Lant's Academy, where she herself had received a modern education on a par with the male boarders enlisted at the school. Similarly, William Carpenter was asked to step in as a tutor in chemistry during his adolescence, and thus began honing his lecturing skills from a very early age.

Lant Carpenter's school quickly became famous for its innovative curriculum in which, in accordance with the training dispensed in the Unitarian academies, modern languages and natural sciences were considered pillars of knowledge contrary to the contemporary emphasis usually laid on the teaching of

[130] L. Zastoupil, *Rammohun Roy and the Making of Victorian Britain* (London, 2010). p. 23

[131] See for example Carpenter's long letter to his mother about his theory of correlation of the vital and physical forces in 1849, in J.E Carpenter's *Memorial Sketch* p.50

classics. His pedagogical approach was praised by former pupils such as James Martineau[132] or Walter Bagehot and can be found explained in detail in his *Principles of Education*, published in 1820[133] and heavily indebted to the associationist philosophies of Locke, Hume and David Hartley. The influence of the internationally renowned Swiss pedagogue Johann Pestalozzi (1746-1827) and more particularly of the Unitarian writers and educators Maria Edgeworth (1768-1849) and Anna Laetitia Barbauld (1743-1825), are also acknowledged by the author and point to the existence of a specifically Unitarian educational tradition.

At the age of sixteen William volunteered to give a lecture on optics at the Bristol Mechanic's Institute, and it was also in Bristol, under the aegis of the Philosophical and Literary Society, that he delivered his first original paper in 1835 on *"The Structure and Functions of the Organs of Respiration in the Animal and Vegetable Kingdoms*[134]*"*.

2.3- A scientific and technological education

It is not surprising that the sixteen-year-old William Carpenter chose optics as the subject of his first public talk. Indeed a definite –yet so-far entirely overlooked– influence on the young Carpenter was the Birmingham and subsequently London-based family business in optics, successfully run (like many Unitarian businesses in the field of technology and industry) by Lant Carpenter's brother Philip (1776-1833). After the latter's premature death, the firm continued to prosper under the name of 'Carpenter & Westley', and was jointly owned and administered by Philip Carpenter's partner William Westley and Philip's sister Mary

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[132] James Martineau gave a laudatory account of his school days under the tutorage of Lant Carpenter in: R. L. Carpenter, *Memoir of the Reverend Lant Carpenter*. pp. 145-162

[133] L. Carpenter, *Principles of Education, Intellectual, Moral and Physical* (London, 1820).

[134] W. B. Carpenter, "On the Structure and Functions of the Organs of Respiration in the Animal and Vegetable Kingdoms," *West of England Journal* (1835).

(1787-1877), a woman of great intelligence who also took a keen interest in natural history[135]. Philip Carpenter, one of the leading scientific instrument-makers in Britain, had made a name for himself in Birmingham before moving to Regent Street in London in 1826, and owed his fame and success to being initially the sole authorised manufacturer of David Brewster's Kaleidoscope, which he first began to produce in 1817. Carpenter in fact jointly owned the patent and only relinquished his exclusive rights to manufacturing the famous object when he found he could no longer keep up with demand, having sold 200 000 kaleidoscopes in just three months both in Paris and London. Philip Carpenter also manufactured magic lanterns and achromatic microscopes– the latter still being much sought-after by collectors for their excellent quality and for the beauty of the Regency-style mahogany cases they were sold in[136]. Carpenter's success also stemmed from his 1821 invention of a 'Phantasmagoria Lantern' which projected a picture onto a thin muslin cloth suspended in the middle of a dark room, thereby creating the optical illusion of an image levitating in the air. Entertainment was indeed part and parcel of the optical business and Carpenter hosted exhibitions which drew numerous visitors to his London shop[137]: his famous 1828 "*Microcosm*" exhibition for example revealed to a bemused and sometimes horrified London audience what type of minute fauna could inhabit a drop of Thames water. Finally, his success and recognition were sealed with his invention of a means to mass-produce glass

[135] See "In Memory of Mary Carpenter", by Russel Lant Carpenter, Harris Manchester College Library, p.27

[136] Philip Carpenter's 'Improved, Opaque and Transparent Compound Microscope'- priced at £30 in the 1834 catalogue can be seen at the Museum of the History of Science in Oxford, along with several other items by Carpenter& Westley, as well a stereoscopic viewer that belonged to William Carpenter.

[137] See S. Talbot, "'The Perfectionist Projectionist': Philip Carpenter, 24 Regent Street, London," *Bulletin of the Scientific Instrument Society* 88 (2006).

projection-plates by printing the desired patterns onto the glass (which would then be hand-painted) thanks to an engraved copper plate.

The young technically-minded William Carpenter therefore grew up surrounded by the most cutting-edge scientific instruments of his day. As a medical student in London between 1834 and 1835, he also resided with his aunt Mary above the shop at n° 24 Regent Street. When he subsequently moved to London permanently in 1845, his aunt became the closest relation he had in the city and William kept a very close connection with her until her death in 1877. It seems plausible that he should also have had some share in overseeing the family business. Though Carpenter –ever the conscious social climber– made no mention of his uncle Philip the instrument-maker in his hugely successful manual of microscopy[138] (his 1856 *The Microscope and its Revelations*), it can reasonably be assumed that he gained a considerable amount of technical prowess and knowledge from his early initiation to the science of optics and that he derived the profound interest and expertise he later developed in microscopy from his uncle's trade and genius.

Technology was always of special interest to William Carpenter, who enjoyed handiwork, be it with his microscope or as he would demonstrate in later years --whilst dredging the seabed along the Scottish coast for example. His close and lasting friendship with the German-born engineer and businessman Sir William Siemens (1823-1883), one of the three Siemens brothers who established the Siemens telegraphic and steam-engine business in England, is another example of the life-long delight Carpenter took in studying new technologies. Indeed, as a

[138] See W. B. Carpenter, *The Microscope and its Revelations*. In the preface, Carpenter mentions "his own experience, which dates back almost to the time when Achromatic Object-glasses were first constructed in this country" (p.9, preface) but does not pay homage to his uncle's work. Perhaps he did not need to and remained silent on the topic out of modesty, since the firm Carpenter & Westley was quite famous in the country, but it is equally plausible that Carpenter elected not to remind his readers of his family's involvement in trade.

young child, a fascination and enthusiasm for the study of engineering was one of the earliest interests he expressed, prompting him to build model ships and meteorological instruments. This inclination might have been kindled to some extent by his life in Bristol, for the city of the engineers Marc Brunel and Isambard Kingdom Brunel, and of the inventors Sarah and Thomas Guppy[139], was throbbing with the pulse of technical innovation. But the young William's fascination for works of engineering was also nourished by Lant Carpenter's own enthusiasm for technical and scientific topics, which he taught and lectured on with great pleasure, as was fitting with the Unitarian interest in applied sciences vocally promoted by David Priestley during the eighteenth century. One anecdote in particular reflects Lant Carpenter's interest in new technologies, namely the fact that he chose to have his Unitarian Meeting equipped with gas-lighting as soon as he arrived in the city. John Breillat, a Unitarian benefactor of the Meeting who was the supervisor of the recently set up Bristol Gas Light Company (1815), helped the young minister achieve his goal, and by December 1817, a mere few months after the Carpenters had settled in town, Lewin's Mead Chapel was the first building in Bristol to be illuminated by indoor gas lighting.

Another crucially important dimension of Carpenter's Bristol years was his family's acquaintance with the Quaker doctor, anthropologist and philosopher, James Cowles Prichard (1786-1848) as well as with the pioneering eye surgeon John Bishop Estlin (1785-1855), who was the son of the previous Unitarian minister of

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[139] Sarah Guppy, née Beach (1770-1852) in Birmingham, was an inventor who contributed to developing new piling techniques for building suspension bridges, lending her patented design free of charge to engineers such as Thomas Telford. Having married the copper merchant Samuel Guppy, she lived in the Clifton area of Bristol and was a friend of Kingdom Isambard Brunel. She was informally involved in the Great Western Railways engineering projects and her son Thomas Richard, following in her footsteps, became a close associate of Brunel with whom he designed the ships SS Great Western and SS Great Britain. See: R. A. Buchanan, *Brunel: The Life and Times of Isambard Kingdom Brunel* (New York and London, 2002). pp. 200-202

Lewin's Mead and who also happened to be the brother in law of James C. Prichard. The latter, whose major work on the "varieties of mankind" shaped Carpenter's long-term approach to questions about the geographical distribution of species, must be considered a determining factor behind Carpenter's early interest in –and subsequent defence of– evolutionary theories, as will be developed later in this thesis.

John Bishop Estlin also played a crucial role in Carpenter's training as a doctor, perhaps mainly by providing a medical apprenticeship to the young Carpenter in 1828, when the pressures of a growing family were the hardest on Lant Carpenter. Though this meant that William had to give up his dreams of becoming an engineer, the experience of working under John Bishop Estlin's guidance was a stimulating one, for Estlin was a man deeply interested in reform and innovation of all kinds. A member of the Royal College of Surgeons since 1806, he was famous for being one of the earliest and most able ophthalmic surgeons in England, as well as an early promoter of vaccination—a subject William Carpenter held close to his heart until he died. In 1812 Estlin set up an eye clinic in the form of a charitable dispensary, and by 1848 had treated over 52 000 pauper patients through an institution which still continues to live on in Bristol up to this day. John Bishop Estlin was not just an influential member of the Bristol and British medical community, he was also an open critic of slavery, religious discrimination, and superstition. This typically Unitarian intellectual agenda, which he shared with the Carpenter family, must have sealed a friendship between him and his young apprentice. The fact that Estlin invited Carpenter to be his personal companion during a voyage to the West-Indian island of St Vincent in 1832 to improve his health (not to mention the fact that Carpenter named one of his sons Joseph *Estlin*

Carpenter) bears further witness to the important role Estlin played in Carpenter's intellectual development during his apprenticeship and early studies at the Bristol Medical School.

Chapter 3. Higher education and early career

3.1- Medical studies in London and Edinburgh

In the autumn of 1834, William Carpenter moved to London to further his medical studies at University College where he attended up to thirty-five lectures a week. One of the lecturers he found most impressive and inspirational, was the Scottish physician Dr. Robert Grant who had been offered the chair of comparative anatomy for life at University College in 1827. The importance of Grant's thinking and his influence on Carpenter's evolutionary views—like his influence on Charles Darwin– will be discussed in the relevant chapter on this topic, but needs to be underlined immediately as a further theoretical milestone in Carpenter's early intellectual development. Whilst in London, Carpenter also became deeply interested in Charles Lyell's *Principles of Geology* which he continued to hold up for the rest of his life as an example of scientific brilliance and epistemic courage.

In October 1835, after successfully passing his examinations to become Licentiate of the Apothecaries' Company and Member of the Royal College of Surgeons, William moved to Edinburgh to complete his medical training. The significance of his studies in "The Athens of the North" is very clearly stressed and explained by his son Joseph Estlin Carpenter in his *Memorial Sketch*. According to J.E. Carpenter, it was in Edinburgh that Carpenter encountered the freedom of thought and intellectual stimulation that most lastingly shaped the course of his future thinking under the guidance in particular of Professors William Pulteney

Alison, Professor Christinson, and Sir John Forbes, and influenced by the study of Kepler, Schiller, Herschel and Whewell's works, as will be discussed further.

What is less well known, is that during his time in Edinburgh Carpenter met the Scottish journalist and publisher Robert Chambers, who in 1844 anonymously published his sensational evolutionary book *Vestiges of the Natural History of Creation.* Correspondence between the two men found at the National Library of Scotland testifies to the hitherto suspected but unproved links between Carpenter and Chambers, an early acquaintance which paved the way for a closer friendship when Chambers moved to London in the 1850s. The main object of the correspondence however, was the terms of a publishing agreement: Carpenter wrote an encyclopaedia of natural science for Robert Chambers in 1842. What these letters bring to light is the fact that Carpenter insisted it should be published anonymously so as to preserve his chances of entering the realm of professional science. Indeed, from the end of his studies at Edinburgh in 1837, which were followed by several lectures on Natural History, a series of papers delivered before the Royal Medical Society of Edinburgh, and a prize M.D dissertation (which was read and translated into German by the celebrated Humboldt University physiologist Johannes Müller) on "*The Physiological Inferences to be deduced from the Structure of the Nervous System in the Invertebrate Class of Animals*"(1839), Carpenter's unswerving wish was to become a full-time researcher and academic.

3.2- Return to Bristol and career frustration

It seems that following his medical studies in Edinburgh, Carpenter struggled to establish himself professionally. After graduating in 1837 he returned to Bristol and set up a private medical practice whilst lecturing on Medical Jurisprudence[140] at the Bristol Medical School and occasionally on various topics to do with Natural History to general audiences at the Philosophical and Literary Institution. Alongside both jobs Carpenter supplemented his income through writing the *Popular Cyclopedia of Natural Science* published in 1841 by the Society for the Promotion of Popular Instruction as mentioned above[141], alongside his first physiological books: *Principles of General and Comparative Physiology* which went into a second edition in 1841 and which will be discussed at length in the next section of this thesis, as well as another volume entitled *Principles of Human Physiology,* published in 1842.

Soon the strain of dealing with a large number of patients became irksome for the ambitious young doctor who longed to return to strictly studious occupations. Judging by a number of allusions to his own impatient and gruff manner, Carpenter probably found the type of interactions required with patients tedious and emotionally taxing. He also reportedly found it difficult not to become distressed by certain cases he had to treat. His true wish was to devote himself to research and in effect he did not rest until he secured an academic position.

In 1840 the Carpenter family was hit by the loss of Lant Carpenter, who disappeared unexpectedly in circumstances that remain unclear and that suggest a possible suicide. Like many overwrought Victorians, the strain of his incessant activity proved difficult to bear for Lant Carpenter, and his mental health had been

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140 For a brief sketch of the history of forensic medicine –known as medical jurisprudence-- in England see: B. T. Davis, "George Edward Male MD, the Father of English Medical Jurisprudence," *Proceedings of the Royal Society of Medicine* 67.1-4 (1974). According to Davis, this branch of medicine was little developed in England compared to what could be found on the continent by the end of the eighteenth century, in Italy especially. It was not a prestigious discipline, though Bristol appears to have been an active centre in developing the tradition through the works of the physicians Dr. Samuel Farr and Dr. O.W. Bartley.

141 W. B. Carpenter, *Popular Cyclopaedia of Natural Science* (London, 1841), L. Carpenter, *Principles of Education, Intellectual, Moral and Physical*.

fragile for years. In the spring of 1840, he was sent on a trip to Italy to recover from his latest nervous breakdown but went missing one night from his cruise-ship. His drowned body was found washed up ashore several weeks later. This episode in the family's history seems to have impressed on Carpenter the notion of a filial duty which he set out to honour by taking up his father's intellectual and moral pursuits, a point that becomes important when examining Carpenter's allegiance to the philosophical and religious ideas taught by Lant Carpenter.

On the 24th of October 1840 William married Louisa Powell, from a Unitarian family in Exeter, and thus became connected with one of the great names of British metallurgy. Indeed his young wife was the granddaughter of Henry Cort Harold, the inventor of the iron-puddling process which he patented in 1784 and which so dramatically boosted the production of iron during the Industrial Revolution. William and Louisa's first son was born the following year, and four more boys would follow over the course of the next decade. It was during this time, with a young and rapidly growing family, that Carpenter first began what would remain his life-long study of the microscopical structure of shells. Determined to devote his energy entirely to scientific research, writing and teaching, and having begun to make a name for himself as a respected scientific writer, he was now pressed to find a more permanent academic position and applied for the Professorship of the Institutes of Medicine at Edinburgh, only to find himself declared an unsuitable candidate by the Town-Council and Lord Provost on the grounds of his Unitarianism[142]. Following this rejection, which caused bitter disappointment, Carpenter entered into a contract that proved to be the most imprudent move of his early career, and that almost cost him both his marriage and

142 J. E. Carpenter, "Memorial Sketch." p. 31

his reputation. This episode of Carpenter's life was tactfully glossed over by his son in his biographical account and thus remains mostly unknown.

3.3- Flirting with danger: William Carpenter, Lady Byron and Ada Lovelace or the pitfalls of social climbing

Lady Byron (1792-1860), the widow of the famous romantic poet Lord Byron, became a friend of Mary Carpenter's in the early 1840s. It is not quite clear whether she came to Bristol specifically to meet Mary Carpenter (she was a great admirer of Mary's edited collection of spiritual poetry and prose entitled *Meditations*[143], first published in 1842) or whether she initially visited the upmarket Clifton area with her daughter Ada to take the waters at the Hotwells springs. What is clear however is that by the early 1840s she had met both Mary Carpenter and her brother William, later becoming the main benefactor behind Mary Carpenter's pioneering Reformatory School for Girls which opened in Bristol in 1854, the same year as the Youthful Offenders Act was passed by parliament[144].

Indeed it was Lady Byron who in 1852 purchased the famous Red Lodge[145] that would serve as the main premises for the Reformatory. In a country where the penal system was only just starting to differentiate between adult and juvenile criminals, Mary Carpenter's endeavour to cater specifically to the needs of young

143 M. Carpenter, *Morning and Evening Meditations for Every Day in a Month*, 7th ed. (Boston, 1847).

144 This act of Parliament provided treasury for the setting up of reformatory schools, which juvenile offenders under the age of sixteen now had to attend for a period of two to five years, after an initial 'shock' of two weeks in prison immediately after their crime. The politician and later Recorder of Birmingham Matthew Davenport Hill, who had been pressing for such a reform for several years, did not agree with the prescribed two weeks in prison, but nevertheless considered the bill to be a major step forward. He worked closely with Mary Carpenter on the subject. Both his and Mary's works are fundamental documents for the history of the reform of the English penal system. See M. D. Hill, *Practical Suggestions to the Founders of Reformatory Schools* (London, 1855), M. Carpenter, *Reformatory Schools for the Children of the Perishing and Dangerous Classes, and for Juvenile Offenders* (London, 1851).

145 The Red Lodge, situated on Park Row in Bristol and previously inhabited by James Cowles Pritchard and his family, is now a museum where visitors can discover the spectacular Tudor wood-panelled rooms and learn about its educational past as Mary Carpenter's Reformatory.

delinquents could not have been possible without the involvement of wealthy philanthropists such as Lady Byron. Mary Carpenter's Domestic Mission amongst the Bristol poor (she founded a Ragged school in 1846) as well as her two Reformatories (her Reformatory for Boys opened in Kingswood in the Redland area of Bristol in 1857) were also backed by the Unitarian politician Matthew Davenport Hill (1792-1872)[146], a friend of Jeremy Bentham's and a close ally of Henry Brougham with whom he had cooperated for the creation of the *Penny Magazine*. Matthew Davenport Hill and Mary Carpenter are considered to be the main instigators of the movement for penal reform in Britain, as well as pillars of the Social Sciences Association which grew out of this Reformist movement from 1857 onwards. Mary Carpenter herself contributed no less than thirty-six papers to the SSA between 1857 and 1876, the largest number given by any member.[147] Frances Power Cobbe, another committed philanthropist who like Lady Byron took a particular interest in women's welfare and women's rights, also came to live and work with Mary Carpenter for several months in 1858.

Mid-century Bristol was thus-- through individuals like Mary Carpenter-- a city that continued to be animated by a powerful spirit of social reform and it is quite likely that a woman with the charisma and convictions of Lady Byron should have actively sought to meet the Carpenter clan, a possibility that suggests the increasing influence, appeal and respectability of the Unitarian reformers of the mid Nineteenth-Century. Assuming that Lady Byron met Mary Carpenter first, she was bound to be favourably disposed towards Mary's younger brother William when she made his acquaintance in the autumn of 1843.

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146 Matthew Davenport Hill's daughter Florence (1828-1919) was one of the founding members of the West of England Suffrage Society, in 1868, which involved several Bristol women reformers such as Emily Sturge (1847-1892).

147 L. Goldman, *Science, Reform and Politics in Victorian Britain- The Social Science Association 1857-1886* (Cambridge, 2004). p. 145

The Lovelace-Byron archives, held at the Bodleian Library in Oxford,[148] reveal that Lady Byron not only met and conversed with William Carpenter, but also offered him a job as a tutor for her grandchildren shortly after their initial meeting. Ada Lovelace, Annabella Byron's daughter whose tragic life and brilliant mathematical mind were as famous in their day as they still are now, had by then also become personally acquainted with the Carpenters in Bristol and was on various occasions guest for dinner along with her husband William King Noël, First Earl of Lovelace, at William and Louise Carpenter's home. Lady Byron, as is widely known, had made sure that her daughter Ada received excellent scientific training from a very young age. She probably valued the opportunity of providing the same type of education for her grandchildren when meeting the talented young William Carpenter. The fact that he was also a physician, an outspoken teetotaller, and an experienced teacher from a family whose educational achievements were exemplary, was doubtless an additional incentive --all the more so as the Lovelace children were proving unruly at the time.

What is much less known --though the episode has been mentioned with a questionable level of creative licence by Benjamin Wooley[149]-- is that Lady Byron also struck up a secret deal with William Carpenter concerning the education, or rather the moral improvement, of her own daughter's mind. Indeed, as the Lovelace-Byron papers show, Annabella Byron in hiring Carpenter was also hoping that the 'Carpenter stamp' of morality would have a beneficial influence on Ada whose recurrent bouts of depression, perceived lack of maternal feelings and rejection of religious practice were preoccupying her mother. It is not certain whether Ada's

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[148] Carpenter and Lovelace Correspondence, Bodleian Library Special Collections, Oxford, box 169, dep Lovelace-Byron.
[149] B. Wooley, *The Bride of Science: Romance, Reason and Byron's Daughter* (London, 1999).

addiction to gambling had already begun, and if so, whether her mother was aware of it, but Lady Byron had deep concerns over her daughter's psychological wellbeing. It transpires through the early letters between Lady Byron and William Carpenter in 1843 that unbeknownst to Ada Lovelace, Lady Byron urged Carpenter to exert a stimulating moral influence over Ada.

From the onset, therefore, William Carpenter was caught in the crossfire of various personal interests and expectations, in an unhealthy triad of employers whose own relationships with each other were complex and tumultuous. In effect, not only was he charged with a double mission—one of which was secret or at least tacit—but he was also working for two different employers, taking orders from three different people: it was agreed that he would be paid a salary by Lord Lovelace, as well as an annual premium of 200 pounds granted by Lady Byron for the full duration of the envisaged period of tutoring, which was to last five years.

Carpenter accepted the job offer and began tutoring the young Lovelaces from the end of the summer of 1844. Considering the difficulties he seemed to be encountering at the time in finding a stable and respectable position as an academic, Lady Byron's offer must have come as an intoxicatingly tempting lifeline. It promised to provide him with a handsome income and free accommodation, as well as the time and freedom to pursue his own intellectual work. Most importantly, it was a dazzling gateway to the private networks of the ruling elite, allowing him to rub shoulders with the most famous figures of the English aristocracy. Carpenter seems to have had reservations-- surely to do with personal pride and the fear of losing credibility as an academic-- about placing himself at the service of such a rich family. He wrote to friends for counsel, notably to Edward Forbes who was living in London at the time and who also expressed strong reservations about the scheme.

Carpenter's decision to accept the job ended up being close to disastrous: the bulk of the correspondence in the Lovelace-Byron folios relating to Carpenter's time in Surrey with the Lovelaces[150] consists of letters between Carpenter and Ada Lovelace. Written between the autumn of 1843 to the start of 1845, these messages reveal an increasing fascination by the tutor for his acquaintance-turned-employer-and-pupil, whose keen intellect, wit, freedom of thought, gift for science and strong personality seem to have subjugated him. His secret mission as the guardian of Ada's emotional and psychological wellbeing was not an easy task to undertake for a man of just thirty years of age. It is unclear what happened exactly and whether the amorous feelings that Ada seemed to have inspired were mutual, but a boundary appears to have been crossed, throwing Carpenter into a diplomatic maelstrom out of which he was forced to manoeuvre precariously.[151]

Carpenter's excessive zeal in trying to justify his actions adds to the impression that he either forgot himself completely or made a serious error of judgment. Letters from Carpenter to Lady Byron, who appears to have cut contact with Carpenter after the incident (refusing to open his letters and those by his wife), as well as Lord Lovelace's anger, are further elements that confirm the attraction between Carpenter and Ada. Final proof of the inappropriate feelings that the tutor developed for his employer, and of how desperately the panic-stricken Carpenter was trying to salvage his reputation and future career, can be found in a letter written by Carpenter's wife Louisa to Ada. In her missive, the seemingly selfless Louisa tried to rehabilitate her husband whilst pacifying Lady Lovelace, who was either offended or feigning to be for her own tactical reasons, by assuring her that she still

[150] Carpenter and his family moved to Ripley, Surrey. The estate of Okham was Lord Lovelace's country-seat. Carpenter also regularly followed his young pupils to Lady Byron's estate at Esher.
[151] See Byron-Lovelace papers, Oxford Special Collections, folios 95 onwards. (No permission to quote directly from the correspondence, for copyright purposes)

had every faith in her husband's integrity and good character and that her marriage would come out strengthened from his minor trespass.

Whatever the exact intimate details involved, this humiliating incident put an end to what amounted on the whole to a rather unhappy period for the Carpenters in Surrey: the house given to William and his wife did not meet the couple's expectations and Carpenter's many letters to Lord Lovelace reveal both his dissatisfaction and unsuccessful negotiations to try to obtain a larger and newer abode. Louisa Carpenter seems to have had an accident and hurt her head on a wooden beam in the house whilst pregnant with their second child, prompting Mrs Carpenter, the matriarch, to come and stay with the couple to help. Furthermore, Lord Lovelace seems to have been reluctant to pay Carpenter the agreed salary, and the scientist also complained about his lack of free time to carry out his research as initially requested. By the start of 1845, after a mere few months working for the Lovelaces, the agreement was called off and Carpenter was left fighting to claim the initial bonus promised by Lady Byron. A large number of letters sent by Carpenter to Ada and Lady Byron's lawyer Wronzlow Greig,[152] show how vigorously Carpenter sought to assert his good faith whilst also trying to secure the large sum of money. This wrangling was finally resolved by a payment of 300 pounds.

Carpenter made many important contacts through his acquaintance with Lady Byron, and for lack of any evidence suggesting a major downfall, it is hard to tell how damaging this painful episode was to Carpenter's public persona. Lord Lovelace seems to have been ready to blacken Carpenter's reputation,[153] but one can

[152] Wronzlow Greig was Mary Sommerville's son by her first husband Samuel Greig. (Samuel Greig was a sailor and had named his son after a friend in the Russian navy. Samuel Greig died in 1807)
[153] B. Wooley mentions that Lord Lovelace, a few months after Carpenter had ceased to work for them, allegedly reported that the scientist had once again become caught up in an incriminating relationship with a young woman. However this assertion needs to be questioned as no references to the letter are provided, and many other details mentioned by Wooley (such as Carpenter and Ada

imagine that most actors involved in the incident would have had the decorum to keep it secret, and Carpenter's subsequent scientific achievements seem to have done more than enough to rehabilitate him. The main point of interest however, resides in the very fact that William Carpenter was hired by the Lovelaces in the first place. This decision reveals that by the early 1840s Unitarians were no longer regarded as dangerously radical or in any way seditious. On the contrary, William Carpenter's erudition, moral principles and thorough intellectual training were viewed by Eton-educated fathers such as William Lovelace[154] as desirable assets to be transmitted to the next generation of young aristocrats. Carpenter's choice to enter into the service of the Lovelace family, in turn, suggests that he was perhaps acting under a certain imperative of political entryism, which lends support to the hypothesis that in the second half of the nineteenth century, social and religious categories which were previously radical and marginalized, were seeking to integrate the establishment, thus participating in what has been called the mid-century liberal consensus, and demonstrating that by that time Unitarianism was no longer being equated with sedition or radicalism.

Chapter 4. London career and professional recognition

4.1- Settling in Bloomsbury

Letters sent by Carpenter to Richard Owen[155] in the early 1840s further testify to his determined attempts at getting close to the big names who could champion his entry into London scientific circles. Carpenter, who had most probably

exchanging several kisses) are not backed by archival evidence. See B. Wooley, *The Bride of Science: Romance, Reason and Byron's Daughter*. p. 299

[154] On this point it is worth noting that Carpenter's own son Philip Herbert Carpenter (1852-1891) would become a Master at Eton in charge of biological sciences in 1877.

[155] See Richard Owen's correspondence at the Natural History Museum, General Manuscripts collection at South Kensington, 44NHM ALMA.

met Richard Owen during his initial studies in London and who kept up a correspondence with him until the mid 1850s, asked for references from the scientist when he applied for the Chair of Medicine at the University of Edinburgh in August 1842. Carpenter used the fact that Owen had mentioned his *Comparative Physiology* to strike up the correspondence, and boldly and methodically applied similar approaches other professional contacts, such as Joseph Hooker for example. Carpenter's determination and relentless efforts to tackle burning questions in the field of anatomy and general science, and his achievement in publishing a variety of works from the 1830s onwards proved ultimately successful: by the spring of 1845 when the agreement with the Lovelaces came to an end, Carpenter had gone a long way towards making a name for himself as a microscopist specialised in conchology, and --as will be shown in the second section of this thesis-- as the author of one of the most thought-provoking works in biological science, his *Principles of General Comparative Physiology* which by then had already reached a third edition.

After leaving the Lovelace's service in Surrey, Carpenter and his wife and two young children moved to London where it now appeared more probable that Carpenter should find suitable employment. For the first few months they lived in Stoke Newington, where a strong Unitarian congregation was based, before settling near Regent Park, which would become their area of residency until the end of their lives. Carpenter had been elected a Fellow of the Royal Society in 1844 and had just been appointed Fullerian Professor of Physiology at the Royal Institution. These two events marked the beginning of his true career within recognised scientific institutions. Indeed, with his move to London, Carpenter entered the intellectual Establishment of the British nation. He formed close friendships with many leading men of science, and was geographically and socially situated at the centre of one the most active intellectual networks of his age. Rosemary Ashton has recently mapped the hitherto little studied history of the Bloomsbury area of London by collecting a wide array of archives relating to the many educational institutions that developed there. From the 1800s onwards when Francis Russell, fifth Duke of Bedford, obtained two Acts from Parliament to develop the portion of his estate now stretching north from Great Russell Street to Euston Road and comprising Russell, Tavistock, Woburn and Torrington squares, the area underwent a rapid transformation[156]. The institutions that flourished as a result of this urban development turned the Bloosmbury neighbourhood into a vibrant new centre for progressive thought and educational reform, with University College London at the heart of this new impetus.

By moving into Regents Park Terrace, Carpenter was thus gravitating towards the new cultural centre of the liberal and reformist London intelligentsia, and was surrounded by prominent British intellectuals. His immediate neighbours, living on the same street, were Robert Chambers, and William Henry Wills (1810-1880), one of Charles Dickens's agents who had previously edited Robert Chambers's *Journal* and who jointly owned and managed Dickens's famous weekly magazine *Household Words* (published from 1850 to 1859). Mrs Janet Wills, who was noted for her soirées, was Robert Chambers's sister and the Carpenters were regular guests of the Wills[157]. Another neighbour in the same row of terraced houses was the Professor of English at University College[158], Mr. A. J Scott, who hosted

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[156] R. Ashton, *UCL Bloomsbury Project*. See also: R. Ashton, *Victorian Bloomsbury* (New Haven & London, 2012).
[157] See: P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. P. 274 note 4.
[158] University College was the first University in England to add English to its academic curriculum.

several famous guests: it was through Scott that Carpenter met Thomas Carlyle and Francis Newman. Through his scientific network, Carpenter also became acquainted with Dr. Edward Sharpey, professor of Physiology at University College, Dr. James Paget, Dr. Joseph Hooker, and Mr. George Busk, who remained lifelong close friends.

Soon after his arrival in London, Carpenter obtained a lectureship in General Anatomy and Physiology at the London Hospital and would continue to fill that position for the following twelve years. During the first five years after his move to the capital, Carpenter was also heavily involved in the publication of the *British and Foreign Medical Review*, Sir John Forbes's moderately liberal medical journal, for which he had been recruited as a reviewer from its creation in 1836. After Forbes's retirement in 1847, Carpenter became the editor of the journal and held the position during five very busy years. When his time as the Fullerian Professorship at the Royal Institution came to an end in 1847, Carpenter was given the Swiney Lectureship in Geology by the trustees of the British Museum.

4.2- Carpenter and the University of London

The year 1847 was also marked by Carpenter's recruitment by the University of London where he was elected to the Examinership in Physiology and Comparative Anatomy. From that moment on Carpenter's career was firmly anchored institutionally, and this new employment allowed him to play a leading role in the shaping of the University at a crucial stage of its early development. The important part played by Carpenter in matters of administration and governance within the new University was recognised in 1879 when he was awarded the Order of the Bath for his services to Education[159]. Though it is generally a little acknowledged fact, the physiologist's centrality in the internal affairs of the institution during those important years has also been underlined by historians of the University of London such as Negley Harte and F. Willson[160], and their valuable studies constitute the backdrop to the present analysis of Carpenter's position within the educational landscape of the second half of the nineteenth century[161].

The University of London was founded in 1836 and granted its first Royal Charter in 1838. A unique institution at the time, it more closely resembled a governmental body than an independent educational establishment, contrary to the Universities of Oxford or Cambridge, or even to University College which had been founded in London in 1826 to provide higher education for the sons of Dissenters. In effect, the University of London was merely an examination board whose role was to award degrees to students who had been prepared by one of the several schools or colleges across London recognised by the University. These schools included, among others, University College, King's College, and the Medical schools such as the Royal Colleges of Physicians and Surgeons. The Senate, the main governing council of the university, was headed by a Chancellor and Vice-Chancellor. The Vice-Chancellor was elected every year by the thirty-six Fellows of the Senate, but the Fellows themselves, like the Chancellor, were directly nominated by the Home

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[159] It was Joseph D. Hooker who wrote to Benjamin Disraeli in 1874 to put Carpenter's name forward for a distinction of merit. Writing as the President of the Royal Society, Hooker suggested that "Dr. Carpenter's services to the State in the cause of a higher Education in Literature, the Arts & Sciences, are of such merit and of such long standing, and have been attended with such success, as the books of the University show, that a recognition of these by the Crown would…be both advantageous to the country and highly appreciated." (See Hooker Papers, Kew archives). Though Carpenter retired from his role as the Registrar in 1879, he continued to sit as a Fellow on the council of the main governing body of the University, the Senate, until 1884. Thirty-six Fellows made up the governing council of the Senate.

[160] N. Harte, *The University of London 1836-1986* (London, 1986), F. M. G. Willson, *The University of London, 1858-1900, The Politics of Senate and Convocation* (Woodbridge, 2004).

[161] The present sketch of Carpenter's role within the University is also based on new archives made available in 2012 by Rosemary Ashton and the University of London.

Secretary. In essence, therefore, the University was an organ of government whose members of staff were civil servants accountable to Parliament, and whose funding and budget were entirely overseen by the Home Office. This crucial fact must be borne in mind when interpreting the significance of Carpenter's involvement in University governance and educational reform, because any involvement in the decision-process at the University implied working in close synergy with Westminster, and can be equated to taking a direct part in British politics[162].

In 1849 Carpenter obtained the Chair of Medical Jurisprudence at University College, and in 1852 was offered the job of principal of University Hall. These halls of residence on Gordon Square, now home to the Unitarian library and archives known as Dr. Williams Library[163], had been built in 1848-49 to celebrate the passing of the 1844 Dissenters'Chapel Act and later hosted the Unitarian Academy of Manchester College until it moved to Oxford in 1889. Rosemary Ashton has noted Carpenter's success in his role as Principal of University Hall, which was on the verge of financial collapse before his appointment, citing his successful endeavours to raise funds, attract students, and manage administrative and every-day affairs at the residence in an efficient and personable way, with a stabilising effect on the institution as a whole. Despite the strong Unitarian stamp which came with Carpenter and the arrival of the Manchester group, the Halls of residence were given a new lease of life by the Carpenters:

> The fact that Carpenter had a wife and young children in the principal's quarters helped to make the Hall more homely than in Clough's time. The principal installed an organ, which he played at the musical soirées he and his wife initiated. As a forward-thinking biologist and enthusiastic populariser of the microscope (…) he offered in October 1854 to give a

[162] It is also important to note that, despite the University's increasing efforts to become a fully-fledged teaching and research institution in the later decades of the century, the close political ties between the institution and Parliament persisted and were strengthened in 1867 when the Reform Act gave the University the status of an electoral constituency with one seat in Parliament. The constituency was only abolished in 1950. See: F. M. G. Willson, *The University of London, 1858-1900, The Politics of Senate and Convocation*. p. 70.

[163] Dr. William's Library has occupied the premises since 1890.

lecture at University Hall on the topic. As Swiney Lecturer from 1847 to 1851, he also helped to bring University College into closer connection with the British Museum.[164]

Most probably thanks to his successful management of University Hall, Carpenter was offered his most important and prestigious role yet in 1856 when he was selected as the Registrar of London University after the death of Richard Wellesley Rothman who had held the post since 1838[165]. Carpenter was thus the second Registrar of the University and proved a much more high profile and active administrator than his predecessor[166]. In an institution whose only purpose was still to award degrees, the role of Registrar was key: it was his responsibility to lead the team of examiners who would both design the examination questions and orchestrate the recruitment of suitable colleagues to carry out the various assessments.

During the early years of the University, the Senate had hotly debated the salary that was deemed appropriate for the all-important administrative role played by the Registrar. Several voices within the initial governing body called for an annual salary of £1000, but this amount was deemed too expensive by other members and upon the appointment of Rothman a compromise salary of £600 was agreed upon[167]. It is a testimony to the growing success of the University, as well as to the solid reputation Carpenter had built himself in London by the middle of the century, that in 1863 his salary was raised to the previously controversial £1000 per

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[164] R. Ashton, *Victorian Bloomsbury*. pp. 200-201

[165] Archives at the Royal Society of London show that in 1856 Carpenter asked John Herschel to support his application to the position of registrar at the University, and subsequently thanked him warmly upon his election. The two men had been corresponding since 1838. See Herschel Papers, Royal Society, H.S.5.190 to H.S.5.193.

[166] Writing to T.H. Huxley in 1856, most probably in response to a letter of congratulations, Carpenter admitted that his election to the post had been a wrangle with the three other candidates. Tongue-in cheek, as always when corresponding with Huxley, Carpenter also wrote: "As regards 'influence', I shall from the first observe the rule of rigid neutrality, save when my opinion is asked by the Senate or by any member of it. Rothman's great merit, according to Sharpey, was that he never encouraged anybody; and though I do not intend to be the same kind of frozen wet blanket that he was, yet I must not lay myself open to the imputation of favouritism."

[167] N. Harte, *The University of London 1836-1986*. p. 91

annum[168]. It is within this context of a new institution still in the process of establishing itself all at once logistically, geographically, as well as politically and intellectually, that Carpenter embarked on a course of administrative and educational reform for the following twenty-three years.

4.2.1- Carpenter and the reform of the scientific curriculum: an exercise in national education

In 1858 the University of London was granted its fourth Royal Charter. This moment in time marked the beginning of a new era for the university, because several key elements which had been under discussion since the early days of the institution were integrated into the document. One of the main changes made possible by the Charter was the opening up of the University both in terms of admissions and governance. Indeed, until 1858, graduates were not represented and had no say in decisional matters, but the new Charter enabled the creation of a 'Convocation' which acted as a counter-power to the Senate, could nominate up to a quarter of the members of the Senate, and had "the power of discussing any matter whatsoever relating to the University[169]". The Charter also made it possible for any student in the country to try for the examinations at the University, instead of furnishing proof of adequate training at one of the affiliated London institutions as had been mandatory until then. This change caused concern and disagreement amongst members of King's College and University College particularly, who feared that "mere examinations, without evidence that a regular curriculum of study has been followed, are a very insufficient test of education[170]". However, this impetus to open up the University may have had the corollary effect of spurring the

[168] Carpenter was given this pay rise in recognition of his "watchful observation of the march of the University in detail"; see: ibid. p. 102
[169] Ibid. p. 102
[170] Ibid. p. 104

design of new curricula, and of strengthening the debate about the need to reform and improve education throughout the nation.

With the opening up of the University to candidates from any school in the country and with the introduction of new scientific degrees, it thus became more important than ever --in the interest of preserving the standards and reputation of the University and of the scientific profession itself-- to oversee the quality of the teaching being dispensed throughout the country. In 1858, there was no state Department of Education in the modern sense of the term. Though the call for a national system of education had been expressed in Parliament since 1833, no concerted national steps towards designing new curricula or homogenising existing teaching practices were yet being taken. The Senate of the University of London, therefore, filled this vacuum, providing the institutional framework in which such discussions could take place among men who were teachers themselves, and whose professional respectability depended on consolidating the existing educational framework. Until the early 1870s and the reforms implemented by Foster, the Senate of the University of London was effectively the only governmental body to hold council about the state and future of British education.

Willson has already stressed the key role played by Carpenter in the setting up of the Schools Inquiry Commission of 1864 (known as the Taunton Commission, for which Carpenter was initially considered as a potential leader) which asserted the importance of the role of Universities in shaping the secondary school examinations and curricula[171]. The Commission's Report stated that 'the Universities, as being themselves institutions for education, are considered by the schoolmasters to be their natural centres" and should therefore become the main body which designed the

[171] see F. M. G. Willson, *The University of London, 1858-1900, The Politics of Senate and Convocation*. pp. 187-188

entire curriculum, as was already the case for Oxford and Cambridge whose entry examinations had been implemented in the 1850s with the corollary effect of fashioning secondary school curricula to fit their standards. In fact, the example of the influence exerted by Oxford and Cambridge on secondary schools was highlighted by Carpenter, who recommended an alliance between the universities of London, Oxford and Cambridge so as to better pave the way towards a more homogenous system of national education[172]. Letters between Carpenter and colleagues within the Convocation of the University of London, as well as with London school headmasters (such as the Reverend William Jowitt of the London Corporation for Middle-Class Education) testify to his support for setting up schemes of inspection of London schools by Fellows of the University of London, including himself.

Hence, from 1858 onwards, efforts were made to oversee the quality and contents of teaching in secondary schools in London, and gradually throughout the country; and examination regulations within the University of London itself were tightened accordingly both for the entry exam and for the B.A degree. For the 28-hour entry exam, only one of the classics (the candidate could choose between Greek or Latin) remained compulsory, while chemistry, mathematics and natural science were added to the list of obligatory subjects. Similarly, the type of subjects that could be chosen in order to obtain the B.A were revised: more topics were added and the BA examination was spread over two sessions, while new emphasis was laid on scientific degrees. Institutions like University College London and the Royal Institution, which had been founded precisely to expand the existing canon, had already made a point of offering courses in new scientific subjects such as

[172] See ibid. p. 202. Oxford and Cambridge were in effect already shaping part of the secondary school curriculum through their entrance examinations.

Physiology. However, the University of London did not, before 1858, deliver scientific degrees as such. Thus in the years and the discussions leading up to the drafting of the new Charter, Carpenter's role as both a leading scientist and Registrar proved capital. Though it is difficult to ascertain to what extent he initiated the move himself, it is known that Carpenter played an important part in the 1857 Committee set up by the University to gather evidence in favour of scientific degrees.

This Committee was formed after a letter signed by twenty-four eminent scientists and was addressed to the Senate in July 1857. Among the authors were William Sharpey, A. W. Williamson, John Tyndall, T.H. Huxley and Charles Lyell, all of whom were close acquaintances (and some of them friends) of Carpenter at the time, whom he had ample opportunity to meet and concert with outside of his university duties, especially within the premises of the Royal Society. The letter stated that:

> The branches of human knowledge at present academically recognised are those of Arts, Theology, Law, and Medicine. But this fourfold division, though possibly sufficient in the age in which Universities took their rise, has become utterly inadequate as a recognition of the great classes of knowledge which at the present day subserve the discipline of the individual mind or promote the good of mankind. In fact, a fifth branch of knowledge – Science—has gradually grown up, and being unrecognised as a whole, has (N. Harte, 1986)dismembered. (…) The Academic bodies …continue to ignore Science as a separate Profession; and even the University of London, though especially instituted to meet the wants of modern times, can confer no Degree upon the first Chemist and Physicist of his age (…)[173]

Contrasting the situation in Britain to that in Germany and France where universities had instituted science as a discipline in itself, the petitioners deemed this state of affairs a particular hindrance to the progress of science in the country, and stressed the fact that by not recognising science as a profession British universities were in effect discouraging "those who have the direction of youth" to promote its pursuit. The *Report of the Committee to Consider the Propriety of Establishing a Degree or*

[173] A long extract of the letter can be found in: N. Harte, *The University of London 1836-1986*. p.109

Degrees in Science, presented to the Senate in 1858, thus proposed the establishment of a new faculty of science, as well as the creation of the degrees of Bachelor of Science and Doctor of Science, with compulsory subjects in the BSc including mechanical and natural philosophy, chemistry (inorganic and organic), animal physiology, geology and palaeontology, logic and moral philosophy. The proposed measures were implemented along with the adoption of the new Charter by the University, and marked the beginning of a new era in education which accelerated the professionalization of scientific study. Carpenter's pride in advancing the cause of institutionalised scientific education is palpable in some of his correspondence. For instance, on the 5th of May 1882, writing about a speech in homage to Charles Darwin to his friend John Lubbock (who was also head of the University Senate), Carpenter suggested that:

> You are so identified with the cause of Scientific Education, that I cannot but think that you might very appropriately allude to the fact that since our last Anniversary, the Nottingham and Liverpool Colleges have been opened, our own Doctors in Science holding important positions in both, --and that the provincial foundations have been laid of the great Science College to be supported by the City of London, the principal at South Kensington, and its 'Chapel of ease' in Cowper Street[174].

Years later, in 1885, Carpenter was still informally pushing for greater reform of the scientific curriculum at Universities. In a revealing letter to Sir Henry Acland[175] (1815-1900), Regius Professor of Medicine at Oxford and president of the General Medical Council, Carpenter responded to his colleague's appeal for advice on new curricula by tackling head-on what he felt to be Oxford's ongoing failure to dispense adequate scientific training on a par with what was by then being offered by the universities of Cambridge and London. Carpenter began his letter by underlining the fact that during the latest meeting of the Council of the Royal

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[174] Carpenter to John Lubbock, British Library Archives, ADD 49641 f. 24-26.

[175] Sir Henry Acland was one of the academics most heavily involved in the revival of the school of Medicine in Oxford and in introducing Natural History into the curriculum.

Society of London, the four Fellows who were elected were all Cambridge-trained biologists, who had initially matriculated from the University of London. Carpenter then explained that his own son was one of the four Fellows elected, which made him all the more able to speak of "the effect of the Cambridge system in encouraging scientific ability" and of his having no hesitation, were he to educate another son for a scientific career, to send him to Cambridge rather than Oxford. The main body of Carpenter's letter is then devoted to rejecting the notion, that still underpinned Oxford's curriculum at the time, that two years of general knowledge prior to scientific training were necessary academic baggage for an aspiring scientist. According to Carpenter, had his son attended Oxford, "two years would have been taken from his scientific education", leaving him less fitted to carry out original research, while not gaining any clearly demonstrable advantage in terms of general knowledge. Carpenter thus concluded his letter with the following opinion:

> If your University would impose a suitable entrance Examination, based on the ordinary curriculum of the Public Schools, upon Science Students, and were to shape out such a three years' Course of Physics, Chemistry, and Biology as should qualify them for its Degree, and at the same time constitute a first-rate preparation for Medical Study, I have no doubt whatever that it will attract a high class of students, who would do credit to the University, and become as conspicuous in the Scientific world as the Cambridge Science men are now making themselves. But every year's continuance of the present system will be for the advantage of Cambridge[176].

Carpenter's passionate involvement in drawing up a vision of scientific education for universities in Britain is evident from his correspondence and dedication to the subject years after giving up his role as Registrar. It therefore appears that in the history of education in nineteenth-century Britain, through individuals such as Carpenter and bodies such as the Convocation, the University of London spearheaded the process of top-down regulation and reform that took place from the 1860s onwards. Thanks to its close ties to Westminster, the Senate acted as the first

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[176] Bodleian Library Special Collections, Oxford, M.S Acland d.92; ff. 49-54.

institutional interface between teachers, students and the government and, outstripping the old universities of Oxford and Cambridge of a large share of their influence, set the pace for the changes to come. Carpenter's role as Registrar must therefore be viewed as seminal --rather than merely administrative or even anecdotal-- in shaping the educational standards and priorities of the last third of the Century. Historians of science have until now systematically glossed over this aspect of the physiologist's career, dismissing it –one assumes—as a mere administrative job taken on by Carpenter for the sake of a stable income. Though Carpenter most certainly did take the job to secure the necessary livelihood he needed to maintain a household of seven[177], he was able to tailor it to his interests and use it as a platform from which to negotiate directly with some of the most influential figures in government[178] the terms of a modern –and above all scientific-- educational agenda that had been promoted in Unitarian teaching academies for over a century.

Figure 1: Cartoon published in *The Gauntlet* in1870 showing the army of reason led by the scientists (Carpenter can be seen in the centre holding a brain in both hands) and backed by the University of London, facing the supporters of religion on the right hand side of the picture.

[177] With, it would appear, an adoptive daughter, as well as additional guests and occasional extra family members. (Information obtained through personal communication with Mrs. Carla Contractor, Bristol.)

[178] Such as Lord Granville, or Lord Overstone, for example, who were both members of the University Senate. (Samuel Jones Loyd (1796-1883), made 1st Baron Overstone in 1850, was one of the most eminent bankers and fincancial policy-makers in nineteenth-century Britain, having served as MP in the first third of the Century)

4.2.2- Carpenter and the education of Women

Alongside the question of the reform of curricula and examinations, Carpenter as the registrar of the University of London was faced with repeated requests for admitting women to study. As is well known, in a wider context of lobbying Parliament to obtain legal reform affecting women's rights, several women's rights activists[179] began pressing members of the Council of the University of London to grant access to degrees to women. As a dissenter and a Unitarian in particular, the question of women's education would have inevitably been familiar to Carpenter, all the more so given the educational ventures that his mother and sisters engaged in. The strong ties between Unitarianism and social reform in nineteenth-century Britain have been underlined by several historians, such as R.K Webb and John Seed[180] more particularly, but it is historians of the feminist movement in England who have most thoroughly defined the link between the radical Unitarianism of the end of eighteenth century and the emergence of liberal thought concerning the education and political representation of women. Examples of Unitarian women thinkers, educationalists and reformers abound: Mary Wollstonecraft (who was influenced by the Unitarian community living in Stoke Newington where the Carpenters initially spent a short while before moving to central London-- and by Richard Price's sermons in particular[181]), writers Anna Laetitia Barbauld and Maria Edgeworth (who were prolific children's authors and

[179] The earliest request to obtain medical training was made to the University in 1856 by Jessie Meriton White (1832-1906), a well-educated non-conformist whose attempts were quickly dismissed by the University Senate.

[180] John Seed devoted his doctoral thesis to the question of the ties between Unitarianism and progressive ideas in Britain, see as previously mentioned: J. Seed, "*The Role of Unitarianism in the Formation of Liberal Culture 1775-1851: a Social History*."

[181] Richard Price (1728-1820) was a Welsh Unitarian minister and original political and economical thinker preaching at the Newington Green Chapel which Wollstonecraft attended. It was famously he who introduced Wollstonecraft to Joseph Priestly, Thomas Paine, William Godwin, Coleridge and Wordsworth.

educationalists) Elizabeth Gaskell, Florence Nightingale, are but a few of these examples.

Scholars such as Kathryn Gleadle, Ruth Watts, Helen Plant and Arianne Chernock have convincingly revealed the social, theological and economical factors underpinning the Unitarian emphasis placed on high educational standards for women[182]. Ruth Watts in particular has underlined the Unitarians'strong interest in education and innovative theoretical approach --based on the Lockean idea that differences are not innate but acquired through learning—that made it especially possible for them to "equate the male and female intellectual capacities and to see the need for women to be well educated both for their own moral and spiritual development and to fulfil their traditional maternal and caring roles."[183] All these studies also explore the solidarity demonstrated by Unitarian men with the cause of the advancement of women, usually taking the view –first put forward by Kathryn Gleadle—that such support was the logical corollary to the wider Unitarian agenda of political and religious equality, and their traditional support for oppressed minorities[184]. The following short section thus examines Carpenter's position with regards to the administrative and political response given by the University of London to a question that lay at the heart of Unitarian concerns, and argues that

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[182] See: K. Gleadle, *The early feminists : radical Unitarians and the emergence of the women's rights movement, 1831-51*. R. Watts, *Gender, Power and the Unitarians in England, 1760-1860*. H. Plant, "*Gender and the Aristocracy of Dissent: a comparative study of the beliefs, status and roles of women in Quaker and Unitarian communities, 1770-1830, with particular reference to Yorkshire.*," University of York, 2000, A. Chernock, *Men and the Making of Modern British Ferminism* (Stanford, 2010).

[183] R. Watts, *Gender, Power and the Unitarians in England, 1760-1860*. p.8

[184] Helen Plant argues that both Gleadle's work and her own research reveal a higher degree of solidarity from Unitarian men for feminist causes, than was noticeable from the "mainstream" male population from the 1880s onwards concerning the question of female suffrage. (See H. Plant, "*Gender and the Aristocracy of Dissent: a comparative study of the beliefs, status and roles of women in Quaker and Unitarian communities, 1770-1830, with particular reference to Yorkshire.*."p. 22). On the same topic see also: A. Chernock, *Men and the Making of Modern British Ferminism*. On male support for feminism at the end of the century, see: A. V. John and C. Eustance, eds., *The Men's Share?: Masculinities, Male Support, and Women's Suffrage in Britain, 1890-1920.* (London, 1997).

although he did not vocally campaign in favour of female education, Carpenter quietly sided with the cause and aided the agenda of the admission of women to higher education from his position within the governing body of the University of London.

Carpenter's private correspondence reveals his early interest in—and overall support of—better education for women, as well as a certain ambivalence towards the subject nevertheless. For example, as a young student writing back to his father from Edinburgh in 1835, Carpenter expressed his admiration, surprise but also reservations after witnessing women taking part in scientific activities on a par with men:

> The tone of society is certainly much more well informed here than in London. At least, there is less reserve among the ladies with regard to scientific pursuits, which many pursue here to an extent which *even I* think hardly feminine; such a practical (hammer-in-hand) geology, practical chemistry in classes –a row of young ladies performing experiments all at the same time, like a company of soldiers going through the exercise. (…) I should be very sorry to see women restraining their natural feelings by reason and philosophy as much as men ought to do. I have often been afraid myself lest too close attention to scientific subjects should blunt my natural feelings; and I should think that the new-fashioned system of female education might be in danger of making the pupils too much matter-of-fact.[185]

Carpenter's choice of words in saying that "*even he*" thought women were perhaps out-stepping their roles by taking such a practical approach to science, is interesting in that it reveals his perception of his own family being unusually progressive in their views on women's education. What also transpires in this extract is that Carpenter did not quite follow the prevalent essentialist view according to which women had different emotional and moral natures to men or innate psychological qualities that made them more "tender" and "emotional" than men, which in turn prescribed certain behaviours and roles for them. Though Carpenter did uphold the notion that women had the mission of softening and assuaging society from within the family sphere --and that consequently some activities were unfeminine-- he did

[185] J. E. Carpenter, "Memorial Sketch."pp.14-15 (my italics)

not seem to base this vision on the premise of any *essential* difference between the sexes.

In fact, rather than postulating that women were naturally more emotional than men and were therefore designed to remain within the realm of emotions rather than venturing into the realm of the intellect, he posited the notion of a natural equality in emotional abilities. The separate spheres did not reflect different innate abilities, but caused these apparent differences through requiring men to curb and repress their natural emotions. Therefore, though at first sight Carpenter's statement may seem to rehash the essentialist argument often brandished at the time, his understanding of men and women's different roles was not founded on the assumption that women were less rational than men, or that were men less emotional than women, but rather on the notion that men were required to sacrifice part of their universal human nature so as to be able to perform outside the domestic sphere. Eight years later, in a letter to Lady Byron, Carpenter expressed this view again. Discussing Ada Lovelace's inability to fully embrace motherhood, he explained that this might have been due to her excessive devotion to intellectual work, citing his own experience of work "deadening his family affections" and causing his mind to become "morally contracted" despite intellectually expanding.[186] Carpenter's recommendation to Lady Lovelace was to turn to natural history rather than to occupy her mind with mathematics only, since natural history, in its dealings with other sentient beings, was less likely to blunt her emotions to the same degree as the sole pursuit of abstraction. These anecdotes reveal how sensitive Carpenter was to the question of women's education and how this interest tied in with his wider

[186] Lovelace-Byron papers, Bodleian Library Special Collections, Oxford, box 169, f. 82.

concerns about the potential negative effects of scientific education on an individual's psychology.

When trying to determine which position Carpenter might have taken up in the debate about female education, it is also important to remember that his sister, Mary Carpenter, was at the time actively setting up schemes to promote the education of girls both in England and, from the 1866s onwards, in India. As previously mentioned, Mary Carpenter was also an active member of the Social Sciences Association which had been founded in July 1857, and which has been described by Lawrence Goldman as "uniquely representative of the social concerns of mid-Victorian Britain, mediating between politicians and an expanding political nation[187]." Through its large membership, the wide spectrum of its social and reformist interests, its numerous connections with politicians, and through the lack of any other institution better fitted to the purpose, the Social Sciences Association was in a powerful position to dialogue and negotiate with the government[188]. Carpenter, who is known to have actively corresponded with his sister (although hardly any of these letters have been found), must surely have followed the proceedings of the association very closely. Several of his professional contacts and personal acquaintances were also members of the association, most notably John Stuart Mill and Charles Kingsley, both of whom are referred to as friends[189] by Carpenter and both of whom were vocal advocates of better female education. For instance, both men delivered papers on the urgent need to improve women's

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[187] L. Goldman, *Science, Reform and Politics in Victorian Britain- The Social Science Association 1857-1886*. p.2

[188] It was for example partly under the impulse of members of the Social Science Association that the afore-mentioned Taunton Commission was set up in 1865. See: ibid. p. 121.

[189] No surviving correspondence has been found between Carpenter and either one of them unfortunately (bar a few snippets from Mill to Carpenter, cited in J. Estlin Carpenter's previously cited biography of his father).

education[190] before the Association and provided testimonies to the Royal Commissions on education in favour of better secondary education for girls[191]. Mill's connection to Unitarianism is often mentioned as having inspired his active feminism[192] and in turn it is highly probable that Mill's promotion of women's rights influenced Unitarian men such as Carpenter, who already held his philosophical work and political status in high regard.

Kingsley too mingled with Unitarians and was actively involved in educational ventures alongside his friend Frederick Denison Maurice (1805-1872), who had been brought up a Unitarian (his father was a Unitarian minister) and had later converted to Anglicanism before becoming one of the leading figures of Christian Socialism. Kingsley had met Maurice in 1844 and collaborated closely with him, becoming one of the figureheads of Christian Socialism himself. It can thus be said that a connection between Christian Socialism and Unitarianism exists, even if it is limited (for lack of closer studies on the topic) for the time being to Maurice's biographical circumstances.

In the wake of the Chartist revolt of 1848, Maurice set up the Working Men's College (which opened in Great Ormond Street in 1854) in the hope of defusing future social and political unrest through educating the working classes in a

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[190] J. S. Mill also famously presented a petition for female suffrage to Parliament in 1866 ahead of the Second Reform Act which was due to extend the franchise to a section of the male working class population. The petition had been drawn up by Barbara Leigh Smith Bodichon and her fellow activists from the Kensington Society, and carried 1 499 signatures. See: M. L. Shanley, *Feminism, Marriage, and the Law in Victorian England* (Princeton, 1989). pp. 50-51.

[191] In 1858 Maurice also founded Queen's College in Harley Street, in association with the Governesses' Benevolent Institution, to improve the education of governesses.

[192] The connection to Unitarianism of Mill's wife, Harriet Taylor are well documented. Harriet Taylor's first husband John Taylor, was a Unitarian merchant. Taylor also moved in the same circles as Harriet Martineau, as well as George and Harriet Grote--famous for their hosting of radical London intelligentsia in Saville Row in the 1850s. It is worth mentioning that Carpenter too was on close terms with the Grotes, as George Grote was heavily involved with the Council of the University of London from its early days, eventually becoming its president in 1868. Correspondence between the two men can be found at the Royal Institution in London.

collaborative venture between teachers and students. Kingsley took an active part in the foundation of the College, and taught there once it opened. [193]

In a similar fashion to his two acquaintances, Carpenter became involved in the movement for better education for women. In 1849, the Unitarian widow and philanthropist Elizabeth Jesser Reid (1789-1866) opened Bedford College for Girls in Bedford Square, thereby launching what was at the time the first higher education venture catering for women in the United Kingdom. Modelled on the ideal of University College London, it was non-sectarian, and drew most of its volunteer lecturers from the staff of University College. Carpenter was one of these early volunteers, along with individuals such as Francis Newman, Augustus de Morgan and Alexander John Scott. Though he soon gave up the teaching position due to his increasingly busy schedule, his early involvement reveals how connected he remained to the Unitarian milieu and its feminist agenda[194].

Though the Bedford College for Girls provided higher education to women from 1849 onwards, women were still excluded from the University of London and were consequently not granted any degrees. Thus, in 1856, Jessie Meriton White requested admission to the University to study medicine and addressed her demands to Carpenter in his role of Registrar. Carpenter, whose replies to Meriton were

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[193] Both Mill and Kingsley are known to have been influenced by early figures of French socialism such as Saint Simon and Fourier. The connection between Saint-Simonian ideas and Maurice's own views on the importance of working class and female education has been established. (See for example: E. R. Norman, ed., *The Victorian Christian Socialists* (Cambridge, 1987). However, a question that has not yet been raised to my knowledge, and that could yield interesting insights into the movement, is the possible connection between Maurice's early Unitarian upbringing and his reading of these French thinkers in England.

[194] The Bedford College archives are now held by the institution that grew out of the early college, namely Royal Holloway. The Bloosmbury project also indicates that details concerning the early organisation of the College can be found in the correspondence and diary of Henry Crabbe Robinson, at Dr. William's Library in London. Lady Byron, who by then had converted to Unitarianism according to Rosemary Ashton, was an important benefactor behind the project, which was also strongly supported by Barbara Leigh Smith (later Bodichon) and Bessie Rayner Parkes. See: R. Ashton, *UCL Bloomsbury Project*. It can also be postulated that Carpenter relinquished his work at Bedford College for political reasons; however no documents attest the true motivation behind his decisions.

entirely neutral, seems to have merely relayed her request to the University Senate and Convocation, which promptly turned down Miss White's demand on legal grounds, citing the rules of the existing University Charter[195]. In 1862, however, the University was faced with a much more vigorous campaign by Elizabeth Garett Anderson --backed by several other women from the 'Langham Place Group' as well as by Newson Garett, Elizabeth's father'[196]— to be admitted to the University of London to study medicine once again. Though Elizabeth Garett's campaign was unsuccessful at the time, the way it was organised and advertised allowed it to have a resounding effect which within a period of fifteen years led to the admittance of women to the University. With the financial backing of her successful father, a rich East-Anglican businessman, Garett was able to print letters in the *English Woman's Journal*, giving wide currency to her views and her lobbying of the University Council. With the help of her friends, particularly Emily Davies, Elizabeth Garett also collected the written support of figures such as F. D. Maurice, William Cobden, and Mary Somerville, as well as the official support of the vice-chancellor of the University, George Grote, thus putting unprecedented pressure on the administration[197]. These efforts sparked a heated debate within the Council of the University and the fault lines which appeared during these discussions paved the

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[195] See: C. A. Lacey, ed., *Barbara Leigh Smith Bodichon and the Langham Place Group* (Abingdon, 1987). p.p. 70-73 for the correspondence between Jessie Meriton White and the members of the University.

[196] The name "Langham Place Group' refers to the circle of women who ran and published the *English Woman's Journal* from 1858 to 1864**.** The journal's headquarters were based at n°19, Lagham Place, in Westminster. Bessie Rayner Parkes was the Chief Editor, while Barbara Bodichon was the main shareholder, along with the famous industrialist Samuel Courtauld, a Unitarian. The journal employed mainly women. See: ibid.

[197] The motion put to the Council of the University by George Grote in 1862, proposing the admission of women to the examinations, was supported by figures such as James Paget, and Peter Mark Roget, two regular correspondents of Carpenter's and colleagues to whom he looked up to throughout his career. Opponents to the motion were the extremely powerful Lord Granville and Lord Overstone as well as scientific figures such as Faraday. Carpenter, as Registrar, could not take part in these votes, and little is thus known about his exact position during the debates. See: F. M. G. Willson, *The University of London, 1858-1900, The Politics of Senate and Convocation*. p. 96

way to the passage of important legislation: in 1876, the medical registration of women was made possible, and this in turn led to the modification of the University's Charter in 1878, providing the authority to open the examinations to women.

F.M.G Willson has analysed in great detail the internal politics of the University Council that underpinned the debate about women's accession to university degrees[198]. The picture that emerges from his study is one of a house divided against itself, with the historical rivalry between the Convocation and the Senate coming to bear on the question of women graduates. Willson shows that by the end of the 1860s, a large majority of Convocation was resisting the admission of women graduates, whereas a majority of the members of the Senate had come to support the idea. Many medical graduates, represented by Convocation, saw it as against their professional interests to have female co-examinees, and the Convocation more generally saw the revocation of the existing Charter of the University needed to make women eligible, as a threat to their hard-won rights of representation in university governance.

Carpenter, as would often be the case throughout his career, was poised in the middle of this internal wrangling. As the Registrar, he did not take part in any of the votes held by both chambers, and his role was consequently that of a mediator between members of Convocation and Senate. It is thus rather difficult to chart exactly what was the evolution of Carpenter's views and feelings on the matter. This discreet position as a mediator is one that must have suited Carpenter, as the next section of this chapter will continue to demonstrate, since it allowed him to subtly weigh in on the most important topics of reform, while not being outwardly

[198] See: ibid. pp. 85-144.

identified as responsible for tipping the balance either way. It is therefore only possible to theorise about Carpenter's probable allegiance to the feminist agenda, based on the personal friendships and social circles mentioned earlier in this section. However, further clues as to which "camp" he aligned himself with can be found in a few snippets of correspondence. On May the 5th 1876, leading up to the medical registration of women, Carpenter sent the following letter to Elizabeth Garett Anderson:

> Dear Mrs. Garett Anderson, Lord Granville has asked me to get him the best statement I can of the claims of Women to Medical Degrees. As I feel sure that you must know best what would be most suitable, I venture to ask you to forward to him with as little delay as possible what papers you deem most powerful. I believe that Lord Granville intends on taking up the subject in his Address on our Presentation Day; and if you would like to be present, I shall have much pleasure in sending you an Admission. It will be on Wednesday next at 2pm. Believe me, Yours faithfully. [199]

In 1876, Granville was still the Chancellor of the University but had by then changed his mind on the question of women graduates and was pushing for a new University Charter to be voted which would admit female candidates. Though acting upon the Chancellor's initiative, the wording of Carpenter's letter suggests that he too was supportive of the initiative. The following year, wishing to push matters to a head in terms of changing the Charter, Granville wrote to John Lubbock (who was then Vice-Chancellor and a good friend of Carpenter's as has previously been shown in this chapter) asking him to draft a letter to convince the Chairman of Convocation to accept the Senate's proposal regarding the admittance of women:

> I have written a letter to the Chairman of Convocation, and I have asked Carpenter to correct the historical part of it. It may be thought *infra dig* for the Chancellor to descend into the arena, but I believe something of the sort is necessary[200].

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[199] LSE Archives, AB400755.

[200] Extract from a letter by Lord Granville to John Lubbock, 30 December 1877, British Library Archives, Add Mss 49644. See: F. M. G. Willson, *The University of London, 1858-1900, The Politics of Senate and Convocation*. pp. 140-141. Italics original.

Granville's political manoeuvring, and his reliance on Carpenter in his campaign, both point to the high likelihood that Carpenter was an ally in his endeavour. This position would seem to concord with all the other elements listed concerning Carpenter's interest in women's education. However, Carpenter seems also to have taken care to keep his stance ambiguous, perhaps particularly in his dealings with powerful personalities. For instance, upon the successful adoption of the new Charter in early 1878, Lord Overstone resigned from the Senate as an act of protest against the admittance of women, and Carpenter sent a distinctly political letter to him in which he admitted having himself had reservations about the admission of women, and having acted as he did "to prevent a collision between the Senate and Convocation, which would have been (I am strongly persuaded) far more injurious to the University, than the Admission of Women to its degrees can be"[201]. Thus, rather than standing openly and firmly in support of the admittance of women, Carpenter issued a disclaimer, justifying his support for the cause by the wish to promote political conciliation rather than for any ethical reasons per se, disguising his true feelings on the matter and even hinting that he shared those of his correspondent.

Nevertheless, based on the personal and intellectual context detailed in this section, and taking into consideration Carpenter's active involvement with other educational ventures to promote fairer opportunities for less fortunate candidates to higher education[202], it is most probable that the letter to Overstone, rather than a true

[201] Carpenter to Overstone, 4 and 26th of January 1878 in D. P. O' Brien, ed., *The Correspondence of Lord Overstone*, 3 vols. (Cambridge, 1971). pp. 1304-8

[202] Carpenter was also the secretary of the Gilchrist Trust, which had been set up in 1865 as per the will of British Indologist John Bortwhick Gilchrist (1753-1841) who had helped found the University and had served as its first Hindustani Professor. As the secretary of the Trust from 1867 onwards, Carpenter organised the awarding of various scholarships --and an increasing amount of them as the influence and organisation of the Trust grew-- throughout the U.K and the colonies, and was also in charge of selecting the towns that would be the recipients of lectures to working-class audiences

reflection of Carpenter's views on the question of women's education, was purely a tactical attempt at safely remaining in his powerful correspondent's favour.

4.3 - Carpenter and London societies: a respectable agitator

Carpenter's careful strategy of always remaining conciliatory even when siding with reformist views, is illustrated by his role in several other debates which arose within institutions to which he belonged. Indeed these other examples are what make it possible to speak in terms of a deliberate personal social strategy on Carpenter's part.

One such example is Carpenter's involvement with the Philosophical Dining Club of the Royal Society. The Philosophical Club was set up in 1847 as an alternative to the existing Dining Club[203] with the express purpose of "checking any retrograde tendencies in the Council of the Royal Society[204]". The club was founded around the principle that intellectual merit and the purpose of

delivered by his scientist colleagues (and himself, as well as his son William Lant Carpenter who became heavily involved in the scheme). One of the main aims of the Trust was to award scholarships to Indian students wishing to study at the University of London, and Carpenter –as both secretary of the Trust and Principal of University Hall—was the first person in charge of welcoming those foreign students in London. Documents found in Bristol among Mary Carpenter's papers show that William Carpenter sent several of these Indian students to Bristol during vacations, where they were likely welcomed by his family. (Information obtained by personal communication). The scholarhisps were also granted to students from the West Indies, as well as Australia and New Zealand, and were soon extended to female candidates from educational institutions in Britain. The Gilchrist Trust's other central aim --that of popular education-- seems to have achieved widespread renown, and the archives reveal that the Gilchrist scheme of lectures had for main rival the Cambridge Extended Lectures scheme. The archives hold hundreds of letters from small and medium towns in northern England, vying to be selected as the next venue for these events. It appears that the conditions of eligibility imposed by the Trust on the towns, were that they should provide a minimum lecture-hall capacity of 800 seats. The contents of the letters seem to indicate that such requirements were generally met (and often exceeded, peeking at audiences of 1300 people) and that following a Gilchrist lecture, attendance at evening courses at Mechanic's Institutes and at Useful Knoweldge Societies were noted to increase. The contents of the voluminous Gilchrist archives offer a wealth of detail and would constitute an excellent basis for further research on popular lecture schemes in nineteenth-century Britain. (See in particular, UCL archives at Kew, Gilchrist Box 8- UCL0078639 (barcode) stack: 6B-B1057S06)

[203] Both clubs merged in 1901.

[204] T. G. Bonney, ed., *Annals of the Philosophical Club of the Royal Society*. p. iv. Two years after Carpenter, in 1854, the Reverend Baden Powell and Charles Darwin were both elected members.

"strengthening the influence of science in Britain" should guide the election of Fellows, rather than the fact that candidates were "well-born, well dressed and moderately learned in science[205]." The forty seven initial members of the club included Henri T. de la Beche, Edward Forbes, William Grove, Charles Lyell, Richard Owen, Colonel Sabine, William Sharpey and Charles Wheatstone. Carpenter was elected as a member in 1852, and his inclusion in the group is in itself a clear indicator of the progressive political and ideological trend that he embraced within the Society.

However, it is possible to notice how Carpenter aligned himself with the reformists within the society as early as 1848: in reply to William Grove asking him whether he had Carpenter's vote for the election to the post of Secretary of the Royal Society against Thomas Bell, Carpenter went to great lengths to detail to his correspondent his position both as a reformist and as a champion of the under-represented interests of physiology as a scientific discipline:

> Although I have purposely abstained from taking any part in the agitation which is going on in reference to the secretaryship of the Royal Society, it is not from want of interest in the matter; and it may be as well for you to know the grounds on which, in common (I have reason to believe) with many others, I am holding myself neutral and unpledged until the day of election. Two distinct questions are unfortunately mixed up in the present case. The first, whether the Society ought to have a Physiological Secretary. The second, whether it ought to have a Reforming Secretary. If you were a Physiologist, or if Bell were a Reformer, I should have no doubt as to my vote. But it is because you are not a Physiologist and Bell is not a Reformer, and is supported by the anti-reform party, whilst you were proposed by a Geologist (who is next door to a Physiologist) –that I find it difficult to see my way clearly. At present, as I wrote to Gray yesterday, the question of Reform seems to me the paramount one; and I should have had no hesitation in voting for you, if I did not perceive such a studied exclusion of the representatives of physiological science in the proposed list of Officers and Council.[206]

Carpenter went on to suggest, however, that if Grove were willing to persuade the Council to adopt a clause guaranteeing that the next vacancy for the position of Secretary should be filled by a physiologist, he would be pleased to give him his vote. Carpenter concluded his letter (which he gave permission to his correspondent

[205] Ibid. p. iii
[206] Letter from Carpenter to Grove, 1848, Grove papers, Royal Institution Archives, GB 0116.

to circulate if he so wished) by stating that if this condition could not be obtained, "and if, on the day of the Election it should appear that the battle was not between the Reformists and Conservative parties, but between the Physicists and the Naturalists" he would support his own branch of science and vote for Thomas Bell--who was indeed elected as secretary in 1848.

This letter is interesting because in addition to revealing the political and disciplinary dynamics at work within the Society, it shows Carpenter attempting to exert an indirect influence on the proceedings, perhaps even trying to carve out a future path towards secretaryship for himself. Carpenter's manoeuvring in this letter also appears representative of the wider strategy he employed in his professional interactions and scientific writing (as will be shown in the second section of this thesis in particular): by declaring his allegiance to both opponents for two different reasons, Carpenter evaded easy categorising, thus expressing a reformist stance yet finding reason to side with the opposite camp too. I argue throughout this thesis that Carpenter routinely resorted to this strategy which enabled him obliquely support certain radical agendas whilst remaining a figure of consensus within the establishment, as has already been suggested through the example of female education. Through cultivating a multifaceted personality and systematically arguing in favour of both sides of the divide, Carpenter remained firmly and safely poised at the centre of the debates and institutions that interested him most.

Another example of Carpenter's careful positioning with regards to contentious issues is his support for Bishop Colenso of Natal. John William Colenso (1814-1883), the Anglican bishop for the province of Natal in South Africa, gained widespread notoriety amongst the Anglican clergy for his biblical criticism (as well as his views on the treatment the Zulu populations he was in charge of evangelising). In 1861 and 1862 he published two contentious works, *Saint Paul's Epistle to the Romans* and *The Pentateuch and Book of Joshua Critically Examined*[207], which had an explosive effect amidst the tense climate pervading the Anglican community already preoccupied by the Darwinian debate and the 1860 publication of the *Essays and Reviews*[208]. In *The Pentateuch* more particularly, Colenso tore away at the fabric of orthodoxy by claiming that when scrutinised scientifically, the text was wrought with factual inconsistencies (as a Cambridge-educated mathematician, Colenso took an arithmetic approach to Biblical criticism, proving many descriptions in the narrative to be mathematically impossible) also concluding that the author of the account was not Moses. The book, which sold 8 000 copies in the first three weeks of November 1862[209], scandalised a wide portion of its readers, including some of Colenso's initial allies such as F.D. Maurice whose Christian Socialism had had a profound impact on Colenso's thought. Some figures such as George Eliot, famous like Colenso for promoting German biblical criticism in Britain, sided with the bishop along with influential thinkers and Unitarians such as Charles Dickens and Charles Lyell (the publication of Lyell's *Antiquity of Man* in early 1863 coincided with that of the second part of Colenso's *Pentateuch*, and both men became close friends). Nevertheless, Colenso's publications and ideas were widely condemned for their heresy, both by the Anglican hierarchy in South-Africa and by the clergy in England where Colenso was still residing for his research at the time of publication. Colenso was tried in absentia by an Anglican Synod in South Africa in November 1863, and was threatened with excommunication for nine

[207] J. W. Colenso, *The Pentateuch and Book of Joshua Critically Examined* (London, 1862).
[208] On this topic see: V. Shea and W. Whitla, eds., *Essays and Reviews: the 1860's Text and its Reading* (United States of America, 2000). In particular chapter 6.
[209] Ibid. p. 848

charges of heresy if he did not retract his views[210]. Colenso appealed to the Queen, who referred the case to her Privy Council, and in 1865 the South-African Synod's ruling was overturned. In the meantime, Colenso's writings were the object of a great deal of discussion in England.

It emerges from correspondence and records of the Athenaeum club Council that in the midst of this controversy, Carpenter as a member of the Council of the Athenaeum put Colenso forward as a guest member for one month on the 17th of February 1863, with Charles Lyell as the second person nominating him before the Council[211]. Colenso was later proposed again by J.D Hooker, as well as by Lubbock, and later by John Tyndall. Taking a stance on Colenso's heterodoxy had thus become a necessary symbolic statement for any influential intellectual in the early 1860s, and particularly for those men of science who felt it was their particular duty for the sake of rational enquiry to support the methods of biblical criticism[212].

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210 For detailed studies of Colenso's life and work, see: J. A. Draper, ed., *The Eye of the Storm: Bishop John William Colenso and the Crisis of Biblical Interpretation* (London, 2003), J. Guy, *The Heretic. A Study of the Life of John William Colenso*, History Workshop, ed. Terence Ranger (Oxford, 1983).

211 In 1862-1863, the Council of the Athenaeum was composed of the following members: The Duke of Argyll, Rear Admiral Sir George Back FRS, H.A Bruce MP, Dr W B Carpenter FRS, Lord Robert Cecil MP, Frederick Chatfield, John Crawford FRS, Francis Galton FRS, J P Gassiot FRS, The Right Hon Sir E W Head, John Lubbock FRS, R.M Milnes MP, Lieut-Col Lord Northwick, Dr Percy FRS, George Richmond ARA, Dr Sharpey, Dr William Smith, William Stirling MP, Count P. De Strzelecki CB FRS, John Tyndall FRS, The Right Hon Spencer, H. Walpole MP, the Dean of Westminster (Dr Trench), John Meadows White, Thomas Henry Wyatt, Lord Overstone (Trustee). (Source: Athenaeum archives, *Book of Honorary Members*, London)

212 Several letters written to Charles Darwin reveal just how much the Colenso affair was the talk of the town in 1863 and 1864. Huxley for instance, when sardonically detailing several items of work that were getting in the way of his other planned projects, humorously included "Colenso-ism and bother about Moses", as one of the elements on the list. (T.H. Huxley to C. R. Darwin, 2nd of July 1863, DCP-LETT 4228, *Darwin Correspondence Project*). J. D. Hooker, writing to Darwin about the fund set up to help Colenso during his trial, admitted to Darwin (who had announced his intention to contribute) that he would donate but not sign so as to spare his mother any anguish. In a subsequent letter, he explained to Darwin that he would "subscribe to the Colenso defence fund on principle; but (am) not quite sure about Colenso himself— he ought to go further. (My) hope is that after the trial he will go out just to assert his position and then retire. His holding his Bishopric in Natal can only breed intolerable confusion and do his cause mischief; and as to his going out to convert Zulus, why, he has Christians here to convert, and the Zulus are not worth a thought:— He might come back with great glory and set up in England as a Tutor abandoning his title and mitre. (I) have seen a good deal

Colenso's scientific rationalism applied to religious doctrine must undoubtedly also have resonated with Carpenter's Unitarian principles of free rational enquiry and the physiologist's move to suggest Colenso as the recipient of an honorary membership was therefore a radical statement in itself, especially when made within the walls of one of the most elitist intellectual centres of the nation.

Correspondence between Carpenter and Colenso written around the time when Carpenter, Lyell, Hooker and Lubbock were proposing him as a member to the Athenaeum shows that Carpenter was indeed supportive of Colenso's intellectual endeavour and was keen on reassuring him that many thinkers were of the same mindset. However, a stern letter from Lord Overstone to Carpenter seems to have put Carpenter off from rocking the boat any further, and Carpenter's subsequent message to Lubbock reveals once again the mediatory role which he evidently played within the small pro-Colenso group of scientists within the Athenaeum:

March 11,1863

My Dear Lubbock,

Since I last saw you, it has been strongly represented to me by Sir Edmund Head and others, whether it would not be altogether better to suggest to Colenso not to request a renewal of the invitation, than to have another fight about him; and I cannot but own that there is a good deal of force in the arguments used on that side.

If the question were one of *public right*, I would not bate an inch; but it is one of private courtesy; and by forcing it further, we shall create a great deal of ill feeling. If again, I felt that Colenso had a full right to the publication of his opinions, I should feel that he ought to be supported in every way. But, as Disraeli said, free enquiry is all very well for free enquirers; and a man who has placed himself in voluntary relation, of the most important kind, to an Establishment that rests upon Creeds and Articles, is certainly in a false position if he attacks these established beliefs without divesting himself of that relation. As a Dissenter, who honours the consistency of the many who have given up *everything* for conscience-sake, I cannot but feel the force of what Lord Overstone said on the former occasion.

I have as yet taken no step in the matters, but should like to know what you think. Lyell and Crawford are for going on. Sharpey, I think, for peace and quietness.

Believe me, yours most truly,

William Benjamin Carpenter.[213]

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of him and consider him sanguine and unsafe." *Darwin Correspondence Project,* DCP-LETT-4408. See: J. A. Secord, *Darwin Correspondence Project*, Available: http://www.darwinproject.ac.uk.)

[213] British Library Archives, ADD 49640, f. 38

It seems probable that one of the reasons why Carpenter advised his friends to scale down their support for Colenso was due to the behaviour of Colenso himself who was failing to compromise on any of his positions or professional advantages. However, it also reveals Carpenter's attitude towards controversy: though he was ready to further --administratively and institutionally—the cause of progressive reform and of a questioning of the traditional Anglican establishment, he was not prepared to risk his reputation and chose to err on the side of caution and diplomacy. It is precisely this strategy that distinguishes him from the more revolutionary Unitarians of the beginning of the Century, and that signals the shifting institutional politics which were incorporating Dissenters into their midst—so long as they remained careful enough to play a well-balanced political game themselves.

Conclusion to part I: Carpenter, a figure of equipoise?

In his famous study of the mid-Victorian period from 1852 until 1867 entitled *The Age of Equipoise*[214], W.L. Burn argued that following the repeal of the Corn Laws in 1846 and the defeat of Chartism in 1848, elements of continuity and elements of change in British society and politics found themselves in a state of equilibrium "which most contemporaries regarded as satisfactory[215]". According to Burn:

> Something of the passions, of the ingenuous and romantic emotions, which had found expression in Chartism, in Tractarianism, in the bitter controversies over the Corn Laws and the sugar duties, in dozens of utopian schemes, had abated. There was less of that single-minded vehemence which had characterised and perhaps nearly destroyed an earlier England[216].

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[214] W. L. Burn, *The Age of Equipoise, a Study of the Mid-Victorian Generation* (London, 1964).
[215] Ibid. p. 17
[216] Ibid. p. 15

Writing to his mother on the 31st of December 1848, Carpenter took a look back at the year that had just passed and expressed his feelings about the political upheavals of the time, illustrating to a great extent Burn's notion of a transition away from more troubled political times:

> We can never forget this year. How vast and wonderful have been its convulsions, and yet how insignificant at present seem its results. Yet I cannot but believe that it is only the commencement of a more enlightened and progressive state, and that the demonstrations of popular force which it has exhibited will prevent for the future anything like a return to the arbitrary systems of the past. And one of the most hopeful signs has been that there has been nowhere any reaction against religion, as in the first French Revolution. I cannot but think that the increased freedom of action in Germany will contribute to much more practical freedom of religious inquiry.[217] (…)

Pietro Corsi has underlined the more sedate character of the mid-century years, postulating a change in intellectual strategies employed by the reformist intelligentsia. According to him "radical leaders of the 1820s and the 1830s often turned into middle-class reformers or even conservatives when faced with the threat of Chartist or socialist demands"[218]. Following the failure of Chartism, both freethinkers who sought to promote atheistic views and those who were pushing for a more liberal understanding of Christianity, resorted to a "paper and ink battle", which is, I argue, an interpretation also applicable to Carpenter, though he generally remained cautious even in his written work.

Discussing Burn's concept and the way in which it has come to influence historians of nineteenth-century Britain,[219] Martin Hewitt also adheres to the analysis that the mid-Victorian period was one of intellectual and political transition, suggesting that "the break-up of conservatism in the wake of Peel's decision to repeal the Corn Laws in 1846 clearly helped to usher in a period of political coherence which did much to give the mid-Victorian period its sense of transitional

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[217] J. E. Carpenter, "Memorial Sketch." p. 45
[218] P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. p. 223
[219] M. Hewitt, "Prologue: re-assessing the Age of Equipoise," *An Age of Equipoise? Re-assessing Mid-Victorian Britain*, ed. Martin Hewitt (2000). pp. 1-38

stasis"[220]. In the prologue to the edited book, Hewitt re-assesses the usefulness of Burn's concept of equipoise. Describing how it was initially much used to the point of becoming hackneyed, he explains that the notion was more recently replaced with that of 'consensus' or 'compromise'. However, due to the remaining state of confusion amongst scholars about the complex interplay of factors that characterised the mid-Victorian period, and due to the connotations of precariousness underlying the idea of equipoise, Hewitt suggests that it may be the most appropriate expression for historians to use after all:

> Perhaps it is time to look again at equipoise as an analytical frame. If it can be rescued from the kind of causal deployment which has marked the last fifteen or twenty years, it might provide important opportunities for overcoming some of the interdisciplinary contritions which have grown up in the characterisation of the period and for moving towards a more inclusive and multidimensional account of the mid-Victorian decades. (…) It is this emphasis on the fragile, fractured and fragmentary nature of the bonds of coherence that differentiates the notion of equipoise from the potentially very similar idea of balance.[221]

Burn himself had flagged up the difficulties of his concept in his 1964 work, and had suggested that "there (was), danger both in basing this study on individual idiosyncrasies and on wide generalisations about classes, types and occupations. From this there is no safe route of escape. The most one can do is to check the generalisations against the thoughts and actions of particular men and women and to try to find the right show-case in which, without undue crowding or arbitrary labelling, these men and women can be exhibited."[222] I suggest that Carpenter's areas of intellectual interest and professional career constitute one such case study of the concept of equipoise as defined by Hewitt.

Indeed, when added up, Carpenter's many involvements in various areas of British intellectual life from the late 1840s onwards paint a largely consistent picture: throughout his entire career the physiologist continuously pursued

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[220] Ibid. p.22
[221] Ibid. p.25
[222] W. L. Burn, *The Age of Equipoise, a Study of the Mid-Victorian Generation*. p. 23

progressive reformist agendas in more than one aspect of social and institutional affairs. His wish to create a more open and meritocratic educational system, his probable support of female education, his will to redefine the educational canon itself, as well as his welcoming attitude towards biblical criticism[223], reflect the rational and liberal version of Christianity –as well as the evangelical and reformist zeal-- traditionally associated with Unitarianism. However, the very fact that Carpenter is little remembered for these endeavours points to a pattern in the way in which he approached the challenges of reform: operating discreetly within a more inclusive political and religious context, Carpenter never questioned the framework of the establishment that he had respectfully –yet painstakingly-- gained access to and that he represented with pride. Instead, he remained ever cautious and measured, taking care to speak in objective and rational terms only, rather than to resort to any clearly recognisable ideological rhetoric, and limiting the expression of his political and social allegiances to his private correspondence. In practice however, he pushed in the direction of democratic reform and liberal thought, but only as far and for as long as the structure would give, stopping and assuaging tensions among all parties concerned as soon as he encountered resistance, as can be seen in his involvement with Bishop Colenso of Natal. This strategy can be read as a case in point of the spirit of equipoise, because this constant wish to mitigate stemmed, I suggest, on the one hand from the acute awareness Carpenter had of the risk of revolutionary chaos and on the other from the experience of having to fight as an outsider to penetrate the highest spheres of the ruling elite. Carpenter was not just joining the system, having failed to beat it: he wished to reform it from the inside, just as much as he wished to be part of it and to share in its traditional prerogatives and privileges. In

[223] which found its legacy in the ecumenical and comparative approach to religion taken by his son Joseph Estlin Carpenter.

this respect, his personal trajectory and choices illustrate the phenomenon of gentrification of nineteenth-century Unitarians discussed as the beginning of this thesis section.

Thus, in response to the question of whether Carpenter's being a Unitarian had an impact on his scientific career, it can be answered that it did if only in terms of social and political ideals, and thus in terms of social strategy in the particular context of the mid-Victorian 'stasis' described above. In other words, the influence of Carpenter's Unitarian background caused him to apply himself both to reform, and to political entyrism. The two following sections of this thesis will demonstrate that Carpenter carried out a similar balancing act to the one described in the context of his professional life, but this time in the context –and in the very *contents*-- of his scientific thought. Arguing that Carpenter sought to offer a "safe synthesis" of the most radical new scientific ideas without upsetting the traditional framework of Anglican natural theology, the next section will highlight Carpenter's quest to renew British science without endangering either his own reputation or religious teleology, thus seeking to attain what might be called a state of "scientific equipoise".

Part II: Renewing natural science in Britain: a Carpenterian compromise

Introduction. Carpenter and natural science: between immanence and transcendence

In January 1840, the *Edinburgh Medical and Surgical Journal* published a review[224] of William Carpenter's first major work, *Principles of General and Comparative Physiology*[225]. The anonymous reviewer accused the scientist of presenting ideas that "appear(ed) to lead to conclusions so dangerous" that it was impossible "to conscientiously recommend (the) book". The reviewer also criticised Carpenter for leaning towards materialist doctrines, for presenting a clockwork world that could function without divine intervention, and for doing away with the vital principle as a sacred animating life-force through claiming that it was an inherent property of organised matter. He also reproached Carpenter with attempting to disguise these heterodox propositions by deliberately contradicting himself in places, by stating for example that the vital principle in organised beings could *not* be a mere by-product of organic matter. In addition to these comments, the author of the review also deemed Carpenter's final chapter on 'The Evidences of Design Presented by the Structure of Organised Beings' to be "but a feeble antidote to the previous statements", a ploy to confuse the reader about his true naturalistic opinions.

Carpenter was furious to find himself thus lambasted as intellectually dishonest and as intent on undermining religious belief. He immediately published a response entitled *Remarks on Some Passages in the Review of "Principles of*

[224] Anonymous, "Principles of General and Comparative Physiology, intended as an Introduction to the Study of Human Physiology, and as a Guide to the philosophical pursuit of Natural History, by William B. Carpenter, Member of the Royal College of Surgeons, London, 1839.," *Edinburgh Medical & Surgical Journal* 53 (1840). p. 228

[225] W. B. Carpenter, *Principles of General and Comparative Physiology*.

General and Comparative Physiology" in the Edinburgh Medical and Surgical Journal, January 1840"[226], rejecting his critic's implicit accusation that he was betraying the principles of Christian Revelation. To bolster his case, he recruited the support of several weighty figures of the Victorian scientific and religious establishment, such as the Reverevnd John S. Henslow, Sir John F. Herschel, Dr. Peter Mark Roget, Dr. William Puteney Alison, Sir Henry Holland and the Reverend William Conybeare. Defending Carpenter, the Reverend Baden Powell, Savilian Professor of Mathematics at the University of Oxford, declared that:

> " (…) the meaning of the term 'Law of Nature', the notion of the permanence and uniform action of the great mechanism of the universe down to its minutest parts, appears to me most perfectly to accord as well with the soundest philosophy as with the most elevated notions of the Divine Attributes."[227]

Baden Powell was a logical ally for Carpenter to turn to, since he too had supported the link between science and natural theology in his 1838 *The Connexion of Natural and Divine Truth*[228]. The two men were acquaintances, and Carpenter had contacted Powell while he was still working on his manuscript to ask for any advice and corrections he might be willing to offer[229].

This episode in Carpenter's early career and the responses –both favourable and unfavourable-- that it elicited are representative of the wider debate that was raging at the time in Britain over the interpretation of natural theology and the influence of continental idealism. As has been well established by historians such as

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226 W. B. Carpenter, "Remarks on Some Passages in the Review of "Principles of General and Comparative Physiology" in the Edinburgh Medical and Surgical Journal, January 1840.," *British and Foreign Medical Review* 9 (1840).
227 Ibid.p.7)
228 B. Powell, *The Connexion of Natural and Divine Truth; or the study of the inductive philosophy considered as subservient to theology* (Oxford, 1838).
229 Letter from Carpenter to Powell, written in Bristol and dated from September the 4th 1838, kindly provided to me by Professor Pietro Corsi and originally found in the Baden Powell archives (now unavailable).

Toby Appel, Pietro Corsi, Adrian Desmond and Stephen Jacyna[230], the tense political climate in the first third of the nineteenth century and the perceived threat of popular unrest stirred the philosophical and religious debate about the origin of moral authority. Continental ideas which sought to do away with any sense of a divinely ordained world or with a vitalistic “life principle” that needed to be super-added or “breathed in” to creation by an interventionist deity, became associated with the erosion of a top-down model of social control exercised by traditional powers. As Adrian Desmond and Stephen Jacyna have argued, ideas suggesting a continuum from animals to man or implying a bottom-up self-organisation of inert matter into life, and this without a divinely super-imposed vital agency, could be viewed as politically seditious if not downright revolutionary.

In early nineteenth-century Britain, Paleyite arguments of intelligent design and a fixist conception of creation still held sway within a large portion of the scientific establishment. However, as Pietro Corsi[231] and James Secord[232] (amongst others) have demonstrated, transformist concepts were steadily making their way into Britain in the early century and, by the mid 1840s, were the talk of the town after the publication of Chamber’s anonymous *Vestiges of the Natural History of Creation*[233]. Initiatives to safeguard the socially conservative view of an immutable divine order, such as the commissioning of the *Bridgewater Treatises* by Francis Henry Egerton, Eight Earl of Bridgewater (1756-1829), can thus be interpreted as a

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230 L. S. Jacyna, "Immanence or Transcendence: Theories of Life and Organization in Britain, 1790-1835," *Isis* 74.3 (1983).
231 P. Corsi, "Before Darwin: transformist concepts in European natural history," *Journal of the History of Biology*.38(1) (2005).
232 J. A. Secord, *Victorian Sensation : the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation*.
233 Anonymous, *Vestiges of the Natural History of Creation* (London, 1844).

reaction to revolutionary and democratic claims and as an attempt to "sanctify" science, to make it safe by incorporating it to religious culture itself.[234]

In his above-cited article, Stephen Jacyna framed this tension over new anatomical and physiological theories by separating the two main political ideologies –the conservative one and the radical or revolutionary one-- along a metaphysical fault-line opposing immanentists and transcendentalists. Immanentist thinkers, such as the English surgeon William Lawrence (1783-1867), held that life was a mere property of organised matter. On the other hand, transcendentalist scientists, such as John Hunter for example, considered vitality to be the result of a separate divine agency, if not a separate substance altogether, that needed to be adduced to matter by God. This philosophical rift came to light in England in 1819 when Lawrence's latest work, entitled the *Natural History of Man*[235], was published. Declared blasphemous in 1822 by the Court Chancery, his lectures stirred a public debate on the principles of organic life as well as on freedom of conscience in the medical profession. Lawrence's ideas ran contrary to the teachings of his own former master John Abernethy (1764-1831) who was then a lecturer at the Royal College of Surgeons. Abernethy, himself trained by Hunter whose vitalistic views he continued to expound, accused his colleague of materialism and was one of the main voices in the debate that ensued[236].

Almost two decades later, with debates and riots over parliamentary reform still fresh in people's minds, Carpenter's 1838 *Principles of Comparative Physiology* which suggested that the creator could be one step removed from his

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[234] For a stimulating examination of the way in which the Bridgewater Treatises were used to back their own agendas by educationalists from all sides of the political spectrum, see: J. Topham, "Science and Popular Education in the 1830s: the Role of the "Bridgewater Treatises"," *The British Journal for the History of Science* 25.4 (1992).

[235] W. Lawrence, *Lectures of Physiology, Zoology and the Natural History of Man* (London, 1819).

[236] For an overview of the debate that occurred, see: A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London*. Pp. 117-121

semi-autonomous creation, was thus still liable to being perceived as seditious. Positing, as Carpenter did, that a certain amount of mechanism and autonomy lay at the heart of the fundamental processes sustaining organic life, could be interpreted as radical-- both politically and metaphysically.

However, this interpretation does not stand up to close scrutiny. The fact that figures like the Anglican High Churchman Baden Powell could support Carpenter's views and promote rational methods of enquiry does not so much point to a political radicalisation of these thinkers, as to the fact that 'immanentist' views were not systematically interpreted as blasphemous or politically dangerous by members of the traditional establishment. Indeed, I will argue in this chapter that the adherence to immanentist or transcendentalist ideas (or to a mixture of both views as we shall see) was not as polarised or as dependant on political agendas as some historians have suggested. Jacyna himself warned about the danger of rigid categorisations, citing the example of the otherwise reformist Scottish Common Sense philosopher Dugald Stewart who saw religion as one of the most efficient means of supporting the political order:

> Stewart's case is significant because it illustrates that the conservative outlook discussed here was not the exclusive property of any one party or faction. Although Stewart was a Whig who suffered from Tory repression in Edinburgh during the revolutionary wars, his view of God as continuing governor of the universe conformed closely to the cosmology of some of the leaders of the overtly reactionary movement[237].

Baden Powell's case also demonstrates that the voices calling for a more scientific and rational approach to natural theology did not necessarily emanate from the radical fringes, nor did they aim to dissolve the traditional religious agenda. On the contrary, Powell encouraged fellow Christian apologists to embrace the methods of

[237] L. S. Jacyna, "Immanence or Transcendence: Theories of Life and Organization in Britain, 1790-1835." p.324

science so as to strengthen the authority of religion[238]. Science based on hard physical evidence, rather than Natural Theology, was in his opinion the best means of making the case for a divinely ordained world. Carpenter used strikingly similar arguments in his *Principles of General and Comparative Physiology*.

This second chapter therefore aims to analyse how the ideas developed by Carpenter fitted into the intellectual context of the time, asking to what extent he was influenced by continental thought and where he stood in the ongoing debate about living organisms. Through his early works on comparative physiology and human physiology, Carpenter became noticed for his adherence to certain innovative biological theories imported from France and Germany known as 'transcendental morphology'. Historians such as Toby Appel, Philip Rehbock and Nicolaas Rupke[239] have listed Carpenter as one of the early promoters of these doctrines in Britain and consider him to have been instrumental in bringing about a shift in epistemological perspective. According to Toby Appel, Carpenter "combined morphology, teleology and German embryology in a fruitful synthesis, similar to that of Milne Edwards, which had an important role in the genesis of Darwin's theory of evolution by Natural Selection[240]."

This thesis section will examine these statements and offer the first extensive review of Carpenter's approach to natural science. It will argue that Carpenter favoured a conciliatory approach that enabled him to herald radical new ideas without upsetting the foundations of British Natural Theology through presenting a mutable natural world that nevertheless unfolded itself according to a pre-ordained

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[238] For a detailed discussion of Baden Powell's strategy, see p. 181 in P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*.

[239] N. A. Rupke, *Richard Owen, Biology without Darwin* (Chicago, 2009). P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*.

[240] See T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p. 223

divine plan. This analysis will also highlight Carpenter's life-long quest to uncover the hidden unity in nature, and will argue that a strong link can be established between his Unitarian faith and his search for a grand "Unifying Principle", paving the way for Part III which will discuss Carpenter's probable philosophical monism.

Chapter 5 will therefore analyse Carpenter's uptake of continental morphology. Although it is relatively well accepted that Carpenter promoted such ideas in Britain, his attempts at framing his own original 'philosophical' theories have been largely ignored. The two main theories he proposed were those of the "Unity of Function" underpinning the organisation of living beings on the one hand, and the "Correlation of the vital and Physical Forces" which --rather ambitiously-- attempted to unify the general laws of nature, on the other. The inspiration, contents and logic of these two concepts will be analysed in order to bring to light Carpenter's vision of transcendental morphology in relation to his religious beliefs.

These observations will lead to a sixth chapter on the characteristics of Carpenter's participation in the evolutionary debate and of his vision of evolution as orthogenesis, "directed" by divine intelligence. Looking at his early support of the theory, and analysing his reservations in relation to the concept of Natural Selection, will help etch a clearer picture of his central tenets and of his teleological arguments. Finally, Carpenter's endeavours to set up the first large-scale oceanographic expedition, as well as his central role in one of the most notable geological controversies of the second half of the Century, the Eozoön Canadense debate, will be examined in Chapter 7 to throw additional light on the links between the evolutionary interpretation of cell theory and the development of oceanography in the second half of the Century.

Chapter 5. Carpenter and continental idealism: a safe synthesis?

Introduction

The first third of the nineteenth century witnessed a fierce battle of ideas over the very meaning and methods of natural history. William Whewell's famous 1837 treaty on the *History of the Inductive Sciences*[241], which Carpenter took as a main point of reference and in some respects as a counter-example, reflects the preoccupations of British naturalists who were trying to define the scope of their science, and the degree of inductive conclusions they could safely posit in their work. It was published in the wake of the famous Cuvier-Geoffroy debate which took place in 1830 at the French Académie des Sciences and which was described by Goethe as the long-expected explosion of a volcano.[242] This clash of two scientific titans has gone down in history as the dramatic culmination of debates about the metaphysical and methodological claims underlying natural history as a discipline that had been raging since the late eighteenth century. It is also regarded as instrumental in spreading not only Cuvier and Geoffroy's ideas, but also –through Geoffroy's synthesis-- Lamarck's evolutionary hypothesis. Several historians[243] have shown that this debate, by bringing matters to a head, pushed competing theories to the forefront of the scientific scene, thus helping new views of nature to crystallize.

Cuvier and Geoffroy's rival theories both hinged around the notion that comparative anatomy was the key to discovering the laws of speciation and organic development, but they diverged in their interpretations of the analogies observed

[241] W. Whewell, *History of the Inductive Sciences, from the Earliest to the Present Times*, 3 vols. (London, 1837).
[242] T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p.1
[243] See in particular P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830* (Paris, 2001). And T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*.

amongst different organisms. Whereas George Cuvier (1769-1832) posited four distinct models or "embranchments" (vertebrata, articulata, mollusca and radiata) as the pre-ordained plans on which all living beings were based, Etienne Geoffroy Saint Hilaire (1772-1844) claimed that organisms were variations on a single theme unfolding in a linear progression and driven by metamorphic processes.

Cuvier had proposed the novel theory of four different organizational plans to explain the anatomy of living beings in his *Règne Animal* published in 1817[244]. He rejected all notions of a linear progression of life forms, having always disliked the chain of being hypothesis initially popularized in the eighteenth century by the Swiss naturalist Charles Bonnet (1720-1793). Much like the French scientist Louis Jean-Marie Daubenton (1716-1799) who actively opposed the chain of being concept in the 1780s, Cuvier considered the notion to be simplistic and the analogies between various animals insufficient to reflect a consistent and harmonious gradation between forms or types of organisation. By contrast, Geoffroy Saint-Hilaire disagreed with the disparate nature of the four embranchments model and proposed instead the view that all living creatures were linked to each other both chronologically as well as structurally. Contrary to Cuvier whose teleological approach presupposed a benevolent creator, Geoffroy's hypothesis was thoroughly deistic, doing away with notions of vitalism.

Geoffroy was the first naturalist to systematically underline and demonstrate "anaologies" between different animals, comparing –bone by bone- the osseous structure of birds, mammals, fish and reptiles. For Geoffroy, embryological "recapitulation" such as it was discussed by Johann Friedrich Meckel (1781-1833)

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[244] G. Cuvier, *Le Règne Animal Distribué Selon son Organisation pour Servir de Base à l'Histoire Naturelle des Animaux et à l'Introduction à l'Anatomie Comparée*, 4 vols. (Paris 1817).

and Etienne Serres (1786-1868) for example[245], as well as vestigial structures, were evidence of the filiations between different species. By contrast, Cuvier's four branches of living beings, though a relatively dynamic concept which made allowances for sub-modifications and variations, posited a stable barrier that kept all four categories distinct from each other and postulated a deity who had foreseen the needs of his creatures and consequently designed them to be adapted to their respective environments. Cuvier was thus a teleological functionalist, who held that the structure of various organs fitted the conditions of life experienced by the organisms endowed with them. Conversely, Geoffroy's fluid and metamorphic model was based on a structuralist interpretation of anatomy that assumed the primacy of anatomical structure over function, each species being an attempt at reaching the single, ideal, pr-existing anatomical plan for all animals. Chance or adaptive changes in anatomy in embryos shaped the way of life of the animals. Consequently, for Geoffroy, the anatomical organization of an animal dictated its mode of living. This structuralism and systematic quest for analogies (later called "homologies" by Richard Owen as we shall see) constituted the basis of what became referred to as transcendental morphology.

The debate triggered by these two different theories reverberated across Europe, sending shockwaves through the British tradition of Natural Theology and making it impossible for any naturalist to ignore the looming redefinition of scientific paradigms. Thus Carpenter, when writing his first manual of physiology in 1838, was not just trying to earn a living or to launch his career as a professional scientist, he was also taking a stand from the onset and clarifying his position in the

[245] What has become known as the "Meckel-Serres law" is a synthesis of the ideas put forward in Paris in the early 1800s by the German anatomist Johann Friedrich Meckel (who was working under the patronage of Cuvier at the Museum) and the French scientist Etienne Serres. Their theories of recapitulation, later criticised by Von Baer, posited that there was a parallelism in development between the ontogeny of the embryo and the phylogeny of the species as a whole.

ongoing scientific debate. The following section of this chapter argues that Carpenter's first step out into the professional arena was a daring one, and that the vision of natural science that he championed when claiming his place within the debate was a bold, yet ultimately safe synthesis of existing views of organic nature.

Carpenter made sure from the outset to present a clear methodological and theoretical stance to the scientific world, branding himself a "philosophical naturalist", as has already been shown by Philip Rehbock.[246] By this, Carpenter meant a scientist who believed that the role of the naturalist was not just to interpret raw facts, but also to construct speculative frameworks that would guide research. Carpenter was thus taking an idealist view, asserting his belief in a teleological universe and in the existence of universal rules underpinning the specific characteristics of living organisms to fulfil this plan. This chapter argues that Carpenter's approach to continental morphology was quite new in Britain, and that he systematically sought to overcome diverging theories through collapsing oppositions between the immanentist and transcendentalist views such as they have been defined by Stephen Jacyna. I argue that Carpenter achieved this synthesis through conciliating British functionalist traditions with the new philosophical structuralism propounded by Geoffroy and his continental colleagues.

Toby Appel and Nicolaas Rupke have sugested that several naturalists tried to conciliate the ideas of Cuvier and Geoffroy and their respective allies. Richard Owen, often referred to as the "English Cuvier" due to the similar outlook he shared with his French counterpart, is often cited as the naturalist who managed to blend both transcendental morphology and Cuvier's functionalist approach into a fruitful synthesis that fitted the British cultural context. Appel also notes that:

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[246] P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*.

> Comparative anatomists came to recognize the many evidences of unity of plan that transcended similarities of function. The leaders of French zoology after 1830—in particular, Henri de Blainville, Isidore Geoffroy Saint-Hilaire, Pierre Flourens, and Henri Milne Edwards—reconciled the extremes presented by Geoffroy and Cuvier within a non-evolutionary framework. In England, in a different cultural context, the comparative anatomist Richard Owen also formulated a compromise between the views of Cuvier and Geoffroy, one that played an important and, until recently, overlooked role in the development of Darwin's thought.[247]

Appel further notes that in Britain, Carpenter was instrumental in creating a similar compromise that went beyond teleological functionalism and sowed the seeds for later evolutionary ideas[248]. The influence of continental morphology and of 'philosophical natural science' (as it became known in France at the turn of the nineteenth century) on Carpenter's early physiological work has also been mentioned by Adrian Desmond and Peter Rehbock[249], while Robert J. Richards has underlined the links between British biological thought and German Naturphilosophie[250]. The following chapter will therefore illustrate these observations, since Carpenter's adherence to the tenets of continental morphology has been alluded to by these scholars without ever being documented. The uniqueness and conciliatory nature of Carpenter's theoretical propositions will also be demonstrated. However, in order to identify what unique propositions Carpenter put forward, it is necessary to give an overview of his earliest approach to continental ideas, before analysing the consistency and development of his own postulates from the mid 1830s through to the 1860s. Furthermore, Carpenter's use of comparative anatomy in his overarching methodological approach has not been analysed in the context of his wider metaphysical and methodological outlook, and

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[247] T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p.4
[248] Ibid. p. 207
[249] P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*.
[250] See in particular R. J. Richards, *The Meaning of Evolution: the Morphological Construction and Ideological Reconstruction of Darwin's Theory.* (Chicago, 1992). Though German and French transcendental morphology are usually held to be two largely distinct movements, Toby Appel has mentioned J. H. F Kohlbrugge's thesis according to which the ideas of Goethe and Schelling were known to Geoffroy, probably through Cuvier, see: T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p. 90

this section aims to highlight the metaphysical considerations underlying Carpenter's advocacy of the new comparative method.

5.1- Carpenter and continental morphology: the metaphysical significance of comparative anatomy.

William Carpenter's studies at the University of London in the early 1830s brought him into contact with a number of naturalists who were spreading new biological theories imported from Germany and France. The last decade of the eighteenth century had indeed witnessed the development on the continent of transcendental biology, with various forms of philosophical idealism coming to bear on the study of nature. As Robert J. Richards and Lynn Nyhart[251] --amongst others—have shown, the German towns of Weimar and of Jena were the cradle of the romantic approach to natural science known as *Naturphilosophie,* which sought to reveal the consistency and purpose inherent to Nature. The leading figures of this movement were the thinkers Johann Wolfgang Von Goethe (1749-1832), his disciple Johann Gottlieb Fichte (1762-1814) and Friedrich Schelling (1775-1854) who all gravitated towards the university town of Jena.[252] Their thinking was stimulated by Emmanuel Kant's critical idealism, which challenged the notion of an external material reality directly accessible to the senses and sought instead to explain the coherence of human perception as the result of internal categories of

[251] See L. K. Nyhart, *Biology Takes Form: Animal Morphology and the German Universities 1800-1900* (Chicago, 1995). R. J. Richards, *The Meaning of Evolution: the Morphological Construction and Ideological Reconstruction of Darwin's Theory*, R. J. Richards, *The Romantic Conception of Life, Science and Philosophy in the Age of Goethe* (Chicago and London, 2002), R. J. Richards, *The Tragic Sense of Life : Ernst Haeckel and the Struggle over Evolutionary Thought* (Chicago; London, 2008).

[252] It is important to note however that "morphology" never acquired an official status within German universities and that no professorships in that discipline were ever created. Lynn Nyhart warns against interpreting this fact as a sign of institutional failure, arguing that the intellectual colonisation achieved by the school of morphology within existing disciplines was in itself major institutional success. See L. K. Nyhart, *Biology Takes Form: Animal Morphology and the German Universities 1800-1900*. p.4

mind.

Kant's counter-intuitive paradigm shift set learned Germany alight and Goethe, Fichte and Schelling's idealism can be read as responses to Kant's own hypothesis. Indeed, upon his return from his famous stay in Italy in 1788, Goethe found that Kant's ideas were being energetically promoted at the university of Jena by the Viennese scholar Karl Leonhard Reinhold. According to Friedrich Jodl in his 1901 article on Goethe and Kant, the *Goete Archiv* offers remarkable evidence of Goethe's scrupulous study of Kant in the shape of "a manuscript in Goethe's own hand containing a careful abstract of Kant's book, and a considerable quantity of slips and separate sheets on which Goethe had noted down the doubts and objections which occurred to him as he read."[253] The famous correspondence between Goethe and Schiller[254] further testifies to the growing interest Goethe expressed for Kant's work in the 1790s. However, though greatly impressed by Kant's system, and though seduced by the notion that an understanding of reality needed to be structured by the subject's own intellect, neither Goethe nor Schelling ultimately fully adhered to the subjectivism implied by Kant's philosophy despite agreeing that higher truths were not directly intelligible. On the contrary, Goethe's concept of material reality was that it could be apprehended objectively, was intelligible and existed in and as of itself. Goethe's "whole thought was supported by the conviction that Nature, as revealed to our senses, is an expression of the highest and all-embracing reality; that the Primal Being himself is no mere phenomenon; his whole poetic product is inspired by the feeling of the most intimate kinship, even of unity,

[253] F. Jodl, "Goethe and Kant," *The Monist* 11.2 (1901). p. 260 (The book in question was Kant's *Critique of Pure Reason* published in 1781)

[254] The German poet Friedrich Von Schiller (1759-1805) took a keen interest in Kantian ideas during his time lecturing at the university of Jena between 1789 and 1799.

of man and Nature (…)"[255]. Schelling, who had initially been seduced by Kant's theory of a subjective construction of phenomena, later relinquished this view and considered Spinoza's immanentism and monism as a more fertile model.

These debates on the nature of reality and on the very possibility of interpreting it, prompted German thinkers to try to extract universal categories or principles from organic nature in order to demonstrate its coherence and intelligibility.[256] The central aim of this romantic philosophy of nature was thus to comprehend nature in its entirety, postulating underlying unity and harmony as well as an overarching theoretical structure that transcended immediate reality. Goethe's concept of metamorphosis according to a meta-archetype or ideal form[257], the idea of a unity of plan behind the organization of living beings, the notion of parallelism in structure and in embryological development as a sign of this underlying unity, as well as the hypothesis of recapitulation in embryogenesis, underpinned this new transcendental morphology put forward alongside Goethe by Lorenz Oken, Johann Friedrich Meckel, Carl Gustav Carus in Germany, as well as Geoffroy Saint Hilaire and Etienne de Serres –amongst others-- in France.[258]

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[255] F. Jodl, "Goethe and Kant." p. 263

[256] Dalia Nassar gives an analysis of Goethe's reaction to Kant's work and underlines his wish to rehabilitate the importance of intuition in attaining a true knowledge of nature. She spells out Goethe's epistemological project through studying Novalis's praise of Goethe's "empirical idealism", pointing out that both thinkers sought to conciliate those two seemingly opposed philosophical methods. See: D. Nassar, "“Idealism is nothing but genuine empiricism”: Novalis, Goethe, and the Ideal of Romantic Science," *Goethe Yearbook* 18 (2011). Carpenter's own work is characterised by a similar theoretical endeavour. In addition to this, his definition of 'common sense' might also have been inspired by Goethe's empiricism, as will be developed in Part III.

[257] In 1790, Goethe published *The Metamorphosis of Plants* in which he presented his concept of an "Urpflanz", or primordial meta-plant which was an abstract blueprint of an organism that all plants were attempting to express through their specific organisation. Goethe called the modification of organisms over periods of time *metamorphosis*, and postulated the existence of developmental forces (Bildungstrieb) which drove the organisms to develop towards the ideal model of the Urpflanz. In this work Goethe described morphology as "a science of organic forms and formative forces aimed at discovering the underlying unity in the vast diversity of plants and animals." See J. W. Goethe, *The Metamorphosis of Plants* (Cambridge, Mass., 2009). p. xvi

[258] R. J. Richards, *The Romantic Conception of Life, Science and Philosophy in the Age of Goethe*, P. Corsi, *The Age of Lamarck: Evolutionary Theories in France, 1790-1830.*, trans. Jonathan

As J. Estlin Carpenter's biography of his father suggests, and as Adrian Desmond has already mentioned,[259] the young William Carpenter soaked up these ideas enthusiastically and zealously. Historians have begun to trace how exactly these concepts were disseminated internationally by studying the lists of students who attended the lectures of the thinkers involved.[260] Such lists, when available, provide indications of how far ideas travelled and whom they might have been discussed by, but more research still needs to be devoted to mapping the intellectual influence of particular individuals. For instance, many doubts still remain as to the exact dynamics of the circulation of ideas between Germany and France in the emergence of 'transcendental morphology' or 'philosophical anatomy' in both countries.

Pietro Corsi pointed out in his work on Lamarck, that several transcendental morphologists such as Lorenz Oken, Johann Friedrich Meckel and Johann Baptist von Spix followed Cuvier, Lamarck and Geoffroy's lessons at the Muséum in Paris, and that there are definite reciprocal influences between the German metaphysical tradition and the French medical tradition. However, historians also tend to agree-- for want of sufficient evidence-- that despite the fact that certain individuals were reading and translating each other's work (Meckel had translated Cuvier's *Cours d'Anatomie Comparée* into German in 1810 for example) it is also likely that several thinkers in Germany and France drew up similar theories independently from each other, subsequently sharing their ideas when Paris became the international centre of

Mandelbaum (Berkley, 1988). A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London*.

259 A. Desmond, *The Politics of Evolution : Morphology, Medicine, and Reform in Radical London*. p. 213

260 See for example Pietro Corsi's research project mapping the sociology and geographical origins of the students who attended Lamarck's lectures in Paris: P. Corsi, *Les auditeurs aux cours de Jean-Baptiste Lamarck*, 2006, Available: http://www.lamarck.cnrs.fr/auditeurs/presentation.php?lang=fr.

excellence for anatomical studies.[261]

William Carpenter's own allegiance to philosophical natural history can be deduced from a variety of factors. Firstly, it is well known that the young William attended and thoroughly enjoyed Robert E. Grant's lectures on the morphological theories of continental thinkers and Geoffroy de Saint Hilaire in particular (with whom Grant had become personally acquainted during his several trips to France). Secondly, though there is no evidence to suggest that Carpenter ever spent much time in France or in Germany during his medical studies as was still routinely done by Edinburugh medical students, it is known that he spoke fluent French and was a francophile. It is also evident from the reviews written by Carpenter from 1837 onwards for the *British and Foreign Medical Review*, that he was well versed in the latest German scientific literature. It is also clear from many of his writings that Carpenter adhered to Charles Lyell's uniformitarianism, and it is therefore possible to speculate that Lyell's discussion of continental science and particularly of Lamarck's ideas in the second volume of his 1832 *Principles of Geology* also made an impression on the young scientist. Finally, Carpenter's close friendship with Edward Forbes probably also played a significant role in anchoring the importance of idealist theories in his mind, since Forbes had attended Robert Knox's lectures in Edinburgh and later attended Geoffroy's course in Paris in 1836.[262]

What is certain, is that by the time Carpenter reached Scotland to complete his medical studies, he was acquainted with German 'Naturphilosophie' and

[261] See: P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. pp. 291-94

[262] P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*. p. 69. Robert Edmund Grant is known to have visited the Muséum in paris in the winter of 1816-1817, and Robert Knox had spent a year in Paris in 1821, from which he returned a convinced supporter of both Geoffroy and Lamarck's ideas. See: P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. p. 233

particularly with Goethe's plant morphology.[263] In a letter written to his family in 1835 shortly after beginning his studies in Edinburgh, he mentioned taking part in a dinner conversation with several professors about Wordsworth's poetry and Goethe's *Faust,* proudly narrating that he had managed to steer the discussion towards Goethe's scientific work, declaring that "(he) was able to edge in a word as to his having been the first propounder of the doctrine of morphology in plants.[264]" The care Carpenter took to single himself out by mentioning Goethe, and the point he made of writing home about the fact, seem to indicate that German Naturphilosophie was a novel and exciting topic of conversation that was gaining currency in Britain, whilst still being exceptional enough to be noteworthy.

Carpenter's interest in plant morphology characterised all his early writings, whether private or public, and is the earliest evidence of his strong leanings towards idealist natural history. For instance, shortly after writing this letter to his family, Carpenter won a gold medal for a an essay "on a department of physiological botany."[265] In November 1835, Carpenter wrote home again, expressing his intention of working on a book on comparative physiology. Referring to Peter Mark Roget's famous *Bridgewater Treatise*[266] of 1834, Carpenter explained that his own forthcoming work would include "a number of most beautiful analogies which Roget ha(d) omitted from his evident ignorance of Vegetable Physiology."[267] The same year, the young student's very first published article was also devoted to the topic of the "*Structure and Functions of the Organs of Respiration in the Animal*

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[263] Goethe's botanic work had been translated into French in 1829, and was referred to during the Geoffroy-Cuvier debate in the French *Gazette Médicale*. His scientific memoirs were translated into French in 1837.
[264] J. E. Carpenter, "Memorial Sketch." p. 14
[265] Ibid. p. 16. The exact title of this essay was unfortunately not found.
[266] P. M. Roget, *Animal and Vegetable Physiology, Considered with Reference to Natural Theology*, Bridgewater Treatises on the Power, Wisdom, and Goodness of God, as Manifested in the Creation (London, 1834).
[267] J. E. Carpenter, "Memorial Sketch." p. 18

and Vegetable Kingdoms[268]".

Having evidently begun to establish himself as somewhat of an authority on vegetable physiology, Carpenter was asked to review the latest literature on the subject when first recruited by John Forbes as a writer for his famous *British and Foreign Medical Review* in 1837. The young doctor duly produced an article entitled *Lindley, Henslow, De Candolle, Treviranus, Raspail on Vegetable Physiology*[269], though as he himself admitted, the review was in reality a platform to expound his own ideas on plant physiology and on the wider benefits of comparative physiology for the progress of science:

> Botanists have too frequently overlooked, in their eager pursuit of the systematic part of the science, the investigation of the structure and function of the organs whose external form and arrangement afford them the means of classification. The study of the affinities of plants, however, upon which the Natural System is founded, requires an intimate acquaintance, not only with organography, or the internal as well as external conformation of their parts, but also with morphology, the department which treats of the laws regulating the arrangement and variation of organs, and which occupies in botany a station corresponding to that of philosophical anatomy in the study of the animal kingdom. [270]

Thus, in his earliest published writings, Carpenter was openly promoting the practice of inductive "philosophical" science as well as the pursuit of continental "morphology" as opposed to merely adhering to Linnaean methods of classification. Carpenter's review addressed the recent textbook by the Swiss botanist Alphonse de Candolle[271], and his description of the work makes evident his familiarity with the ideas of Augustin Pyramus De Candolle (the Swiss botanist and father of Alphonse De Candolle), who is also credited with independently proposing similar notions of plant morphology to those put forward by Goethe. The senior De Candolle (1778-1841) had worked in Paris until 1808 and had put forward notions of unity of plan in

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[268] W. B. Carpenter, "On the Structure and Functions of the Organs of Respiration in the Animal and Vegetable Kingdoms."

[269] W. B. Carpenter, "Lindley, Henslow, De Candolle, Treviranus, Raspail on Vegetable Physiology," *British and Foreign Medical Review* (1837).

[270] Ibid. p. 2

[271] A. De Candolle, *Introduction à l'étude de la Botanique* (Paris, 1835).

his influential work *Théorie Elementaire de la Botanique*[272] published in 1813. De Candolle had also studied plant monstrosities following the hypothesis that deviations from usual structure might be a reversion by the organism to nature's basic tendency to favour "symmetry". Without any knowledge of Goethe's ideas[273], De Candolle's thought represents a further strand of continental morphology Carpenter was perfectly aware of.

In addition to encouraging this methodological shift towards morphology, Carpenter also urged his readers to encompass the entire "chain of being" in their scientific considerations. Referring once again to Roget, he agreed with the latter's teleological interpretation of the role of plants in the general economy of nature:

> We are therefore inclined to agree with those who consider plants as intermediate in their constitution between animals and inorganic matter. "The only final cause", says Dr. Roget, "which we can assign for the series of phenomena constituting the nutritive functions of vegetables, is the formation of certain organic products calculated to supply sustenance to a higher order of beings. The animal kingdom is altogether dependent for its support, and even existence, on the vegetable world. Plants appear to be formed to bring together a certain number of elements derived from the mineral kingdom, in order to subject them to the operations of vital chemistry; a power too subtle for human science to detect, or for human art to imitate.[274]

Carpenter's adherence to this view is significant, as it reveals his teleological interpretation of nature, which may also have been derived from Lamarck who himself adhered to the eighteenth-century concept of a progressive gradation in the sophistication of living beings. This outlook, as we will see, formed the basis of Carpenter's orthogenetic interpretation of evolution.

Another point of interest is the fact that Roget's *Treatise*, from which Carpenter cited the extract, was heavily inspired by Robert Grant's lectures (which

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[272] A. P. De Candolle, *Théorie Elementaire de la Botanique* (Paris, 1813).

[273] Jean Marc Drouin explains that Goethe's work on plant morphology was not translated into French until 1830 and that De Candolle did not read German. He also points out that in his 1827 work *Organographie Végétale*, De Candolle mentioned the fact that Goethe had forseen the science of vegetable organography. See: J.-M. Drouin and J.-D. Cabdaux, eds., *Augusting Pyramus De Candolle, Mémoires et Souvenirs (1778-1841)* (Paris, 2004). p. 22

[274] W. B. Carpenter, "Lindley, Henslow, De Candolle, Treviranus, Raspail on Vegetable Physiology." p.17

Roget had attended before writing his piece). The public dispute between the two men in 1846[275] revealed to what extent British 'philosophical' scientists were inspired by continental thought and therefore to what extent the new science of morphology was circulating in Britain. Indeed, in response to Grant's accusations of plagiarism, Roget reminded his colleague that the very same charges could be laid against him, since many of the views he expressed-- such as his theory of the development of the cranial vertebrae[276]—had been "taken by G. St. Hilaire, Carus, Oken, and others[277]." This acknowledgement by Roget of the British debt to continental morphology, and Carpenter's close scrutiny of Roget's work, make evident the ties that brought Carpenter into contact with transcendental anatomy during his time in London.

It seems likely that the attention Carpenter devoted to the subject of plant physiology was not just the reflection of his debt to German and French thought, but also a very deliberate strategy to publicly position himself on these subjects of international scientific controversy. For a young scientist striving to gain recognition and even fame within the scientific community, addressing the most contentious issues of the day was essential. At the same time however, remaining within the dominant framework of natural history was equally important for the young writer so as to safeguard his credentials within the Anglican establishment. Adrian

[275] Roget, in response to accusations of plagiarism by R. E Grant published by the *Lancet*, replied by publishing the correspondence that had passed between them in 1833. See T. Lancet, "Dr. Roget's Bridgewater Treatise (Dr. Roget's Reply to Professor Grant)," *The Lancet* 25 April 1846.

[276] This theory is an example of the wide circulation of morphological ideas in Europe. The priority disputes it gave rise to are emblematic of the confusion which arises when trying to trace the exact authorship of the concepts promoted at the time. The theory, according to which the skull in vertebrates was a modified (and greatly enlarged) lumbar vertebra, is understood to have been first presented in 1790 by Goethe, who also mentioned it to Carl Firedrich Kielmeyer (under whom Cuvier studied). The same idea was then put forward again by Lorenz Oken in 1807, prompting a priority dispute with Goethe. The French editor of Cuvier's *Leçons d'Anatomie*, Constant Duméril, also presented the same notion in a paper read to the Institut in 1808. See: P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. p. 292

[277] T. Lancet, "Dr. Roget's Bridgewater Treatise (Dr. Roget's Reply to Professor Grant)." p. 438

Desmond has called Carpenter's careful negotiation of this theoretical minefield the "accommodation and domestication" of continental morphology and a "bourgeois assault on science and society". I argue that Carpenter was indeed balancing scientific and metaphysical boldness with socially conservative concepts so as to emerge as a promising new thinker whilst not upsetting the conventional status quo, and that plant morphology enabled him to initiate this balancing act successfully for several reasons.

Firstly, studying plants rather than animals from a morphological perspective provided a safer entry point into promoting controversial new theories and methods, because the comparative study of plants was at first sight less symbolically charged than the comparative study of vertebrates and invertebrates which had notoriously escalated into the Geoffroy-Cuvier confrontation of 1830.

Secondly, focusing on plant physiology allowed Carpenter to gently and progressively promote a comparative study of all existing organisms under the guise of a didactic step-by-step method. Indeed, Carpenter was effectively encouraging his readers to study the universal principles that regulated both vegetable and animal life, and this in itself could be politically and metaphysically charged. However, by putting forward the didactic value of plant physiology, Carpenter argued in favour of this all-inclusive study of organic life for strictly educational purposes: according to him, the study of plants offered particular pedagogical advantages since it allowed students to grasp a simpler version of the universal physiological processes at work in all living creatures, thus making it easier for them to move on to the more complex processes found in higher beings[278]. Thus, through presenting a teleological framework (as in the Roget quote previously discussed) in which the plants were the

[278] W. B. Carpenter, "Lindley, Henslow, De Candolle, Treviranus, Raspail on Vegetable Physiology." p.5

vital first link in a hierarchy of organisms, Carpenter was preserving traditional top-down structures of power while effectively ushering in a new transversal study of organisms which would reveal common features.

Finally, making vegetable physiology one of his initial areas of speciality also enabled Carpenter to claim a certain degree of methodological originality. Two years after his 1837 review of De Candolle, in the preface to his 1839 *Principles of General and Comparative Physiology*, a slightly more self-assured Carpenter presented the case for comparative physiology in a bolder fashion, openly pointing to the common features between vegetable and animal organisms and plainly advocating principles of induction in science. In what amounts to his first clear manifesto in favour of new 'philosophical' methods in natural history, Carpenter relied on his inclusion of vegetable physiology to give added value to his first published book:

> It is now generally acknowledged that Physiology can only be properly studied by a constant reference to the comparative structure and functions of many different classes of Animals; and in most of the recent works on this Science, an outline of the development and actions of each system in the inferior tribes is prefixed to the details relating to its condition in man. This outline is filled up in the present volume, not only by amplifying the portion of it which relates to the Animal Kingdom, but also by the introduction of a similar view of the comparative structure and functions of Vegetables, which is here shown to be governed by the same laws. It is this which constitutes the peculiar feature of the work; as the author believes it to be the first attempt, in this country at least, to form anything like a Systematic Comparative Physiology of Vegetables.[279]

This time, rather than gently suggesting the study of plants as a starting point towards the wider comparative study of organisms and obliquely suggesting the common traits present in all living beings, Carpenter openly presented his work as ground-breaking precisely because it extended the type of comparison that Geoffroy had daringly established between vertebrates and invertebrates even as far as plants themselves. With this contention, Carpenter was bravely stepping into the scientific arena and pushing the debate one step further. It is therefore not surprising that his

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[279] W. B. Carpenter, *Principles of General and Comparative Physiology*. p. v

Principles of Comparative Physiology attracted unfavourable reviews.

Thus from the outset, Carpenter himself placed his writings under the banner of the continental metaphysical scientists and actively adopted the label of philosophical naturalist, seeing, like Goethe and Geoffroy, evidence of the Unity of Plan behind nature and of a 'Final Cause' in certain aspects of plant and animal morphology. The young physiologist also delighted in "the rapid progress of philosophical views in sciences which (had) hitherto been too much confined to mere observation[280]" and actively promoted what he saw as the new methodological direction natural science ought to take:

> In the ever-varying conditions of the animated world, then, a very superficial glance will display to us a certain degree of regularity and arrangement; and the more attentively we investigate the relations which its changes present, the more stable and definite is the assurance we obtain, that they are all harmonised and controlled by fixed laws, which are but simplified expressions of those conditions of action which the Creator has imposed upon organised no less than upon inorganic matter. (…) In this, as in the Physical Sciences, the first object of the philosophic enquirer is to collect a body of facts, by the comparison of which the general principles common to all may be deduced.[281]

But more significantly still, it is in the final chapter of the book, entitled 'On the Evidences of Design Presented by the Structure of Organised Beings' (p. 460) that Carpenter's metaphysical and epistemological views are most clearly expressed. Carpenter often referred to William Whewell's ideas to argue in favour of the inductive method in physiology. However, though a great admirer of Whewell's *History of the Inductive Sciences*[282], Carpenter believed that his colleague had been wrong to exclude physiology from the inductive sciences and sought to extend the principles of the inductive method to the biological realm. Carpenter, like Baden Powell, considered Whewell's distinction between the physical and the biological sciences to be doubly harmful: on the one hand it weakened religion by disavowing

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[280] W. B. Carpenter, "On Unity of Function in Organized Beings," *The Edinburgh New Philosophical Journal* 23 (1837). p.92
[281] W. B. Carpenter, *Principles of General and Comparative Physiology*. p.2
[282] W. Whewell, *History of the Inductive Sciences, from the Earliest to the Present Times*.

the notion of universal final causes (and therefore of the power of God), and on the other hand it weakened science by establishing differences of reliability between its various branches. Therefore to make up for what he saw as a flaw in Whewell's reasoning, Carpenter sought to extend his colleague's methodological statements to the realm of vital actions and of physiology more generally.[283]

In that chapter, Carpenter can also be seen trying to reconcile the teleological postulate with a firmly rationalist approach to the study of nature. Carpenter did this by arguing that the second approach was merely a more efficient method of achieving the first. In his view, proper, rational science called for the examination of material causes without any immediate inference about the divine design behind them. This method did not preclude the idea of a Final Cause but simply pushed it into the background while the scientist --freed from any preconceptions— independently arrived at the objective truth. Once again drawing on Whewell --who was himself leaning on Francis Bacon's discussion of the inductive approach in science-- Carpenter explained that:

> We are not to rest satisfied with the obvious purpose of a particular structure as affording us the supposed *reason* for which it was created. As well might we think it (to take Bacon's examples) a sufficient account of the clouds that they are for watering the earth, or " that the solidness of the earth is for the station and mansion of living creatures. "The physical philosopher", says Mr Whewell, "has it for his business to trace clouds to the laws of evaporation and condensation; and to determine the magnitude and mode of action of the forces of cohesion and crystallisation by which the materials of the earth are made solid and firm. This he does, making no use of the notion of final causes; *and it is precisely because he has thus established theories independently of any assumption of an end, that the end, when after all returns upon him and cannot be evaded, becomes an irresistible evidence of an intelligent Legislator*." The philosophic Physiologist, who is not deterred by the clamour of bigotry and prejudice, will follow precisely the same course.[284]

Carpenter's final chapter can therefore be read not only as a methodological manifesto in favour of comparative anatomy, but also as a ninth *Bridgewater*

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[283] Carpenter devoted an entire article to the purpose, see: W. B. Carpenter, "Physiology an Inductive Science," *British and Foreign Medical Review* (1838).

[284] W. B. Carpenter, *Principles of General and Comparative Physiology*. p. 460. Italics original. The quote by Whewell, as used by Carpenter, can also be found in p. 353 in the *Bridgewater Treatises*.

Treatise of sorts, a disclaimer placing his work under the patronage of natural theology and attempting to diffuse any possible criticism of his less orthodox incursions into continental thought. At any rate, Carpenter's clear stance in favour of extending the inductive methods to the study of living organisms, and in favour of applying the technique of comparative anatomy to physiology, reveal his philosophical and metaphysical bias: the object of biology and physiology, through the methods of comparative physiology, was to uncover the underlying unity of the laws of nature, and the oneness of the intelligent 'Legislator' in whom this regularity originated.

5.2- "On the Unity of Function in organized beings": a Carpenterian synthesis.

It is thus clear that Carpenter, from the very beginning of his career as a scientific writer, got fully involved in the most controversial theoretical debates of the time. However he did not simply seek to usher these new methodological approaches into Britain, he also tried to contribute to this new idealistic trend by producing his own theories. The way in which Carpenter sought to advance the pursuit of 'philosophical physiology' provides insights into the degree to which he adhered to continental thought, but more importantly, into the compromise that he sought to construct to safeguard his social, institutional and religious agendas. It is important to note however that Carpenter's contributions to the field were adaptations and applications of the methods devised by his predecessors and contemporaries, rather than complete theoretical innovations.

The first way in which he adapted the idealistic approach to nature was by transferring Geoffroy's concept of "Unity of Structure" or "Unity of

Composition"[285] to the physiological function of various organs. Carpenter was thus hoping to head his own new school of 'philosophical physiology' by shifting the search for common anatomical traits to the comparison of the *function* of organs rather than to that of their mere shape and localization. This attempt is made clear in his paper delivered before the Edinburgh Royal Medical Society on April the 14th 1837, entitled *On Unity of Function in Organized Beings.*[286] In it, Carpenter argued that the unity of form across the animal and vegetable kingdom resulted from unity of function.[287] For example, according to Carpenter, the most basic and universal function shared by all living organisms was that of "the assimilation of matter from without, and the liberation of excrementitious matter from within."[288] Applying this search for general principles of development and behaviour common to all functions performed by organisms, Carpenter saw, on a smaller scale, unity of form in the *permeability* of tissues serving to oxygenate blood in the process of respiration, rather than in the shape of the organs of respiration themselves. He claimed that these common anatomical features of porosity and permeability were derived from the common purpose these organs shared.

In making these claims, Carpenter was also taking a stand in another one of

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[285] Geoffroy first proposed this concept in his *Philosophie Anatomique*, in 1818.

[286] W. B. Carpenter, "On Unity of Function in Organized Beings."

[287] Jane Oppenheimer and Dov Ospovat have discussed the role played by the Scottish microscopist and physician Martin Barry (who was awarded the Royal Medal of the Royal Society of London in 1839 for his researches on mammalian embryology) in introducing continental morphology and in particular the ideas of Von Baer in Britain in the 1830s. See: J. M. Oppenheimer, *Essays in the History of Embryology and Biology* (Cambridge, Mass., 1967). pp.312-315, and D. Ospovat, "The Influence of Karl Ernst Von Baer's Embryology, 1828-1859: A Reappraisal in Light of Richard Owen's and William B. Carpenter's "Paleontological Application of Von Baer's Law'"."p.9 Correspondence between Carpenter and Richard Owen in 1842 shows that Carpenter was personally acquainted and on friendly terms with Barry, and it appears highly likely that he had derived his knowledge of Von Baer's ideas from him. However, Ospovat omits to underline another clear indication of the scientific filiations between Barry and the young English physiologist: Carpenter's article "On the Unity of Function in Organized Beings" was published just after Barry's article "On the Unity of Structure in the Animal Kingdom" in the same *Edinburgh New Philosophical Journal* of 1837. (see: M. Barry, "On the Unity of Structure in the Animal Kingdom," *Edinburgh New Philosophical Journal* 22 (1837).)

[288] W. B. Carpenter, "On Unity of Function in Organized Beings." p. 101

the most important debates which particularly agitated the British scientific community at the start of the century: the difference between the functionalist school of anatomy which arose out of the work of the Scottish surgeon John Hunter (1728-1793), and the structuralist approach promoted by continental thinkers such as Geoffroy Saint Hilaire. Indeed British anatomy was still dominated by Hunterian anti-mechanist ideas according to which life was not just determined by the machine-like structure of the body, but first and foremost by the existence of a vital principle that imbued living organs with "principles of action", in other words, *functions* which were coordinated together in order to sustain life. Thus, rather than relying on a purely anatomical taxonomy as was being practised across most of Europe at the time, Hunter devised a classification based on the similarity in physiological functions which could be observed across different types of organisms in spite of their superficial anatomical differences.[289]

This emphasis on function, which posited a divine "vital principle" and which supposed the creation of organisms perfectly adapted to their environment, sat comfortably with the Paleyite arguments promoted by Anglican Natural Theology since it could be understood to exclude the possibility mechanistic and therefore materialistic principles, unlike the structuralist approach taken across the Channel which also posed the threat of models of fluidity and metamorphosis. Dov Ospovat and Nicolas Ruupke have underlined the fact that "during the pre-*Origin of*

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[289] For a discussion of John Hunter's ideas in the context of what the author calls 'British Romanticism', see: P. Youngquist, *Monstrosities: Bodies and British Romanticism* (Minneapolis, 2003). p. 10. It is also worth mentioning that although historians generally tend to speak of continental transcendental anatomy and the British functionalist approach spearheaded by John Hunter as being opposed, this antagonism is often posited for simplicity's sake, since the reality of the link between these two approaches is much more fluid. Indeed, Jane M. Oppenheimer has shown that John Hunter himself was most probably indebted to transcendental anatomy in the elaboration of his own anatomical theories which initiated a shift away from purely observation-based anatomy in eighteenth-century Britain, through his personal connection with several individuals who were instrumental in spreading German romantic thought in Britain. See: J. M. Oppenheimer, "John and William Hunter and Some Eighteenth Century Scientific Moods," *Essays in the History of Embryology and Biology*, ed. Jane M. Oppenheimer (Cambridge, Mass., 1967). p. 316

Species period, and certainly during the pre-*Vestiges* years, the primary issue that divided British naturalists was not "pro-or contra-transmutation", but "form or function"."[290] Carpenter, in remaining faithful to the functionalist approach, yet by using the theoretical rhetoric of Geoffroy and other transcendentalist anatomists from the continent, by preserving the emphasis placed on function yet evacuating the concept of "vital principle", was thus gently modifying the accepted contents and direction of British Natural Theology.

The second way in which Carpenter adapted new continental theses was by setting out to achieve Geoffroy's highly controversial attempt to demonstrate the unity of plan between vertebrates and insects. He undertook this challenge in his 1839 M.D thesis entitled *Inaugural Dissertation on the Inferences to Be Deduced from the Structure of the Nervous System of the Invertebrated Classes of Animals*[291]. In the 1820s, Geoffroy had tried to expand his theory into new anatomical territory by postulating that insects and vertebrates shared a common organizational plan since they all had eyes, a mouth, an abdomen, hips and articulated limbs. He even went so far as to suggest that the exoskeleton of insects was a true skeleton and could be compared piece for piece to the bones of vertebrates. The naturalist Jean-Victor Audouin (1797-1841) also proposed analogies between the different elements of the thorax of insects and the bones of vertebrates in 1824[292]. Other naturalists were also looking for corresponding structures across the divides of Cuvier's four embranchments: Pierre André Latreille (1769-1833) sought to establish the transition from invertebrate animals to vertebrates in his *Passage des animaux*

[290] N. A. Rupke, *Richard Owen, Biology without Darwin*. p. 97. See also D. Ospovat, "The Influence of Karl Ernst Von Baer's Embryology, 1828-1859: A Reappraisal in Light of Richard Owen's and William B. Carpenter's "Paleontological Application of Von Baer's Law""."

[291] W. B. Carpenter, *Inaugural Dissertation on the Inferences to Be Deduced from the Structure of the Nervous System of the Invertebrated Classes of Animals* (Edinburgh, 1839).

[292] T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p. 110 and P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. p. 290

invertébrés aux vertébrés in 1820[293].

Once again, by picking up a similar challenge, Carpenter took a stand on this inflammatory topic from the very beginning of his career and his M.D. dissertation was read with great interest by other physiologists abroad such as Johannes Müller. It offered a comparative physiology of invertebrates, seeking to look beyond structure to find the common physiological functions of the various invertebrate organisms, and –importantly—pointing out possible generalizations that exceeded the simple class of invertebrates:

> I-A nervous system, in the form of connected filaments with ganglia on certain parts of them, exists in all Animals (that is, in all beings endowed with any degree of sensibility and voluntary power), although its presence may not be detected by our means of observation. II- The actions most universally performed by a nervous system are those connected with the introduction of food into the digestive cavity. (…) [294]

The young physiologist was thus illustrating Geoffroy's "theory of analogues"[295] and supporting his controversial attempt at showing the continuity between the invertebrate and the vertebrate classes of animals.

Considering the context of the literature being produced on the continent, the very choice of invertebrates as a topic by Carpenter can also be interpreted as a theoretical stance in itself. Indeed the reference that would have been unmistakably conjured up by such a choice of subject matter is Lamarck's 1801 treatise on

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[293] T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p. 106 and 267 (for details of Latreille's 1820 pamphlet which is not easily accessible)

[294] W. B. Carpenter, *Inaugural Dissertation on the Inferences to Be Deduced from the Structure of the Nervous System of the Invertebrated Classes of Animals*. p. 77

[295] Toby Appel gives an excellent summary of Geoffroy's concept of analogous parts: "Geoffroy consistently used the term "analogue" for what is now called "homologue." In effect, he appropriated a common word and gave it a specific meaning, much to the confusion of some of his colleagues. German authors, some time before 1820, had begun to employ the term "homology" for what is now called serial homology, that is, for correspondences among different parts of the same individual, a type of comparison in which Geoffroy had relatively little interest. The confusion of terminology was alleviated in 1843 when the British comparative anatomist Richard Owen established the modern distinction between homology and analogy. Owen formally defined "homologue" as "the same organ in different animals under every variety of form and function" and "analogue" as "a part or organ in one animal which has the same function as another part or organ in a different animal." in T. A. Appel, *The Cuvier-Geoffrey Debate : French Biology in the Decades before Darwin*. p. 71

invertebrates.[296] Four years earlier, in 1797, Lamarck had introduced a new taxonomic system which distinguished vertebrate animals from invertebrate creatures, thus replacing the distinction made by Cuvier between red-blooded animals and white-blooded animals, and rapidly converting many naturalists to this new model of classification[297]. It is clear from Carpenter's article on *Unity of Function* that he had read Lamarck[298] since he refers to him explicitly, as well as to the insights of other scientists such as Karl Herman Burmeister (1807-1892) who were themselves inspired by the French scientist:

> We find among the classes which make up the sub-kingdom radiata, a still greater tendency to pass into one another; so that it is almost impossible to fix with precision the limits to each (…). Dr Barry has quoted from Burmeister the very ingenious remark, that the osteozoa (vetrebrata) unite in themselves the development of the nutritive system, which is characteristic of the gastrozoa (mosllusca) and the locomotive apparatus of the arthozoa (articulata). This is a beautiful confirmation of the arrangement of the invertebrata, suggested by Lamarck, who regarded the mollusca and articulata as forming two parallel lines commencing with the radiata below and terminating in the vertebrata above; each has its own characters of elevation and degradation, and neither can be considered as in every respect superior to the other. It appears to me, that, in the nervous system of the vertebrata, we may trace the combined characteristics of those of the mollusca and articulata. [299]

It is evident from the extract above and in particular from the expression "pass into one another" that Carpenter was adhering to the linear models proposed by Lamarck and Geoffroy rather than to Cuvier's separate embranchments, and was seeking to find echoes within different organisms that helped make sense of the general progression and organization of the animal kingdom along an ascending scale. This same view is expressed in his MD thesis in which Carpenter constantly mentions "higher" and "lower" classes of animals, or high and low "grades" of invertebrates:

> VI. In the lowest animals such actions (consumption of food) constitute nearly the entire function of the Nervous System; the amount of those involving sensation and volition being very small. VII. As we ascend the scale, the evidence of the participation of true sensation in the actions necessary for the acquirement of food (…) is much greater. (*Ibid*, p. 77)

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[296] J. B. Lamarck, *Système des Animaux Sans Vertèbres* (Paris, 1801).

[297] P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. p.88

[298] For a case-study of the type of discreet circulation of Lamarckian ideas that could be found in Edinburgh in the first third of the nineteenth century see: J. A. Secord, "Edinburgh Lamarckians: Robert Jameson and Robert E. Grant," *Journal of the History of Biology* 24.1 (1991).

[299] W. B. Carpenter, "On Unity of Function in Organized Beings."p. 98

Carpenter's choice to focus on invertebrates in his thesis can certainly be taken as symbolic of the way in which he positioned himself at the centre of the most modern debates in zoology at the time, pulling together various strands of thought from ferociously opposed camps so as to create a synthesis of his own. Thus, in selecting invertebrates as his area of study and in presenting a view of living organisms as a continuum from the most simple to the most complex forms, Carpenter was vindicating Lamarck. But in choosing to focus on the nervous system as the means to reveal the consistency of this continuum, Carpenter might also have been tipping his hat to Georges Cuvier: in 1817, Cuvier had advocated (though he was partly drawing on ideas suggested by Julien Joseph Virey and Carl Gustav Carus[300]) the organization of the nervous system as a new common taxonomic denominator.[301] Carpenter was also clearly indebted to his *Mémoire sur les Mollusques*[302], to which he referred at length in his thesis.

Further references to continental morphology can be found in Carpenter's MD thesis which mentions concepts such as that of 'rudimentary' structures, as well as observations borrowed from authors such as Grant and Meckel. For example, Carpenter discusses the nervous filaments found in the Ascidia Mammilata, asserting that if the presence of certain small ganglia was confirmed, these should be regarded as "rudiments of a sympathetic system, which does not, however, manifest itself in so distinct a form in any of the lower molluscous classes."[303] Importantly, it can also be noted that Carpenter took great care to systematically include references

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[300] P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. p. 289

[301] G. Cuvier, *Le Règne Animal Distribué Selon son Organisation pour Servir de Base à l'Histoire Naturelle des Animaux et à l'Introduction à l'Anatomie Comparée*.

[302] G. Cuvier, *Mémoires Pour Servir A l'Histoire et A l'Anatomie Des Mollusques* (Paris, 1817). Carl Gustav Carus, *Lehrbuch der Zootomie*, Leipzig, Gerhard Fleischer, 1818)

[303] W. B. Carpenter, *Inaugural Dissertation on the Inferences to Be Deduced from the Structure of the Nervous System of the Invertebrated Classes of Animals*. p. 17

to human physiology in the continuum he thus subtly constructed between invertebrates and man:

> The division of the nervous system in Vertebrata with which this stomato-gastric system corresponds, is a question of more apparent difficulty; but if we bring into comparison not only the highest but the lowest forms of the cerebro-spinal apparatus, the chief difficulties will be removed. (…) In the lower animals we find these reflex actions bearing a much larger proportion to the voluntary, than in man; and even in him we not unfrequently meet with cases in which the functions of the cerebral hemispheres seem suspended, whilst those of the spinal cord are unimpaired; so that the prehension of food by the lips may take place without any effort of the will. (*Ibid* p.72)

It is also important to note that Carpenter, in keeping with the epistemological aims that have already been outlined in his work on plants, advocated a systematic application of comparative physiology to all categories of living beings, making sure to include plants in the spectrum of his study and thus encompassing all life-forms in his analysis of common physiological processes. In his general conclusions, he stated that:

> V. Such actions (the contractile structure of tissues) may be regarded as the simplest of those which the nervous system performs, and most resemble the examples of contraction produced by the irritation of distant organs in Plants (where an *impression* is mechanically conveyed by the circulating system) of any which the Animal Kingdom affords. (*Ibid.* p. 77)

However, it can also be noticed that Carpenter took great care to argue the case of this 'continuum' model without ever clearly describing it as such, and more importantly, without ever explicitly mentioning Geoffroy or Lamarck whose names are nowhere to be found in the thesis or bibliography. Though nineteenth-century methods of referencing and citing other scholarly work were far from systematic, these omissions can also be interpreted as a deliberate strategy to disseminate continental morphology without setting off too many alarm bells in the process.

Finally, the other way in which Carpenter sought to integrate continental morphology into his own theoretical endeavours was to use the ideas of the German embryologist Karl Ernst Von Baer (1792-1876), applying them to his own adaptation of Geoffroy and Lamarck's work and even adding an extra rule to them.

This exercise in intellectual recycling was certainly not a harmless transposition since it amounted to proposing a new evolutionary vision of the connection between various life forms. Indeed, Von Baer's embryological laws, which rejected the notion of recapitulation of lower species in embryogenesis, argued that a process of gradual specialisation --and hence differentiation-- was observable in the embryos of higher organisms, which was the reason why all embryos looked similar initially before taking on their distinct species-specific characteristics. Speaking of unity of function in his 1837 essay, Carpenter stated that he "wished to apply to function one of the laws propounded by Von Baer with regard to structure, namely, that a special function arises only out of one more general and this by a gradual change".[304] By expanding Von Baer's law --which was formulated in the context and within the time-scale of embryological development-- to the development of all life-forms on earth throughout the geological ages, Carpenter was essentially positing a dynamic, teleological model of linear affinities between species.[305]

Carpenter also wished to contribute to the theory itself and thus added his own rule to the one enounced by Von Baer, namely that "in all cases where the different functions are highly specialized, the general structure retains, more or less, the primitive community of function which originally characterised it." In essence, Carpenter was positing that more complex animals retained a form of 'vestigial' memory of the most basic functions performed by lower organisms. To illustrate these two propositions, Carpenter devoted the remaining pages of his 1837 essay to studying the function of absorption, excretion, voluntary movement and

[304] W. B. Carpenter, "On Unity of Function in Organized Beings." p.100

[305] Carpenter's evolutionism which is already clearly apparent in his writings in 1837, will be discussed in more detail in the following chapter of this section.

reproduction in animals, dwelling particularly on nutrition and respiration and carefully including comparisons with plants wherever possible.

The general function common to all organisms put forward by Carpenter in this study was their ability to absorb external elements through tissue. According to him, the way in which this function became gradually specialised in lower animals and plants was by the extension of external tissue so as to maximise absorbency, and in higher animals by the apparition of a circulatory system so as to allow this absorption to take place in a more remote location inside the organism. To this general principle of specialisation borrowed from Von Baer, Carpenter added his own postulate, namely that the most basic form of absorption was still present -- although in a diminished and secondary manner-- in the higher animals which had developed a circulatory system:

> We very early find in the animal kingdom a tendency to specialization of the organs of absorption, by the appropriation of a continuation of the external surface for the purpose. (…) Direct absorption, then, is the lowest degree of specialization of the function of absorption in the animal kingdom; and perhaps we may regard the condition of the absorbent surface of the lichens as somewhat analogous to it (…). Now, it will be remarked, that as soon as a particular part of the surface is modified for absorption, the tissues in general derive their nutriment indirectly through the medium of a circulating system, however imperfect. (…)
>
> Let us now study this function in another point of view, by applying to it the second general principle with which we set out. (…) In the animal kingdom, we perceive that the external surface of most aquatic tribes forms part of the general absorbent system, but that in the inhabitants of the air, its function is partly changed, and it is rather an organ of exhalation. The experiments of Dr Edwards, however, show the importance of cutaneous absorption both in fishes and reptiles; and the human body, in certain states both of health and disease, is greatly dependent upon it. (…) The facility with which absorption takes place through the lungs is another example of the same fact. (…)[306]

Carpenter particularly insisted on the function of respiration in demonstrating his principle of unity of function, and used it as a means of discussing intermediary forms in the gradual modification of living organisms along an ascending scale of increasing complexity:

> In air-breathing animals, on the other hand, the prolongation of the surfaces takes place internally, so that the air comes to meet the blood, instead of the blood being sent to meet

[306] W. B. Carpenter, "On Unity of Function in Organized Beings." pp. 101-107

> the air. (…) We find, however, many interesting intermediate forms, such as the pulmonary branchiae of the Arachnida; and in tracing the development of the air-bladder of fish into the lung of the reptile, and at the same time the progressive disappearance of the gills, we have a beautiful example of the gradual change which (where the links are within our reach) may everywhere be observed throughout nature. I think that the structure of the respiratory organs affords a beautiful illustration of the argument which might be raised on a priori considerations in favour of the doctrine of "fundamental unity of structure". The function of respiration is a very simple one, and it is essentially the same not only throughout the animal kingdom, but in vegetables also, as I shall presently show. It might be regarded then, as a necessary result of the law, which everywhere prevails throughout creation, of the attainment of every *end* by the best adapted *means*, that the essential structure of the organs should be the same where the function is the same, but that the disposition off these parts should vary with the circumstances in which that function is to be performed. (italics original)[307]

Carpenter continued to place Von Baer's law of gradual specialisation at the centre of his argument in his *Principles of General and Comparative Physiology*[308], which was essentially devoted to demonstrating the idea through a variety of examples across the diversity of living beings. The book went through four English and two American editions in which more attention was devoted to Von Baer in each: by the fourth edition in 1854, Carpenter, who by then was gaining in confidence and recognition, had given centre-stage to Von Baer's law entirely by discussing it from the very introduction rather than later on in the body of the work. This confirms the argument made by Dov Ospovat in 1976[309] according to which Von Baer's theory, contrary to what other historians had suggested, had a considerable influence on the thought of contemporary scientists and thinkers such as Milne Edwards in France and Carpenter, Richard Owen or Herbert Spencer in England.

Richard Owen has rightly been portrayed ever since his own time as the embodiment of the British synthesis of functionalism and continental transcendentalism. In an illustration which appeared in his work *On the Principal Forms of the Skeleton and the Teeth* in 1856, he is shown proudly staring out of the

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[307] Ibid. p. 108

[308] W. B. Carpenter, *Principles of General and Comparative Physiology*. p. 170

[309] D. Ospovat, "The Influence of Karl Ernst Von Baer's Embryology, 1828-1859: A Reappraisal in Light of Richard Owen's and William B. Carpenter's "Paleontological Application of Von Baer's Law"."

centre of the image framed by fossil bones and flanked by Georges Cuvier on the left and Lorenz Oken on the right[310]. This drawing encapsulates the notion that Owen offered a balanced middle ground between both schools of thought, emphasizing the functionalist approach yet reasoning in terms of homologies and putting forward his own version of an ideal vertebrate archetype. It is well known that Owen studied under Cuvier in Paris in 1821, and that he attended the same lectures as Carpenter in London, notably Grant's. It thus seems sensible --rather than continuing to declare that "of all British naturalists, Owen was most strongly influenced by idealist thought[311]"-- to suggest that both naturalists need to be considered as mediators between the functionalist and transcendental models, thus making the "enduring epistemological duality of Owen's oeuvre"[312] seem somewhat less original and isolated than previously thought, whilst posing new questions about how widespread this effort to synthesize new continental "philosophical" ideas was in Britain at the time.

The correspondence between Carpenter and Owen[313], which spanned the years 1842-1855, reveals the commonality of thought between the two scientists as well as the mutual influences of one upon the other. Owen relied on Carpenter's study of invertebrates for his lectures on the nervous system in 1842, and in 1845 Carpenter expressed his great admiration for Owen's *Odontography*[314] which he had

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[310] This drawing also features in N. A. Rupke, *Richard Owen, Biology without Darwin*. p. 105
[311] P. J. Bowler, *Evolution, the History of an Idea*, 2nd ed. (Berkley, 1989). p. 130
[312] N. A. Rupke, *Richard Owen, Biology without Darwin*. p. 106
[313] W. B. Carpenter, *Letters from W. B. Carpenter to Richard Owen*, Owen Papers, London. (Natural History Museum)
[314] R. Owen, *Odontography, or a Treatise on the Comparative Anatomy of the Teeth in the Vertebrate Animals* (London, 1840). In this work, Owen proposed a new understanding of the formation of teeth (his "conversion theory"), arguing in favour of a process similar to ossification by the transformation (which he called "conversion") of the inside layers of tooth (the pulp) into the outside layer of dentrite and enamel, rather than by the excretion of new matter to form the surrounding layer, as had been suggested by others before him. Owen also organised his work from the most basic and ancient specimens, to the more "specialised".

already reviewed in the *British and Foreign Medical Review* upon its publication in 1840 and which he was reading again while preparing his own work on shell-structure. The letters from 1850 onwards reveal that the two men were squabbling over priority matters relating to the application of Von Baer's law to the "geological succession of organic life". Both Carpenter and Owen rejected the claims of recapitulation and "permanent embryonicity" made by Louis Agassiz in his 1844 work on Red Sandstone Fishes.[315] Ospovat has dealt with this particular episode in detail[316], yet what does not appear clearly in his study is the fact that Carpenter had promulgated these ideas much earlier than any of the other scientists cited. Ospovat does take care to mention that in adhering to Von Baer's principle Richard Owen was drawing on Carpenter's work, but he does not seem aware that the earliest known mention of Von Baer's ideas in Britain appeared in 1837 (and not 1851 as he suggests page 17) in Carpenter's article on *Unity of Function*, whereas Owen's first reference to Von Baer was only made in 1851. Ospovat then explains his choice to "discuss Owen's views first, rather than Carpenter's, for Carpenter's were based to a great extent on conclusions drawn from Owen's morphological and paleontological research."[317] This choice, which was made by Ospovat for simplicity's sake, is dangerous however because it skews the order of priority which in this particular case seems to fall in Carpenter's favour, and reasserts the importance of the most famous figure of the two, simply because he is more famous and thus better-studied. Indeed, if it is true that Owen and Carpenter shared many similarities in outlook and that Carpenter seemed to have relied on Richard Owen's help initially to find his

[315] L. Agassiz, *Monographie des Poissons Fossiles du Vieux Grès Rouge ou Système Dévonien* (Neuchatel, 1844).
[316] D. Ospovat, "The Influence of Karl Ernst Von Baer's Embryology, 1828-1859: A Reappraisal in Light of Richard Owen's and William B. Carpenter's "Paleontological Application of Von Baer's Law"'."pp. 17-19
[317] Ibid. p. 18

own place within the scientific community, the assumption that Richard Owen's work was more authoritative than Carpenter's seems solely to stem from the lack of close scrutiny of Carpenter's work by scholars. This distorted emphasis on Owen's precedence would be corrected by acknowledging the importance of Carpenter's influence in suggesting Von Baer's model very early on in his writings as this section has shown.

5.3- The "mutual relations of the vital and physical forces" as the cornerstone of Carpenter's epistemology

Historians have written about the seditious nature and political significance of continental morphology. However it is important to consider that Carpenter's insistence on comparative physiology might also have been first and foremost a personal metaphysical and philosophical enterprise rather than a social or political stance. A very clear demonstration of what could be called Carpenter's "metaphysical epistemology" can be found in his 1838 pamphlet *Physiology an Inductive Science*,[318] in response to Whewell's separation of the biological and physical sciences. Carpenter acknowledged that the distinction between vital and physical phenomena was currently the stumbling block preventing the biological sciences from being dealt with in the same way as the science of physics or of mathematics. To this difficulty however, he opposed his belief that it was only a matter of time before vital properties were shown to depend on the same physical laws as those applicable to inert matter. More importantly, the young physiologist expressed his certainty that a unifying scientific law which would encompass all aspects of material reality would soon be discovered:

> Is it possible that these physical and vital properties of matter, which are at present our ultimate facts or axioms, may be hereafter included within a more general expression

[318] W. B. Carpenter, "Physiology an Inductive Science."

> common to both? On this subject we can only speculate; but the probability appears decidedly in the affirmative. We have already remarked upon the rapid progress of generalization in the physical sciences, rendering it probable that before long one simple formula shall comprehend all the phenomena of the inorganic world; and it is not, perhaps, too much to hope for a corresponding simplification in the laws of the organised creation, although this is necessarily retarded by the many obstacles which the nature of the subject presents to the philosophical inquirer.[319]

The metaphysical basis for Carpenter's quest of an all-encompassing principle is made even more obvious in the following passages of the essay, in which the scientist describes the advent of a much more awe-inspiring conception of the deity thanks to the revelations of science which would:

> increase our admiration of the beauty of the adaptation, and the harmony of the action of the laws we discover; a beauty and harmony in which the contemplative mind delights to recognize the wisdom and beneficence of the Divine Author of the universe.[320]

Shortly after publishing this essay on the possibility of conducting physiology as an inductive science, Carpenter wrote another paper entitled *On the Differences of the Laws Regulating Vital and Physical Phenomena*, which was awarded a prize at the University of Edinburgh.[321] In that second essay, the young scientist can be seen once again trying to transcend unnecessary dualisms by attempting to conflate the opposition between vitalist and mechanist conceptions of living matter, implying that they would "ultimately be shown to result from some higher more general quality"[322] and listing a number of analogies between vital properties and physical properties, such as certain chemical processes for example, or the principle of capillarity, which tended to blur the distinction between both types of actions. A typical example of Carpenter's conciliatory outlook and overarching epistemological aim can be found in the following extract of the essay:

> It would be useless to recapitulate the various opinions which have been at different times advanced regarding either of these subjects; different writers have espoused the opposite

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319 W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical*. p. 157

320 Ibid. p. 157.

321 W. B. Carpenter, "On the Differences of the Laws regulating Vital and Physical Phenomena," *Edinburgh New Philosophical Journal* 24 (1838).

322 Ibid. p. 331

> extremes, some maintaining that the actions performed by living beings are purely of a physical nature; others, that physical powers are not concerned in them; and others have even presumed upon the existence of a distinct intelligence, "Divinae particular aurae", presiding over the affairs of each organism. The truth appears, with regard to this, in common with so many disputed questions, to be in the mean between the opposing extremes[323].

By taking this stance, Carpenter was also positioning himself in the long-running debate on vitalism in the sciences, rejecting both the mechanicist views and the iatro-chemical views defended in the seventeenth century by followers of Descartes or Galen, arguing for a more subtle middle-ground.[324]

Thus, and though accepting that many vital properties were still unexplained and incomparable to any of the principles regulating the inorganic world, Carpenter concluded that "*vital* properties are not *added* to matter in the process of organization; but those previously existing, and hitherto inactive, are called out or developed."[325] In effect, Carpenter was decidedly settling the enduring debate in favour of an immanentist interpretation of the organic world, whilst remaining within the traditional hierarchical framework of a world under the authority of a divine ruler and thus effectively adhering both to an immanentist and a transcendentalist view. This balancing act explains why Carpenter's 1838 *Principles of Comparative Physiology*, in which the final chapter presents the same arguments, confused the reviewer who accused the physiologist of contradicting himself on the subject of vital properties.

Carpenter's enduring efforts to unite physical and vital properties culminated

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[323] Ibid. p. 333

[324] For a useful overview of the debate that raged in the seventeenth century on the topic of the continuity --or lack thereof-- between inert matter and living organisms, especially through the work of the mechanicist Leibniz and his vitalist critic Georg Ernst Stahl, see: S. Carvallo, "Chimie et scepticisme: Héritage et ruptures d'une science," *Revue d'histoire des sciences* 55.4 (2002). Much useful insight can be found on the vitalist tradition in the analysis of Van Helmont's thought, in: W. Pagel, *Joan Baptista Van Helmont, Reformer of Science and Medicine*, ed. Margaret Pelling (Cambridge, 1982).

[325] W. B. Carpenter, "On the Differences of the Laws regulating Vital and Physical Phenomena." p. 353

in his attempt in 1850 to demonstrate the correlation of certain vital and physical laws. Vance M.D Hall has already given a thorough account of the context surrounding Carpenter's work on the subject, exploring Kuhn's notion of a "simultaneous discovery" of the law of conservation of energy in which "previously separate problems were gaining multiple interrelationships".[326] Indeed around the mid nineteenth century, a number of scientists (most notably Hermann Helmholtz (1821-1894), James Prescott Joule (1818-1889), William Thomson (1824-1907), William Grove (1811-1896), Rudolf Clausius (1822-1888) and William Rankine (1820-1872)) were developing ideas that would later lead to the notion of 'conservation of energy' and to the first law of thermodynamics. Letters from Carpenter to William Grove found in the Royal Institution archives testify to the fact that Carpenter had been greatly inspired by Grove's 1846 paper on the *Correlation of Physical Forces*[327], which is considered one the earliest articulations of a theory of conservation of energy. In it, Grove argued that "the various forces or affections of matter may, *mediately or immediately*, produce the others. (…) Motion will directly produce heat and electricity, and electricity, being produced by it, will produce magnetism (…). Light also is readily produced, to all appearance, by motion."[328] This work had a lasting impact on Carpenter, as will be discussed again in the third part of this thesis, as it provided the basis for his understanding of "force", a concept that became central to his formulation of the relationship between mind and matter.

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[326] V. M. D. Hall, "The Contribution of the Physiologist, William Benjamin Carpenter (1813-1885), to the Development of the Principles of the Correlation of Forces and the Conservation of Energy," Medical History.23 (1979). See also: T. S. Kuhn, "Energy Conservation as an Example of Simultaneous Discovery," *Critical Problems in the History of Science*, ed. Marshall Clagett (Madison, 1959). p. 324

[327] W. R. Grove, *The Correlation of Physical Forces*, 6th ed. (London, 1874).

[328] Ibid. p. 25

In 1850 however, Carpenter's priority was to help elucidate the mystery of the vital principle in living organisms by providing physiology with a new inductive theoretical framework. The ambitious young scientist was not just tackling the subjects of muscular action and heat which he himself dismissed as "physical in their manifestations although generated in living bodies"[329], but rather the more elusive functions which he called "purely vital" meaning those of growth, development and reproduction. Carpenter was essentially debunking two notions that still dominated the concept of 'vital properties' of living organisms: on the one hand the idea that the vital powers were super-added to matter separately and subsequently by the creator, and on the other that the vital principal lay dormant in matter until it was awakened. Carpenter argued that physical forces, such as light and heat, could be converted into vital force according to the same principle of correlation observable between the various physical manifestations of force. Thus, a seed or a cell which developed into a plant or an animal was not to be considered as having had its vital principle awakened from a dormant state:

> According to the view here advocated, the vital force which causes the primordial cell of the germ first to multiply itself, and then to develop itself into a complex and extensive organism, was not either originally locked up in that single cell, nor was it latent in the materials which are progressively assimilated by itself and its descendants; but is directly and immediately supplied by the Heat which is constantly operating upon it, and which is transformed into vital force by its passage through the organized fabric that manifests it.[330]

Carpenter's paper was at best highly speculative, and due to lack of sources relating to this particular aspect it has been difficult to ascertain how seriously it was taken by his colleagues and how influential, if at all, it was within the scientific community. Nevertheless, two things stand out as significant about Carpenter's endeavour. Firstly, Carpenter's attempted theory reflects his constant wish to

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[329] W. B. Carpenter, "On the Mutual Relations of the Vital and Physical Forces," *Philosophical Transactions of the Royal Society* (1850). p. 730
[330] Ibid. p. 752

incorporate cutting-edge and speculative new science into a modified existing framework –in this case the very theory of vitalism—so as to offer a balanced yet modern new synthesis, and so as to contribute to the most exciting new discoveries and metaphysical advances of his day.

Secondly, his hypothesis regarding vital principles reflects his deep-seated quest to uncover the fundamental unity of all creation, and to reveal through science an “Omnipotent and Omnipresent Creator.”[331] It gave him hope that a single unifying principle might be governing the universe, an idea he put forward time and again in his early publications:

> If we can conceive that the Almighty *fiat* which created matter out of nothing, impressed upon it one simple law, which should regulate the association of its masses into systems of almost illimitable extent, controlling their movements, fixing the times of the commencement and the cessation of each world, and balancing against each other the perturbing influences to which its own actions give rise -- should be the cause, not only of the general uniformity, but of the particular variety of their conditions, governing the changes in the form and structure of each individual globe protracted through an existence of countless centuries – should people all these worlds with living beings of endless diversity of nature, providing for their support, their happiness, their mutual reliance, ordaining their constant decay of succession, not merely as individuals, but as races, and adapting them in every minute particular to the conditions of their dwelling (…) then shall we be led to a far higher and nobler conception of the Divine mind than we have at present the means of forming.[332]

As the passage cited above makes clear, Carpenter’s approach to new scientific theories cannot be isolated from his overarching metaphysic outlook and it is from

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[331] Ibid. p. 730

[332] W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical*. p. 157

It can be noticed that in this passage Carpenter alludes to the existence of other worlds, thus also taking a stand in one of the oldest ongoing debates in the history of science, namely the debate on extraterrestrial life. Carpenter’s known admiration for William Herschel and David Brewster point to where he might have gathered his ideas on the topic. Carpenter’s view in favour of the plurality of worlds enabled him to argue in favour of the consistency and uniformity of divine laws, and the hypothesis agreed well with his Unitarian creed. John Hedley Brooke and Michael J. Crowe have shown that contrary to popular belief which tends to assume that the acceptance of the extraterrestrial life theory only dates back to the twentieth century, the bias in favour of the plurality of worlds had been fairly common in the Western world since antiquity, and that many protestants convincingly argued in favour of the notion as conferring even more majesty to the divine Creation. See: M. J. Crowe, "A History of the Extraterrestrial Life Debate," *Zygon, Journal of Religion & Science* 32.2 (1997). J. H. Brooke, "Natural Theology and the Plurality of Worlds: Observations on the Brewster-Whewell Debate," *Annals of Science* 34.3 (1977). For a detailed analysis of how the Scottish evangelical thinker Thomas Dick argued in favour of the plurality of world see: W. J. Astore, "*Observing God: Thomas Dick (1774-1857), Evangelicalism and Popular Science in Victorian Britain and Antebellum America*," Oxford, 1995.

that angle that his attitude towards evolutionary theory must also be examined.

Chapter 6. A religious evolutionist

6.1- Carpenter and the *Vestiges of the Natural History of Creation*

In November 1844, the book *Vestiges of the Natural History of Creation*[333] was published in Britain, energetically opposing the notion that the natural world was the result of a succession of individual creative acts by God. Instead, it offered a sweeping narrative of evolution from the earliest nebular origins of the cosmos[334] to man, who was presented as descending from primates. The book's author is now known to have been the Scottish journalist and publisher Robert Chambers (1832-1888), but --as has been shown by James Secord's study of its critical reception,[335] when *Vestiges* first appeared the anonymity of its author caused almost as much of a stir as the sensational subject matter itself. In January 1845, a review written by Carpenter appeared in the *British and Foreign Medical Review*, making evident from the very first lines the physiologist's great enthusiasm for Chambers' ideas:

> This is a very beautiful and a very interesting book. Its theme is one of the grandest that can occupy human thought –no less than the creation of the universe. But neither its interest nor its grandeur would of themselves claim our notice, in this Journal, were not the science of Physiology called in to play an important part in the elaboration of the author's theory. (…) It will be our duty to show that the "Vestiges" contains many defects and not a few errors; but it will also be our delight to prove, from its own eloquent pages, that its beauties and its merits are more numerous still.[336]

Carpenter's article abounds with positive adverbs about the author's "felicitously" explained views and "beautifully expressed" summaries, waxing lyrical about the book in a rather uncharacteristic way. This enraptured tone, coupled with the fact that --as Carpenter himself stated: " the complete accordance of these views, with

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[333] Anonymous, *Vestiges of the Natural History of Creation*.
[334] Based on the "nebular hypothesis" put forward by Pierre Simon Laplace (1749-1827) in 1796.
[335] J. A. Secord, *Victorian Sensation : the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation*.
[336] W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844," *British and Foreign Medical Review* 19.32 (1845). p. 155

those some time ago propounded by ourselves (vol. V, p. 342[337]), must be evident, we think to our readers"[338]— is surely what must have led some of his contemporaries to suspect Carpenter himself of being the author.[339]

Indeed, the similarity of style between Chamber's book and Carpenter's own prose is quite striking: some notions such as that of natural laws being an expression of the Almighty's "will", are very close to those found in Carpenter's writing. Capitalising on this similarity to underline an argument that was dear to his heart, Carpenter quoted the very passages in Chamber's work that most vibrantly portrayed his own point of view:

> The ordinary notion may, I think, be not unjustly described as this – that the Almighty Author produced the progenitors of all the existing species by some sort of personal or immediate exertion. But how does this notion comport with what we have seen of the gradual advance of species, from the humblest to the highest? How can we suppose an immediate exertion of this creative power at one time to produce zoophytes, another time to add a few marine molluscs, another to bring in one or two conchifera, again to produce crustaceous fishes, again perfect fishes, and so on to the end? This would surely be to take a very mean view of the creative power; to, in short, anthropomorphize it, or reduce it to some such character as that borne by the ordinary proceedings of mankind. (…) Some other idea must then be come to with regard to *the mode* in which the Divine Author proceeded in the organic creation. (…) We have seen powerful evidence that the construction of this globe and its associates, and, inferentially, that of all the other globes of space, was the result, not of any immediate or personal exertion of the Deity, but of natural laws which are expressions of His Will. What is to hinder our supposing that the organic creation is also a result of natural laws which are, in like manner, an expression of His Will? [340]

Carpenter's acclaim for Chamber's work, his commonality of views with those exposed, and his proposed corrections of many of Chamber's mistakes concerning biology (such as for example the confusion of cells and globules, to cite but one of the many details that the physiologist sought to redress in his first review), prompted Chambers to contact him anonymously, asking for his help in further revising the

[337] The article Carpenter was referring to was his review of Whewell's *History of the Inductive Sciences*, and more particularly the passage about the uniform laws acting upon the living beings that inhabit the various worlds created by the deity already quoted in this thesis page 155: W. B. Carpenter, "A History of the Inductive Sciences, by the Reverend W. Whewell," *The British and Foreign Medical Review* 5 (1838).

[338] W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844." p. 167

[339] J. E. Carpenter, "Memorial Sketch."p. 34

[340] See W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844." p. 167, quoted from: Anonymous, *Vestiges of the Natural History of Creation*. pp. 151-54

manuscript. Chambers had probably been counting on Carpenter's help when writing his book, and Carpenter already suspected Chambers of being the author.[341] Nevertheless, the physiologist declined to take too active a role in the revision of the subsequent editions and had already made sure in his review to express his doubts as to the applicability of a theory of descent to man, issuing the following intriguing disclaimer:[342]

> That the Creator formed man out of the dust of the earth, we have Scriptural authority for believing; and we must confess our own predilection for the idea that, at a certain period, however remotely antecedent, the Creator endowed certain forms of inorganic matter with the properties requisite to enable them to combine at the fitting season into the human organism, --over that which would lead us to regard the great-grandfather of our common progenitor as a chimpanzee or an orang-outan.[343]

In his biography, Carpenter's son interprets his father's apparent rejection of the evolutionary model as a sign of his "imperfect emancipation from the traditional view of Biblical revelation in which he had been trained."[344] It may be the case that Carpenter was still attached to a certain Biblical orthodoxy. However, it is worth questioning this interpretation and conjecturing whether Carpenter wasn't in fact employing a strategy to support Chamber's views whilst seemingly opposing transformism so as not to endanger his reputation at a time when his relationship with his employers, the Lovelaces, was becoming increasingly fraught. Indeed there are a few potential inconsistencies in Carpenter's disclaimer against his adherence to

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[341] J. E. Carpenter, "Memorial Sketch." p. 42. The connection between the two men can also be established as dating back to the early 1840s at least, thanks to the letters from Carpenter to Chambers (chiefly regarding phrenology and Chamber's *Popular Cyclopaedia*) kept at the National Library of Scotland, as previously mentioned in Part I of this thesis, p.65.

[342] For an example of the strategies employed by scientists to either obliquely support or -- in this case-- indirectly oppose Chambers's work, see: J. H. Brooke, "Richard Owen, William Whewell, and the Vestiges," *The British Journal for the History of Science* 10.2 (1977). Brooke reveals Whewell's and Owen's concerted decision not to publicly criticise Chambers's work. Owen's silence, as well as isolated extracts from his correspondence, were initially interpreted by his biographer as a secret adherence to Chamber's views, but on closer scrutiny their silence reveals itself to be a deliberate attempt to stifle Chambers voice. John Brooke's analysis thus draws our attention to the difficulties of untangling the exact intentions behind the contents of published reactions or the very decision to react publicly or not. Carpenter's contradictory statements must be interpreted in the context of scientists having to, metaphorically-speaking, release clouds of ink to remain safe.

[343] W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844."p. 180

[344] J. E. Carpenter, "Memorial Sketch." p.35

transformism. The first one is his reference to the possibility of spontaneous generation, since this view ran counter to the opinion about spontaneous generation that he had enounced in 1838 in his article on the differences between vital and physical phenomena:

> The writer of this essay considers that we are fully warranted by evidence in rejecting the supposition of spontaneous generation as commonly understood, that is, the origination of organized beings by fortuitous combination of inorganic matter. He thinks, however, that there is also evidence to render it a question worthy of consideration, whether plants or animals of a lower degree of organization may not be developed by degeneration of the tissues of those more elevated in the scale.[345]

Admittedly, Carpenter may have changed his mind on the topic between 1838 and 1844, and the model of spontaneous generation he suggested in his review of *Vestiges* was by no means a materialist doctrine, and materialism may have been what he was chiefly rejecting in 1838, rather than the possibility of spontaneous generation itself. However, the arguments he used in 1844 to bolster his case for spontaneous generation orchestrated by God --namely the fact that the German scientist Christian Ehrenberg (1795-1876) had shown that infusoria were complex organisms, as well as the fact that the English amateur naturalist Andrew Crosse had produced quartz crystals through galvanic action-- were not new facts to him. Indeed, Carpenter had been present at the 1836 meeting of the B.A.A.S in Bristol during which Crosse had described his experiment.[346] It thus follows that when rejecting spontaneous generation in 1838, Carpenter already knew about the evidence which he later used in 1844 to argue in favour of it, as can be seen below in the elusive definition of spontaneous generation proposed by Carpenter in his

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345 W. B. Carpenter, "On the Differences of the Laws regulating Vital and Physical Phenomena."p. 346 Carpenter's suggestion that simple organisms might be formed through the decomposed matter of more complex beings might have been inspired by the work of the French naturalist Pierre-Jean-Georges Cabanis (1757-1808) who in 1802 suggested a similar idea, namely that decomposing vegetable matter may give rise to animated corpuscules. See: P. Corsi, *Lamarck : Genèse et Enjeux du Transformisme, 1770- 1830*. p. 115

346 For a description of the excitement caused by Crosse and Ehrenberg's experiments, see: P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. pp. 252-253

review of *Vestiges*:

> If it be admitted as possible ("there is great virtue in an *if*") that any combination of inorganic matter can, under any circumstances, produce a living being, we do not see why we should not look to such a combination as the real origin of every race, including man himself, each species thus being called into existence by the original ordination of the Creator, just when that coincidence of circumstances occurred which was favourable to its development and continuance.(…) it is the origin of a living cell that constitutes the great stumbling-block; *ce n'est que le premier pas qui coute*. "Give me a vesicle" quoth Raspail, "and I will make a thinking man." In this manner, too, we would account for the successive appearance of new species of infusoria, of a higher and higher type, in a vegetable infusion; the new ones making their appearance, as the character of the infusion became adapted to generate them, by new combinations of elements, rather than by the metamorphosis of forms which had been previously developed in accordance with a different state of things. And this view, moreover, seems to us much more consonant with the fact –if fact it be, that the being produced in Mr. Crosse's electric apparatus was not a monad, nor any other protozoic infusory, but an animal of complex organization, and capable of propagating its own kind.[347]

These inconsistencies in Carpenter's argumentation over the years can suggest two things: either that he had indeed changed his mind on the topic having been convinced by Crosse's subsequent experiments, or that he was playing a trump card in his 1844 review of *Vestiges*.

Secondly, though Carpenter does formally reject the notion of transformism in his review, the sheer ratio of textual volume he granted to Chambers' views compared to that which he devoted to his own alleged criticism, could be seen to tell a story of its own, undermining Carpenter's professed reservations. It was not uncommon for Victorian reviewers to cite large amounts of text from the works they were discussing, but Carpenter's review still appears particularly generous in the amount of space devoted to the original text. [348] What is more, the passages from *Vestiges* cited by Carpenter are predominantly justifications of the validity of the ideas presented, and often vigorously defend the notion that there was nothing humiliating or degrading for man about being descended from lower animals:

> "degrading" is a term expressive of a notion of the human mind; and the human mind is liable to prejudices which prevent its notions from being invariably correct. (…) For, it may be asked, if He, as appears, has chosen to employ inferior organisms as a generative

[347] W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844."p. 180

[348]See for example pp. 233-235 of Anonymous, *Vestiges of the Natural History of Creation*. where both pages entirely consist of Champers's own writing.

> medium for the production of higher ones, even including ourselves, what right have we, his humble creatures, to find fault?[349]

Though in this review Carpenter purported to reject Chamber's idea of a link between all creatures, the fact remains that he provided Chambers with an ample platform, cutting his own refutation of the theory short after just a single page by claiming that "our limits forbid our dwelling any longer on these topics, though we are strongly attracted to do so by their highly interesting nature".[350] Similarly, Carpenter didn't address Chambers' "application of these views to the physical and moral nature of man", evading one of the most controversial implications of the book due to an alleged lack of space. What remains, therefore, is a strikingly positive review overall, in which quotes taken from *Vestiges* --a large majority of which are framed by laudatory remarks-- fill approximately twelve pages out of the total of twenty-six.

If indeed Carpenter was trying to cover his tracks by running with the hare and hunting with the hounds, his endeavours were successful since it is nowhere clear how convinced by the theory of 'progressive development' he really was before the publication of Darwin's work. His reception of Darwin's work, therefore, constitutes the moment in time when Carpenter officially and publicly adhered to transformist ideas, though there is sufficient evidence to warrant suspecting him –as many of his contemporaries did—of having entertained those views for several years before the *Origin* was published. Finally, this hypothesis can be further supported by the fact that Carpenter himself offered what could be termed a 'revisionist' account of his own review in an 1881 article describing his initial reception of Darwin's theory:

> Some years before, indeed, while criticizing the "Vestiges of the Natural History of

[349] W. B. Carpenter, "Vestiges of the Natural History of Creation, 1844."p. 179
[350] Ibid. p. 181

> Creation" and exposing the unsoundness of the author's data and the fallacy of his reasonings, I had taken occasion to say that I had not the least objection, either philosophical or theological, to the doctrine of Progressive Development, if only it could be shown to have a real scientific basis: since the development of the very highest type of animal life from the very lowest, during the long succession of geological ages, did not seem to me more strange than the actual development of that same type during a nine months' gestation.[351]

In the same article written in 1881, Carpenter gave the label "pre-darwinian" to the views he had entertained before the publication of Darwin's work. Holding the *Origin* to be "the inauguration of a new era in biological science", he explained that although he felt he had been instrumental in paving the way for these conclusions through his work on Von Baer's ideas, he had always remained within the framework of morphology, putting forth these ideas "merely as an expression of the plan according to which the succession of animal and vegetable forms had been created, not as indicating any genetic continuity between the earlier and the later."[352]

6.2- Carpenter's reception of the *Origin of Species* : variation, monogenism and natural selection.

On November the 18th 1858, Charles Darwin –who had been corresponding with Carpenter since the mid 1840s[353]—wrote to the physiologist to thank him for his appreciation of the advance sample of his book *On the Origin of Species* that he had sent him. Judging by Darwin's letter, Carpenter's reaction had been extremely encouraging:

> My dear Carpenter,
>
> I must thank you for your letter on my own account (…) and still more warmly for the subject's sake. As you seem to have understood my last chapter without reading the previous chapters, you must have maturely & most profoundly self-thought out the subject; for I have found the most extraordinary difficulty in making even able men understand at what I was driving.

[351] Paper initially published in a small Italian newspaper in 1881 during Carpenter's cruise in the Mediterranean, and later used as the material for the essay on Darwin ('Charles Darwin: his Life and Work') published in 1882 in the *Modern Review*. Cited in: J. E. Carpenter, "Memorial Sketch."pp. 106-107.

[352] Ibid.p. 108

[353] Carpenter had counselled Darwin on the acquisition of a microscope and had analysed several specimens of the Beagle voyage for him.

> There will be strong opposition to my views. If I am in the main right (of course including partial errors unseen by me) the admission of my views will depend far more on men, like yourself, with well established reputations, than on my own writings. Therefore, on the supposition that when you have read my volume you think the view in the main true, I thank & honour you for being willing to run the chance of unpopularity by advocating the view.(…) If you are willing to review me anywhere, I am sure from the admiration which I have long felt & expressed for your Comparative Physiology, that your review will be excellently done & will do good service in the cause for which I think I am not selfishly, deeply interested[354].

As has been shown in the first Part of this thesis, by 1859 Carpenter was in a much more comfortable situation both socially and professionally than he had been in the mid 1840s when *Vestiges* was published, and he immediately set out to oblige Darwin and to defend a cause which he evidently cared about a great deal himself. Thus, shortly after the *Origin* was published on the 24th of November 1859[355], Carpenter wrote several in-depth reviews of Darwin's book, the most notable ones appearing in the *Edinburgh Review* in December 1859, and later in the *National Review* and *British and Foreign Medico-Chirurgical Review* in January and April 1860 respectively. As the rest of the correspondence between the two men demonstrates, Darwin was extremely pleased to have found an early ally in Carpenter[356], telling Charles Lyell on the 3rd of December 1859 that he "look(ed) at it as grand having brought round a great physiologist, for great I think he certainly is in that line"[357] and writing to Carpenter on that same day that "it is a great thing to have got a great physiologist on our side. I say "our" for we are now a good & compact body of really good men & mostly not old men.— In the long run we shall conquer."[358]

The fact that Darwin sent Carpenter a sample of his book is in itself

[354] Letter 2535,J. A. Secord, *Darwin Correspondence Project*. Unfortunately Carpenter's letters to Darwin have not been found.

[355] C. Darwin, *On the Origin of Species by means of Natural Selection, or the Preservation of the Favoured Races in the Struggle for Life* (London, 1859).

[356] Carpenter was one of the first scientists to review Darwin's work, and the first known Christian scientist and public figure to have openly supported the theory.

[357] Darwin to Charles Lyell, 3 December 1859, J. A. Secord, *Darwin Correspondence Project*.(www.darwinproject.ac.uk), letter n° DCP-LETT-2567.

[358] Darwin to William Carpenter, 3 December 1859, ibid. letter n° DCP-LETT-2568.

indicative of the reputation the physiologist had acquired since the 1830s as one of the main naturalists in Britain openly trying to re-think the question of species. Indeed, Carpenter had given much thought to the problem of variation in his *Principles of Comparative Physiology*. The Revered Baden Powell, in his *Essay on the Philosophy of Creation* published in 1855, was one of many writers to refer to Carpenter's thoughts on the question. Relying on geological and physiological evidence to demonstrate the consistency of the Creator's laws at work in nature, Powell cited the following passage from Carpenter's work to illustrate his own point:

> The uncertainty of the limits of species is daily becoming more and more evident, and every naturalist is aware that a very large number of races are usually considered as having a distinct origin, when they are nothing more than permanent varieties of a common stock.[359]

Darwin too had read and heavily annotated Carpenter's 1854 edition of the *Comparative Physiology* and was particularly impressed with the physiologist's discussion of hybridism, as his letters to Joseph D. Hooker in May and July 1855 attest:[360]

> I have lately been at work, compiling from all works on Hybridism; & most interesting work (though I know you despise it) I have found it; the difficulty has wonderfully enhanced my respect for Carpenter et id genus omne. (July the 14th 1855)

Darwin at the time was also in touch with the naturalist Thomas Bell Salter who, in a paper on the fertility of hybrids in 1852, had used Carpenter's *Principles of Comparative Physiology* as his main reference:

> I would wish, first, to state the now usually received opinions respecting the laws according to which the intermixture of species, and the subsequent perpetuation of the resulting progeny, appear to take place. I cannot better do so than in the words of Professor Carpenter. "The conclusion which has now been attained", writes that accomplished author, ""is equally applicable to both the animal and vegetable kingdoms". "In plants the stigma of the flower one species may be fertilized with the pollen of an allied species; and from the seeds produced, plants of an intermediate character may be raised. But these hybrid plants will not perpetuate the race (…) So writes Professor Carpenter, one of the most satisfactory authors who could be cited as setting forth the received opinions of the best most recent authorities."

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359 B. Powell, *Essays on the Spirit of the Inductive Philosophy, the Unity of Worlds, and the Philosopgy of Creation* (London, 1855). p. 378

360 Secord, *Darwin Correspondence Project*. DCP-LETT 1688 and 1717.

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Bell Salter went on to explain that although “the general rule thus expressed by Dr. Carpenter with regard to the facility of hybridizing varieties, and the fertility of the resulting forms, is certainly most true” in the case of animals, the same could not be said about all garden plants since he himself had experimented with a number of fertile hybrids. According to Salter, “the instances thus cited by Dr. Carpenter (namely Calceolarian and Amaryllis) are at least unsatisfactory; and another garden-plant, --the Fuschsia,--would (…) warrant quite the contrary conclusion.”[362] Darwin’s correspondence reveals that after reading this article, he had asked Thomas Bell Salter for some seeds of Hybrid plants.[363] Chapter Eight of the *Origin*, which presented Darwin’s conclusions on the topic –namely, that there were insufficient grounds to draw a distinction between varieties and species based on the degree of fertility of hybrids—can thus be read as having been inspired to a large degree by Carpenter’s prior attempts at theorising on the question.

Carpenter’s *Comparative Physiology*, which Darwin often referred to respectfully in his correspondence, can indeed be understood to have had an important influence on the famous naturalist’s work. Through delving into the topics of variation and fertility, and underlining their difficulty as well as their poor general understanding by the scientific community, Carpenter’s book most probably encouraged Darwin to pursue his own line of enquiry on those same subjects. Carpenter’s work can thus be considered to have contributed to creating the right intellectual climate for the reception of Darwin’s ideas, since it can be seen from the earliest edition of Carpenter’s *Comparative Physiology*, that his understanding of

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361 T. B. Salter, "On the Fertility of Certain Hybrids," *The Phytologist: A Popular Botanical Miscellany* IV.2 (1852). p.737

362 Ibid. p. 741. Carpenter acknowledged Bell Salter’s qualification of his theory in his fourth edition of his *Comparative Physiology*, p. 634.

363 See J. A. Secord, *Darwin Correspondence Project*. DCP-LETT 1703 and 1719, June 1855.

species was anything but fixist:

> It becomes a most interesting question, then, to determine what are the changes which may be produced by the influence of external circumstances, and how far these are hereditarily transmissible. (…) How all those varieties have been produced, which are now so numerous and striking, is a question much more easily asked than replied to satisfactorily. That very important changes may be induced by the direct influence of climate, food, and habits of life, upon successive generations, cannot be doubted; since experience shows that particular races of animals, placed under new conditions, gradually undergo modifications which adapt them to those conditions.[364]

Carpenter seemed to be reasoning in terms of Lamarckian adaptation to the environment, and in terms of transmission of acquired characteristics from one generation of organisms to the next, citing examples initially given by Buffon and subsequently used by Erasmus Darwin, such as that of dogs whose tails had been cut off producing offspring with stumps instead of tails. Importantly, Carpenter also underlined the fact that not all modifications were the result of external circumstances, but that some seemed inherent to the organisms themselves. Carpenter spoke of spontaneous variation which occurred frequently in nature and which breeders took care to perpetuate when such unusual features proved beneficial to them. In this first edition, Carpenter also cited the example of a lamb born in Massachussetts in the 1790s with very short limbs which was used by farmers to create a new breed of sheep that could not leap over enclosure fences. Using this story of the "otter breed" of short-legged sheep, Carpenter exposed his views on the effects of geographical distribution and isolation of certain strands of population, explaining that:

> This history shows the influence which the circumstance of a scanty population may have formerly had on the production of varieties, both in the human and other species. At the present time, any peculiarity which may occasionally arise, speedily merges by intermixture, and returns to the common standard; but it may be surmised that, in the older ages of the world, some individuals in which a peculiarity existed, may have been so far separated from the rest, as to necessitate frequent union among themselves, so that the character would be rendered still more marked, instead of disappearing; and, being propagated for a few generations, would be rendered permanent.[365]

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[364] W. B. Carpenter, *Principles of Comparative Physiology*, 4th ed. (London, 1854). pp. 637-38

[365] Ibid. p. 638. (Significantly, in Darwin's copy of this edition kept in Cambridge but also available in digital format online, this particular passage was highlighted.)

Thus it appears that in Carpenter's *Comparative Physiology*, many of the most fundamental concepts underpinning Darwin's own theory were present and clearly formulated, namely that of spontaneous variations frequently occurring in nature and producing individuals which departed from the general type, that of the effect of the environment on causing adaptive modifications, and that of the result of geographical distribution and segregation as a potential explanation for the emergence of new species, "which might assist in the solution of the curious problem of their origin."[366]

Carpenter had derived many of his ideas on variation from the work of James Cowles Prichard, the Bristol ethnologist whose ideas strongly shaped the nineteenth-century anthropological debate over monogenism and polygenism, a debate which had strong political and religious implications especially regarding the practice of slavery. Prichard, one of the leading monogenicists in Britain[367], had initially rejected environmentalism and adaptation in the earlier editions of his work, but had later come to accept a more Hunterian view of the ecology of nature. Eventually, he made allowances even for the notion of the inheritance of acquired characteristics, as can be seen in the later editions of his *Researches into the Physical History of Mankind*.[368] Like many Christian monogenicists, Prichard was intent on proving the conformity of nature with the genealogy given in the Bible.

However, it is important to note that although Darwin's theory gave a second

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[366] Ibid. p.636

[367] For a full analysis of Prichard's ideas and their repercussions, see: F. A. Augstein, *James Cowles Prichard's Anthropology, Remaking the Science of Man in Early Nineteenth Century Britain* (Amsterdam, 1999). Augstein notes that Prichard acknowledged his own interest in the varieties of mankind to the Scottish Philosopher Dugald Stewart (1753-1828) whose lectures on moral philosophy he had attended in Edinburgh in 1806 (see p. 106). The Carpenters and Prichards knew each other well, and the Red Lodge purchased for Mary Carpenter in 1854 by Lady Byron was formerly the private residence of the anthropologist. Carpenter often referred to Prichard (1786-1848) as his personal friend.

[368] J. C. Prichard, *Researches into the Physical History of Mankind*, 3rd ed. (London, 1837). (First edition published in 1813.)

wind to the monogenist camp in the second half of the century, it by no means followed that all defenders of those ideas were transformists. Moreover, Carpenter, despite being a staunch monogenicist who embraced Prichard's views and meshed them with Darwin's theory, was himself still not convinced that all living beings were descended from the same initial parents. Evidence of Carpenter's intellectual debt to Prichard's work can be found in the following letter he sent to the famous French anthropologist Armand de Quatrefages in November 1861:

> I recognize in your Anthropological writings the advantage of that training in the school of General Zoology, which most of the special anthropologists want; and it is a great satisfaction to me to see that the doctrine of the essential unity of the human races, which (following in the steps of my early friend Dr Prichard) I have always upheld, is taught in the Musée Français by so distinguished a Professor. (…) I had the pleasure of conversing with M. Milne-Edwards on this subject during his visit to London one and a half years ago, I said that I thought this general admission of the antiquity of man, and of considerable changes in the relative distribution of land and water since his origin, removed all serious difficulties from the Theory of the specific unity of the races; and I understood him to concur with me entirely.[369]

In his 1861 book, Quatrefages had underlined the similarity between Darwin's thoughts on the origin of species and his own earlier thoughts on the origin of the human races, seemingly campaigning for some form of intellectual priority over the notion of the derivation of varieties from an earlier general type.[370]

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[369] Carpenter to Quatefages, Quatrefages correspondence, Muséum d'Histoire Naturelle, Paris. Jean Louis Armand de Quatrefages de Bréau (1810-1892) held the chair of anthropology and ethnography at the Muséum d'Histoire Naturelle in Paris since 1855. Carpenter was writing in reply to Quatrefages having sent him a copy of his latest book: A. De Quatrefages, *Unité de L'Espèce Humaine* (Paris, 1861). In this work, Quatrefages argued in favour of monogenism and in his chapter on heredity and the influence of the environment (chapter 13), the French scientist cited Carpenter as being one of the naturalists to have previously mentioned the modification of features due to an adaptation to local climate (see p. 224). Quatrefages also abundantly cited Prichard throughout the book. This letter is also interesting because it demonstrates that Carpenter, like Darwin, fully adhered to Lyell's uniformitarianism in geology. This view was consistent with Carpenter's understanding of the uniformity and harmonious constancy of the physical laws implemented by God. It also highlights the transnational scientific dialogue taking place at the time between British and French scientists.

[370] Ibid. pp. 198-199. In this passage De Quatrefages mentions the claim to priority over the theory of evolution by natural selection of another French scientist, the botanist Naudin. Henry Osborn discussed Naudin's views, explaining that his understanding of "natural selection" was by no means analogous to Darwin's but was rather a synonym of divine providence, and that the two theories cannot be compared, even though Naudin's ideas were published in 1852, seven years before Darwin's. See: H. F. Osborn, *From the Greeks to Darwin, an Outline of the Development of the Evolution Idea* (London, 1908). pp. 221-24

This suggests that in the study of ideas about transmutation in Europe, the development of the disciplines of philology and anthropology at the beginning of the nineteenth-century which coincided with the increasing paleontological awareness of the 'antiquity of man' as well as with new archaeological discoveries through the expansion of European empires, are probably underestimated factors worth bringing to the fore. Without going as far as Desmond and More in claiming that the "sacred cause"[371] behind the theory of evolution was really the study of the origin of the races of man, the importance of the budding science of anthropology in achieving the groundwork necessary to the formulation of Darwin's theory in the first half of the nineteenth century, must not be underestimated.

Thus, given the strong interest that Carpenter –along with many other scientists involved in the monogenism versus polygenism debate-- had already shown for the question of variation and speciation, as well as his openness to the idea of progressive development, it is not surprising that he should have welcomed Darwin's ideas. However, when writing to Lyell on December the 3rd 1859, Darwin told the geologist that Carpenter "(was) a convert, but does not go quite as far as I— but quite far enough; for he admits that all Birds from one progenitor; & probably all fishes & reptiles from another parent. But the last mouthful chokes him—he can hardly admit all Vertebrates from one parent.— He will surely come to this from Homology & Embryology."[372] It thus appears necessary to examine precisely to what extent Carpenter adhered to Darwin's views, so as to pinpoint the exact differences between his own understanding of evolution and that proposed by Charles Darwin. The main sources available to assess the degree of Carpenter's

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[371] See: A. Desmond and J. Moore, *Darwin's Sacred Cause: How a Hatred of Slavery Shaped Darwin's Views on Human Evolution* (New York, 2009).

[372] Darwin to Charles Lyell, 3 December 1859, J. A. Secord, *Darwin Correspondence Project*.(www.darwinproject.ac.uk), letter n° DCP-LETT-2567

congruence with Darwin's views are his two extensive reviews of the *Origin* in 1860, both fourty pages long and covering every aspect of the theory. Later writings by Carpenter on the question also confirm that the scientist retained quasi-identical views on the subject throughout his life, except on one particular aspect, that of common descent from one original parent.

The first point that Carpenter tackled in 1860 in the *British and Foreign Medico-Chirurgical Review*, was the idea of transmutation being incompatible with religious faith. In an attempt to dispel such criticism, Carpenter sought to rehabilitate Lamarck. Quoting a lengthy paragraph from his work and underlining the fact that most British detractors of Lamarck only possessed second-hand knowledge of his writings,[373] Carpenter offered the following appreciation of the French naturalist's views:

> The doctrine of transmutation is commonly regarded as atheistical; and Lamarck has been branded as an atheist for upholding it. Yet nothing can be more unfair, as is obvious from his own very explicit statement on the subject: "Doubtless", he says, "nothing exists but by the will of the sublime Author of all things. But can we assign to him rules in the execution of his will, and fix the method which he has followed? Has not his infinite power been able to create an order of things which should successively give existence to all that we behold?"(…) What can be more truly philosophical, or more truly religious? We cannot suppose that the virulent detractors from the merits of this great man (…) can have read more than those sections of his work which fairly lie open to adverse criticism; the larger part of them, we feel pretty sure, know it only at second hand; and we believe that the day is not far distant when it will be admitted that his great misfortune was in living in advance of him time[374].

After "checking the odium theologicum" as he himself put it,[375] Carpenter continued to reject the most widely used religious argument against transformist ideas, namely the fixist model of creation. He called attention to the fact that "many men of high scientific reputation" such as Sir Henry Holland for example, "regard(ed) the

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[373] The fact that very few scientists in Britain had read Lamarck first hand is a view also put forward by historians such as Pietro Corsi.
[374] W. B. Carpenter, "The Theory of Development in Nature," *British and Foreign Medico-Chirurgical Review* (1860). p. 378
[375] Charles Darwin to W.B. Carpenter, December 3rd 1859, J. A. Secord, *Darwin Correspondence Project*. DCP-LETT-2568

question of the immutability of species as by no means settled in the affirmative."[376] The physiologist had already argued in the *National Review* that the sheer accumulation of taxonomic knowledge as well as the difficulty in determining the difference between genera, varieties and species, was in itself indicative of a flaw in the scientific understanding of the problem, and that "the species of plants and animals which such men have added to our already overloaded catalogues, are of human, not of divine creation; and it is the business of the philosophic naturalist to get rid of all such as soon as possible."[377] In his second review in 1860, Carpenter reminded his readers that Linnaeus "himself looked upon his artificial system as merely provisional and temporary."[378]

Carpenter also relied on the theological arguments set forth by his friend the Reverend Baden Powell in his 1855 collection of *Essays on the Spirit of the Inductive Philosophy, the Unity of Worlds, and the Philosophy of Creation*[379] which he listed at the beginning of his article in the *National Review* as one of his main sources along with Darwin's *Origin* and Wallace's famous essay *On the Tendency of Varieties to depart indefinitely from the Original Type.*[380] Pietro Corsi has already pointed out that Powell, Francis Newman, Robert Chambers and Carpenter formed a tight-knit circle in London from the late 1840s onwards,[381] and indeed the close similarity between the views taken by Powell and Carpenter --as well as the fact that they cited each other in their respective works—confirms the notion that both men shared many similar ideas on the compatibility of science and religion, as

[376] W. B. Carpenter, "The Theory of Development in Nature." p. 379
[377] W. B. Carpenter, "Darwin on the Origin of Species," *National Review* 10 (1860). p. 191
[378] W. B. Carpenter, "The Theory of Development in Nature." p. 368
[379] B. Powell, *Essays on the Spirit of the Inductive Philosophy, the Unity of Worlds, and the Philosopgy of Creation*.
[380] A. R. Wallace, *On the Tendency of Varieties to depart indefinitely from the Original Type* (Ternate, 1858).
[381] P. Corsi, *Science and religion : Baden Powell and the Anglican debate, 1800-1860*. pp. 274-76

well as on the plasticity of species. Quoting from James 1: 17 in King James's Bible, Carpenter affirmed that:

> To our apprehension, the Creator did not finish his labours with the creation of the protoplasts of each species; his work is always in progress (…) and the question is simply as to the mode in which it has pleased Him to exercise that power (…). For ourselves we do not hesitate to say that the orderly and continuous working out of any plan which could evolve such harmony and completeness of results as the world of Nature spreads out before us, is far more consistent with our idea of that Being who "knows no variableness, neither shadow of turning", than the intermittent action of a power that requires a succession of interferences to carry out its original design in conformity with successive changes in the physical conditions of the globe. And we have no sympathy with those who, to use the admirable language of Professor Powell (whose *Essay on the Philosophy of Creation* contains a masterly refutation of the current theological arguments bearing on this question), maintain that we "behold the Deity *more* clearly in the dark than in the light, --in confusion, interruption, and catastrophe, *more* than in order, continuity, and progress." (italics original)

Following in this line of thought, Carpenter also presented a series of analogies aimed at deflating the perceived theological threat posed by the new theory, suggesting for example that even "the stoutest believers in the Mosaic cosmogony" would not be much dismayed "if it could be shown that the dog is really a derivation of the wolf"[382], and reminding his readers that "the naturalist who first found out that butterflies and beetles were caterpillars in the earlier stage of their existence instead of coming out of the egg in full possession of their insect attributes" was probably not "considered on that account less religious than his neighbours."[383] He also used a striking argument which he had already obliquely suggested in his review of *Vestiges* and which he would often repeat until his death, namely that there was nothing more shocking in the idea that species could evolve over the course of many epochs, than in the fact that "modern Embryology teaches that the human infant, instead of first coming into existence as a fully-formed though minute *homunculus*, begins life in the condition of the simplest protozoon, and successively acquires those peculiarities or organization which end in

[382] W. B. Carpenter, "Darwin on the Origin of Species." p. 193
[383] Ibid. p. 193

constituting him a Man."[384] This argument echoed Herbert Spencer's famous sentence in his article "The Development Hypothesis" anonymously published in the *Leader* in 1852 and later reprinted in 1891, in which he insisted that:

> Surely if a single cell may, when subjected to certain influences, become a man in the space of twenty years; there is nothing absurd in the hypothesis that under certain other influences, a cell may, in the course of millions of years, give origin to the human race.[385]

Though Spencer is nowadays more famous than Carpenter for his early advocacy of transformism, it is important to note that in this article his only reference to any scientific work is to Carpenter's *Principles of General and Comparative Physiology*, making it the likely source of his inspiration and thus testifying once again to the important role played by Carpenter --from the late 1830s consistently through to the publication of the *Origin* in 1859-- in promoting the idea of development in nature. Indeed, a few lines before his famous quote, Spencer used a direct quote from Carpenter to explain:

> That the uneducated and the ill-educated should think the hypothesis that all races of beings, man inclusive, may in process of time have been evolved from the simplest monad, a ludicrous one, is not to be wondered at. But for the physiologist, who knows that every individual being *is* so evolved—who knows, further, that in their earliest condition the germs of all plants and animals whatever are so similar, "that there is no appreciable distinction amongst them, which would enable it to be determined whether a particular molecule is the germ of a Conferva or of an Oak, of a Zoophyte or of a Man;"—for him to make a difficulty of the matter is inexcusable.[386]

Carpenter's enthusiasm for Darwin's theory, in which both morphology and the notion of the adaptation of organisms to their surroundings played equally important roles, must also be put back into the context of his constant efforts to forge a compromise between the two schools of thought, as has been shown in the previous chapter. Indeed, Carpenter saw Darwin's theory as able to finally resolve the differences between the functionalist and the morphological approach. According to

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384 W. B. Carpenter, "The Theory of Development in Nature." p. 379

385 H. Spencer, *Essays: Scientific, Political and Speculative*, vol. 1 (London, 1891). p.6. See Part III of this thesis for a further analysis of the relationship between Carpenter's and Spencer's ideas.

386 Ibid. p. 6. The quote cited by Spencer can be found in Carpenter's *Principles of Comparative Physiology*, p. 474

Carpenter, Darwin's theory had the merit of "bring(ing) into mutual reconcilement the two great ideas of opposing schools,—the morphological notion of Unity of Type,—and the teleological notion of Conditions of Existence"[387], opening up an avenue towards the more coherent and inductive practice of biology that Carpenter had been advocating for two decades.

Finally, Carpenter in his 1860s reviews --and contrary to many of his contemporaries as is widely known-- expressed no difficulties in accepting the mechanism of Natural Selection, which he openly supported through using his own examples of artificial selection of breeds under the influence of man's breeding programmes. However, he drew the line at the notion of a single common ancestor for all types of animals, ending his article in the *Medico-Chirurgical Review* by firmly rejecting the notion of man being descended from lower animals:

> Supposing, for the sake of argument, that we concede to Mr. Darwin that all Birds have descended from one common stock, --and we cannot see that there is any essential improbability in such an idea, so small are the divergences from a common type presented by any members of that group, --yet it by no means thence follows that Birds and Reptiles, or Birds and Mammals, should have had a common ancestry. The very imperfection of the Geological record, on which he so pointedly dwells, takes away all power of denial that Birds may have been placed on the Earth as early as any form of organic life whatever. And to us it seems far more likely that this has been the case with regard to each of the great types marked out by decided structural and physiological peculiarities, than that these have been derived from any still more remote ancestor by the process of Natural Selection. So, too, there seems to us so much in the psychical capacity of Man, however degraded, to separate him from the nearest of the Mammalian class, that we can far more easily believe him to have originated by a distinct creation, than suppose him to have had a common ancestry with the Chimpanzee, and to have been separated from it by a series of progressive modifications.[388]

Carpenter's mitigated reaction to the notion of a single common ancestor prompted Darwin to encourage the physiologist to think further, expecting him to come to similar conclusions to those he himself had reached:

> I look at it as immaterial whether we go quite the same lengths; and I suspect, judging from

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[387] W. B. Carpenter, "The Theory of Development in Nature."p.404
[388] Ibid. p. 474

> myself, that you will go further, by thinking of a population of forms like Ornithorhynchus and by thinking of the common homological and embryological structure of the several Vertebrate orders. But this is immaterial; I quite agree that the principle is everything. (…) When I reflect how very slowly I came round myself, I am in truth astonished at the candour shown by Lyell, Hooker, Huxley and yourself.[389]

Indeed, the idea of a possible common ancestor for all vertebrates seems to have grown on Carpenter over the next few years, and when he later recounted his reaction to the theory in his article published in 1881, he noted that he had initially found it difficult to consider birds and reptiles as related, but that subsequent discoveries had allowed him to admit the possibility:

> Thus, while some of us have found no difficulty in believing that all existing birds have arisen from one common stock, the derivation of that stock from a common *stirps* with the reptilian at first appeared almost inconceivable; birds and reptiles being *physiologically* almost the antithesis of each other. But the discovery of the Archaeopteryx has shown that a true bird may have a prolonged and distinctly jointed tail. (…) Further, the development of the Struthious birds, which were formerly supposed to have the closest mammalian affinities, is now found to be much more reptilian than mammalian; while certain Dinosaurian reptiles present distinct indications of progress towards birds. And thus it does not seem at all unlikely that evidence may hereafter be obtained, which may adequately support the idea of the descent even of birds and reptiles from a common ancestor.[390]

Overall, Carpenter's early response to the *Origin* was extremely positive and as Darwin himself suggested, it can be assumed that the physiologist had already given serious thought to the theory of descent with modification. Carpenter seems to have been all the more prepared to accept the hypothesis of natural selection –usually considered to be the biggest stumbling block in Darwin's theory at the time for most contemporaries—as he had himself drawn clear analogies between artificial selection and the formation of species in nature ever since the publication of his *Comparative Physiology*. Therefore, by 1859 at the very latest, Carpenter was a publicly outspoken supporter of the theory of evolution by natural selection and he continued until his death to campaign for a wider acceptance of Darwin's work. Indeed in 1882, Carpenter was still promoting Darwin's theory, offering the

[389] Charles Darwin to W.B. Carpenter, December 3rd 1859, J. A. Secord, *Darwin Correspondence Project*. DCP-LETT-2568
[390] J. E. Carpenter, "Memorial Sketch."p. 113

following valuable testimony about the spread of evolutionary ideas in Britain:

> (…) It has doubtless occurred to you that it would be appropriate to introduce in such a connection some mention of Darwin. This, from one of his nearest friends, would –I am sure—be extremely welcome. And perhaps you would think it not unsuitable to advert to what has most forcibly impressed myself, --the evidence which the event has brought out, in a degree altogether unexpected to myself—of the change which has been quietly taking place in the intelligent thought of our people as to the value of his work –even the Theologians having long ceased to pooh-pooh it, and the best of them now showing an appreciation of it which has greatly surprised me.
> If the Quarterly Reviewer of the "Origin of Species" could now return to the world, what a change he would find![391]

However, Carpenter's understanding of the evolutionary process differed from Darwin's and Huxley's in one fundamental way: Carpenter maintained the agency of the Creator as a directing force in shaping evolution, and refused the idea that the variations which resulted in natural selection occurred randomly. Carpenter's views can thus be better defined as 'Intelligent Design by Natural Selection', or in other words, 'orthogenesis'. The following chapter will analyse in detail what his exact version of evolution was.

Chapter 7- Carpenter, the ocean, and orthogenesis

Two aspects of Carpenter's career have been overlooked by previous studies: his reputation as one of the most renowned microscopists in Britain at the time, and his role in the history of oceanography through his wide-scale studies of marine life and of worldwide oceanic circulation. The following section, in detailing Carpenter's specific understanding of evolution as orthogenesis, also aims to shed new light on Carpenter's long-standing involvement in marine biology, arguing that his personal motivations for such an enterprise were to demonstrate the validity of a divinely ordained world.

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[391]Extract taken from a letter dated from May the 5th 1882 by Carpenter to John Lubbock, advising him on the contents of a speech he was preparing to deliver as the Vice-Chancellor of the University of London. See Lubbock papers, British Library Archives, ADD 49645 f. 138

7.1- Carpenter, microscopy and sea-shells

7.1.1 A passionate conchologist

As was shown in the first part of this thesis, William Carpenter was very well acquainted with the science of optics and with microscopy in particular. His close family ties with one of the leading British microscope makers of the first half of the century meant that from childhood he was accustomed to using the instrument and had gained an intimate understanding of its workings and improvements over the years. From his earliest days as an independent researcher, Carpenter worked with his microscope almost daily and delighted in preparing his specimens and slides himself. Writing to Richard Owen in September 1842, the young physician informed him that he was about to present a paper in London on the microscopic structure of shells, and that he had arrived at similar conclusions about the formation of the shells to those put forward by Owen on the formation of tooth enamel. Carpenter also aimed to use his study of shell structure as a template for a new taxonomic method, in much the same way as Owen in his *Odontography* in 1840 had used the comparative study of teeth to distinguish between different fossilised remains:

> I have prepared (entirely with my own hands) about 150 specimens for the microscope; and these, being selected from the different groups of Mollusca, give, I believe, a pretty good view of the varieties which shell present in the several tribes and of their importance as characters for classification and for the recognition of fossil fragments.[392]

Carpenter's findings were presented the following year at the annual meeting of the B.A.A.S[393] and were published in December 1843.[394] This work, which was

[392] Carpenter to Owen, September 23 1841, Owen papers, Natural History Museum, London. 44NHM ALMA.
[393] British Association for the Advancement of Science. The Association subsequently awarded Carpenter grants to carry out further research in the classification of marine invertebrates during his time in Ripley.

Carpenter's first piece of original scientific investigation, won him a reputation as one of the foremost experts on microscopy and shell-structure in the country, which is presumably what the scientist was hoping to achieve so as to break away from the reputation of being a mere "compiler" of scientific knowledge, as some critics of his 1838 *Comparative Physiology* had labelled him.

Not just microscopy, but conchology itself, was somewhat of a shared passion in the Carpenter family. Though such a leisure was by no means exceptional for British middle and upper-class individuals in the mid-nineteenth century,[395] Carpenter's youngest brother developed an enduring passion for the classification of sea-shells that exceeded the mere hobby of collecting specimens for one's cabinet of curiosities. Philip Pearsall Carpenter (1819-1877) was a University College graduate who later became the minister of the Unitarian congregation of Warrington, and was known locally for being an eccentric who took a near-obsessive interest in social reform and seashells. In 1855, the young Unitarian minister learnt about a treasure-trove of unusual shells that had been collected in Mazatlàn on the Mexican Pacific coast by the Belgian naturalist Frederik Reigen and were being kept in a store in Liverpool. Due to the naturalist's premature death, the shells had remained unstudied and unclassified. Carpenter purchased the impressive fourteen tonnes of specimens for the sum of £50, and spent the rest of his life studying and classifying them.[396] Through his colossal taxonomic work, Philip Carpenter demonstrated that

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[394] W. B. Carpenter, "General Results of Microscopic Inquiries into the Minute Structure of the Skeletons of Mollusca, Crustacea, and Echinodermata," *Annals and Magazine of Natural History* 12 (1843).

[395] For a concise account of the British passion for collecting marine specimens in relation to the rise of natural history and the development of sea-side leisure activities from the eighteenth century onwards, see: H. M. Rozwadowski, *Fathoming the Ocean, The Discovery and Exploration of the Deep Sea.* (Cambridge, MA, 2005). Chapter 4, p. 99. P. F. Rehbock, "The early dredgers: 'Naturalizing' in British seas, 1830-1850.," *Journal of the History of Biology* 12.2 (1979).

[396] A full account of Carpenter's exceptional purchase can be found in his British Association report of 1856 cited in the biography put together by his brother Russel Lant Carpenter. It gives a valuable

104 shells previously thought to be species were in fact only varieties, and added 222 new species to the catalogue of known Mollusca.

William Carpenter's own son, Philip Herbert Carpenter (1852-1891), also displayed the family penchant for marine organisms and later took part in his father's oceanographic endeavours and expeditions,[397] becoming a leading figure of marine biology and conchology in his own right.

By 1844, William Carpenter was already widely known for his specialist knowledge of the structure of shells, and was approached on those grounds by Charles Darwin[398] who was seeking to find out whether a specimen of calcareous rock collected from the Chilean Pampas contained any shell fragments which would indicate traces of organic remains, so as to settle a dispute over the formation of the layer of rock surmounting the strata in which Darwin had found many fossilised remains of large mammals.[399] Carpenter willingly analysed a variety of specimens

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glimpse into how the British Museum came to acquire some of its collections at the time. Philip Pearsall's report read: "The largest collection ever brought to Europe from one locality (with the single exception of Mr. Cuming's stores) was made at Mazatlan during the years 1848-50 by a Belgian gentleman of the name of F. Reigen. (…) After his death in 1850 his collection was sent for sale, partly to Liverpool and partly to Le Havre. The Liverpool portion measured about fourteen tons of forty cubic metres each. (…) Finding that in a small manufacturing town this could not be made available for the purposes of science, I acceded to the request of Dr. Gray that it should be deposited in the British Museum. Being desirous of making it as complete as possible and finding that the original stores were in danger of being dispersed, and so rendered useless for science, I obtained possession of the remainder of the vast collection, and subjected it to renewed and more rigid scrutiny. The whole number of shells passed under review probably exceeded one hundred thousand." See:R. L. Carpenter, *Memoirs of the life and work of Philip Pearsall Carpenter, B.A., London, Ph.d., New York: chiefly derived from his letters* (London, 1880). p.141. For Philip Pearsall Carpenter's study of these shells, see: P. P. Carpenter, "Catalogue of the Collection of Mazatlan Shells in the British Museum collected by Frederick Reigen, described by Philip P. Carpenter," ed. British Museum (London, 1857), vol. 1.

[397] Philip Herbert Carpenter acted as a scientific assistant alongside his father during the pioneering oceanographic voyages aboard the *Lighting* and *Porcupine* in 1869 and 1870, and was one of the main authors of the *Challenger Report's* section on echinoderms and crinoids, published in 1884 and 1888, as will be discussed in more detail later in this section.

[398] See: J. A. Secord, *Darwin Correspondence Project*. Darwin to William Carpenter, December 6, 1844. DCP-LETT-797F. Darwin used the recommendation of Charles Lyell as an introduction to Carpenter in this letter.

[399] The question about the nature of the rock had emerged after Alcide D'Orbigny claimed in 1842, in volume 3 of his *Voyage dans l'Amérique Méridionale*, that the Pampas was formed by a sudden deposition of mud, whereas Darwin (following Lyell's uniformitarian views) was more inclined to consider it the result of a slow sedimentary process rather than a "sudden debacle" (term used by

for Darwin, and the two men corresponded intensely. In 1847, Darwin informed Carpenter that his latest letter had convinced him he should buy a microscope and that he would like to visit Carpenter to obtain his advice on the matter.[400]

By 1856, Carpenter was thus a recognised authority on microscopy, and had published an eight-hundred-page-long book explaining the technicalities, different models, and different objects of study relating to most microscopes available at the time. His hugely successful *Microscope and its Revelations,*[401] which was sold widely in America and was cited by subsequent similar works produced in France for example,[402] quickly became a major reference in the field and had reached its sixth edition by 1881. In 1855 Carpenter also became the president of the London Microscopical Society (later renamed the Royal Microscopical Society in 1870), actively campaigning –as can also be seen in the preface of his book—for a more professional microscopical culture in Britain. His educational zeal regarding the microscope led him to chide the members of the society for practising their passion as dilettantes rather than using their common interests to pool resources that could be harnessed for the benefit of scientific research.[403] In 1870, he was asked once

Darwin in his letter to Carpenter), which would have been attested by the presence or traces of sea-shells. Carpenter replied that he "feared the results would not be satisfactory to (Darwin) as not affording the evidence he desired", since he could not find any traces of calcareous or organic remains in the specimen.

[400] J. A. Secord, *Darwin Correspondence Project*. Letter from Darwin to Carpenter DCP-LETT 1050.

[401] W. B. Carpenter, *The Microscope and its Revelations*.

[402] See for example: C. Robin, *Traité du Microscope* (Paris, 1871). Robin, a Professor at the Faculty of Medicine in Paris and member of the Academy of Sciences, referred deferentially to Carpenter over a dozen times in his own work, citing his *Microscope and its Revelations* as well as Carpenter's studies of shell structure. Also in France, the populariser of science H.P. Adan refered to Carpenter as "le Docteur Carpenter, l'habile micrographe de Londres" and recommended his book alongside Robin's and the German Schachter's as one of the most important contributions to the field. See: H.-P. Adan, *Le Monde Invisible Dévoilé, Révélations du Microscope* (Paris, 1879). A few years after Carpenter published his *Microscope*, his colleague Henry Philip Gosse published a more accessible book for the non-specialised public (although Carpenter was writing for a large audience too), acknowledging his debt to Carpenter's book from which several of the illustrations used by Gosse were directly reproduced. P. H. Gosse, *Evenings at the Microscope* (London, 1859).

[403] In his presidential address to the Society, Carpenter expressed the following concerns: "Another source of the deficiency in question, appears to me to lie in the desultory mode in which a large

again to preside the Society and to find premises for it through his position at the University of London, but declined the offer citing his continuing disappointment with the Society's lack of scientific organisation:

> When I had formerly the honour of being its President, I threw out some hints as to the desirableness of doing some things to turn to good account the large amount of "Microscope power" which is at present wasted on desultory trifling. (…) Now that the Microscopical Society has been admitted among the "Royals", it seems to me more than ever needful that it should aim at a distinctly scientific character; and I should not be satisfied to occupy the Presidential Chair, without making a very considerable effort to induce its members to unite in some kind of working organisation.[404]

Correspondence also reveals that in 1861 Carpenter was asked by Lady Ashburton, the second wife of William Bingham Baring, 2nd Baron Ashburton (1799-1864), to counsel her on microscopes, and later in 1870 to buy a suitable microscope for her eleven year-old daughter.[405] These various elements clearly establish Carpenter as one of the widely recognised British authorities in microscopic work in the nineteenth century. Though this fact has not been highlighted until now, the physiologist played an important role in promoting and refining the practice of microscopic research in Britain, and it is in the context that his most celebrated work on the Foraminifera needs to be understood.

7.1.2- Foraminifera as proof of orthogenesis

a- Carpenter's *Introduction to the Study of the Foraminifera*

In 1862, Carpenter published the work that would earn him enduring fame among marine biologists up to the present day, namely his *Introduction to the Study*

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proposition of our microscopic observers apply themselves to the use of the instrument. When we contrast the products of British and of German microscopy, and see how completely inverse are the proportions between the values of the instruments employed, and of the results obtained, in the two countries respectively, we cannot but feel some shame at the low position we take." See: W. B. Carpenter, "Presidential Address," *Transactions of the Microscopical Society of London* 4 (1856).

404 Carpenter to Rvd. J.B. Reade, July 18170, Wellcome Centre Archives, MS.8723.

405 See: Ashburton papers, Royal Library of Scotland, Acc.11388.

of the Foraminifera.[406] Carpenter had begun his study of the Foraminifera, a group of extremely diverse shelled unicellular organisms (some of them microscopic), in the 1840s, prompted by his good friend the Manx marine biologist Edward Forbes (1815-1854). At the time, those marine micro-organisms were still little-studied and were the object of taxonomic debates: the French naturalist M. Dujardin classified them among the Rhizopods in 1835, while the German zoologist and microscopist Christian Ehrenberg considered them to be cilobrachiate polpys to be classified as Bryzoa. The French naturalists Henri Ducrotoy De Blainville and Alcide d'Orbigny[407] had also studied them, and it was the taxonomic classification established by D'Orbigny in particular that Carpenter's study purported to overthrow: instead of the five categories based on geometrical shape proposed by his French predecessor, Carpenter arranged the organisms according to their degree of departure from a few --or possibly a single-- original parent form(s).

Carpenter was effectively abolishing all previous distinctions between species, genera, families and orders established by D'Orbigny and De Blainville who were working within the Linnean framework, and was proposing instead a model of evolutionary taxonomy by systematically demonstrating the genetic relationship between different foraminifera throughout geological time. Carpenter was finally 'cleaning up' what he had long considered to be the counter-productive proliferation of useless taxonomic distinctions artificially created by naturalists, and which he had criticised in his discussion of species as early as 1838, as previously

[406] W. B. Carpenter, *Introduction to the Study of the Foraminifera*. Capenter was assisted in his work by two colleagues, W. K. Parker and T. Rupert Jones, who shared the same views concerning the need to reform the existing classification of the Foraminifera.
[407] D'Orbigny had extensively studied these organisms and was the one to propose the name "Foraminifera" in 1825 in his systematic classification of Cephalopods, dividing the group into five sub-orders, depending on the geometrical arrangement of the segments of shell.

mentioned. His work on the foraminifera is thus important because it stands as one of the earliest available systematic case-studies in evolutionary taxonomy:

> The ordinary notion of species as assemblages of individuals marked out from each other by definite characters that have been genetically transmitted from original prototypes similarly distinguished, is quite inapplicable to the group of Foraminifera; since even if the limits of such assemblages were extended so as to include what would elsewhere be accounted as genera, they would still be found so intimately connected by gradational links, that definite lines of demarcation could not be drawn between them.[408]

Thus, by setting out to demonstrate that the foraminifera were an excellent example of how "everything passes into everything else,"[409] Carpenter was finally laying to rest the notion of separately created species, and reforming taxonomic methodology so as to make it concord with the notion of transmutation.[410]

Carpenter's evolutionary taxonomy once again reveals his intellectual debt to Lamarck, through his choice to focus more specifically on one type of foram, the orbitolite. Indeed, one of Carpenter's main contributions to research on the foraminifera was to recognise a newly discovered organism dredged off the coast of Australia and presented to him by Forbes in 1847, as being akin to the fossil orbitolite described by Lamarck in his 1801 *Système des Animaux Sans Vertèbres*:

> I at once saw (…) the disks' very close alliance to the fossil genus *Oribitolites*, originally established by Lamarck in his *Système des Animaux sans Vertèbres*, on the basis of a well-known fossil of the Calcaire Grossier, which he placed among his "Polypiers Foraminés"

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[408] W. B. Carpenter, "Report on the Specimens of the Genus Orbitolites collected by H.M.S Challenger during the Years 1873-1876.," *Report of the Scientific Results of the Voyage of H.M.S Challenger* ed. Wyville; Murray Thomson, John, vol. 7 (London, 1883). p.8. Carpenter's Challenger report gives an excellent and detailed account of the various stages in his study of the Foraminifera between 1840 and 1883.

[409] Ibid. p. 9

[410] It is interesting to note that the same year, in 1862, Ernst Haeckel published his first extensive study of the radiolaria, in a two-volume, 500-page long work that Carpenter would later refer to as Haeckel's "magnificent work" (W. B. Carpenter, *The Microscope and its Revelations*. p. 565). Like Carpenter, Haeckel chose to use the foraminifera to illustrate the theory of evolution due to the clearness with which genealogy could be recognised in those sea-creatures. Though the two men each knew Kölliker and Müller personally, no evidence of their having corresponded or met has been found and it is likely that both their studies were produced in isolation from one another. What the parallel publication of both works seems to suggest however, is the notion that the foraminifera chosen by Carpenter as his core speciality was a deeply topical area of study, both in its relevance to the transmutation question and in its links to cell-theory, as will be explained later in this section. For an explanation of Haeckel's work, see: R. J. Richards, *The Tragic Sense of Life : Ernst Haeckel and the Struggle over Evolutionary Thought*. p.p.63-70. For the original work see: E. Haeckel, *Die Radiolaren (Rhizopoda Radiaria). Eine Monographie*, Atlas ed. (Berlin, 1862).

> between Lunulites and Millepora (…) Lamarck altered the name of this type from Orbitolites to Orbulites; but as the latter designation had been previously applied to a Molluscan genus, the original one was restored by M. Milne-Edwards, in the posthumous edition of Lamarck's great work which he edited in conjunction with M. Deshayes. Under one or other of these names, the genus was accepted by almost every systematist of repute as a Zoologist or a Palaeontologist; but no one gave any account either of the internal structure of the calcareous disk, or of the animal that forms it.[411]

Carpenter thus became an orbitolite specialist and applied himself to showing that the organism was a foram. This endeavour would become the cornerstone of his argument in favour of evolution and more importantly, of evolution directed according to a divine "plan", a concept otherwise known as orthogenesis.

Carpenter's study of the Foraminifera must also be analysed against the backdrop of cell-theory in Europe.[412] The paradigm shift brought about in the second half of the nineteenth century by the work of the German biologists Matthias Schleiden (1804-1881), Theodore Schwann (1810-1882) and Rudolf Virchow (1821-1902) amongst others needs to be taken into account when thinking about Carpenter's choice to focus on a primitive unicellular organism. It is well documented that in the wake of the discovery of the cell as the fundamental building block of biological processes, naturalists started placing new emphasis on protozoa as the key to uncovering the evolutionary origin of all other organisms as well as the development of physiological and even psychological processes.[413] I suggest that cell-theory appealed to Carpenter for two main reasons: firstly, because it elegantly supported his much-cherished notion of "unity of function" across the animal and

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411 W. B. Carpenter, "Report on the Specimens of the Genus Orbitolites collected by H.M.S Challenger during the Years 1873-1876.." p.2

412 For a quick overview of the history of cell-theory, see for example: L. Wolpert, "Evolution of the Cell Theory," *Philosophical Transactions of the Royal Society* 349.1329 (1995). M. L. Richmond, "T. H. Huxley's Criticism of German Cell Theory: An Epigenetic and Physiological Interpretation of Cell Structure," *Journal of the History of Biology* 33.2 (2000).

413 On the topic of how the formulation cell-theory encouraged many scientists to consider protozoa and amoeba as archetypes of primitive life-forms, see in particular: A. Reynolds, "Amoebae as Exemplary Cells: The Protean Nature of An Elementary Organism," ibid.41 (2008). J. Johns Schloegel and H. Schmidgen, "General Physiology, Experimental Psychology, and Evolutionism: Unicellular Organisms as Objects of Psychophysiological Research, 1877-1918," *Isis* 93.4 (2002).

vegetable world, and secondly because it offered a glimpse back to the evolutionary origins of organic life itself.

The publication of Carpenter's treatise on the Foraminifera in 1862 therefore offers significant insights into his evolutionary thinking within the context of nineteenth-century scientists' new fascination for the cell as the fundamental unit of all life. It also makes it possible to ascertain that if Carpenter had ever seriously adhered to the concept of spontaneous generation or "heterogeny[414]" as he had claimed in his review of *Vestiges* in 1844, by 1862 he had given up the notion and instead fully adhered to the theory that most organisms derived through gradual modification from common ancestors:

> No other group affords anything like the same evidence, on the one hand of the derivation of a multitude of distinguishable forms from a few primitive types, and on the other of the continuity of those types through a vast succession of geological epochs.[415]

Furthermore, Carpenter's 1862 treatise on the Foraminifera is informative due to the scientific controversy that it sparked, and that resulted in Darwin's first public comment since the publication of *The Origin of Species*. Darwin's reaction, in turn, revealed which were the exact fault-lines between evolutionists and non-evolutionists on the one hand, and more importantly, between Darwinian evolutionists and other 'brands' of evolutionists on the other.

The quarrel was initiated by the review of Carpenter's work published in the *Athenaeum* on the 28th of March 1863, in which the anonymous author, immediately identified by his colleagues as being Richard Owen, sneered at Carpenter for blindly following Darwin as his "master" and for adhering to his hypothesis of descent from a single common ancestor. Owen praised by contrast "the superiority of the Lamarckian principle of the heterogeneous production of the primitive types of

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[414] The notion of heterogeny was understood at the time to mean the generation of low organization organisms from inorganic matter, in other words, spontaneous generation.

[415] W. B. Carpenter, *Introduction to the Study of the Foraminifera*. p. 10

organisms"[416] out of primordial ooze through the combination of matter under magnetic forces. Owen's article was written in a repetitive, disjointed and at time confused style, and J.D. Hooker suggested the anatomist might have written it whilst drunk.[417] Nevertheless the piece successfully roused Carpenter whose pride was easily nettled, especially in matters of intellectual priority, and who immediately proceeded to published a much irritated reply in the Athenaeum on April the 4th 1863, affirming that he had not slavishly followed Darwin and that:

> So far is this from being the fact, that these conclusions had been arrived at by my coadjutors and myself before the publication of Mr. Darwin's 'Origin of Species,' and in utter ignorance of his views.[418]

Carpenter also vigorously opposed Owen's notion of spontaneous generation, scathingly branding his colleagues views as unscientific:

> If your reviewer prefers to suppose that new types of Foraminifera originate from time to time out of the "ooze," under the influence of "polar forces," he has, of course, a right to his opinion; though by most naturalists such "spontaneous generation" of rotalines and nummulites will be regarded as a far more "astounding hypothesis" than the one for which it is offered as a substitute. But I hold that mine is the more scientific (…)[419]

In his reply Carpenter also highlighted one of his observations which –due to its "anti-Darwinian"[420] character— was intended to prove that he was not blindly following Darwin. This observation, for which he claimed originality, was the idea he had put forward in his 1862 treatise that "there ha(d) been no advance in the foraminiferous type from the palaeozoic period to the present time" and that "however widely they diverge from each other and from their originals, *they still remain Foraminifera*". [421] Carpenter was underlining the "continuity of type" visible in the foraminifera; in other words, he was suggesting that there had been no

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416 Owen's review is quoted in F. H. Burkardt, et al., eds., *The Correspondence of Charles Darwin*, vol. 11 (Cambridge, 1999). p. 761
417 Ibid. p. 754 (letter to Darwin, 28th of March 1863)
418 W. B. Carpenter, "Dr. Carpenter and his Reviewer," *Athenaeum* (1863). p.461
419 Ibid.
420 Ibid.
421 Ibid.

transmutation of foraminifera into other types of organisms throughout the geological epochs, even possibly since the very beginning of their existence, in short, that they had not evolved as much as might have been expected.

Darwin was very disappointed by Carpenter's reaction, writing to Hooker on the 17th of April 1863 that he thought it "rather silly in Carpenter to be vexed, as he clearly was, at Owen calling me his Master"[422] and that the physiologist had wasted an opportunity of defending his ideas (and Darwin's theory) appropriately since "no one could have given a better answer"[423] than Carpenter. Admittedly, in his rather egotistical reply, Carpenter had chosen to protect his reputation rather than the theory of evolution itself, and in doing so had attempted the rather undignified split of expressing on the one hand his reservations concerning Darwin's ideas, while also claiming on the other to have been the earliest to speak of transmutation. Feeling weakened –if not betrayed-- by Carpenter, Darwin resorted to the unusual tactic (which he later regretted) of responding in the *Athenaeum* with a letter of his own "to say, under the cloak of attacking heterogeny, a word in my own defence"[424] and taking "sly advantage to quote Lyell's *amended* verdict on the *Origin.*"[425]

In this letter, Darwin --like Carpenter-- rejected Owen's notion that new organisms were constantly being produced out of "slimy ooze", taking a swipe at his adversary by suggesting that "a mass of mud with matter decaying and undergoing complex chemical changes is a fine hiding-place for obscurity of ideas."[426] However, the notion that Darwin most strongly set out to oppose in his reply was not so much Owen's largely incoherent protest, as Carpenter's own hint that the lack

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422 J. A. Secord, *Darwin Correspondence Project*. DCP-LETT-4103
423 Ibid.
424 Ibid.
425 See letter from Darwin to Asa Gray, 20th of April 1863, in which he described the same incident as well as the motives behind his reply in the Athenaeum. Ibid. DCP-LETT 4110 (italics original).
426 C. Darwin, "The doctrine of heterogeny and modification of species," *Athenaeum* (1863).

of transformation visible in the foraminifera somehow weakened Darwin's theory:

> Dr. Carpenter seems to think that the fact of Foraminifera not having advanced in organization from an extremely remote epoch to the present day is a strong objection to the views maintained by me. But this objection is grounded on the belief—the prevalence of which seems due to the well-known doctrine of Lamarck—that there is some necessary law of advancement, against which view I have often protested. Animals may even become degraded, if their simplified structure remains well fitted for their habits of life, as we see in certain parasitic crustaceans. I have attempted to show ('Origin,' 3rd edit. p. 135) that lowly-organized animals are best fitted for humble places in the economy of nature; that an infusorial animalcule or an intestinal worm, for instance, would not be benefited by acquiring a highly complex structure. Therefore, it does not seem to me an objection of any force that certain groups of animals, such as the Foraminifera, have not advanced in organization. Why certain whole classes, or certain numbers of a class, have advanced and others have not, we cannot even conjecture. But as we do not know under what forms or how life originated in this world, it would be rash to assert that even such lowly endowed animals as the Foraminifera, with their beautiful shells as figured by Dr. Carpenter, have not in any degree advanced in organization.[427]

Darwin's response is important because it pinpoints the distinction between his own theory, and Carpenter's vision of the evolutionary process. Whereas Darwin insisted on the ability to mutate of populations which –if pressed by their environment-- could become more complex or on the contrary less developed over successive generations, Carpenter retained the postulate of a necessary teleological progression towards ever greater sophistication. Thus the public debate in the *Athenaeum* over Carpenter's *Introduction to the Study of the Foraminifera* revealed Carpenter's opinion --which he would stand by until his death – that evolution was a guided process advancing, step by step, towards ever greater sophistication.[428]

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[427] Ibid.

[428] Carpenter's unwavering support for divinely directed evolution is evidenced in his essay entitled 'Darwinism in England' written and published in 1881 in an Italian journal named *Il Barth* (Carpenter was on an oceanographic cruise in the Mediterranean when he wrote the text) and reproduced in full in his son's biographical sketch, pages 105-113. Carpenter wrote: "(…) but it cannot be justly said that the variations which these present are "spontaneous". Every effect requires a cause. Natural Selection is assuredly not that cause, since its effect is only to perpetuate, among varietal forms, that which best suits the conditions of existence. (…) That the "accidents" of Natural Selection should have produced that orderly succession is to my mind inconceivable; I cannot but believe that its evolution was part of the original Creative Design; and that the operation of Natural Selection has been simply to limit the survivorship (…) to those which were suited to maintain that existence at each period." See: J. E. Carpenter, "Memorial Sketch." p. 110

b-Orthogenesis according to Carpenter.

Though other scientists, such as Carpenter, had already put forward the idea of divinely directed evolution, the term "orthogenesis" was coined in the late 1890s by the German scientist Wilhelm Haacke and popularized by the Tübingen naturalist Theodor Eimer.[429] The concept, as understood and presented by Eimer, stipulated that non-adaptive features in animals (such as certain colourings and markings for example) could not be accounted for by the mechanism of natural selection, and that the notion of organisms as fortuitously adapted to their surroundings was erroneous. In particular, paleontological evidence of linear continuity without much modification over long geological periods appeared to furnish proof that evolution was less the result of random variations subsequently selected by the environment, than the consistent unfolding through gradual incremental modifications of a predetermined master-plan.

Peter J. Bowler, in his studies of the non-Darwinian alternatives to evolution being proposed at the end of the nineteenth century, has noted that in the case of Theodor Eimer "the expectation that nature ought to exhibit a regular pattern of development seems to represent the last phase in the influence of the old idealist worldview of *Naturphilosophie*."[430] Considering Carpenter's early intellectual allegiance to German idealist biology, the observation proposed by Bowler seems equally applicable to him, since he continued until the end of his life to speak in terms of unity or harmony of plan, and to present an evolutionary model which involved a hierarchical progression from simplicity to complexity, and from "lower" forms to "higher" forms. . Carpenter's understanding of orthogenesis is most clearly

[429] See: P. J. Bowler, "Theodor Eimer and Orthogenesis: Evolution by 'Definitely Directed Variation'," *Journal of the HIstory of Medicine* 34.1 (1979). And: T. Eimer, *On Orthogenesis and the Impotence of Natural Selection in Species-Formation*, trans. McCormack Thomas (Chicago, 1898).

[430] P. J. Bowler, "Theodor Eimer and Orthogenesis: Evolution by 'Definitely Directed Variation'." p. 72

expressed in his 1883 *Researches on the Foraminifera, a Supplemental Memoir*[431] and his 1884 essay on *The Argument from Design in the Organic World, Reconsidered in its Relation to the Doctrines of Evolution and Natural Selection*[432]. The latter fifty-page-long article yields one of the clearest accounts of Carpenter's belief in directed evolution.

Carpenter's teleological model had little room to accommodate Darwin's concept of organisms opportunistically (though fortuitously) filling vacuums in nature, as well as that of organisms having the ability to 'regress' in terms of physical development or abilities. According to Carpenter, evidence of intelligent design lay in the very tendency of organisms to vary indefinitely, since this ability for variation, as well as the variations themselves, were the manifestations of the will of a higher power. Carpenter accepted natural selection as a blind mechanism without difficulty, because the notion as such did not remove the possibility of teleological development: in his view, natural selection was merely a secondary stage in the process, a mechanism that enabled the original design to become realised. The divine agency resided in controlling the direction taken by a species by imposing the initial variations:

> But to me it seems that Professor Huxley and his followers (…) have entirely overlooked the consideration that, before Natural Selection among varietal forms could come into operation, there must have been varieties to select from, --that for the "fittest" to have survived, they must have *come to possess* the structure that made them the fittest.[433]

Thus, intelligent design was still at work, but it was one step removed from the organism itself, and was to be found in the general law making the variations amongst organisms possible rather than in any 'Paleyite' design of the beings

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[431] W. B. Carpenter, "Researches on the Foraminifera. Supplemental Memoir. On an Abyssal Type of the Genus Orbitolites; a Study in the Theory of Descent," *Proceedings of the Royal Society of London (1854-1905)* 35 (1883).

[432] W. B. Carpenter, "The Argument from Design in the Organic World, Reconsidered in its Relation to the Doctrines of Evolution and Natural Selection," *The Modern Review* (1884).

[433] Ibid.p. 436 (italics original)

themselves. This new understanding of intelligent design "transferr(ed) the idea of that Design from the particular to the general, making all the special cases of adaptation the foreknown results of the adoption of that general Order which we call Law.[434]" Carpenter also made sure to remind his readers that "in his later years, Mr. Darwin showed himself quite willing to admit (…) the causes of variation as at present the greatest problem of biological science[435]". Thus, the notion of "intelligent design" simply "need(ed) to be reconstructed under the new light of the Evolution-doctrine by those who (like himself) maintain(ed) it to be still tenable[436]".

In Carpenter's opinion, some of the organisms that seemed to point to this teleological evolution most strongly, were birds. Though by 1884 Carpenter stated as most probable that there was a single common ancestor rather than several initial ancestors for all animals[437], he still struggled to accept that birds may have been descended from reptiles merely through "aimless variations", because there was such a wide gap between a feather and a reptilian scale, and between a three-chambered heart and a four-chambered heart. At a loss to explain such a dramatic transformation purely through the process of Natural Selection, Carpenter affirmed that "nothing but intentional pre-arrangement (was) competent to bring about such a result."[438] However, not being an ornithologist himself, Carpenter proposed to illustrate the process of orthogenesis through a close exposition of the foraminifera as "evidence of such pre-arrangement furnished by the *orderly sequence of variations following definite lines of advance*".[439]

Carpenter's particular emphasis on Orbitolites makes sense when placed in

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[434] Ibid. p. 463
[435] Ibid. p. 436
[436] Ibid. p. 431
[437] Ibid. p. 434
[438] Ibid. p. 445
[439] Ibid. p. 445 (italics original)

the context of his adherence to the principle of orthogenesis, because of their relative stability as a type, and because of their modifications in what appeared to be gradual, rational stages towards ever more complex forms. Carpenter was especially interested in the *Orbitolites Complanata* because they appeared to him to represent the pinnacle of sophistication amongst all foraminifera, having attained a state of quasi-perfect circular shape and cyclical growth, as shown on the illustration below taken from Carpenter's 1862 *Treatise*.

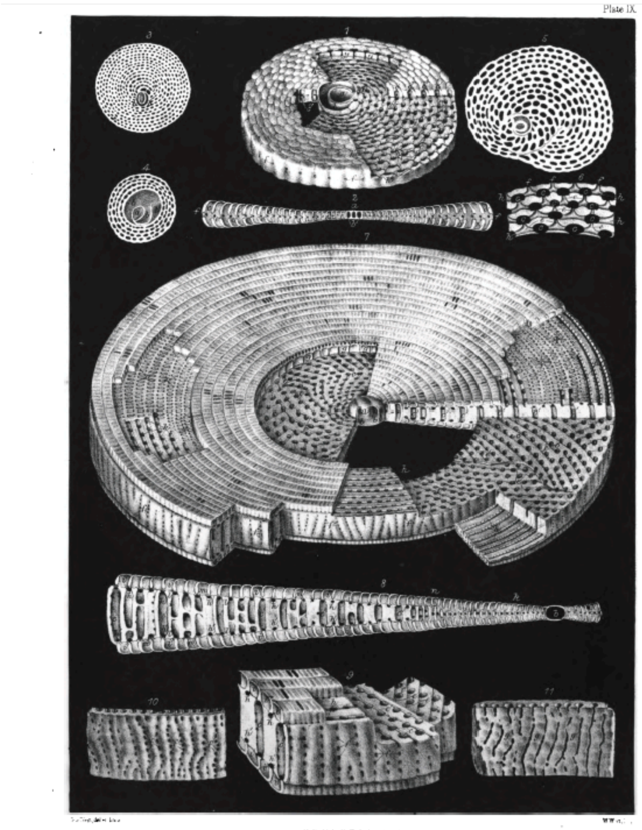

Figure 2: Wood engraving of the Orbitolite, in the *Introduction to the Study of the Foraminifera*, 1862, Appendix, plate IX.

This foram was especially dear to Carpenter, because the organism's structure appeared to him to encapsulate the entire history of the species by encompassing the various stages of development at which other types of foraminifera seemed arrested. It also seemed to him that its shape and pattern of growth started off like that of the simplest types of spiral forams, before changing into a circular growth-plan in the arrangement of the various "chamberlets" around the centre. Describing this particular shell in his 1883 *Supplementary Memoir on the Foraminifera*, Carpenter explained how its development could be understood to summarise the history of the entire group:

> Thus by the combined study of *O. tenuissima* and of sub-typical examples of *O. complanata*, we are enabled to work out the whole evolutionary history of the Orbitoline type, from its simplest to its most complex form. For there can, I think, be no reasonable doubt, that the succession here presented to us in the consecutive phases of two lives, has been the genetic history of this type; which, originating in the simplest "jelly-speck" that could form a shelly chamber, first assumed the form of a spirally-coiled undivided tube (*Cornuspira*, fig. VII); then of a spire interrupted at intervals by imperfect partitions (*Spiroloculina*, 2); then of a flattened spire crossed by complete septa traversed by stolon-passages (*Peneroplis,* 3); then of a progressively widening spire, whose chambers are divided into chamberlets (*Orbiculina*, 4); then of a chamberletted disk of one storey, commencing as an orbiculine spire, but subsequently increasing by annular additions (*Orbitolites tenuissima* and *O. Marginalis,* 5); then of a chamberletted disk whose origin still shows in its light eccentricity a trace of the primordial spire, and whose single story has, so to speak, two rows of windows (*Orbitolites duxplex*,6); and lastly, of a "complex" disk, whose growth is cyclical from the beginning, and whose upper and lower superficial planes are separated by the interposition of an intermediate columnar structure between the duplicated annular stolons (*Orbilotiles complanata,* 7). This last would seem to be the culmination of the type, which, while attaining a considerable size, has never shown so far as is at present known, any tendency to pass into a higher form.[440]

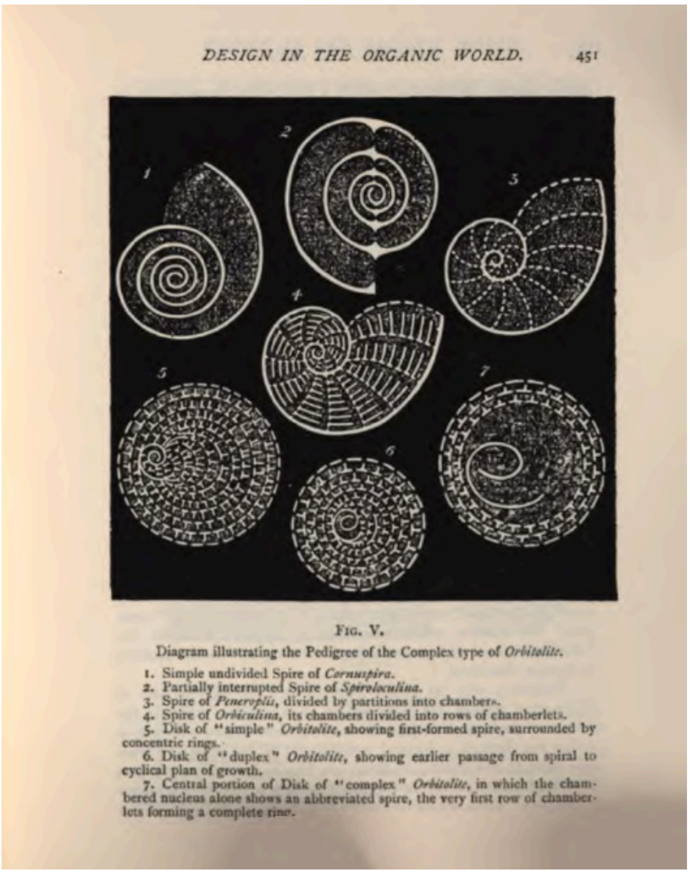
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FIG. V.

Diagram illustrating the Pedigree of the Complex type of *Orbitolite*.

1. Simple undivided Spire of *Cornuspira*.
2. Partially interrupted Spire of *Spiroloculina*.
3. Spire of *Peneroplis*, divided by partitions into chambers.
4. Spire of *Orbiculina*, its chambers divided into rows of chamberlets.
5. Disk of "simple" *Orbitolite*, showing first-formed spire, surrounded by concentric rings.
6. Disk of "duplex" *Orbitolite*, showing earlier passage from spiral to cyclical plan of growth.
7. Central portion of Disk of "complex" *Orbitolite*, in which the chambered nucleus alone shows an abbreviated spire, the very first row of chamberlets forming a complete ring.

Figure 3: The Pedigree of the Complex type of Orbitolite, in Carpenter, *The Argument of Design in the Organic World*, 1884, p.451.

[440] W. B. Carpenter, "Researches on the Foraminifera. Supplemental Memoir. On an Abyssal Type of the Genus Orbitolites; a Study in the Theory of Descent." pp. 567-68

The ‘recapitulative’ anatomy of the Orbitolite, whose ontogeny seemed to express its phylogeny[441], therefore appeared to Carpenter as living proof of Von Baer’s law of progressive specialisation of organisms. What is more, the regularity of the pattern observable in the gradual development of the *Orbitolite Complanata’s* shell, seemed in itself to illustrate the notion of a rational plan as opposed to the haphazard result of chance mutations:

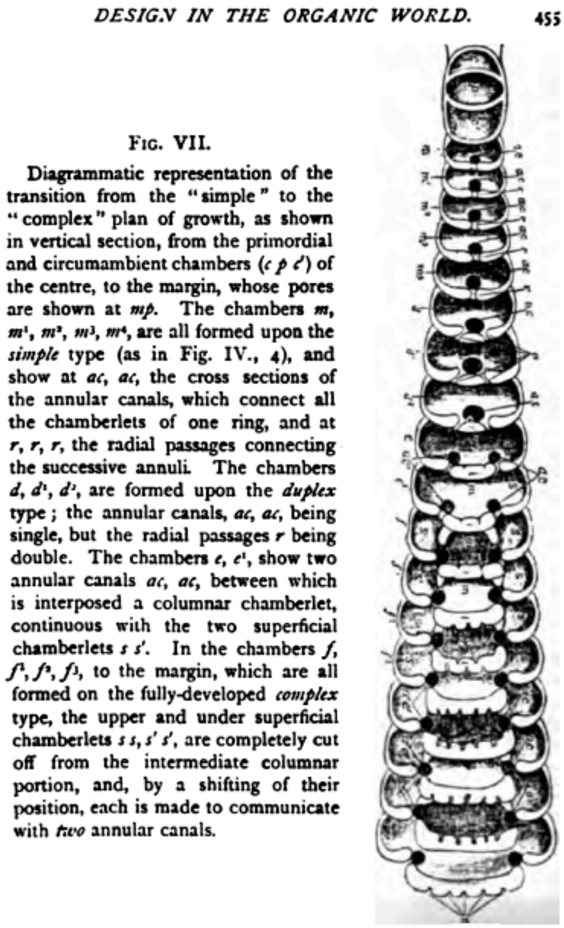

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FIG. VII.

Diagrammatic representation of the transition from the "simple" to the "complex" plan of growth, as shown in vertical section, from the primordial and circumambient chambers (*c p c'*) of the centre, to the margin, whose pores are shown at *mp*. The chambers *m*, m^1, m^2, m^3, m^4, are all formed upon the *simple* type (as in Fig. IV., 4), and show at *ac*, *ac*, the cross sections of the annular canals, which connect all the chamberlets of one ring, and at *r*, *r*, *r*, the radial passages connecting the successive annuli. The chambers *d*, d^1, d^2, are formed upon the *duplex* type; the annular canals, *ac*, *ac*, being single, but the radial passages *r* being double. The chambers *e*, e^1, show two annular canals *ac*, *ac*, between which is interposed a columnar chamberlet, continuous with the two superficial chamberlets *s s'*. In the chambers *f*, f^1, f^2, f^3, to the margin, which are all formed on the fully-developed *complex* type, the upper and under superficial chamberlets *s s*, *s' s'*, are completely cut off from the intermediate columnar portion, and, by a shifting of their position, each is made to communicate with *two* annular canals.

Figure 4: Diagrammatic representation of the transition from the “simple” to the “complex” plan of growth, in Carpenter, *The Argument of Design in the Organic World*, 1884, p.455

Carpenter also put forward another important argument to bolster the case of orthogenesis, namely the fact that there seemed to be no environmental pressure justifying the appearance of new, more complex, anatomical features in orbitolites.

[441] It appears that though Carpenter had always promoted Von Baer’s law of gradual specialisation, he seemed tempted by a recapitulative interpretation of the development of orbitolites more consistent with the “Meckel-Serres” law for example.

In other words, there was no explanation (in strictly Darwinian terms) for the gradual derivation of forms from one another since the environment was not exerting a selective pressure on them. Indeed, in the case of the orbitolites, the new forms existed in the same exact conditions as their parent forms and did not seem to have a distinct function or mode of existence to those they were descended from. Therefore, in the absence of any clear adaptive justification for their existence, Carpenter concluded that their reason for being was the unfolding of a divine plan of increasing complexity, whose laws and purpose were as yet unknown to scientists:

> And as all these earlier forms still flourish under conditions which (so far as can be ascertained) are precisely the same, there is no ground to believe that any one of them is better fitted to survive than another. They all imbibe their nourishment in the same mode; and no one type have more power of going in search of it than another. That they are all dependent on essentially the same conditions of temperature and depth of water, is shown by their occurrence in the same marine areas. That they all equally serve as food to larger Marine Animals, can scarcely bed doubted; and it is hardly conceivable that any of their devourers would discriminate (for example) between the disks of a large *O. marginalis* a middle-sized *O. duplex*, and a small *O. complanata*, which even the trained eye of the Naturalist cannot distinguish without the assistance of a magnifying glass. To me, therefore, it appears that the doctrine of "natural selection" can give no account of either the origin or the perpetuation of those several types of Foraminiferal structure which form the ascending series that culminates in *Orbitolites complanata*. On the other hand, there seems traceable throughout that series a plan so definite and obvious, as to exclude the notion of "casual" or "aimless" variation. (…) Everything in this history, then, shows *a well-marked progressive tendency along a definite line towards a highly specialised type of structure in the Calcareous fabri*c; and this without any corresponding departure from the original homogeneity of the Animal body which forms that fabric. And being, so far as I know, altogether unique in these peculiarities, I venture to offer this study of a humble protoplasmic organism (…) to the consideration of those who believe with Sir James Paget, that "the highest laws of our biological science are expressed in the simplest terms in the lives of the lowest orders of Creation"[442].

Such was Carpenter's understanding of evolution: though he accepted the mechanisms proposed by Darwin, the metaphysical interpretation he derived from them was entirely different. The apparent gratuitousness of the diversity, complexity and beauty of the minute creatures he was studying could not but point to a divine intention, in his opinion. Until his death he argued in favour of a shift in emphasis away from natural selection and in search of what he considered to be the true factor

[442] W. B. Carpenter, "Researches on the Foraminifera. Supplemental Memoir. On an Abyssal Type of the Genus Orbitolites; a Study in the Theory of Descent." pp. 570-71 (Italics original)

at the root of the process, in other words, a divine force impressing its laws on living matter so as to orchestrate the unfolding of its preconceived divine plan.

c- The ‘Eozoön Canadense’ debate as proof of Carpenter’s lifelong adherence to the notion of orthogenesis.

One particular episode illustrates the fervour with which Carpenter defended this interpretation of the evolutionary process: the Eozoön Canadense (or “Dawn Animal of Canada”) debate --in which Carpenter’s scientific credibility was seriously put to the test. The controversy in which Carpenter was involved for several years reveals to what extent the physiologist was attached to demonstrating the validity of his own understanding of evolution.[443] In 1858, what was thought to be the fossilised remains of a very large and primitive rhizopod --due to the alternation of concentric layers of siliceous and calcareous rock-- were discovered in the pre-Cambrian limestone beds of the Ottawa river by a member of the Geological Survey of Canada. Four years later, the specimen along with other similar examples found in limestone in Ontario, were brought to England by Sir William Logan, the director of the Survey. Another two years later, when further specimens were discovered in the Grenville limestone near Ottawa, microscope slices were prepared and sent to J. William Dawson, the principal of McGill university, a geologist and friend of Charles Lyell who announced the organic nature of the ‘fossils’ which he identified as being giant foraminifera.

Carpenter who by then had published his monograph on the foraminifera and had become the worldwide authority on the subject, was asked to confirm Dawson’s

[443]For a full account of the Eozoön controversy, see: C. F. O'Brien, "Eozoön Canadense "The Dawn Animal of Canada"," *Isis* 61.2 (1970). See also: M. Brasier, *Secret Chambers : the Inside Story of Cells and Complex Life*. p. 151

analysis. Carpenter supported the view that the fossils were of organic origin and was very excited to find what appeared not only to be evidence of a continuity in the structure of foraminifera across a long time-span (thus backing his hypothesis of orthogenesis), but also evidence of an even earlier-than-assumed apparition of primitive life on earth, which further consolidated the theory of evolution as a whole[444]. However, a controversy soon ensued, stoked by two Irish geologists from Queen's College, Galway,[445] who opposed Dawson and Carpenter's conclusions and insisted that the specimens were in reality a mere geological artefact caused by the metamorphic processes undergone by that particular type of rock.[446]

The controversy lasted until the end of the 1890s (outliving both Dawson and Carpenter) and was settled in favour of the mineral rather than organic explanation. What is significant about this debate however, is the way in which Carpenter did not re-examine his position for more than twenty years during which he actively corresponded and published on the subject, vehemently responding to articles by the two Irish geologists[447] and offering new analogies based on the study of other foraminifera under the microscope. When Carpenter died in 1885, he was still working on an unpublished monograph on the Eozoön. Though this work was never completed or published, its very existence[448] demonstrates to what extent the possibility of continuity in the pattern of foraminifera shells mattered to the scientist until the end of his life.

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444 Darwin himself was pleased by the discovery, and integrated Carpenter's analysis of the Eozoön as being a giant foram in his fourth edition of the *Origin* (p. 287), since the expanded time-scale of the evolutionary process suggested by the discovery knocked down some of the arguments against his theory. See: C. F. O'Brien, "Eozoön Canadense "The Dawn Animal of Canada"." p. 216

445 William King and Thomas H. Rowney.

446 The fact that Eozoön "fossils" were only ever found (including in Europe, in Bavaria) in highly metamorphic layers of rock, was the cornerstone of the two geologists' non-organic hypothesis.

447 See for example: W. B. Carpenter, "Final Note on Eozoon canadense by Willam B. Carpenter, M.D, LL.D, F.R.S," *Annals and Magazine of Natural History*.October 17 (1874).

448 Mentioned in many items of correspondence over a period of years, and by Carpenter's son after his death.

Carpenter's study of the Foraminifera must therefore be reconsidered by scholars as one of his most central and most meaningful endeavours, rather than –as has been the case until now in historical accounts of the physiologist's career—as a mere exercise in experimental science that did not break any major scientific ground and that mainly served the purpose of gaining Carpenter his professional credentials. Instead of being sidelined, Carpenter's life-long work on the foraminifera must be understood as a cornerstone of his metaphysical interpretation of the process of evolution.

7.2- Carpenter and the emergence of the science of oceanography

Another significant and often overlooked aspect of Carpenter's career is his long-standing involvement in marine zoology and his pivotal role in setting up the scientific expeditions now considered to have institutionalised the science of oceanography, most notably the 1872 *Challenger* expedition. Carpenter's influence and activity in this area of scientific research as "one of the most active promoters of ocean science in Britain"[449] need to be highlighted, because they further demonstrate how central the evolutionary question was for Carpenter among his many other intellectual and professional engagements. Indeed, as will be explained, much of the effort invested by Carpenter into the practice of marine biology over a period of several decades was aimed at uncovering evidence that could back up the evolutionary hypothesis from the point of view of the study of the foraminifera. Through searching for those specimens, Carpenter weighed in on several debates surrounding the study of the oceans at the time, most notably about the depth of the oceans and about the oceanic circulation.

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[449] H. M. Rozwadowski, *Fathoming the Ocean, The Discovery and Exploration of the Deep Sea.* p. 144

Carpenter's interest in marine organisms was first kindled during his time at the University of Edinburgh where he met the Manx naturalist Edward Forbes, who would become famous for his pioneering stratigraphic study of marine fauna[450] and for his expertise on dredging, a skill he had learnt from fishermen on the isle of Man as a young boy. Carpenter's friendship with Forbes, as well as the dredging excursions he was almost certainly invited to join while at University[451] probably played an important role in fostering his passion for the ocean. It is also likely that Carpenter's journey to the West Indies as a companion to the Bristol eye-surgeon John Bishop Estlin in 1833, had sealed his predilection for sailing.

In 1855 Carpenter sojourned on the West coast of Scotland, at Arran, and amused himself with collecting samples of marine invertebrates. Astonished by the richness of the specimens he collected through dredging in Lamlash Bay, Carpenter presented his findings (in particular those of crinoids) at the Glasgow meeting of the B.A.A.S in 1855 and wrote to T.H. Huxley suggesting the project of an observation station for marine zoologists that would be based in the same location. Correspondence between the two men[452] reveals Carpenter's very great enthusiasm for the scheme, which he also mentioned to the German naturalists Albert von Kölliker and Johannes Müller, apparently gaining their support. The project imagined by Carpenter and Huxley involved renting a house near Lamlash Bay, which would be able to host scientists and their families for several months a year, as well as a vivarium of marine specimens (in particular echinoderms). Carpenter hoped to have the project sponsored by the Geological Survey (as part of a

450 See in particular: E. Forbes, *The Natural History of European Seas* (London, 1859).

451 Philip Rehbock and Helen Rozwadowski have both noted the importance of scientists such as Robert Grant at Edinburgh University in promoting the practice of scientific dredging in the 1830s. See for instance: H. M. Rozwadowski, *Fathoming the Ocean, The Discovery and Exploration of the Deep Sea.* Chapter 5.

452 This correspondence can be found in the Thomas Henry Huxley Collection, Imperial College, Scientific and General Correspondence, Box 12, Section c1.

zoological survey of the British coastline) as well as by the B.A.A.S. Later correspondence reveals that the scheme did indeed go ahead as intended (a suitable house was found on Holy Island) and that Kölliker came to dredge with Carpenter on at least one occasion. The mention of Müller and Kölliker in Carpenter's correspondence is extremely significant, as it illustrates to what extent the young scientist was integrated within an international network comprised of the most renowned physiologists and marine zoologists of the time.[453]

The pivotal role played by Carpenter in organising official scientific missions to study the sea provides further evidence of his central place within the international community of marine zoologists. Charles Wyville Thomson is the name most often remembered in association with British scientific exploration of the deep-seas and with the l872 Challenger expedition in particular. The *HMS Challenger* expedition (1872-1876), famous for having discovered the mid-Atlantic Ridge and sounded the record depth of the Mariana Trench (or Challenger Deep) for the first time, is usually seen as marking the beginning of the organised science of oceanography, and remains to this day one of the most fruitful oceanographic expeditions ever undertaken due to the colossal amount of samples collected and new species catalogued. The fifty-volumes, 29 552-pages-long *Challenger Report*, which took nineteen years to complete, is still studied nowadays by zoologists.[454]

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[453] For a presentation of the significance of Müller and Kölliker's work, see in particular: R. J. Richards, *The Tragic Sense of Life : Ernst Haeckel and the Struggle over Evolutionary Thought*. p. 293

[454] For detailed accounts of the expedition, see the following works: T. Rice, M. Deacon, and C. Summerhayes, eds., *Understanding the Oceans: a Century of Ocean Exploration* (Abingdon, 2003), P. F. Rehbock, ed., *The Challenger Letters of Joseph Matkin* (Honolulu, 1992), H. M. Rozwadowski, *Fathoming the Ocean, The Discovery and Exploration of the Deep Sea.* H. S. Bailey, "The Background of the Challenger Expedition: The Men, Ideas, and Events that led to the Beginning of Modern Oceanography," *American Scientist* 60.5 (1972). M. Deacon, *Scientists and the Sea, 1650-1900 : a Study of Marine Science* (London, 1971). W. B. Carpenter, "The Voyage of HMS Challenger," ed. For private circulation only (London, 1875), vol, C. W. Thomson, ed., *Report of the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76.* (London, 1889).

Though Thomson is acknowledged for having led the expedition, Carpenter's name is seldom remembered in association with the project. Yet, Carpenter, due to his central importance within the most prestigious intellectual institutions of the time, was arguably the person who was most responsible for securing the consent of the government and admiralty to set up the expedition. Working closely with Thomson, Carpenter acted upon his friend's scientific suggestions and was the one who set the institutional wheels in motion. As a prominent member of the Council of the Royal Society and of the Council of the Athenaeum, he was able to gain the support of the Royal Society itself, as well as of the Prime Minister William Gladstone and of his Chancellor of the Exchequer Robert Lowe, whom he regularly met in person both at the Athenaeum and at the Metaphysical Society.[455] The annals of the Philosophical Dining Club of the Royal Society also show that Carpenter's good friend Carl Siemens (also known as Charles William Siemens, 1823-1883) was invited as an honorary member on several occasions to discuss the technicalities of dredging missions, and was later included in the committee set up by the Royal Society to plan the scientific instrumentation ahead of oceanographic voyages.

One of the main arguments wielded by Carpenter both privately and publicly --such as in the lecture he delivered at the Royal Institution in the summer of 1871— was that Britain's sea-faring honour was at stake if the study of the oceans was not made a priority, because scientific cruises were being organised in the world's

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455 Harold Burstyn has highlighted Carpenter's crucial role as a mediator in the following study: H. L. Burstyn, "'Big Science' in Victorian Britain. The Challenger Expedition (1872-6) and its Report (1881-95)," *Understanding the Oceans: a Century of Ocean Exploration*, ed. Tony; Deacon Rice, Margaret; Summerhayes, Colin (Abingdon, 2003).Carpenter's letters to General Edward Sabine, then President of the Royal Society (Royal Society Archives), as well as his relentless interest in the topic which appears clearly in the minutes of the Philosophical Club of the Royal Society, further demonstrate the extent of his involvement. See: T. G. Bonney, ed., *Annals of the Philosophical Club of the Royal Society*.

oceans by the United States, Germany, and Norway more particularly[456], amidst fierce industrial competition in the field of telecommunications. Letters exchanged between Carpenter and Alexander Agassiz, reveal Carpenter's close knowledge of the scientific and engineering goals being set by American scientists and officials, and further demonstrate his role as a scientific coordinator and political mediator both within international scientific networks and governmental structures in London.[457]

Carpenter's campaigning resulted in several preliminary oceanographic missions set up from 1868 onwards, using Royal Navy ships. These endeavours in turn facilitated the organisation of the 1872 *Challenger* expedition. Thomson and Carpenter thus sailed aboard *HMS Lightning* to the Faroe Islands in August 1868, and a similar expedition was mounted the following year aboard the survey ship *HMS Porcupine* (first to the Shetland Islands, and then to the Mediterranean). In 1871, Carpenter embarked again aboard HMS *Shearwater* to the Strait of Gibraltar and Malta. During all three expeditions, Carpenter concentrated on temperature measurements for his new theory on global oceanic circulation[458], delegating part of his zoological interests to his son Philip Herbert Carpenter (1852-1891)-- marine

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[456] In 1864 the Norwegian government commissioned a dredging mission around the coast as part of a survey of fisheries, led by the scientist Michael Sars (1805-1869) and his son, George Ossian Sars (1837-1927).

[457] The Ernst Mayr Library at Harvard University holds five letters sent by Carpenter to Alexander Agassiz (1835-1910, the Harvard professor and son of the famous Swizz geologist and ichthyologist Louis Agassiz) between 1869 and 1883. The letters reveal that Carpenter was turning to Agassiz for advice, especially concerning adequate techniques for measuring water temperature at great depths. The two men probably met in 1882, during Carpenter's tour of North America, as indicated by Carpenter's letter to Agassiz dated from the 24th of October 1882.

[458] Carpenter published several papers on oceanographic circulation from 1869 onwards. See for instance: W. B. Carpenter, *Further Inquiries on Oceanic Circulation*, From the proceedings of the Royal Geographical Society, vol XVIII, 4, 1874 (London, 1874).

zoologist and Science Master at Eton-- who was a member of all three expeditions.[459]

One of Carpenter and Thomson's main lines of enquiry in planning their missions was the subject of the depths of the ocean; little was yet known about the true depths of the seabed around the globe, and in particular, about how much life existed beyond the three-hundred fathom limit posited by Edward Forbes in his famous azoïc theory.[460] The laying and maintenance of telegraphic cables --an activity and industry which played a large part in spurring the development of oceanography as a science in its own right—was already pointing towards the existence of marine life at much greater depths than previously assumed, and Carpenter and his colleagues were convinced that the oceans were teeming with life even in their more forbidding recesses.

Carpenter and T. H. Huxley –another central actor in those ventures-- also continued to pursue their personal scientific agendas: Carpenter aimed to find any unknown forms of foraminifera that could strengthen his theory of orthogenesis and throw extra light on the Eozoön question. Huxley was particularly interested in finding evidence that could help him weigh in on the question of spontaneous generation of organisms from an alleged protoplasmic substance found on the sea-bed.[461] These subjects of enquiry show how central the exploration of the deep sea

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[459] Philip Herbert Carpenter later contributed to the *Challenger Report* by writing on the topic of the comatulae, a crinoid (a type of echinoderm, commonly referred to as a feather star).

[460] In 1842 Edward Forbes had sailed aboard H.M.S Beacon in the Eastern Mediterranean and studied the distribution of marine animals in the Aegean. His findings had led him to postulate that pressure and lack of luminosity made it impossible for life to survive beyond a depth of 300 fathoms. Many scientists subsequently turned Forbes's theory into somewhat of a dogma. See: M. Deacon, *Scientists and the Sea, 1650-1900 : a Study of Marine Science*. p. 281. Carpenter and Thomson tackled this postulate in several publications. See for example: C. W. Thomson, *The Depths of the Sea* (London, 1873).

[461] In 1868 T.H. Huxley had examined a gelatinous substance collected from the seabed by H.M.S Cyclops in 1857, and was convinced he had discovered a form of protoplasm, which he named Bathybius Haeckelii. During his subsequent participation in the dredging missions organised by Carpenter and Thomson, he was determined to replicate his findings of this supposed organic

remained to nineteenth-century debates on the origin and development of life on the planet. All in all, between 1868 and 1880, Carpenter published at least fourty-nine articles relating either to the physical conditions of the deep sea or to marine zoology[462], all the while giving an unprecedented thrust to what has become recognised as a key period in the history of British marine biology. His zeal in promoting that area of science testify to his passionate interest in the origin of life on Earth and to his lifelong dedication to the study of the foraminifera.

Conclusion to Part II: a scientific synthesis

This section has demonstrated that from the beginning of his scientific career, William Carpenter was one of the thinkers in Britain most actively involved in promoting a philosophical and epistemological reform of the biological sciences. Carpenter as a young man was deeply influenced by ideas borrowed from naturalists on the continent, and though he did not openly refer to Lamarck's evolutionary theories until after the publication of *Vestiges* in 1844, his many oblique references to the French naturalist's work in his earlier publications prove that he had read

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substance, which was ultimately proved by Buchanan aboard the *Challenger* to be nothing more than a chemical reaction (a precipitation of calcium sulphate when mixed with the alcoholic preservative). This put to rest all speculations on the Bathybius substance as being able to cause spontaneous generation. In addition to the Bathybius question, Carpenter and Huxley were also intent on solving the 'Globigerina Ooze' controversy: it was generally assumed that the species of Globigerina foraminifera, whose dead bodies formed a blanked of slime on the sea floor, lived close to the surface of the water. However, Carpenter believed that the species lived at much greater depths and was intent on proving this point. It was nevertheless revealed during the Challenger expedition that the Globigerina did indeed live in shallow waters, as initially suspected by most scientists.

[462] See the following (non-exhaustive) examples: W. B. Carpenter, *Preliminary Report of Dredging Operations in Seas to the North of the British Islands, carried out by Dr. Carpenter and Dr. Wyville Thomson.* (London: Royal Society, 1868). W. B. Carpenter, "On the Temperature and Animal Life of the Deep Sea," *Proceedings of the Royal Society of London (1854-1905)* June 17 (1869). W. B. Carpenter, "On the Rhizopodal Fauna of de Deep Sea " *Proceedings of the Royal Society of London (1854-1905)* June 17 (1869). W. B. Carpenter, "Preliminary Report of the Scientific Exploration of the Deep Sea in HMS Surveying Vessel Porcupine, during the summer of 1869, conducted by Dr. Carpenter, VPRS, Mr J. Gwyn Jeffreys, FRS, and Professor Wyville Thomson, LLD, FRS " *Proceedings of the Royal Society of London (1854-1905)* November (1869). W. B. Carpenter, "The Deep Sea: It Physical and Biological Conditions " *The Student* (1870), W. B. Carpenter, "The Gulf Stream " *Nature* October 27 (1870). W. B. Carpenter, "The Geological Bearings of Recent Deep-Sea Explorations " *Nature* August (1870), ibid.

Lamarck closely and was pursuing many of his lines of enquiry. This confirms Pietro Corsi and Adrian Desmond's argument that Lamarck's ideas reached a wide audience in Britain in the first half of the century, and suggests that the prevalence of transcendental morphology and other idealist concepts in British science may still be somewhat underestimated by scholars.

Indeed, a closer look at Carpenter's early work reveals that previous claims by historians about Carpenter's probable role in promoting morphological ideas in Britain, were understatements. When placed under scrutiny, Carpenter's writings show that the young scientist was not only a staunch morphologist in the full German and French acceptation of the term[463], but also that he actively contributed to the theoretical venture whilst supporting an evolutionary vision of nature.

It is also clear, as the close ties between Carpenter's thought with the ideas of Richard Owen make evident, that Carpenter can be considered to have elaborated a unique synthesis between continental theories and British scientific and religious preoccupations. To offer his own synthesis of these ideas, Carpenter cherry-picked the most appealing concepts put forward by Hunter and Cuvier, Goethe and Oken, Von Baer and Geoffroy, without upsetting the foundations of traditional British Natural Theology. In doing so, Carpenter systematically attempted to neutralise binary oppositions by borrowing arguments from both sides of the theoretical divide.

Historians have discussed the political implications of continental morphology, as well as the threat they were perceived to pose to traditional social and religious hierarchies in Britain. However, the metaphysical and religious implications of these theories have not been dwelt on sufficiently, and neither have

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[463] Carpenter openly spoke of "the doctrines of morphology", see: W. B. Carpenter, "On Unity of Function in Organized Beings." p. 111

the personal religious motivations underpinning the interest that scientists such as Carpenter expressed. The central premise of Natural Theology --namely that the 'book of nature' was evidence of the wisdom and greatness of the Creator-- was also the central postulate underlying Carpenter's own adherence to continental philosophical natural history. I argue that psychological factors such as educational history and emotional priorities must not be underestimated when assessing the motivations of individual thinkers, and that Carpenter's religious convictions --rather than any clear political agenda-- were probably the main factor that sealed his attraction for continental morphology.

This section also argues that Carpenter's 1838 *Principles of General and Comparative Physiology* ought to be added by historians to the canon of classic works of biology that fostered the debate on species and evolution in the decades before the publication of the *Origin*. Carpenter's book was read by a generation of botanists, anatomists and physiologists in Britain and served as a main reference for thinkers such as Robert Chambers, Charles Darwin and Herbert Spencer, all of whom acknowledged their debt to Carpenter's stimulating new approach.[464] In particular, Carpenter more than any other British naturalist whose work has been studied so far, was responsible for popularising Von Baer's ideas in Britain. This achievement in itself had a far-reaching intellectual legacy.

Another element that emerges from this study of Carpenter's work as a naturalist is the remarkable consistency with which he adhered throughout his career to the philosophical framework that underpinned his early thought on 'inductive' comparative physiology. Phillip Rehbock's statement that "the evolutionary theory

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[464] For a discussion of the influence that the 1841 edition of Carpenter's *Principles of Comparative Physiology* had on Herbert Spencer when he first read it in 1852, see: S. J. Gould, *Ontogeny and Phylogeny*. pp. 112-113

spelled the demise of transcendental natural history", meaning that by the 1850s "Carpenter had been drawn to other research problems"[465], therefore has to be called into question, because it suggests that Carpenter's approach to natural history experienced a theoretical shift following the formulation of Darwin's ideas, whereas it has been argued in this section that on the contrary Carpenter retained what might be called a transcendental approach to biological science up until his death.

What also stands out is the systematic way in which Carpenter sought to balance his formulation of contentious new ideas, with an effort to preserve a recognisable orthodox scientific and religious framework. This approach can be read as a further confirmation that Carpenter was, as has been argued in the first general section of this thesis, a figure of equipoise --socially, religiously, and scientifically, as the following part of this thesis will further illustrate.

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[465] P. F. Rehbock, *The Philosophical Naturalists : Themes in early nineteenth-century British Biology*. pp. 193-94

Part III. The Unitarian Psychologist: Carpenter's 1874 *Mental Physiology* in context

Introduction

When the Physiological Society was established in London in response to the 1875 Royal Commission Report on vivisection,[466] William Carpenter declined the invitation to be one of its founding members. He was present at the inaugural banquet held at the Criterion Restaurant on Regent –now Piccadilly—Circus, on Friday May 26th 1876, but preferred to remain an honorary guests among thirteen others – mostly of foreign nationality—and abstained from signing the Minute Book. His refusal to become actively involved in the Society in 1876 could be put down to the large number of other engagements that he already struggled to keep up with at the time. However, the physiologist and leading endocrinologist Edward Sharpey-Schäfer (1850-1935) in his *History of the Physiological Society*, offered another interpretation of Carpenter's decision, suggesting that he "probably declined the invitation because he felt he could no longer regard himself as a physiologist"[467]. Though this hypothesis is not supported by anything Carpenter said himself, it is an interesting assumption that offers a glimpse into the way Carpenter was perceived

[466] For a full account of the anti-vivisection movement in Britain, see R. D. French, *Antivivisection and Medical Science in Victorian Society* (Princeton, 1975), N. A. Rupke, ed., *Vivisection in Historical Perspective* (London and New York, 1987). Rupke argues that when faced with the public outcry against vivisection that occurred in the 1880s, many scientists supported vivisection as much to defend their professional credentials as to assert the usefulness of the experiments themselves. Carpenter, like many of his colleagues, argued for the acceptability of the practice in the following philosophical terms: animals were limited in their ability to act morally and consequently their moral rights should also be limited. In addition to this point, the justification of vivisection, according to Carpenter, lay in the motive rather than in the method. "Thus then, the narrow limitation and unprogressive range of the moral nature of animals justify a corresponding limitation of their moral rights, as compared with those of beings of unlimited capacity for progressive elevation; and I hold this to be the ethical justification of those dealings with them." W. B. Carpenter, "The Ethics of Vivisection," *The Fortnightly Review* (1882). p.242.

[467] E. Sharpey-Schäfer, *History of the Physiological Society during its First Fifty Years 1876-1926*. p.16

by the following generation of physiologists to which Sharpey-Schäfer belonged.[468] Schäfer further speculated that by then, Carpenter probably considered himself more of a psychologist than a physiologist.

This third part therefore deals with Carpenter's contributions to what was becoming recognised at the time as the budding intellectual discipline of psychology. From the publication of his *Principles of Human Physiology* in 1842, until his death in 1885, Carpenter never ceased to be fascinated with the human mind, the nature of human consciousness and --like many of his contemporaries-- the moral and political implications of Free Will. Some of his theorisations of the role of the automatic apparatus of the brain are still referred to by current neuroscientists, and his concepts of 'unconscious cerebration' and 'ideomotor action', which were closely studied by thinkers such as William James, are considered to be fundamental milestones in the development of current ideas about the unconscious activity of the mind.[469]

Focusing on Carpenter's psycho-physiology or "Mental Physiology", the present section thus proposes to situate Carpenter's particular contributions to the field both within the context of the emergence of "the problematic science" of psychology,[470] and with regard to his metaphysics. In doing so, this part further explores Carpenter's efforts to transcend dualisms through his approach to the mind-body relationship, and more widely, to the mind-matter dichotomy.

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[468] Despite his initial refusal to join the club, Carpenter was elected Honorary Member of the Physiological Society in 1882, being made to feature amongst the Society's pantheon of great names that included those of Charles Darwin and William Sharpey, who first held the chair of anatomy and physiology at the University of London.

[469] See for example M. Gauchet, *L'Inconscient Cérébral*, La Librairie du XXIème siècle, ed. Maurice Olender (1992).

[470] Since T. S. Kuhn, *The Structure of Scientific Revolutions* (Chicago, 1962)., the epistemological foundations of psychology have been under scrutiny and a variety of thinkers have asserted that in the absence of any clear paradigm, the discipline of psychology remains in a pre-scientific state. Authors who have tackled this question are, amongst others, K. Danzinger, *Naming the Mind, How Psychology Found its Language* (London, 1997), J. R. Searle, *Mind, A Brief Introduction* (Oxford, 2004), G. Henriques, *A New Unified Theory of Psychology* (New York, 2011).

Historians studying heterodoxy and psychical research in the Ninteenth Century have acknowledged Carpenter as a key influence in delineating the contours of official science, and therefore by contrast, of what became viewed as 'pseudo-science'. Kurt Danzinger, Lorraine Daston, Alison Winter, Janet Oppenheim, Richard Noakes, and Andreas Sommer have all analysed the tension between scientific naturalism and heterodoxy in the work of scientists such as Carpenter. Drawing upon their analyses, this part concentrates on Carpenter's position in the much-mediatised Victorian debate about spiritualism, asking what role psychical research played in Carpenter's approach to neurophysiology, and qualifying the received view –which lies at the heart of most of the studies mentioned above-- that Carpenter was a ferocious and unwavering critic of such heterodoxies. Indeed some new evidence presented in this third section suggests that Carpenter may have been more inclined than previously thought to consider the possibility of certain alleged psychical phenomena.

Finally --and this aspect will constitute the entry-point to this new section-- historians of psychology and parapsychology have traditionally attributed Carpenter's harsh public criticism of psychical research to his eighteenth-century rationalist philosophical legacy. This section will examine that assumption, arguing that --though Carpenter's work on the human brain was unquestionably inspired by certain eighteenth-century views – such rationalism must not be taken in Carpenter's case as "Huxleyian" naturalism. Carpenter's place in the history of psychology, as well as his own personal metaphysics, must therefore be assessed in terms of the various influences that came to shape his thought, but also in the light of his circumstances, acquaintances and personal beliefs.

Chapter 8. Framing a rational study of the mind: Carpenter and the emerging discipline of Psychology

8.1-Eigheenth-century philosophical influences on Carpenter's conception of the human mind

William Carpenter's career spanned the moment when one of the most dramatic redefinitions of the human mind took place in Western thought, and when the modern disciplines of psychology on the one hand, and neurology on the other hand, both grew out of European philosophical and medical traditions. In this context, as one of the leading figures of the new physiological approach to understanding mental states, Carpenter's work and writing combines many strands of thought which form the backdrop to his own particular vision.

Historians such as Kurt Danzinger[471], John Yolton[472], James Harris[473], Chris Smith[474] and Thomas Dixon[475], amongst others, have studied the various currents of thought that contributed to redefining the mind-body relationship in Europe in the Eighteenth Century. Thomas Dixon, in his study of the emergence of the notion of 'emotion', has in particular insisted on the need for scholars to revise the traditional assumptions underlying many histories of psychology according to which "from antiquity up until the late twentieth century philosophers and psychologists have generally, and misguidedly, thought of reason and emotions as antagonists."[476] Similarly, Ann Thompson, in her study of the concepts of body and soul in the Early

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[471] K. Danzinger, *Naming the Mind, How Psychology Found its Language*.
[472] J. W. Yolton, *Thinking Matter: Materialism in Eighteenth Century Britain* (Minneapolis, 1983).
[473] J. A. Harris, *Of Liberty and Necessity: the Free-Will Debate in Eighteenth-Century British Philosophy* (Oxford, 2005).
[474] C. Smith, *The Animal Spirit Doctrine and the Origins of Neurophysiology* (Oxford, 2012).
[475] T. Dixon, *From Passions to Emotions, the creation of a secular psychological category* (Cambridge, 2003).
[476] Ibid. p.2. Dixon argues that one of the reasons historians have missed clues about the more refined ways of considering man's emotional nature in the Eighteenth Century, is due to a lack of lexical distinctions that when left out distort the overall analysis.

Enlightenment,[477] has urged for caution when using expressions such as the "blank slate" or "the ghost in the machine", and has argued that there were many more attempts than generally acknowledged to break down the wall between matter and mind in the Eighteenth Century. It is important to mention these two warnings, because most of the portraits of William Carpenter that have so far been constructed within the limited space of short articles, often tend to categorise his thought using such labels. The most widespread deduction drawn from such categorisations has been that Carpenter, being a 'Unitarian' was therefore a staunch rationalist who was especially suspicious of psychical research. Another erroneous assumption is the one apparently underpinning the previously-cited 1981 article by Stephen Jacyna, and derived from the even more general label of Carpenter as 'religious', namely that Carpenter was socially and politically conservative in his wish to uphold an established social and political elite.[478] In order to avoid such false deductions, it must be borne in mind that Carpenter's philosophical and political outlook cannot be reduced to any single one of the trends that will be reviewed below, but rather emerged from a combination of notions that Carpenter borrowed from the thinkers and ideas he encountered, and moulded into his own vision.

Thanks to Russel Lant's biography of Lant Carpenter,[479] it is known that William Carpenter's father --like many eighteenth-century Unitarians-- read David Hartley's *Observations on Man*[480] closely and studied it with his students, who

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[477] A. Thomson, *Bodies of Thought. Science, Religion and the Soul in the Early Enlightenment* (Oxford, 2008).

[478] As has been discussed in Part I of this thesis, although Carpenter was careful to preserve the status quo and was by no means anti-establishment, he supported reformist and progressive causes in more than one area of social affairs. In this respect, his overall political and philosophical agenda cannot be labelled conservative.

[479] R. L. Carpenter, *Memoir of the Reverend Lant Carpenter*.

[480] D. Hartley, *Observations on Man, his Frame, his Duty, and his Expectations* (Gainsville, Florida, 1749). For a study of Hartley's thought, see: R. C. Allen, *David Hartley on Human Nature* (New York, 1999).

included his own children. Carpenter thus grew up steeped in the ideas of a thinker who was recognised by his own contemporaries as having profoundly re-defined the notion of the human spirit. As has been underlined by C.U. Smith, Hartley's attempt at explaining the human mind through physical determinism (in particular through his theory that perception and thought were enabled by "molecular vibrations" transmitted along nerve fibres between the body and the brain) was a continuation of the ideas found in Newton's *Principia* and *Opticks*, and can be seen as one of the biggest shifts away from the theory of "animal spirits" or "pneumatic fluids" which, in one form or another, had dominated Western thought since classical antiquity.[481] Drawing on Locke's theory of association of ideas, as well as on Newton's atomism and emphasis of the role of force in nature, Hartley's work was recognised in his own time as one of the most radical attempts yet to systematise the study of the human mind by firmly basing it on physiological premises.

The significance of Hartley's work was highlighted and expounded on by another great figure of the Unitarian canon, namely Joseph Priestley (1733-1804), the Unitarian minister and scientist who Carpenter undoubtedly studied very closely as one of the greatest Unitarian theologians and thinkers.[482] Priestly was so struck by Hartley's writings on the human mind that he edited an abridged version of the work in 1775 under the title *Hartley's Theory of the Human Mind*. Ronald Hatch has discussed the fact that Priestley edited Hartley's work in such a way as to emphasize the necessitarian conclusions that could be drawn from it (and that Hartley deplored were the corollary to his own theory), by selecting the relevant passages peppered

[481] C. Smith, "David Hartley's Newtonian neuropsychology," *Journal of the History of the Behavioural Sciences* 23.2 (1987).
[482] For in-depth studies of Priestley, see –amongst others--: I. W. Rivers, David L., ed., *Joseph Priestley, Scientist, Philosopher, and Theologian* (Oxford, 2008). R. E. Schofield, *The Enlightened Joseph Priestley, A Study of his Life and Work from 1773 to 1804* (University Park, PA, 2004). J. W. Yolton, "Priestley's Materialism," *Thinking Matter*, ed. John W. Yolton (Minneapolis, 1983).

throughout Hartley's work and adding his own conclusion to them.[483] Priestley's materialism is another facet of the debate about the relationship between body and soul that took place during the decades preceding Carpenter's birth, and points to the new definitions of mind that were emerging and that could increasingly be conflated with matter or with force.

Carpenter's view on the mind-matter debate can be found at the beginning of his 1874 *Principles of Mental Physiology* in a first chapter written in the form of a treatise entitled "General Relations of Mind and Body". In it, Carpenter fustigated previous metaphysicians for attempting to study the human mind in isolation from the body, and previous anatomists for merely dissecting the brain "as if they expected to map-out the course of Thought, or to weigh or measure the intensity of Emotion."[484] In the face of this "prevalent neglect of the study of the mutual relations of Mind and Body", he praised philosophers such as Dugald Stewart, who, instead of viewing physiologists and physicians "as opponents rather than allies" recognized the limitations of philosophy and declared metaphysics unfit to discuss the question.[485] Having thus established physiology as the approach best suited to studying the workings of the human mind, Carpenter criticized what he saw as a sterile opposition between on the one hand the "materialistic doctrine" that reduced man to a mere "puppet", and on the other "the doctrine held by Spiritualists" to whom the mind appears as "a separate Immaterial existence mysteriously connected with a Bodily instrument."[486] Carpenter then suggested, as the leading philosophical notion that underpinned his entire work, that the fallacies of both philosophies could

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483 See: R. B. Hatch, "Joseph Priestley: An Addition to Hartley's Observations," *Journal of the History of Ideas* 36.3 (1975).
484 W. B. Carpenter, *Principles of Mental Physiology*. p.3
485 Ibid. pp.1-2
486 Ibid. pp. 5-7

be recognized and overcome thanks to "that more advanced Philosophy of the present day, which regards Matter merely as the vehicle of Force."[487]

A corollary to the debate about the relationship between matter and mind which pervaded Enlightenment thought, was the philosophical question of subjectivism versus objectivism, or in other words, of whether ideas were innate to the mind, or on the contrary entirely the result of external sensations, or a combination of both external impressions and pre-existing internal structures of thought that filtered those impressions, as proposed by Kant's famous concept of mental "categories". In his *Principles of Mental Physiology*, Carpenter clearly states that the only tenable position in trying to answer that long-standing philosophical question, was the middle ground between subjectivism and objectivism, in other words, idealism, implying once again that a physiological approach was the only reliable way of trying to answer such a question:

> The Writer does not think it expedient to enter into the Inquiry which has been the subject of so many abstruse and laboured Metaphysical discussions, as to whether our fundamental Ideas originate altogether *without,* or altogether *within*, the Mind; or partly *without*, and partly *within*. It will be sufficient for him to express his own conviction, that the latter is the view at which any Psychological inquirer *must* arrive, ho looks at the subject from the Physiological side.[488]

Carpenter then goes on to refer his readers to the work of the English philosopher John Daniel Morell (1816-1891) for a fuller account of the various philosophical discussions on the topic. Morell had studied theology and philosophy in Bonn, where had attended --and was greatly influenced by-- Immanel Fichte's lectures on modern German metaphysics. It can therefore be assumed that Carpenter adhered to Morell's version of German idealism, which can be found in Morell's 1853

[487] Ibid. p.2
[488] Ibid. Chapter VI "Of Ideation and Ideo-motor Action", p. 220. Italics and capitals original.

Elements of Psychology.[489] It thus appears once again that Carpenter was heavily influenced by German metaphysics, though his acknowledgement of the fact appears at best oblique, featuring as it does in a footnote, in the shape of a reference to Morell. This sidestepping of the philosophical debate itself could be surmised as another one of Carpenter's conciliatory strategies, though this interpretation must remain at best a hypothesis.

Indeed Carpenter can be seen once more to reach for the middle-ground in this debate. Carpenter's interest in the workings of the human mind must also be understood as forming part and parcel of his larger educational enterprise which aimed to bring about a more rational, enlightened and fair society through early training of the mind—in which the scientific method played a predominant role. For Carpenter, like for the moral philosophers before him, understanding the processes underlying thought and therefore behaviour, had direct consequences on the means of educating and conditioning such behaviour. This effort to derive applicable educational principles from the study of the nervous system is transparent in the extended title of Carpenter's 1874 work: *Principles of Mental Physiology: with their applications to the training and discipline of the mind, and the study of its morbid conditions.*[490]

In this work, Carpenter's definition of thought is made clear: he approaches the human capacity for thought as a gradation along a "scale of Psychical activity"[491] from reflexes, to the highest form of abstract thought, which he names "Ideation". He distinguishes three stages or degrees of "the operations of the

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[489] J. D. Morell, *Elements of Psychology* (London, 1853). According to Morell who was himself inspired by the writings of Friedrich Trendelenburg (1802-1872), mental categories resulted from the power of distinguishing between objects in terms of quantity, quality or relation.

[490] This book was an updated and extended version of Carpenter's section on the nervous system and brain already published in his 1842 *Principles of Human Physiology*. See: W. B. Carpenter, *Principles of Human Physiology*.

[491] W. B. Carpenter, *Principles of Mental Physiology*. p. 220

Intelligent Mind becoming more and more independent of the Sensorial changes which first excited them”,[492] namely the sensational stage (in which consciousness is fully engrossed with self and is not aware of any exterior cause for the subjective change it experiences), the perceptive stage (in which consciousness recognizes the cause for its subjective change as objective, and “not self”), and finally the stage of ideation, in which the mind attains a high enough level of activity so as to “form that distinct mental representation, or idea, of the object, which stands altogether apart from our immediate experience, and assumes the character of an independent Intellectual reality”.[493] Carpenter then outlines the role played by association, memory and habit in this process of ideation, and discusses the consequent possibility of distortion and error in judgment which arises out of the complex interplay of these operations.

It is thus as a safeguard against such distortions and misjudgements that Carpenter’s lays down the philosophical cornerstone of his educational edifice: Common Sense. According to Carpenter, common sense is the faculty of epistemic transparency --which enables the subject to know his own present existence with the same immediacy and certainty as that with which he knows the existence of external causes-- that acts as a security against false ideas. This concept, largely derived from Thomas Reid’s common sense philosophy[494] which sought to propose a further alternative to empiricist and idealist models of the mind, is perhaps the most obvious legacy of Eighteenth Century philosophy on Carpenter’s work. Carpenter developed his own particular definition of common sense, which, as stated above, he saw as an

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492 Ibid. p. 220. Original italics.
493 Ibid. p.221
494 There is however disagreement between Reid specialists as to whether Reid can be called a “direct realist” in the full sense of the term, meaning that perceiving the world is an epistemically immediate phenomenon, unmediated by any form of mental processing or inference. See for instance: R. Copenhaver, "Thomas Reid's Direct Realism," *Reid Studies: An International Review of Scottish Philosophy* 4 (2000).

innate mental ability. The importance he attached to the notion can be measured by taking into consideration the several independent articles he wrote on the question, as well as the fact that he referred to it throughout his *Human* and *Mental Physiology.*[495] Cristina Paoletti has examined the connection between Carpenter's studies in Edinburgh and his use of the concept of "common sense",[496] linking it both to his personal acquaintance with William Hamilton --who knew and discussed Thomas Reid's work intimately—and to Carpenter's director of studies William Pulteney Alison --who was also very inspired by Reid's definition of common sense, and whose own writings on perception and mental operations owed a lot to Reid and Hamilton's work. Paoletti concluded that Carpenter particularly picked up on Alison's definition of common sense as "instincts", and transformed the notion into a purely physiological process related to the working of memory and habit, as will be studied more closely in the subsequent chapters of this section. Reid's extensive work on the human mind, and notably on unconscious perception, might also have had a strong influence on Carpenter's own ideas regarding the unconscious activity of the mind, as will be detailed a later.[497]

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495 See for instance: W. B. Carpenter, "What is Common Sense?," *Contemporary Review* (1872). Carpenter establishes a distinction between elementary common sense on the one hand, and ordinary common sense on the other. Elementary common sense was the ability to form immediate true judgements, and ordinary common sense was the ability to make appropriate pragmatic decisions (Carpenter modelled these definitions on Hamilton's distinction). Carpenter saw these mechanisms as half acquired and half trainable, in the same way as speech or walking were at once instinctive sensory-motor actions, and actions that needed repeated practice and training until they became automatic. Therefore these mechanisms of thought, if trained properly by experience and tutoring, could safeguard thought adequately against errors of judgement which could affect the higher, more complex and less immediate forms of ideation. See chapter XI entitled "On Common Sense" in W. B. Carpenter, *Principles of Mental Physiology*.

496 See: C. Paoletti, ""An affair of uncommon sense". William Carpenter's common-sense physiology," *Medicina & Storia* 10.19 (2010).

497 Another full definition of Carpenter's "common sense" can be found in Carpenter's presidential address to the B.A.A.S in 1872, re-printed under the title of "Man as the Interpreter of Nature" in W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical*. p. 194 Carpenter describes common sense in the following terms: "Thus, while philosophers have raised a thick cloud of dust in the discussion of the basis of our belief in the existence of a world external to ourselves—of the Non-Ego, as distinct from the Ego—and while every logician claims to have found some flaw in the proof advanced by every other, the common-sense of mankind has arrived at a decision that is practically

Charting Carpenter's place in the continuity of enlightenment debates about body and soul shows how he reshuffled certain concepts but was also careful to distance himself from previous philosophical ideas so as to present the study of mind as only truly valid when based on an experimental, physiological basis. Of his own admission, Carpenter borrowed some concepts from the Scottish empiricist, associationist and common-sense schools of philosophy, others from more materialist traditions such as those of Hartley and Priestley, and his overall outlook was coloured by German strands of idealism. This array of references must be born in mind when attempting to categorize Carpenter as a follower of 'rational Unitarianism', or as exhibiting any 'strictly Unitarian' tendencies.

8.2-From physiology to "mental physiology": Carpenter and the professionalization of the science of the mind.

8.2-1 Phrenology as a defining counter-example

The German anatomist Franz Joseph Gall (1758-1828) is remembered for firmly localizing the human mind in the brain at the turn of the Nineteenth Century, and consequently, for trying to systematize the way in which the brain was studied. Along with his colleague, Johan Caspar Spurzheim (1776-18832), Gall developed the discipline of 'organology', later known as 'phrenology', which posited that each area of the brain was specialised and exercised a distinct function. It followed that the specific anatomy of each cerebral area in a person's brain could help explain that particular person's behavioural and psychological profile. Gall's approach to the

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worth all the arguments of all the philosophers who have fought again and again over this battle-ground. And I think it can be shown that the trustworthiness of this common-sense decision arises from its dependence, not on any one set of experiences, but upon our unconscious coordination of the whole aggregate of our experiences—not on the conclusiveness of any one train of reasoning, but on the convergence of all our lines of thought toward this one centre. Now, this "common-sense," disciplined and enlarged by appropriate culture, becomes one of our most valuable instruments of scientific inquiry; affording in many instances the best, and sometimes the only, basis for a rational conclusion."

human mind became widely popular across Europe and also became the focus of strong criticism due to his largely speculative approach. However, phrenology, and more importantly, the critical examination of phrenological postulates, played an important role in the emergence of a more scientific attempt at studying the human brain.[498]

When William Carpenter sallied forth into the world of scientific writing in the late 1830s, the debate caused by the popularity of phrenology in Britain was ongoing. In Scotland, Carpenter had rubbed shoulders with some of the chief intellectuals engaged in denouncing the principles of phrenology as unfounded and unscientific[499], and had also met the main proponent of phrenology and founder of the Phrenological Society of Edinburgh in 1820: the lawyer and educationalist George Combe (1788-1858). Carpenter joined the fray and became one of the well-known detractors of phrenology, convincing his friend John Forbes --the editor of the *British and Foreign Medical Review* and initially an enthusiastic phrenologist[500]-- for example, of the invalidity of that approach. As previously shown, Carpenter at the time was struggling to establish himself and asserting his competency as a 'specialist' was therefore of prime personal importance to him. He thus reminded his various interlocutors time and again that the study of the organ of the brain was best left to physiologists and comparative anatomists, advocating a new model of the scientist as a specialist over the increasingly irrelevant model of the 'generalist naturalist' amongst the educated elite.[501] As shown in Part II, and as Alison Winter

[498] R. Cooter, *The Cultural Meaning of Popular Science : Phrenology and the Organization of Consent in Nineteenth-Century Britain* (Cambridge, 1984), J. Van Wyhe, *Phrenology and the Origins of Victorian Scientific Naturalism* (Aldershot, 2004).

[499] William Pulteney Alison was one of the scholars fighting the craze for phrenology.

[500] J. Forbes, *Phrenology Physiologically and Philosophically Considered: with Reasons for its Study, and Directions for its Successful Prosecution.* (London, 1840).

[501] Ruth Barton has analysed the increasing professionalization and therefore changing rhetoric of Victorian science. R. Barton, ""Huxley, Lubbock, and Half a Dozen Others": Professionals and

has also pointed out, Carpenter's credibility as a young practitioner had been endangered by several critical reviews of his *Principles of Comparative Physiology*, forcing him to defend himself publicly and to surround himself with "a large number of specific elite scientists who could be represented as constituting scientific and religious orthodoxy"[502]. In her discussion of Carpenter's strategy to establish himself as a figure of "orthodoxy", Winter rightly stresses the fact that Carpenter's ability to gain the support of the established intellectual elite was a determining factor in the success of his career, as has already been shown in Part I of this work.

Although Carpenter was an unwavering critic of phrenology, which he argued was based on assumptions rather than on true scientific investigation, he employed a mitigating strategy to foster dialogue between both camps. His conciliatory approach consisted in highlighting the ideas that overlapped in phrenological and physiological theories in order to show that ultimately, if phrenologists were willing to bring their methods of investigation within the compass of scientific modes of enquiry, both subjects would merge into one. In 1847, in a private letter to George Combe[503], Carpenter reprimanded his correspondent for passing some of his own work off as phrenological. Nevertheless, though he refused to be publicly called a phrenologist, Carpenter privately pacified Combe by claiming that his own research had led him to conclusions compatible with certain aspects of the phrenological model[504]:

> For myself I may say that I am now nearer to Phrenology than I have ever been before; and that my progress towards it has been retarded by what I conceive to be a fundamental error

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Gentlemen in the Formation of the X Club, 1851-1864.", R. Barton, ""Men of Science": Language, Identity and Professionalization in the Mid-Victorian Scientific Community'.".

[502] A. Winter, "The Construction of Orthodoxies and Heterodoxies in the Early Victorian Life Sciences," *Victorian Science in Context*, ed. Bernard Lightman (Chicago, 1997). p. 37

[503] W. B. Carpenter, 1847, National Library of Scotland, MS 7283.

[504] John Van Whye has posited the rise of phrenology as a major contributing factor in the development of scientific naturalism. J. Van Wyhe, *Phrenology and the Origins of Victorian Scientific Naturalism*.

in the Metaphysics of Phrenology, --namely, the want of discrimination between *Instincts* on the one hand, and the *Emotions and Propensities* on the other.

George Combe was a powerful socialite whose personal influence in Edinburgh was far-reaching and contradicting him too harshly was probably not in Carpenter's interest. His choice to portray himself as moving closer to phrenology could even appear intellectually dishonest, and would suggest he was using flattery as a strategy to make his point without endangering himself socially. However, Carpenter wrote in a similar manner when addressing other phrenologists: just a few months before writing to Combe, Carpenter had published an extensive review[505] of the latest book by the physician Daniel Noble[506], in which he also argued in favour of the absorption of phrenology into the science of neurophysiology --on the condition that phrenologists corrected their methodological mistakes. It is also important to note how often Carpenter referred to phrenological postulates in his section on the brain in his 1842 *Principles of Human Physiology*: though this was often done to debunk Gall's claims, the sheer fact that Carpenter used the hypotheses advanced by phrenology (even if only as a didactic counter-example) is telling of how influential those ideas were in creating the impetus for a systematic and rigorous study of cerebral physiology.

Indeed Carpenter's main point of contention with regards to phrenology was about methodological rigor and scientific training, rather than about the overarching postulate of cerebral localisation proposed by phrenologists. For instance, one major theoretical mistake that Carpenter attributed to phrenology--in addition to the erroneous assumption that the shape of the cranium itself was significant-- was that it failed to ground the hypothesis of localisation on evidence provided by the science

[505] W. B. Carpenter, "Mr. Noble on the Brain and its Physiology," *The British and Foreign Medical Review* XXII (1846).
[506] D. Noble, *The Brain and its Physiology : a Critical Disquisition on the Methods of Determining the Relations Subsisting between the Structure and Functions of the Encephalon* (London, 1846).

of comparative anatomy. While Carpenter emphasized the fact that the localisation of specific functions of the brain was one of the common aims shared by physiology and phrenology, he also stressed that without comparing the lobes of the human cerebrum with the brains of animals that also exhibited –or lacked-- similar abilities, the conclusions of phrenology could not be considered sound. Carpenter therefore vehemently called for phrenologists to embrace comparative anatomy, since it could allow them -- merely through a process of elimination— to avoid stumbling into unfounded conjectures.[507]

As has already been demonstrated in the second section of this thesis, Carpenter's insistence on the method of comparative anatomy, appears in itself representative of his wish to transcend diverging viewpoints and of his view of nature as "one harmonious Whole". Tom Quick, in his D.Phil thesis in the philosophy of science[508], argues however that Carpenter's call for more widespread use of the methods of comparative physiology was a bid to assert the authority of the specialist physiologist over that of the "mere human anatomists" and philosophers. Quick's work offers an excellent review of Carpenter's early opposition to phrenology, and accurately outlines the arguments that he put forward to encourage an approach to the human mind based on comparative anatomy. However, his analysis of the reasons why Carpenter relied so heavily on a comparative approach need to be qualified to some extent for they give a limited --and I argue-- exaggeratedly political, interpretation of the physiologist's thinking:

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507 In his 1843 *Principles of Human Physiology*, Carpenter gives an example of the errors of phrenology by taking apart Gall's claim that the cerebellum was the seat of sexual activity. According to that theory, neutered specimens would have a significantly smaller cerebellum than whole individuals. In order to deconstruct that statement, Carpenter refered the reader to Magendie's dissections of the brains of horses, and especially to his comparative data of the weight of the cerebella of geldings versus those of the cerebella of stallions. p.237

508 T. Quick, " *Techniques of Life: zoology, psychologyand technical subjectivity (c.1820-1890).*" D.Phil, UCL, 2011.

> (Carpenter's) move to align the study of psychological function with a specifically comparative-anatomical conception of nervous physiology can in this respect be understood in terms of a resistance to the interests and beliefs of the emergent middle-classes.[509]

This analysis, which draws on the afore-mentioned work by Alison Winter as well as on Adrian Desmond's thesis, postulates that Carpenter's science was first and foremost a reflection of his wish to establish himself within the intellectual elite. Though this is true to a certain extent, as has been mentioned previously, it does not necessarily follow from Carpenter's professional ambitions that his scientific work consistently bore the mark of his social aspirations, nor that he chiefly operated according to such a clear-cut political strategy. Following what was shown in Part I of this thesis concerning Carpenter's initiatives to open up University education to a variety of new audiences during his time administering University College, and given what was shown in Part II about the philosophical and religious motivations underpinning Carpenter's allegiance to continental morphology, we must remember to interpret Carpenter's work not merely as socially and politically determined, but equally, as psychologically and metaphysically motivated.

I suggest, therefore, that Carpenter's opposition to phrenology was multi-faceted, and that the political motives behind some of Carpenter's manoeuvring and pugnacity weren't as important as his genuine epistemological crusade for truth for its own sake. Winter's interpretation of Carpenter's strategy to gain intellectual authority is convincing but little room is left in her analysis for psychological factors such as Carpenter's sheer pleasure in verifying solid truths by picking faulty reasoning apart, or for his probable utopian dream of a society free from prejudice—a dream many Unitarians whose family history often bore the mark of exclusion would have held close to their hearts. In her wider discussion of the appeal of alternative sciences for young medical men however, Alison Winter warns that

[509] Ibid. p. 99

"explicitly ideological concerns did not necessarily have to be the dominant factor in the appeal and character of many supposedly heterodox sciences. While these attributes could complement a politically radical agenda, they did not necessarily have to accompany it".[510] This point, expressed as a secondary cautionary remark, ought perhaps to be given more central significance and must be kept in mind so as not to distort Carpenter's epistemic approach to science.

Because Carpenter was above all an individual who felt pride, as well as genuine joy, in establishing the scientifically-demonstrated truth[511], he was as a matter of principle "active in asserting the very nature of orthodox and heterodox knowledge"[512]. In the particular case of phrenology, which was one of Carpenter's first 'campaigns' against flawed methodology, the strategy he employed was to seek to absorb phrenology into physiology, rather than to merely antagonise it. From the onset therefore, his style was ambivalent --both confrontational and conciliatory— exhibiting a characteristic duality of tone.

8.2-2 Carpenter and reflex-theory: framing a rational study of the mind

In addition to phrenology, the formulation of the concept of reflex which culminated in Marshall Hall (1790-1857)'s description of the "reflex arc" in 1833, can be considered as the foundation of Carpenter's own study of the human brain, and indeed, as the foundation of the modern neurosciences as a whole. Both Marshall Hall and Johannes Müller, building on the work of Julien Legallois, Robert Whytt, Jean Pierre Flourens, Jiri Prochaska, Charles Bell's and François Magendie's

[510] A. Winter, "The Construction of Orthodoxies and Heterodoxies in the Early Victorian Life Sciences." p. 28

[511] Carpenter's son Josepeh Estlin Carpenter, in his biography of his father, insisted on the physiologist's lifelong reference to Schiller's maxim that a true philosopher was a thinker who "loved truth better than his own system". See: J. E. Carpenter, "Memorial Sketch." p. 135

[512] A. Winter, "The Construction of Orthodoxies and Heterodoxies in the Early Victorian Life Sciences." p. 29

sensori-motor physiology—amongst others[513], put forward similar definitions of the reflex-function of the spinal chord in 1833[514], and in doing so, made the notion of immediate automatic responses central to the study of the nervous system.[515] Marshall Hall distinguished three centres controlling the nervous response of higher invertebrates to the outside world: the cerebrum was the centre for voluntary motion, the medulla oblongata (commonly referred to nowadays as the brain stem) as the centre controlling respiration, and the medulla spinalis (or spinal chord) as the centre controlling reflex movements: these movements were the result of stimuli activating an exchange between sensori and motor nerves within the spinal chord itself, rather than in the brain, thus enabling a quasi-immediate response to the external stimuli since the input could be processed without transiting as far as the brain. Carpenter, leaning on Charles Bell's 1826 notion of "nervous circle" to describe the dual nerve supply of muscles (both motor and sensory) gave the following definition of the "reflex action":

> What is designated as the reflex action of a Nerve-centre (is) the response which it makes, through the *motor* fibres, to the impression that has been conveyed to it by the *afferent* or *excitor* fibres, --the whole constituting what has been termed the *nervous circle*. This response is purely *automatic* or involuntary; depending, like the contraction of a Muscle stimulated by electricity, upon the inherent endowments of the Nervous apparatus. Whether such "reflex action" is or is not attended with Consciousness, depends on the other endowments of the ganglion which performs it; but it is certain that actions which seem to indicated a definite purpose and will, may be called forth by mere stimulation, under circumstances which forbid us to attribute them to anything else than the automatic and unconscious action of the Nerve-centre. [516]

Edwin Clarke and Stephen Jacyna have discussed how the notion of the reflex arc,

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[513] For a thorough account of the history of the reflex in neurophysiology, see: E. Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuro-Scientific Concepts* (London, 1987). chapter 4, pp. 101-157.

[514] Marshall Hall, who aggressively defended his priority of ideas, had given an oral account of his theory to the London Zoological Society in November 1832. Müller acknowledged that his British colleague had formulated the idea first, though both men developed their theories independently.

[515] M. Hall, "On the Reflex Function of the Medulla Oblongata and the Medulla Spinalis," *Philosophical Transactions of the Royal Society* CXXX (1833). J. Müller, *Handbuch der Physiologie des Menschen für Vorlesungen* (Coblenz, 1833).

[516] W. B. Carpenter, *Principles of Mental Physiology*. pp. 46-47. Chapter II: "Of The Nervous System and Its Functions." Capitals and italics original.

as well as the dissection methods of Gall and Spürzheim[517], largely contributed to overturning the idea that the spinal chord was subordinate to the brain. In this new inverted hierarchy, the brain became a mere extension of the system of nervous ganglia rather than the seat of all thought and movement (the brain, traditionally, had orchestrated every physical action by sending "animal spririts" down to the organs and limbs). In this model, the spinal chord, rather than having the status of mere transmitter for the brain, became the fundamental basis of all nervous activity. This crucial shift in perspective has been well covered by George Canguilhem, Ruth Leys, Marcel Gauchet as well as by Edwin Clarke and Stephen Jacyna, who have all explored the context and implications of the new concept of reflex action at the time it was put forward.[518]

Edwin Clarke in particular has mentioned how Carpenter scrupulously described the human brain as the culmination in complexity of the basic nervous system common to all living beings –except for plants whose interaction with the outside world occurred without the mediation of nerves.[519] Carpenter can indeed be considered a major actor in the popularisation of this shift in perspective, as well as, once again, an active promoter of the evolutionary link between all living organisms. He charted this progression up the scale of increasing organic complexity (from invertebrates to man) in his *Principles of Human Physiology*[520],

[517] The two men would start their dissections with the spinal chord before proceeding to exhibit the structure of the brain.

[518] See:E. J. Clarke, Stephen, ed., *Nineteenth-Century Origins of Neuroscientific Concepts* (Berkley, 1987). R. Leys, "Background to the Reflex Controversy: William Alison and the Doctrine of Sympathy before Hall," *Studies in the History of Biology* 4 (1980), M. Gauchet, *L'Inconscient Cérébral*, G. Canguilhem, *La formation du concept de réflexe au XVIIe et XVIIIe siècles* (Paris, 1955), F. Fearing, *Reflex Action, a Study in the History of Physiological Psychology* (New York and London, 1964).

[519] Carpenter, in his *Principles of Human Physiology* p. 270 nevertheless compared the irritability found in plants with the nervous systems of other living organisms. Current research in plant biology is now asking similar questions.

[520] W. B. Carpenter, *Principles of Human Physiology*. p. 32

first published in 1842 and in print until 1881 (ninth edition), describing the structure of the organ of the brain in the higher mammals as having developed its complexity out of the nervous structure of the "lower" animals, a process which he explicitly refers to as the "progressive evolution of intelligence" in the first chapter of his 1874 *Principles of Mental Physiology*.

Taking the idea of the brain as an extension of the spinal ganglia one step further, Carpenter applied the concept of reflex-action to the brain itself, postulating in 1852 in the fourth edition of his *Principles of Human Physiology*, that instantaneous, automatic responses to certain stimuli occurred in the brain unbeknown to the subject[521]. He defined this daring idea again in his *Principles of Mental Physiology*, making it one of the central postulates of the book:

> The reflex action of the Cerebrum (is) called forth, like that of other Nerve-centres, by the stimulus conveyed to it from without; the seat of that activity being its expanded layer of Cortical substance. This reflex action manifests itself not only in Psychical change, but also in Muscular movements: and these may either proceed from simple Ideas, without any excitement or Feeling, in which case they may be designated ideo-motor; whilst, if they are prompted by a Passion or Emotion, they are known as emotional.[522]

Carpenter was not the first thinker to put forward this revolutionary idea: the battle over intellectual priority that erupted between him and Thomas Laycock following Carpenter's first formulation of the concept in 1852 is well known.[523] Carpenter was forced to recognise the precedence of Laycock's writing on the matter, and the

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521 As has already been noted by Stephen Jacyna, it is important to mention that Carpenter's views on the reflex action of the cerebrum changed significantly between 1846 and 1852, most probably due to the influence of Laycock's work. In Carpenter's earlier writings on the cerebrum, he was hesitant to attribute a similar reflex function to the cerebral hemispheres as that which he held to be common to all other nervous ganglia. See: E. Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuro-Scientific Concepts*. p. 140

522 W. B. Carpenter, *Principles of Mental Physiology*. pp. 105-106. Chapter II: "Of The Nervous System and Its Functions."

523 For a good summary and analysis of both men's position, see: S. Dyde, "Life and the Minds in Nineteenth-Century Britain," *Vitalism and the Scientific Image in Post-Enlightenment Life Science 1800-2010*, ed. Sebastien Normandin (Dordrecht, 2013). On the same topic see also: K. Danzinger, "Mid-Nineteenth-Century British Psycho-Physiology: A Neglected Chapter in the History of Psychology," *The Problematic Science: Psychology in Nineteenth-century Thought*, ed. eds. Woodward & Ash (New York, 1982). For a comprehensive discussion of Laycock's character and professional relationships, see also: M. Barfoot, ed., *"To Ask the Suffrages of the Patrons": Thomas Laycock and the Edinburgh Chair of Medicine, 1855.*, vol. Supplement N°15 (London, 1995).

care he still took in 1874 to acknowledge (albeit grudgingly and not without suggesting that Laycock's concept was different to his own independently-derived idea) his colleague's priority, is a testament to how fiercely Laycok defended his intellectual paternity:

> Subsequently to the first publication of his views on this subject (in the fourth edition of his *Human Physiology*, 1852) the Author learned from his friend, Dr. Laycock, to whose Essay on the "Reflex Action of the Brain" he has already referred to as a most important contribution to Mental Physiology, that he had fully intended to convey the idea that such reflex action might be unconscious. As no distinct statement was made to that effect, and as all Dr. Laycock's illustrative examples were of a kind in which consciousness was involved, the Writer may be excused for having –in common with others who were following the same line of enquiry—failed to apprehend Dr. Laycock's meaning on this point. But he willingly accepts Dr. Laycock's statement of it: and now restates the grounds of which he himself independently arrived at the same conclusion, simply as justifying the claim which the question has to a thorough reconsideration on the part of British Metaphysicians.[524]

Thomas Laycock had hit out at Carpenter for not acknowledging his similar ideas on the subject in an appendix to his work, *Mind and Brain*, published in 1860. In this essay, entitled *Examination of Dr. Carpenter's Claim of Priority as to the Discovery of the Law of Unconscious Cerebral Action*[525], Laycock reminded his readers that his suggestion of a "reflex action of the brain" had been publicly formulated some twelve years before Carpenter's, though he acknowledged that he had made no attempt at localising the precise cerebral components involved in the physiological process. He also asserted that Carpenter "believes, or believed, in the distinctness of "mind" and "vital principle"; his doctrines, therefore, (were) necessarily mechanico-vital", whereas he himself "reduce(d) mind and the vital principle to unity[526]; his

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[524] W. B. Carpenter, *Principles of Mental Physiology*. Footnote, p. 515.

[525] See: T. Laycock, "Examination of Dr. Carpenter's Claim of Priority as to the Discovery of the Law of Unconscious Cerebral Action.," *Mind and Brain, The Correlation of Consciousness and Organisation.* (Edinburgh, 1860). In this publication, Laycock accused Carpenter of –amongst other failures to acknowledge his ideas-- having omitted to mention his name in the 4th edition of his *Principles of Human Physiology* (1852) despite having been invited by Laycock to his home in York during the writing of his work, and having discussed Laycock's ideas with him in person during his stay. Laycock also adds that he had "afforded Dr. Carpenter every facility for the comprehension of his views, both in daily conversation and by placing upon Dr. Carpenter's writing table copies of his papers on the subject." (p. 477)

[526] On Laycock's conception of the unity of nature, see: A. Leff, "Thoms Laycock and the cerebral reflex: a function arising from and pointing to the unity of Nature," *History of Psychiatry* 2 (1991).

doctrines, therefore, (were) necessarily teleological." Laycock's statement about the philosophical principles underlying Carpenter's shifting conception of the human brain were echoed by Stephen Jacyna in his analysis of the influence of German Naturphilosophie on Laycock and Carpenter. According to Jacyna:

> Carpenter's work shows in a striking way a tension between the monistic notions of nervous function he shared with some Continental workers and the dualist assumptions whose influence on Hall has already been noted. Carpenter was for theological reasons anxious not to undermine the role of a discrete, causally effective soul in humans, and therefore refused to accept that all cerebral function could be understood in the same terms that served to explicate the operations of the lower nervous centres[527].

This perceived tension in Carpenter's work between a mind-body dualism and a more "monistic" view of all organic and spiritual life, must be examined more closely: this shall be done in the following chapter of this section. By questioning Laycock and Jacyna's statements about Carpenter's remaining dualism, this thesis will ask whether and to what extent Carpenter's views developed into a form of monism. It is worth highlighting, as a preliminary remark --and as Stephen Jacyna himself explains-- that Laycock's own idea of extending the reflex function of the spinal chord to the brain was inspired by German authors such as Alfred Volkmann, Willhelm Griesinger and Johannes Müller, and by the concept of "unity of function". Laycock openly recognised his debt to "recent advances in comparative physiology" in his 1844 address to the medical section of the B.A.A.S, and it has been shown in Part II how relentlessly in his early work Carpenter promulgated the methods of comparative physiology –central to which was his concept of the unity of function as a means of recognising affiliated organisms. Considering that both men had been acquaintances since attending Grant's lectures in London in the 1830s, and seeing as they both regularly contributed to John Forbes's *British and*

[527] See: E. Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuro-Scientific Concepts*. p. 141

Foreign Medico-Chirurgical Review in the 1840s,[528] it is highly likely that Carpenter's advocacy of comparative physiology, as well as his extension of the unity of type to the unity of function, had a direct influence on Laycock's early formulation of his ideas on the reflex function of the brain.

It was clear to many contemporaries that both men had blazed a trail into a new conception of the human mind, as can be seen from the 1876 article entitled *L'action réflexe cérébrale*[529] published by the French philosopher Léon Dumont in *La Revue Scientifique*. In this ten-page analysis of Laycock and Carpenter's ideas and on their influence on thinkers such as Hippolyte Taine – to which Dumont added mention of the work of two French doctors, Ernest Onimus (1840-1915) and Jules Bernard Luys (1828-1897)[530]—the two English men are presented as the pioneers of a new scientific study of the human mind.

8.3-Carpenter's concept of "unconscious cerebration" and its legacy within the nascent field of psychology

> Having thus found reason to conclude that a large part of our Intellectual activity –whether it consist in Reasoning processes, or in the exercise of the Imagination—is essentially *automatic*, and may be described in Physiological language as the *reflex action of the Cerebrum*, we have next to consider whether this action may not take place *unconsciously*. (…) Looking, therefore, at all the automatic operations of the Mind in the light of "reflex actions" of the Cerebrum, there is no more difficulty in comprehending that such reflex actions may proceed without our cognizance (…) than there is in understanding that impressions may excite muscular movements through the "reflex" power of the Spinal Cord without the necessary intervention of sensation.[531]

As is apparent in Carpenter's acknowledgement of Laycock's precedence in formulating the idea of the reflex action of the brain (as exemplified on p. 22 of this

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[528] Carpenter's friendship with Sir John Forbes, as well as his contributions to the *Review*, have already been mentioned in this thesis. Laycock's close friendship with Forbes is noted by A. Leff, "Thoms Laycock and the cerebral reflex: a function arising from and pointing to the unity of Nature."
[529] L. Dumont, "L'Action Réflexe Cérébrale," *La Revue Scientifique* 2.28 (1876).
[530] See: J. Luys, *Etudes de Physiologie et de Pathologie Cérébrales- Des Actions Réflexes du Cerveau* (Paris, 1874). Luys does note mention Laycock or Carpenter's work though he was most certainly aware of their writings on the topic, as Dumont himself suggested in 1876.
[531] W. B. Carpenter, *Principles of Mental Physiology*. Chapter XIII, pp. 515-517. Original italics.

thesis), Carpenter's claim to originality hinged on the following two contributions: firstly, his hypothesis that the automatic actions of the cerebrum were not just involuntary, but also *unconscious*. Secondly, his attempt to pinpoint the various areas involved in the unconscious activity of the brain. Carpenter's concept of "unconscious cerebration" must therefore be understood as a variation on the idea of the reflex action of the brain.

In order to formulate more precisely what this extra process of unconscious cerebration involved, Carpenter built on the notion of the "reflex action of the brain" and paid close attention, like Laycock before him, to patients exhibiting a variety of mental and physical disorders. The study altered mental states, through the work in particular of Alexander Bain, afforded Carpenter what he felt was ample evidence of a distinct type of mental operations at work.

In addition to the evidence which he compiled on human pathologies from the available medical literature, Carpenter relied on the vivisections performed by a number of European physiologists (in particular Orlando, Flourens, Magendie, Hertwige and Longet[532]), to deduce what function could be ascribed to each part of the brain. Their vivisections suggested that the motor abilities, vital functions and reflexes of animals studied were very little affected by any damage inflicted to the lobes of their cerebrum, whereas any injury to the cerebellum or medulla oblongata invariably had dire consequences.

This cumulative work and eliminatory logic was the first step towards the formulation of Carpenter's concept of unconscious cerebration. Indeed, in attempting to localize the various activities of the mind, Carpenter not only concluded like many physicians before him that the enlarged lobes of the cerebrum

[532] Carpenter acknowledges his debt to these experimental practitioners p. 514 of the 1853 edition of his *Principles of Human Physiology*.

were what distinguished humans from other quadrumana and were the reason for their superior intelligence, but also arrived at the paradoxical idea that the very organ of human beings' superior intelligence was *not* the seat of their consciousness and sense of self. Though the cerebrum was without question the seat of higher intellectual operations, the very thoughts and processes that were produced in the cerebrum could not be equated with awareness. This fundamental distinction between thought and consciousness in the definition of intelligence, breaks with traditional conceptions of the human mind. The Cartesian statement "cogito ergo sum", for instance, implicitly equates being aware of one's self with the act of thinking. In Descartes's dualistic model, consciousness is thus very clearly aligned with the process of thought, and it is this paradigm that Carpenter shattered by equating consciousness first and foremost with physical sensation, rather than with thought.[533]

To understand Carpenter's model of the mind, one must follow his anatomical and physiological map of the brain which he derived, to a large extent, from observing mental pathologies and altered states of consciousness: memory loss, absent-mindedness intoxication, sleepwalking, self-delusion and acquired-habits-turned-automatisms, were so many phenomena indicative of another dimension of thought that exceeded usual levels of awareness. This notion of involuntary thought within a subject's mind guided Carpenter's physiological hypotheses and led him to map the seats of various mental processes in an original way. Taking a comparative approach like the one he recommended to phrenologists, and following Flourens's descriptions in particular, Carpenter looked at the anatomical structure of the human brain and contrasted it to that of other animal's

[533] Marshall Hall had said before Carpenter that there could be no consciousness without sensation, but he did not envisage sensation as being dissociated from thought.

brains. Considering all vertebrates to be conscious beings, Carpenter searched for common anatomical features, identifying the thalamus and sensory ganglia as the common denominator between species and therefore as the seat of consciousness for all vertebrates. Indeed, for voluntary movement to be initiated, the area in the brain receiving external stimuli needed to be endowed with awareness, whereas not all thoughts were immediately relevant to directing muscular action and therefore did not need to be conscious. This conscious area of the brain, or sensorium, was what Carpenter named the 'automatic apparatus'. Following this organisation, the ongoing process of unconscious cerebration would only become transmuted into conscious thought, when it travelled downwards from the cerebrum to the thalamus.[534] This theory provides further evidence of Carpenter trying to overcome dualisms and antinomies, by collapsing two apparently contradictory notions, making the main organ of the intellect -- the cerebrum-- devoid of consciousness:

> At first sight it would appear to be a very startling proposition, that the organ of intellectual operations is not itself endowed with consciousness: but a careful consideration of its relations to the sensory ganglia will tend to show that there is no *a priori* absurdity in such a notion. (…) It will be found much simpler to accept the doctrine of a common centre for sensation and for what may be distinguished as mental consciousness, than to regard the two centres as distinct.[535]

This paradigm shift whereby the main organ of the intellect was stripped of the consciousness of its own operations, also had the effect of placing memory at the heart of the debate about the human mind. Indeed, memory was a necessary condition of these unconscious operations of the human mind and body: through turning deliberate movements or processes (such as learning how to walk or how to write) into quasi-automatisms, it enabled thoughts and actions to take place independently "prompting us to do spontaneously, which might otherwise require a

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[534] For an account of the significance of this concept with regards to modern neurology, see in particular: F. M. Walshe, "The Brain-Stem Conceived as the Highest Level of Function in the Nervous System; with Particular Reference to the Automatic Apparatus of Carpenter (1850) and to the Centrecephalic Integrating System of Penfield.," *Brain* 80.4 (1957).

[535] W. B. Carpenter, *Principles of Human Physiology*. p. 680

powerful effort of the Will".[536] Carpenter is recognised by historians[537] as one of the thinkers who explored this question at length, in particular through studying the significance of habit in the mind-body relationship,[538] considering the encoding of a deliberate physical action such as walking --initially directed by the mind-- into an automatic action entirely run by the spinal cord, to be illustrative of the continuum between mind and matter. For Carpenter, this capacity of the body to encrypt a deliberate movement into physical automatisms, was also a significant argument in favour of the theory of the hereditary transmission of acquired characteristics, a notion much discussed at the time in the debate surrounding the theory evolution.[539] Indeed, the process of turning an acquired movement into a "secondary instinct" through repetition, could be compared to that "formative capacity transmitted to the germ in virtue of which it develops itself into an organism possessing the characters of its species, and sometimes the individual characters of one or other of its parents".[540] There seemed to be no clear contradiction between on the one hand the possibility of physiologically imprinting a habit into nerves and muscles through rehearsal, and imprinting the acquired characteristics of a species through reproduction.

The influence of Carpenter's ideas on other thinkers, in particular where the evolutionary ideas of 'biological memory[541]' and the hereditary transmission of

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[536] W. B. Carpenter, *Principles of Mental Physiology*. p. 350

[537] See for example: D. Draaisma, *Metaphors of Memory, A History of Ideas About the Mind*, trans. Paul Vincent (Cambridge, 2000). p.87. Draaisma identifies Carpenter as the most "representative" of the British theoreticians reflecting on the issue of the "neurological substratum of memory".

[538] As a conclusion to these observations, Carpenter also dwelt on the importance of instilling the right habits to children during their formative years.

[539] W. B. Carpenter, *Principles of Mental Physiology*. p. 337-375. See also W. B. Carpenter, "On the Hereditary Transmission of Acquired Psychical Habits," *Contemporary Review* 21 (1872).

[540] W. B. Carpenter, "On the Hereditary Transmission of Acquired Psychical Habits."

[541] The term "biological memory" was used by Vernon L. Kellog in his short description of the contents and context of Butler's writings on evolution. See: V. L. Kellog, "Samuel Butler and Biological Memory," *Science* 35.907 (1912).

acquired characteristics are concerned, can be found in the work of contemporaries, most noticeably in the writings of Samuel Butler (1835-1902). Butler was an iconoclast[542] whose works ranged from the literary (including the famous dystopian novel *Erewhon,*[543] as well as his translation into English prose of Homer's *Odyssey* alongside his theory –expounded in *The Authoress of the Odyssey*, 1897-- that the true author of the epic was a Sicilian woman) to the 'scientific' (notably his evolutionary writings[544]), and though he was a passionate supporter of the notion of evolution, his aim was also to discredit Darwin's proposed mechanism of natural selection and to rehabilitate earlier evolutionary thinkers and particularly Lamarck. [545]In his fight to question natural selection as the agent of evolution and to reinstate the agency of mind, Butler's understanding of memory as the transmission of experience-turned-habit became the cornerstone of his anti-darwinian transformism which he first put forward in his 1878 *Life and Habit* and exposed again in his subsequent works.

In these writings, Butler made a relentless case for the transmission of acquired characteristics, frequently citing "Dr. Carpenter" and quoting lengthy excerpts of his *Mental Physiology* and more occasionally Carpenter's *Mesmerism and Spiritualism*[546]. Indeed it is especially clear in *Life and Habit* that Butler had derived many of his ideas on the central role of memory in the development of both individuals and species from examples that Carpenter had used to bolster his own case for the role of memory in the acquisition of "psychical habits" and in the

542 For a comprehensive overview of Butler's place –or lack thereof-- within the Victorian intellectual scene, see: J. G. Paradis, ed., *Samuel Butler, Victorian Against the Grain* (Toronto, 2007).

543 S. Butler, *Erewhon, or Over the Range* (London, 1872).

544 S. Butler, *Life and Habit* (London, 1878). S. Butler, *Evolution, Old and New* (London, 1879). S. Butler, *Unconscious Memory* (London, 1880). S. Butler, *Luck or Cunning as the Main Means of Organic Modification* (London, 1887).

545 See: S. Butler, *Evolution Old and New* (London, 1879).

546 W. B. Carpenter, *Mesmerism, Spiritualism, etc, Historically and Scientifically Considered* (London, 1877).

formation of organisms.[547] The opening lines of *Life and Habit* make the aim and logic of Butler's argument clear: acquired automatisms such as those often referred to by Carpenter in his *Mental Physiology* could be used, by analogy, as a means of understanding the evolution of embryos and species more generally:

> 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.[548]

One can assume that Butler was not only inspired by Carpenter, but was also openly calling on his authority as a renowned public intellectual to add credibility to his own opinions, which he characteristically chose to formulate in a provocative way:

> A chicken, for example, is never so full of consciousness, activity, reasoning faculty and volition, as when it is an embryo in an 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.[549]

As seen in this particular excerpt, Butler was questioning the very definition of knowledge. By drawing attention to the vast amount of unconscious knowledge (in the form of encrypted memories) involved in the process of life, and by claiming that "birth has been made too much of"[550] since the beginning of intelligence could be traced as far back as the fertilised egg itself, Butler was placing unconscious memory at the very centre of organic life. In doing so, Butler was bending the definition of knowledge, since he was claiming that individuals were unconscious of most of the information enabling life, making a developing chicken embryo more knowledgeable than a fully developed human, relatively speaking. Unconscious

[547] Stephen Jay Gould explored Butler debt to Carpenter and Lamarck's notion of "biological memory", see: S. J. Gould, *Ontogeny and Phylogeny*. pp. 96-100.
[548] S. Butler, *Life and Habit*. p. 1
[549] Ibid. pp. 60-61
[550] Ibid. p. 59

memory was thus, in a sense, more powerful, more central and more defining for individuals, than conscious knowledge. This counter-intuitive reversal operated by Butler echoed Carpenter's own claims that the very process of thought within the brain could proceed unbeknownst to the individual, and mirrored his notions of biological memory.

Butler also quoted Carpenter's remarks concerning the complex behaviour displayed by microscopic foraminifera when building their own intricate shells, drawing attention to the physiologist's rejection of the unsatisfactory term of "instinct":

> To give these actions the vague designation of 'instinctive' does not in the least help us to account for them, since what we want is to discover the *mechanism* by which they are worked out.[551]

Like Carpenter, Butler suggested that a form of memory was the key mechanism underlying the inadequate concept of instinct. Butler also relayed Carpenter's suggestion that if a human stone mason were to perform the same actions as microscopic protozoa by building "casings of the most regular geometrical symmetry of form and of the most artificial construction"[552], he would be regarded as highly skilled and intelligent. However, whereas Carpenter stopped at that remark without carrying its implications through, Butler extended it into a much more radical and provocative claim, namely that all living organisms --no matter how primitive-- should be considered intelligent and conscious.[553] Thus, Carpenter's work was an influential contribution to the interrogations about the processes of memory, and more precisely organic memory, which were being formulated by late

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[551] Ibid. p.68 cited from W. B. Carpenter, *Principles of Mental Physiology*. p. 41

[552] W. B. Carpenter, *Principles of Mental Physiology*. p. 41

[553] For an account of Butler's wider views on the role played by habit and memory in Butler's conception of the human mind, see R.-P. Gounelas, "Mind Matters: Butler and Late Nineteenth-Century Psychology," *Samuel Butler, Victorian Against the Grain*, ed. James G. Paradis (Toronto, 2007).

ninenteenth-century neurophysiologists, such as Henry Maudsley[554] in England or Ewald Hering in Germany. [555]

Another thinker in the early field of psychology whose debt to Carpenter is striking --and self-acknowledged-- is William James (1842-1910).[556] As has been noted by Kurt Danzinger, the particular emphasis placed by William James on habit can be directly traced to Carpenter's works, which he is known to have read very closely and to which he often referred. James also met Carpenter during a trip to London in 1883, which reveals the interest taken by the psychologist in the work of the British physiologist.[557] Danzinger offers the following overview of James's place with regards to British empiricist traditions, underlining the fact that, like Carpenter, he sought to establish psychology as a discipline only scientifically valid if firmly rooted in physiological studies

> A few notable examples of James' direct continuation of doctrines highly characteristic of some of his British predecessors may be mentioned. There is first of all the conception of psychology as a biological science, the tendency to treat many psychological problems as essentially biological problems and to look to biology for final explanations. Secondly, one might note James's commitment to reductionism long propagated by the British empiricists. Thirdly, there is the peculiar emphasis on the concept of habit, which is to be found as far back as Hume, and for which James finds the definitive psycho-physiological model in Carpenter's *Mental Physiology*, 1874.[558]

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554 Henry Maudsley (1835-1918)'s extensive work on the mind and its pathologies was very influential in the field of British psychiatry in the latter part of the nineteenth century. For some of his considerations on memory, see: H. Maudsley, "Memory," *Little Masterpieces of Science*, ed. George Iles (New York, 1902).

555 Ewald Hering (1834-1918) gave a lecture on the topic of what he called "sense-memory", or unconscious organic memory, to the Imperial Academy of Sciences in Vienna in 1870. Samuel Butler's translation of this lecture can be found page 97, chapter VI, of his *Unconscious Memory*, 1880.

556 Another concept put forward by Carpenter, namely that of ideomotor action, was also picked up by James in his discussions of hypnotic states, as will be analysed later in this third part.

557 James gave the following rather unflattering portrait of Carpenter. He wrote to his wife Alice that he had gone "to Dr Carpenter's and found him a very vigorous and egotistic old fogey and philistine, out of whom no great things were to be gained, though he was genial enough." I. Skrupskelis, ed., *The Correspondence of William James* vol. 5 (Charlottesville, 1997).

558 K. Danzinger, "On The Threshold of the New Psychology: Situating Wundt and James," *Wundt Studies, a Centennial Collection*, ed. Wolfgand G. Bringmann (Toronto, 1980). p. 373

Indeed, in his *Principles of Psychology,*[559] James drew heavily on Carpenter as can be seen in his chapter IV entitled *Habit.*[560] The notion that James most admired in Carpenter's discussion of the formation of habits and that he repeatedly insisted on in his own work, was that habit was "at bottom a physical principle", "a chapter in physics rather than in physiology or psychology"[561] which had to do with the "fundamental properties of matter"[562], as he put it. More particularly, it was the notion of the inherent plasticity of all organisms and the ability during the developmental years of the "nervous system to grow to the modes in which it has been shaped"[563] put forward by Carpenter, that James heralded as a major advance in the understanding on habit formation. Carpenter's understanding of the mind and body being inseparable, and of matter being inherently able to give rise to thought as will be detailed in the following sections, made it possible for him to seek the physiological roots of mental processes within the anatomy and physiology of the nervous system. This continuum between matter and thought as advocated by Carpenter, was the premise of James's own bio-physiological understanding of the principles of thought and its unconscious reflexes or habits. This debt to Carpenter is especially evident in the lengthy excerpt of Carpenter's *Mental Physiology* cited by James to underline the parallelism between the plasticity of muscular and physical abilities of the body under the effect of training and repetition (such as in athletes whose bodies were shaped by their physical practice) and that of the nervous system and cerebrum to become imprinted by repetition and form mental habits. Carpenter's argument that the extraordinary activity of the nervous system during

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[559] W. James, *The Principles of Psychology*, vol. 1, 2 vols. (London, 1890).
[560] Ibid. pp. 104-128
[561] Ibid. p. 105
[562] Ibid. p. 104
[563] Ibid. p. 112 Quote from Carpenter's Principles of Mental Physiology, cited by James according to whom it "expresse(d) the philosophy of habit in a nutshell".

developmental years made it all the more important to establish the correct unconscious "pathways" in individuals through an early education, was especially dear to James.[564]

Carpenter's influence on Hebert Spencer has already been discussed by several scholars, notably Stephen Jay Gould[565] and Robert J. Richards. The links underlined between Carpenter and Spencer by Gould and Richards mainly concern Carpenter's role in spreading an awareness of Von Baer's embryology amongst British thinkers, as previously detailed in Part II of this thesis. However, it can also be argued that Carpenter's reach on thinkers like Spencer was more fundamental, in the sense that he can be seen to have helped shape their epistemological approach itself. Just as James openly borrowed Carpenter's analogy between the plasticity of the muscular body and the plasticity of the cerebrum in his discussion of habit, it can be argued that Spencer's analogical approach to the individual, society and the human mind as 'organisms' may have been inspired by Carpenter's own frequent uses of analogy in his scientific work so as to show the continuum of organic life and the universality of natural principles.[566] This argument has been put forward by Victor Hilts, who analyses the likely influence of Carpenter on Spencer's system of thought as one of Spencer's primary sources of scientific information. In his paper, Hilts argues that from a methodological point of view, Spencer "encountered in

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[564] Ibid. pp. 110-112

[565] See for instance S. J. Gould, *Ontogeny and Phylogeny*. p. 112

[566] Spencer's often quoted argument that "surely if a single cell may, when subjected to certain influences, become a man in the space of twenty years; there is nothing absurd in the hypothesis that under certain other influences, a cell may, in the course of millions of years, give origin to the human race" was directly inspired by Carpenter's *Principles of Comparative Physiology*. Indeed, throughout his article—and immediately preceding this sentence—Spencer referred the reader to Carpenter's work. See: H. Spencer, "The Development Hypothesis," *The Leader* (1852). (Originally anonymous) Reprinted in: H. Spencer, *Essays: Scientific, Political and Speculative*.

Carpenter's physiological textbooks an explicit defence of analogy as a means of arriving at scientific generalisations."[567]

Another thinker who popularised Carpenter's concept of "unconscious cerebration" abroad[568] was the French philosopher and psychologist Théodule-Armand Ribot (1839-1916), considered one of the first clinical psychologists in France and founder of the famous *Revue Philosophique* in 1875. Ribot actively promoted a more scientific (rather than metaphysical) approach to the study of the mind, by tirelessly popularising the work of British associationist psychologists and German experimental psychologists in France. A long-standing admirer of British philosophers (he had written his doctoral thesis on David Hartley), Ribot translated Herbert Spencer's *Principles of Psychology* into French in 1874 and subsequently met Spencer who invited him to the Athenaeum Club in 1877.[569] Ribot was thus instrumental in spreading British physiological ideas and among them Carpenter's—both directly, and indirectly through his sustained dissemination of Spencer's evolutionary approach to psychology.[570]

Conclusion to Chapter 8

Carpenter in the second half of the Century emerged as one of the leading figures of what might best be called psychology despite the persistent ambiguities surrounding the use of such a label. His work on the unconscious processes of thought and his concept of 'unconscious cerebration' in particular were influential amongst his contemporaries, both in Britain and abroad. In addition to the influence

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567 V. L. Hilts, "Towards the Social Organism: Herbert Spencer and William B. Carpenter on the Analogical Method," *The Natural Sciences and the Social Sciences* 150 (1994). p.276

568 See: T. Ribot, "La psychologie scientifique en Angleterre: La physiologie mentale de M. Carpenter," *Revue Scientifique* 9 (1875).

569 See S. a. M. Nicolas, David, "Le fondateur de la psychologie "scientifique" française: Théodule Ribot (1839-1916)," *Psychologie et Histoire* 1 (2000). p.7. Ribot alswo met G. J. Romanes, Henry Lewes and Alexander Bain during his trip to England.

570 See: T. Ribot, *La psychologie anglaise contemporaine (école expérimentale)* (Paris, 1870).

of Thomas Laycock, Carpenter was most probably led to reflections on the unconscious operations of the mind through his personal links to William Hamilton. As has been mentioned before by historians such as Marcel Gauchet[571] and Robert J. Richards[572], the notion of latent mental processes was already present in the first half of the century in the writings of German thinkers such as Leibniz ("unconscious mental modifications") and Kant, and were re-worked in a variety of ways by a number of Carpenter's contemporaries, most notably by Hamilton in Britain, and by Hermann Von Helmholtz and Wilhelm Wundt in Germany. It must thus be borne in mind that Carpenter's attempt at re-ordering in detail the nature and hierarchy of mental operations was founded on ideas that were already "in the common domain."[573]

Scholars like Kurt Danzinger have declared Carpenter to have "remained faithful to[574]" sensationalist philosophy and Hartleyian ideas in particular throughout his life. However, though the influence on Carpenter of a Unitarian culture rooted in eighteenth-century associationist philosophy is undeniable, it would be an over-simplification to assume that Carpenter remained exclusively attached to these principles. Similarly, though Carpenter certainly was intent on applying his understanding of the human psyche to fighting social plagues such as alcoholism, branding him an "eminently practical" philosopher who "did not seek answers to the fundamental questions of life[575]" is a deep misunderstanding of Carpenter's overarching metaphysical outlook.

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[571] See: M. Gauchet, *L'Inconscient Cérébral*. pp. 56-57
[572] See: R. J. Richards, "Wundt's Early Theories of Unconscious Inference and Cognitive Evolution in their Relation to Darwinian Biopsychology," *Wundt Studies. A Centennial Collection*, ed. Wolfgand G. Bringmann (Toronto, 1980). pp. 47-49
[573] Ibid. p.49
[574] K. Danzinger, "Constructing the Subject: Historical Origins of Psychological Research." p. 128
[575] Ibid. p. 131

The following section will demonstrate that widening the definition of Carpenter's Unitarian faith --through examining the influence that thinkers such as Martineau and German philosophers had on him in his later years—helps avoid reducing his psychology to a mere expression of scientific naturalism and makes it possible to re-construct the full picture of Carpenter's philosophical and religious world-view in line with the wider developments that Unitarian thought was undergoing in the mid-Nineteenth Century.

Chapter 9. From the Will to Force: Carpenter's quest for a Great Unifying Principle

9.1-Carpenter as a moral philosopher: the centrality of the Will in Carpenter's work

9.1.1- The importance of the Will in Victorian society

In Carpenter's definition of unconscious cerebration, the "will" became the keystone of the human mind, the true point of distinction between the human and the animal, and the last rampart against utter physiological determinism. Since --as Carpenter was bent on explaining-- even mental operations could occur unconsciously in a process of association and according to "the laws of thought"[576], the will or ego was the only agent of active choice. In Carpenter's own words, "we may define Volition or Will as a determinate effort to carry out a purpose previously conceived, and this effort may be directed to the performance of either the Mental or the Bodily acts which are adapted to carry that purpose into execution".[577] This power of self-determination was central to Carpenter's educational enterprise: as the only means of regulating –either by initiating or by halting—thoughts or actions, the

[576] W. B. Carpenter, *Principles of Mental Physiology*. p. 377
[577] Ibid. Chapter IX, 'Of the Will', p. 376

will became the target for education which sought to instil correct regulatory habits. Common sense and the will were considered by Carpenter as intimately linked, and as a safeguard against poor individual or social behaviour and judgment. It was therefore paramount to educate this aspect of the human mind so as to foster an enlightened and just society. As has been previously discussed, Carpenter also believed that a strengthened or weakened will could be hereditary,[578] and the stakes of equipping people to develop a stronger power of self-determination were all the higher:

> But the deficiency of Common Sense, which we occasionally meet with in grown-up Men and Women, depends, not so much upon the want of experience, as on the want of power to profit by it; their minds not having been duly trained in that volitional exercise, which, when it once comes to be habitual, is performed with so slight an effort that it is scarcely perceptible even to ourselves. Slight as this effort may be, however, it is the one thing needful ; and it may be unhesitatingly laid down, that, *if the directing power of the Will be entirely suspended, the capability of correcting the most illusory ideas by an appeal to Common Sense is for the time annihilated*[579].

It is important to remember how central Carpenter's educational mission was to his neurophysiological work, since it in turn explains his emphasis on the notion of will. The deep social and reformatory motive behind his definition of the "will" is indeed apparent in the full title of his book: *Principles of Mental Physiology with their Application to the Training and the Discipline of the Mind and the Study of its Morbid Conditions*.

Carpenter derived this central educational premise --namely that the will was susceptible to habitual conditioning-- from observations of situations in which it faltered or became altogether absent. Indeed, studies by many of Carpenter's colleagues (famously, James Braid) of altered states of consciousness and various

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[578] Carpenter put forward this view in many of his writings, and acknowledged Herbert Spencer's influence on the matter in his presidential address to the BAAS in 1872. He also cited a passage from a letter J.S. Mill had sent him, in which the philosopher agreed with Carpenter that habit could cause certain mental operations to be passed on to future generations. See: W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical*. pp. 197-198

[579] W. B. Carpenter, *Principles of Mental Physiology*. p.390

pathological conditions had shown that this power of volition and self-determination could become entirely disengaged in certain particular states such as sleep or somnambulism, and was generally liable to being "in abeyance" under the influence of certain substances, or of suggestion, sometimes leading to "ideomotor action[580]" without the subject realising that he or she was executing these actions. The study of altered states of consciousness played a significant part in shaping Carpenter's understanding of the will as being a completely separate and mental power from the other activities of the brain (rather than the result of thought processes themselves), and has already been noted by several historians as having been instrumental in generating new physiological understandings of consciousness in the nineteenth century[581].

> Now, that the Will *is* something essentially different from the general resultant of the automatic activity of the Mind, appears to the Writer to be proved, not merely by the evidence of our own consciousness of the possession of a self-determining power (Chap. I.), but by observation of the striking contrasts which are continually presented in abnormal states of Mind, between the automatic activity and the power of volitional control. For, in the first place, it is the special attribute of all " nervine stimulants," such as Alcohol, Opium, and Hachisch, as well as of those morbid poisons which induce Delirium, to exalt the automatic activity of the Mind, while diminishing the power of volitional control; and this not only relatively, but absolutely. A most instructive example of this general fact is furnished by the description given by Dr. Moreau of his own experience in regard to the Hachisch; and the " Confessions of an English Opium-eater" exhibit the same characteristic phenomena. [582]

This definition of the will as the last remaining seat of self, must be understood within the wider context of the nineteenth-century preoccupation with freedom and self-determination, including political self-determination. Several scholars have discussed the centrality of the notion of free will in Victorian rhetoric

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[580] Ideomotor action, according to Carpenter, was a physiological response (such as crying) or muscular action that occurred without a subject consciously deciding to carry it out. For some of Carpenter's key articles on the brain see: W. B. Carpenter (1852, 1868, 1871a, 1871b, 1873). For an analysis of Carpenter's main concepts from the point of view of twentieth-century neuroscience see: E. Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuro-Scientific Concepts*.

[581] See in particular A. Winter, *Mesmerized*. Particularly chapter 11. And R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910* (London, 2013).

[582] W. B. Carpenter, *Principles of Mental Physiology*. p. 392. Italics original. Carpenter refers to Thomas De Quincy's famous account of his addiction to opium, first published in 1921, and which remained for years a standard reference amongst medical circles for the study of the effects of narcotics on the mind.

and culture, most recently Roger Smith in his 2013 study of the concept of Will in nineteenth-century Britain.[583] Smith reminds us of how endemic the concept was in Victorian discourse, and credits Immanuel Kant as being one of the seminal thinkers of the age to have framed the will as the last guardian of individual choice against the perceived incoming tides of materialism and necessity. With studies of the human mind becoming increasingly claimed by physiologists rather than philosophers, defending the notion of the independent will became a means of defending the idea of a soul in Christian terms for certain thinkers.

Roger Smith has mentioned the debates held within the Metaphysical Society as one of the examples of how such questions about physical determinism and independent volition were discussed.[584] Firm defenders of scientific naturalism like Huxley and later Clifford did away with the notion of the will as a superintendent power, and were opposed by thinkers who vindicated the notion of the will, notably the future Cardinal H.E. Manning or W. G. Ward, the Catholic editor of the Dublin Review, who argued in favour of the irreducible human soul. James Martineau and William Carpenter, whose influence on one another was very strong as will be detailed further on in this chapter, joined forces in offering a conciliatory solution which upheld the possibility of an individual human will (and consequently also a divine will), whilst basing this principle on physical laws and scientific observations.

Indeed, it is on the particular point of causation that Carpenter argued in favour of what could be called "scientific moral philosophy" which, to his mind, made it possible to retain the concept of the will without relinquishing logic or science. Carpenter's discussions with John Stuart Mill are revealing of Carpenter's

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[583] R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910*.
[584] See: ibid. Chapter 5.

attempted scientific metaphysics. As early as the 1840s, Carpenter was a vocal admirer of John Stuart Mill's writings, and referred to Mill's work --as well as to Mill's personal feedback on his own thoughts-- in a variety of publications. Evidence of the exchanges that occurred between both men (who were friends --Mill's younger brother had lived with William and Louisa Carpenter for a year in London in the 1850s[585]) can also be found in Mill's published work. In his *System of Logic*[586] for instance, Mill referred to Carpenter's *Principles of Physiology* --and to Carpenter's remarks on vital properties of organic matter as most probably being governed by the same laws as other physical bodies—to illustrate his discussion of causation and of combined causes in particular.[587] However, Carpenter seems to have tried in vain to convince Mill to found his philosophy and epistemology more radically on physical properties. Indeed, Carpenter's entire demonstration of the existence of the human will hinged upon the notion of "force", and of "muscular force" in particular. Carpenter was once again inspired by Scottish common sense philosophy and Thomas Reid's ideas in particular, in his formulation –jointly with James Martineau-- of what Roger Smith has called the "phenomenology of force"[588].

According to Carpenter, who was drawing on the ideas of Reid and Brown before him, the feeling of resistance encountered by any living being was what gave that being a direct understanding of force. This resistance could be felt muscularly, which gave the individual cognisance of physical force, but could also be experienced as a mental obstacle, which gave an individual knowledge of his or her

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585 See: W. B. Carpenter, "The Force Behind Nature," *The Modern Review* January 1880. p.34

586 See: J. S. Mill, *A System of Logic* (London, 1843). pp. 431-432

587 For a discussion of the influence of science on Mill's epistemology, see: S. Jacobs, "From Logic to Liberty: Theories of Knowledge in Two Works of John Stuart Mill," *Canadian Journal of Philosophy* 16.4 (1986).

588 R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910*. p.93

own will. Through the immediate encounter of resistance, the true existence of the will could be validated. Here below is Carpenter's critique of Mill's definition of causation in the *System of Logic*:

> Among these was the Doctrine of Causation set forth in his recently published "System of Logic": "We may define the cause of a phenomenon to be the antecedent, or the concurrence of antecedents, on which it is invariably and unconditionally consequent." I pointed out to my friend that, when this assemblage of conditions is analyzed, it is uniformly found resolvable into two categories, which may be distinguished as the dynamical and the material; the former supplying the force or power to which the change must be attributed, while the latter affords the conditions under which that power is exerted. Thus, I urged, when a man falls from a ladder because (as is commonly said) of the breaking of the rung on which his foot was resting, the real or dynamical cause of his fall is the force of gravity, or attraction of the earth, which pulls him to the ground when his foot is no longer supported; the loss of support being only the material condition or collocation, which allowed the force previously acting as pressure on the rung to produce the downward motion of the man who stood upon it.
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> To this Mr. Mill's reply was, that the distinction is one of metaphysics, not of logic. I ventured, however, to press on him that, to whichever department of philosophy this point is to be referred, it is one of fundamental importance; that, assuming experience as the basis of our knowledge, we recognize the downward tendency of every body heavier than air, by our sense of muscular tension in lifting it from the ground, or in resisting its descent toward the earth; and that our cognition of force through this form of sensation, being thus quite as immediate and direct as our cognition of motion through the visual sense, ought to be equally taken account of.[589]

What Carpenter deplored, was that contemporary scientific epistemology was doing away with the notion of force in its way of conceiving of causality. Amidst the debate about the possibility of the will as an independent power, Carpenter thus argued more for the re-instatement of the concept of "force" as an efficient cause. In his own words, Carpenter felt that " the mechanical philosophy of the present day tend(ed) more and more to express itself in terms of motion rather than in terms of force, to become *kinetics* rather than *dynamics*[590]." Placing the notion of force at the centre of the philosophical and epistemological approach to science left the door open to an understanding of the human mind as a power and causal agency in itself.

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[589] W. B. Carpenter, "The Force Behind Nature."pp. 34-35

[590] See: "Man the Interpreter of Nature" in W. B. Carpenter, *Nature and Man, Essays Scientific and Philosophical*. p.206

9.1.2-"Man not an Automaton"

The debate which Carpenter entered into with T. H. Huxley and the mathematician William Clifford in 1875 about whether or not man was an 'automaton'[591], further illustrates Carpenter's understanding of the will as a moral agent. Carpenter's insistence on the Will as the last fortress of independent volition and moral responsibility can indeed be read, as previously suggested, as a metaphysical claim in favour of religious naturalism over scientific naturalism[592]. It also sheds additional light on Carpenter's precise understanding of force as the unifying principle at work within the world, which, this thesis claims, leaves his writings open to a monistic interpretation.

At the 1874 Belfast meeting of the BAAS, and later the same year in an essay entitled "*On the Hypothesis that Animals are Automata and its History*[593]", T. H. Huxley had defended the slightly modified Cartesian point of view according to which animals –and therefore human beings—were not unconscious machines, but "conscious automata" set in motion by their nervous systems and equipped with a special apparatus in the brain which produced those states of consciousness more generally known as sensations, emotions and ideas. Huxley also asserted that if animals had any volition at all, "it (was) an emotion indicative of physical changes, not a cause of such changes." Huxley was seconded in his claims by the physicist John Tyndall and by the mathematician William Clifford who stated in an article published in the *Fortnightly Review* of December 1874[594] that the postulate "the will

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[591] Roger Smith has also recently discussed this debate. R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910*. Chapter 2.

[592] This particular interpretation is also given by L. Daston, "The Theory of Will versus the Science of Mind." p. 96 and 111

[593] T. H. Huxley, "On the Hypothesis that Animals are Automata, and its History," *Science and Culture and Other Essays*, ed. T.H Huxley (London, 1888).

[594] W. Clifford, *Fortnightly Review* 1874.

influences matter" was "nonsense". Carpenter immediately took issue with these views and expressed his disagreement in *The Contemporary Review* of February 1875[595] as well as in the preface of the fourth edition of his *Principles of Mental Physiology*[596].

Indeed, Carpenter's colleagues' statements attacked the central notion that he had been developing throughout his career, namely, that of an "Ego" or "Will", which could counter-balance and even counteract physical determinism[597]. Huxley's arguments also went against Carpenter's postulate of a two-way influence between external stimuli and internal stimuli (emanating from the will) on human physiology and human thought. Carpenter strongly disagreed with Huxley's idea that the notion of the reflex action of the cerebrum had put the nail in the coffin of "volition" as being an independent process thanks to which an individual could exert control over his or her body. In Carpenter's view, the new understanding of the human brain only meant that the will was one step removed from the execution of the actions it prompted, instead of being directly responsible for them. It did not have "immediate voluntary control over the muscles", but it had "the power of making the automatic apparatus perform anything that lies within its capacity"[598]. In other words, the new understanding of the organ of the brain as being analogous to other lower nervous centres, did not bring with it the necessary corollary that a higher level of independent volition was no longer possible:

> That there is a *mechanism* of thought and feeling, the action of which forms part of the life of the body (…) can be doubted by no psychologist who is also a physiologist. (…) But is this all? Have we no power to control and direct this automatic cerebral action, as the cerebral action itself directs and controls the action of the lower centres? Does the

[595] W. B. Carpenter, "On the Doctrine of Human Automatism," *Contemporary Review* 1875.
[596] W. B. Carpenter, *Principles of Mental Physiology*.
[597] In promoting the concept of the Will as a moral agent, Carpenter seems to have blended ideas borrowed from the British empirical school of philosophy with principles derived from Kant's idealism (in particular the concept of categorical imperative) as interpreted by James Martineau.
[598] W. B. Carpenter (1874, p. 279)

> body of man constitute his *whole self*, or is there an *Ego* to which that body is in any degree subservient? To these questions it does not seem to me to be within the capacity of physiology –limiting that term to man's corporeity—to give an answer. (…) But to say that this is the only way in which science permits us to regard it, is to disregard that on which all science is based—experience. Surely our own immediate mental experiences are as worthy of confidence, as are deductions drawn from phenomena outside ourselves.[599]

Carpenter was once again drawing on his common sense philosophy, according to which direct empirical knowledge, such as the fact of experiencing one's own independence of intention, was proof enough of the existence of this directing volition, or "will" [600]. He therefore opposed Huxley's underlying argument (and other similar assertions such as those previously made by De La Mettrie in France[601]) that the human mind was simply a by-product of human physiology, a mere response to external forces. He argued in favour of a much more fluid, two-way view of the relationship between mind and body, turning around Huxley's own assertion that "neuroses could give rise to psychoses" and arguing therefore that " it was surely quite accordant with the great fundamental principle of interaction to affirm that conversely psychoses could give rise to neuroses; just as the electricity generated in a voltaic battery by chemical change, could itself produce chemical change." [602]

9.2-Carpenter's concept of matter and force: a scientific monism?

In his discussions of Carpenter's position with regards to the Will, Roger Smith presents the physiologist as one of the increasingly isolated thinkers towards the end of the century who, in continuing to assert the existence and supremacy of the will, had reintroduced "an unjustified and indeed incomprehensible dualism into

[599] W. B. Carpenter (1874, p. 282)
[600] Carpenter wrote several essays on his understanding of the philosophical concept of 'common sense'. See for example: W. B. Carpenter, "What is Common Sense?."
[601] J. O. La Mettrie, *L'Homme-Machine* (Paris, 1747).
[602] W. B. Carpenter (1874, p. 283)

nature."[603] Other historians, in studying his attitude to psychical phenomena (as will be discussed further on), have labelled Carpenter as a fervent defender of scientific naturalism whose approach excluded the possibility of a spiritual dimension in his understanding of the human mind, or reduced his vision to Hartleyian associationism.[604] Both these assessments of Carpenter's standpoint with regards to the mind-matter debate seem to fall short of uncovering the nuances of Carpenter's personal metaphysics. I will thus argue that Carpenter's concept of *force* as the basis of all creation enabled him to move beyond physical determinism as well as the duality of mind and matter. I will suggest that rather than being a dualist, Carpenter on the contrary tried to advocate a form of monism based on an energeticist understanding of nature.

As previously mentioned, the Unitarian wish to strip Christianity of superstition and obscurantism underpinned Carpenter's vision of the relationship between science and religion, making science the only true means of attaining divine revelation through reading the "Book of Nature."[605] As seen in his study of the Foraminifera, Carpenter attributed special value to the notion of the *unity* and *uniformity* of natural laws as evidence of a teleological universe. Pursuing his quest for the greatest possible denominator behind all observable phenomena, Carpenter became particularly fascinated with the emerging theory of the correlation of physical forces, more specifically with the law of conservation of energy developed amongst others by James Prescott Joule, William Thomson and William Grove, which Carpenter hoped would one day be extended to the vital properties of

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[603] R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910*. p.23
[604] See for example: K. Danzinger, "Mid-Nineteenth-Century British Psycho-Physiology: A Neglected Chapter in the History of Psychology." p. 128.
[605] On this topic see the following works: J. Raymond and J. V. Pickstone, "The Natural Sciences and the Learning of the English Unitarians," *Truth, Liberty, Religion. Essays celebrating two hundred years of Manchester College.*, ed. Barbara Smith (Oxford, 1986).pp. 127-164, R. E. Schofield, *The Enlightened Joseph Priestley, A Study of his Life and Work from 1773 to 1804*.

organisms as he had himself tried to do.[606] Following the lines of Grove's hypothesis, Carpenter posited an equivalence between heat and light, seeing them as two different manifestations of one supreme all-pervasive energy, or "force". In his article *The Force Behind Nature*, Carpenter spelled out his anti-materialistic vision of the cosmos as pervaded by divine power, which humans could become cognisant of through their "force sense", or "sense of effort", a concept which he openly admitted sharing with Herbert Spencer and Sir John Herschell.[607]

Indeed the "sense of effort" was particularly important in Carpenter's philosophy, because not only did it reveal the existence of *power* to the mind (rather than just inert matter, or movement), but by analogy it also linked this power to will-power, by making the individual aware of his or her own decision to resist the force encountered. Thus for Carpenter, this "sense of effort" established an intimate connexion between the power at work in the cosmos and the power of the will, enabling him to posit that the force behind nature might itself be a form of divine Will, and therefore, Mind. According to Carpenter, since solar radiation was the ultimate cause of all heat and all physical and vital energy on Earth[608], and since the

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[606] See: W. B. Carpenter, "On the Mutual Relations of the Vital and Physical Forces."

[607] Carpenter quoted a passage from Herschell's *Familiar Lectures on Scientific Subjects* p.460, as an exemplary description of what he meant by force sense: "In the mental sense of effort, clear to the apprehension of everyone who has ever performed a voluntary act, which is present at the instant when the determination to do a thing is carried out into the act of doing it, we have a consciousness of immediate and personal causation which cannot be disputed or ignored. And when we see the same kind of act performed by another, we never hesitate in assuming for him that consciousness which we recognise in ourselves: and in this case we can verify our conclusion by oral communication. (…) In the only case in which we are admitted into any personal knowledge of the origin of Force, we find it connected "possibly by intermediate links untraceable by our faculties, yet indisputably *connected*" with volition, and by inevitable consequence, with motive, with intellect, and with all those attributes of Mind in which personality consists." See: W. B. Carpenter, "The Force Behind Nature." p.50

[608] For that reason Carpenter took a great interest in William Crookes's invention, the "Radiometer", presented to the Royal Society in 1875. However Crookes's hypothesis that the device (dubbed the "light mill") was being moved by a newly-discovered ability of light to cause mechanical motion through radiation was soon discarded by the scientific community, in favour of the explanation that there were residual gases in the vacuum that were being heated by the source of light and moving the apparatus through expansion. In an article published in 1877 in the Metaphysical Society's journal the *Nineteenth Century*, Carpenter used the case of the Radiometer as an example of how science

formation of the sun itself was the result of nebular condensation –in other words the ultimate known creative event in the universe--, the cause of all force must surely have emanated from the "Divine First Cause". For Carpenter, this correlation was a revelation of the immanence of the deity in nature[609] and seemed to point to the origin of all matter, all movement and all life-processes in energy. Matter itself was inseparable from force because --as a vehicle for it-- it was necessarily co-extensive with it. Going one step further, as mentioned above, Carpenter equated this force with the manifestation of a divine *mind:*

> I expressed the opinion that Science points to the origination of all Power in Mind. This is no new doctrine (…) but I think that it derives a new importance from the recent development of the Dynamical Philosophy, which looks at Matter as the mere vehicle of Force and regards the various modes of Force, how diverse soever in their manifestations, as mutually convertible.[610]

It can be noted that Carpenter's reasoning on this particular point was clinched by his physiological doctrines:

> As a Physiologist, I most fully recognise the fact that the Physical Force exerted by the body of Man is not generated *de novo* by his Will, but is derived from the oxidation of the constituents of his food. But holding it as equally certain, because the fact is capable of verification by every one as often as he chooses to make the experiment, that, in the performance of every volitional movement, that Physical Force is put in action, directed, and controlled, by the individual personality or *Ego*, I deem it just as absurd and illogical to affirm that there is no place for a God in Nature, originating, directing and controlling its forces by His will, as it would be to assert that there is no place in Man's body for his conscious Mind.[611]

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consisted in interpreting facts correctly, at the cost of relinquishing one's "pet hypotheses" if necessary. See: W. B. Carpenter, "The Radiometer and its Lessons," *The Nineteenth Century* (1877). p. 254. (Carpenter refers to this experiment again in his later work: W. B. Carpenter, "The Force Behind Nature.") For Crookes's response to Carpenter's epistemological lesson, in which he accused the physiologist of misrepresenting his views, see: W. Crookes, "Another Lesson from the Radiometer," *The Nineteenth Century* (1877). For a detailed account of Crookes's research on the Radiometer, see: A. E. Woodrfuff, "William Crookes and the Radiometer," *Isis* 57.2 (1966).

609 For evidence of Carpenter's immanentist view of God, see for example: W. B. Carpenter, "On Mind and Will in Nature," *Contemporary Review* October 1872. p.761. In this article, it can once again be noticed that in a typical conciliatory and anti-dualistic manner, Carpenter offers to reconcile two traditionally opposed understandings of God: the immanent and the transcendent views, claiming that: "the truths which these separate views contain, are in perfect harmony with each other; and the very act of bringing them into combination effects the elimination of the errors with which they were previously associated." (p.762) Carpenter thus argues in favour of a First Great Cause which is immanent in Creation, yet possesses the directing influence of "Will" as traditionally associated with an anthropomorphic understanding of God with a personality, operating from without his Creation.

610 W. B. Carpenter, "What is Common Sense?." p. 747

611 W. B. Carpenter, "The Force Behind Nature." p. 50

In other words, the ability of living beings to relate to the world around them through what he called their "force sense" or muscular sense (based on the sensorial input caused by resistance—as previously explained), that is to say, the fact that neurophysiology had proved --as he saw it-- that there was no physical causation of force in a human being without the involvement of mind, it necessarily followed that the ultimate First Cause behind the functioning of the Universe was some form of meta-mind or Divine will. Carpenter clearly articulated this analogy in his 1857 article *The Phasis of Force*, making his own pantheistic view very obvious:[612]

> And as we are thus led by the "correlation doctrine" to consider the various agencies of nature as the expression of a conscious will, we find the highest science completely according with the highest religion, in directing us to recognise the omnipresent and constantly sustaining energy of a personal deity in every phenomenon of the universe around us –the pantheistic and anthropomorphic conceptions of his character being thus brought into harmony when we view "nature" as the embodiment of divine volition, the forces of nature as so many diversified modes of its manifestation, and the laws of nature as nothing but man's expressions of the uniformities which his limited observation can discern in its phenomena.

We can also notice in this passage that Carpenter was trying once again to bring together two different visions of God, the anthropomorphic and the pantheistic, which were generally felt to be irreconcilable. In defining God's omnipresence as that of a conscious mind, Carpenter was presenting a version of pantheism which retained some elements of an anthropomorphic creator. Thus, much as Carpenter's Christian faith had influenced his teleological view of nature, it seems that conversely, his physiological concepts about the relationship between body and mind furnished him with the theological arguments in favour of the existence and attributes of God.

The most direct expression of Carpenter's monism can be found in his article *What is Common Sense?* in which he once again urges his readers to resist the dualism of opposing viewpoints and defines mind and matter as "the two sides of

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[612] W. B. Carpenter, "The Phasis of Force," *Nature and Man*, ed. Joseph E. Carpenter (London, 1888). pp. 183-184

the same shield,"[613] as the two modes of a same reality. Carpenter's vision can thus be categorised as a form of dual-aspect monism, and more widely as a version of panpsychism,[614] a label used to describe philosophical doctrines that posit mind as a fundamental and all-pervasive feature of the universe.

However, framing the question of Carpenter's personal cosmogony in terms of "monism" is problematic for several reasons. Firstly, the label of monism has often been applied to thinkers retrospectively and was not claimed by them during their lifetime, which makes it a somewhat artificial categorisation whose validity can consequently be questioned. Secondly, there are many different acceptations of the term monism itself, and the monism of Spinoza cannot be confused with that of Leibniz or Haeckel for example. Finally, the subject of how widespread a monistic view of the universe was in Europe in the nineteenth century has received relatively little attention from scholars, and any attempt to describe Carpenter's world-view in such terms must also be verified against a more in-depth study of the circulation of monistic ideas in Europe and Britain more particularly.[615] Another difficulty lies in the fact that Carpenter's monism is not often apparent in his writing, which may explain why it has been largely overlooked so far despite their being evident reasons for identifying it as such. More widely, Carpenter's attempts at articulating his own

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613 W. B. Carpenter, "What is Common Sense?." p.762

614 See: W. Seager, *"Panpsychism" in The Stanford Encyclopedia of Philosophy*, 2015, Available: <http://plato.stanford.edu/archives/fall2015/entries/panpsychism/>.

615 For a recent overview of the question, however, see: T. H. Weir, ed., *Monism. Science, Philosophy, Religion, and the History of a Worldview* (New York, 2012). In his chapter in the book, entitled 'Monism in Britain: Biologists and the Rationalist Press Association', Peter J. Bowler writes of his initial surprise at being asked to work on the subject of monism in Britain since it did not seem to be a philosophy that had been expounded by many in the British isles, and explains his later conclusion that such ideas were in fact more widespread than commonly thought, though the term "monism" was rarely claimed by the authors themselves (p.194). Bowler focused his study on early 20th-century British agnostics and rationalists, tracing the links between their ideas and the monism of Haeckel or Romanes for example, and studying the influence of the publication of the American journal *The Monist*, created by Paul Carus in 1890. I suggest that Carpenter's ideas, and more generally, earlier British thinkers, should be included in future studies of this hitherto neglected aspect of nineteenth-century British thought.

brand of metaphysics have been little discussed, probably because he did not put them forward in a systematic or comprehensive way. The physiologist may have lacked confidence in straying too far into the terrain of metaphysics, and was most likely also wary of undermining his hard-earned reputation as a man of science by writing anything too philosophical, much as he privately believed that metaphysics ought to be founded anew on the most recent advances of the natural sciences.

Nevertheless, I suggest that discussing Carpenter's philosophy in terms of monism is the best-suited definition of his cosmogony. Though no clear links have been found to evidence any direct exchange of ideas on the topic of monism between Carpenter and Haeckel, or between Carpenter and George John Romanes for example, the mere fact that these contemporaries were thinking in similar terms, lends weight to the plausibility of Carpenter's own cosmogony being monistic. Little scholarship exists on Romanes's and William Clifford's monism[616], or on the filiations between their ideas and those of William James's later "neutral monism" for example, but the deep similarities between Romanes's dual-aspect monism and Carpenter's own writing makes the label monism easily transferable to the physiologist. Indeed, in the posthumously published essays by Romanes, the chapter entitled "Monism" expounds a vision of the universe pervaded by force (an idea Romanes backed by referring the doctrine of the conservation of energy in a similar manner to Carpenter) where mind and matter --or mind and body-- were but two aspects of higher form of mind[617]. Stephen Jacyna also mentions that Laycock's views on the relationship between body and mind, which were closely akin to

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616 In focusing on monism in Britain after the translation of Haeckel's *Riddle of the Universe* into English in 1900, Peter J. Bowler bypasses the question of late nineteenth-century British monists such as Clifford and Romanes.

617 See: G. J. Romanes, *Mind and Motion and Monism* (New York & London, 1895). For William Kingdom Clifford's monism and famous expression of "mind-stuff", see: W. K. Clifford, "On the Nature of Things-in-Themselves," *Mind* 3.9 (1878).

Carpenter's as previously stated, were identified at the time by contemporary thinkers as being a form of Spinozist or Leibnizian monism, where the elementary particles of matter were themselves sentient.[618] It must also be remembered that within the context of cell-theory, much was being written at the time in Europe about the possible consciousness of elementary organisms, reflecting a general questioning about the extent to which all matter could become conscious.[619]

In addition to this, other scholars have previously referred in passing to Carpenter as a monist: when writing about the publication of the *Vestiges of the Natural History of Creation* in 1844, Boyd Hilton mentions in a footnote that "others suspected of writing *Vestiges* were George Combe, Ada Lovelace, William Carpenter, Andrew Crosse, J.P. Nichol, and Francis Newman, all of whose thought was in the monistic tradition[620]." Lorraine Daston also identifies Carpenter's philosophy as being monistic, most probably borrowed from Gustav Fechner's double-aspect monism "which considered mind and matter as two aspects of a single world-stuff viewed from different perspectives."[621] Daston does not give any evidence to trace Carpenter's ideas back to Fechner, but it is a hypothesis that seems entirely plausible due to Carpenter being well acquainted with German thought.

Finally, Carpenter's philosophy may have been misunderstood because of the assumed influence on his thought of other Unitarian thinkers, such as Joseph Priestley. Priestley's views are often labelled 'materlialistic', since he himself used the term materialism to define his philosophy. However, it is important to point out

[618] See: L. S. Jacyna, "The Physiology of Mind, the Unity of Nature, and the Moral Order in Victorian Thought," *The British Journal for the History of Science* 14.2 (1981). p. 118

[619] See: J. Johns Schloegel and H. Schmidgen, "General Physiology, Experimental Psychology, and Evolutionism: Unicellular Organisms as Objects of Psychophysiological Research, 1877-1918." For a clear example of nineteenth-century monism based on an understanding of cells as conscious beings, see: J. Soury, *Le Système nerveux central, structure et fonctions: Histoire critique des théories et des doctrines* (Paris, 1899). Chapter V, p. 1763.

[620] B. Hilton, *A mad, bad, and dangerous people? : England 1783-1846*. p. 457

[621] L. Daston, "The Theory of Will versus the Science of Mind." p. 104

that in his effort to redefine the very nature of matter, Priestley's version of materialism can in fact be conflated with monism. Robert E. Schofield has demonstrated this in his work, most notably in his article *Monism, Unitarianism and phlogiston*, as well as in his later book *The Enlightened Joseph Priestley.*[622] Schofield shows that in his *Disquisitions relating to Matter and Spirit* published in 1777[623], Priestley reassessed the very meaning of matter as units of attraction and repulsion (a notion resonant with Carpenter's own notion of resistance and force-sense), so that "matter (was) by this means, resolved into nothing but the divine agency, exerted according to certain rules."[624] Schofield also points out that Coleridge had picked up on Priestley's conversion of matter into spirit, and cites the following passage to illustrate the poet's interpretation of Priestley's monism -- which could also be dubbed panpsychism:

> For since impenetrability is intelligible only as a mode of resistance; its admission places the essence of *matter* in a mode of power which is possesses in common with spirit; and body and spirit are therefore no longer absolutely heterogeneous, but may be without any absurdity be supposed to be different modes, or degrees of perfection, of a common substratum…. But as soon as materialism becomes intelligible, it ceases to be materialism. In order to explain *thinking* as a material phenomenon, it is necessary to refine matter into a mere modification of intelligence…Even so did Priestley…He stripped matter of all its material properties; substituted spiritual powers.[625]

The resemblance between Coleridge's interpretation of Priestley's materialism and Carpenter's writings, is striking, and further confirms that it would not be

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[622] See: R. E. Schofield, "Monism, Unitarianism and phlogiston in Joseph Priestley's natural philosophy," *Enlightenment and Dissent*.19 (2000). R. E. Schofield, *The Enlightened Joseph Priestley, A Study of his Life and Work from 1773 to 1804*. (pp. 75-76 in particular)

[623] J. Priestley, *Disquisitions relating to matter and spirit. To which is added the history of the philosophical doctrine concerning the origin of the soul, and the nature of matter, with its influence on Christianity, especially with respect to the doctrine of the pre-existence of Christ.* (Birmingham, 1777).

[624] J. Priestley, *A free discussion of the doctrines of materialism, and philosophical necessity, in a correspondence between Dr. Price, and Dr. Priestley. To which are added, by Dr. Priestley, An introduction, explaining the nature of the controversy, and letters to several writers who have animadverted on his Disquisitions relating to matter and spirit, or his Treatise on necessity.* (London, 1778). p. 250, cited in R. E. Schofield, "Monism, Unitarianism and phlogiston in Joseph Priestley's natural philosophy." p.89

[625] S. T. Coleridge, *Biographia Literaria*, ed. J. Shawcross (London, 1907). Vol.1, pp. 88-91. Quoted in R. E. Schofield, "Monism, Unitarianism and phlogiston in Joseph Priestley's natural philosophy." pp. 89-90.

implausible to classify Carpenter's ideas as belonging to a similar vein of monism where matter and power were intimately linked, and which evidently resonated with a romantic conception of nature for contemporaries such as Coleridge.

9.3-Martineau's influence on Unitarianism and on Carpenter's views

Scholars such as Martin Wauck have shown how James Martineau, as the main Unitarian thinker of the Nineteenth Century in Britain, operated a theological shift towards a more romantic interpretation of the creed, inspired by German thought and Kant's ideas in particular.[626] The close relationship between Carpenter and Martineau, who had studied in Bristol under Lant Carpenter as mentioned in part I of this thesis, provides evidence of Carpenter's own move towards a more personal and intuitive experience of his faith. The correspondence between both men reveals that Carpenter turned to Martineau for guidance in matters of philosophy and religion, a fact also attested by Carpenter's son Joseph Estlin Carpenter.[627] Martineau and his followers rejected the belief in certain miracles that Priestley had declared possible, but remained open to the idea of the immortality of the soul following Priestley's earlier break with mortalism.[628] Joseph Estlin Carpenter, who became principal of Manchester College in Oxford from 1906 until 1915 also openly spoke in favour of the possibility of life after death for the human spirit.[629] These elements all make it plausible that Carpenter's own private Unitarian faith was a more flexible and contemplative form of spirituality than the rationalist,

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[626] See: R. Waller, "James Martineau: The Development of his Religious Thought," *Truth, Liberty, Religion. Essays celebrating two hundred years of Manchester College.*, ed. Barbara Smith (Oxford, 1986), M. P. Wauck, "*Religion, reason, responsibility: James Martineau and the transformation of theological radicalism in Victorian Britain, 1830--1900*." Chapters 3 and 4 especially.

[627] J. E. Carpenter, "Memorial Sketch."

[628] Priestley held that the human soul, despite being a physical entity, did not die with the body but merely "slept" until the day of resurrection. J. D. Bowers, *Joseph Priestley and English Unitarianism in America*. p. 34

[629] J. E. Carpenter, *The Place of Immortality in Religious Belief: a Discourse* (London, 1898).

materialist creed still commonly taken to represent Unitarianism. The possibility of the endurance of a human soul may have made Carpenter more open to certain considerations in psychical research, as will be shown later.

However, Carpenter's close cooperation with Martineau on metaphysical questions has also caused hasty assumptions to be made about the physiologist's views, which are often entirely equated with those of Martineau as a result of their friendship. For instance, Martin Wauck states that: "James Martineau and his close friend, the Unitarian physiologist William Benjamin Carpenter, abruptly abandoned Priestley's monism and argued for a duality between matter and mind that would preserve freedom, morality and a God independent from nature."[630] In making this claim, Wauck is drawing on Stephen Jacyna's analysis, as found in his article on the *Physiology of Mind and the Unity of Nature*[631], in which he explains Martineau and Carpenter's emphasis on the notion of personal and divine will as a means to preserve authority and moral responsibility in society. Although Carpenter undoubtedly shared Martineau's social agenda, it would nevertheless be taking a shortcut to assume that he relinquished his monism. I suggest that Carpenter's own private philosophy must be distinguished from Martineau's ideas, and that the physiologist went further than his friend in terms of a scientifically-based Unitarian monism, which he upheld, even though he also asserted the existence of a superseding divine intelligence.

The following extract taken from a letter sent by Martineau to Carpenter after reading his 1872 presidential address at the BAAS meeting,[632] highlights the

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630 M. P. Wauck, "*Religion, reason, responsibility: James Martineau and the transformation of theological radicalism in Victorian Britain, 1830--1900*." p.18

631 L. S. Jacyna, "The Physiology of Mind, the Unity of Nature, and the Moral Order in Victorian Thought." pp. 123-126

632 W. B. Carpenter, "Man the Interpreter of Nature, Presidential Address at the British Association, Britghton, 1872."

fact that Martineau did not quite follow Carpenter's theory about force, which, as we have shown, formed the cornerstone of Carpenter's energeticist version of monism:

> I do not see how we can claim more than access to the Laws of phenomena, in their grouping and succession: nor can I hesitate to accept a Positivist dictum that causes lie entirely beyond scientific cognisance. Our own causality, as you justly say, we do directly know: but causality other than our own, we do not know by either observation or consciousness: we observe only movement, we feel only certain sensations of our own, both of which are phenomena not their causes: and our reference of such things to an objective causality which is not in our experience, is, I take it, an intuitive intellectual act, planting outside of us the counterpart and antithesis of the power which we put forth from within. Of the authority of this intellectual act, as a thinking of phenomena at all is denied, no ground whatever appears to me to remain for "Dynamical laws": and either Mill or Büchner would easily throw back your 2nd class into the 1st. They would ask what more you find in the conditions of the action of a force than the concurrence or sequence of phenomena; i.e than the 'laws of phenomena", and would protest that the "Direct Consciousness" to which you appeal is still nothing but an order of feelings, i.e of "internal phenomena": and, on the ground of scientific experience and method, I really do not see how an answer could be given to this.[633]

Therefore conflating Carpenter's views with of those of Martineau presents the risk of bypassing his originality and his wish to uphold a monistic understanding of the universe. Rather than relinquishing his version of a dual-aspect monism integral to which was the concept of force, it appears that Carpenter tried to accommodate his cosmogony with the idea that there was a certain hierarchical order "governance" at work in the unified cosmos.

Conclusion to chapter 9

Carpenter's theorisations on the relationship between body and mind, and in particular on the possibility of retaining a superintendent moral agency in spite of the unconscious nature of many cerebral processes, had deep ramifications for his lifelong philosophical, social and religious thought. His ideas on the effect of the will (be it consciously or unconsciously though ideomotor action) on initiating muscular force, provided him with an analogy which helped him articulate his understanding of a pervasive divine agency in the world. In defining all matter as an

[633] Letter from Martineau to Carpenter, in the Joseph Estlin and Lant Carpenter Archives, Harris Manchester College, Oxford. MS J.E. Carpenter 1, f. 31.

aspect of (as well as a vehicle for) force, and in equating force with a form of volition or "mind", Carpenter was putting forward a energeticist, teleological monism where all creation was ultimately an expression of the divine mind, where all being was, in effect, intellect.

The context and currency of monism in nineteenth-century Britain remains insufficiently studied, but the approach taken by Romanes, Laycock and Clifford, among others, provides some preliminary clues as to the probable circulation of such ideas in the country. In addition to this, and even though both men didn't exactly agree on the particulars of their philosophy, the mentoring relationship between Martineau and Carpenter further demonstrates that scholars must remember to interpret Carpenter's scientific work as a philosophical and spiritual endeavour so as fully understand it. Martineau's new Unitarianism deeply influenced Carpenter's attitude towards science, by leaving the door open to the immortality of the soul and by encouraging a more mystical, personal spirituality based on the premise that Unitarian worship needed to be re-imagined. This, it will be argued in the final chapter, may have made Carpenter more receptive to certain unorthodox ideas, in particular those to do with the power of mind. Indeed, his understanding of all physical reality as being an immanent divine *intellect* may have authorised him – even though he seems to have remained dissatisfied with their findings-- to sympathise with investigations into "undiscovered forces".

Chapter 10. Carpenter and psychical research: a new archival review

10.1-Carpenter and spiritualism: the "Great Opponent of all Humbug"

In Carpenter's overarching ideal of an enlightened society where people could make responsible decisions and live together in harmony, training the mind to tell truth from artifice was of the utmost moral, social and political importance. Carpenter was especially concerned by what he saw as humanity's tendency to be credulous and swayed by superstition, and amidst the wave of psychical experiments sweeping across North America and Europe in the second half of the century, he became famous for his relentless criticism of spiritualism. Carpenter denounced the lack of rational and empirical basis for some of the claims being made by spiritualists and his scepticism on the issue earned him the reputation of one of the most active detractors of spiritualism in Britain. Writing and lecturing assiduously on the topic of 'Mesmerism and Spiritualism', 'Thought-Reading' and 'Somnambulism', he did his utmost to debunk popular notions of supernatural agency and otherworldly interferences, in the same way as he had previously criticised the practice of phrenology and using the popular craze ignited by such practices as an argument in favour of urgently reforming scientific education in the country.

One of the defining moments in Carpenter's public battle against what he felt to be the excessive gullibility of the population, occurred at the beginning of the 1870s. In 1872, the physicist and psychical researcher William Crookes angrily printed a series of letters in a bid to expose the prejudices of the intellectual elite against "scientific men" such as himself " who have learnt exact modes of working" and who "consider it their duty…to examine the phenomena which attract the attention of the public"[634]. The printed letters were entitled *Correspondence upon Dr. Carpenter's Asserted Refutation of Mr. Crookes's Experimental Proof of the Existence of A Hitherto Undetected Force* and were intended by Crookes as a means of repairing the injury done to his reputation by his fellow member of the Royal Society. The series of seven letters exchanged between Crookes, George Stokes (then the Secretary of the Royal Society), Charles Wheatstone and Carpenter, reveal the tense diplomatic tiptoeing that was taking place around the topic of psychical research within the institution[635]. Neither the secretary of the Royal Society nor his colleagues were satisfied with the parameters of Crookes's experiment, which consisted in using a bowl of water surmounted by a stabilising apparatus to dip a pair of scales. By merely inserting one hand into the water, the operator would be able to exert a "force" without applying any direct muscular pressure on the bowl[636]. The paper submitted by Crookes was rejected twice by the Council of the Royal Society. Nevertheless, despite strong reservations about the scientific legitimacy of the experiment, and in response to Crookes's complaint about Carpenter, the Council admitted that the physiologist had relayed private information without the consent of his sources, and that this was a breach of professional and gentlemanly etiquette.

Crookes was eager for this concession to be made public, because it acknowledged the type of negative attitudes that he was increasingly hitting

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[634] W. Crookes, *Researches in the Phenomena of Spiritualism* (London, 1874). p.3

[635] The term "psychical research", which only became widespread after the Society for Psychical Research (SPR) was founded in 1882, is being used for simplicity's sake despite the slight anachronism.

[636] For full details and pictures of the experiment in question, see W. Crookes, "Correspondence upon Dr. Carpenter's Asserted Refutation of Mr. Crookes's Experimental Proof of a Hitherto Undetected Force," (London, 1872), vol. pp. 6-8

against[637]. His anger was understandable, for Carpenter's tone in the debate was often condescending at the very least, and the pugnacity with which he criticised spiritualist claims sometimes had the rather undignified flavour of ad hominem attacks. Carpenter's vindictive attitude in the debate over animal magnetism and spiritualism in mid-Victorian Britain is the aspect of his career that is still best remembered and has been discussed by several historians[638].

The role played by the spiritualist controversy in shaping professional science in the second half of the Nineteenth Century has also been analysed by several researchers such as D. J. Coon and Andreas Sommer, notably in the context of American psychology[639]. Alison Winter and Richard Noakes have shown how this rift allowed scientists to establish their professional authority by drawing clear boundaries between charlatanism and official science, and Peter Lamont has also analysed the social and intellectual dynamics of scientific enquiry into the spiritualist séances[640]. There is indeed a clear link between heterodoxy and the development of Carpenter's ideas, as his understanding of the human mind can be said to owe a lot to his observation of the spiritualist craze and his consequent wish to get to the root of what caused so many people to become, in his view, deluded. His idea of individuals –be they medical patients or scientists themselves-- falling

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[637] For an analysis of the public confrontation between William Crookes and William Carpenter, see R. Noakes, "Spiritualism, Science, and the Supernatural in Mid-Victorian Britain," *The Victorian Supernatural*, ed. Burdett C Brown N, Thurschwell P (Cambridge, 2004). pp. 33-38 and J. Oppenheim, *The other world : spiritualism and psychical research in England, 1850-1914*. p. 352. See also: P. Lamont, "Spiritualism and A Mid-Victorian Crisis of Evidence," *The Historical Journal* 47.4 (2004). pp. 911-913

[638] J. Oppenheim, *The other world : spiritualism and psychical research in England, 1850-1914*. A. Winter, *Mesmerized*. R. Noakes, "Spiritualism, Science, and the Supernatural in Mid-Victorian Britain." P. Lamont, "Spiritualism and A Mid-Victorian Crisis of Evidence." P. Lamont, *Extraordinary Beliefs - A Historical Approach to a Psychological Problem* (Cambridge, 2013).

[639] D. J. Coon, "Testing the Limits of Sense and Science. Amercian Experimental Psychologists Combat Spititualism.," *American Psychologist* 47 (1992), A. Sommer, "Psychical research and the origins of American psychology: Hugo Münsterberg, William James and Eusapia Palladino.," *History of the Human Sciences* 25 (2012).

[640] P. Lamont, "Spiritualism and A Mid-Victorian Crisis of Evidence."

prey to “a dominant idea”, was one of the central notions behind Carpenter’s previously mentioned psychological theory of “unconscious cerebration”. The argument of the fallibility of human nature was thus one of the cornerstones of Carpenter’s indictment of spiritualist beliefs, as can be found in his introduction to a series of printed lectures, published in 1877 and entitled “*Mesmerism and Spiritualism Historically and Scientifically Considered.”*[641] In this work, Carpenter developed at length --and by referring to many examples taken from history-- the idea that most people were liable to become victims of themselves by unconsciously yielding to what he called “suggestion” or a “dominant idea”.

Inspired by the experiments on ‘hypnosis’ carried out in Manchester in the 1840s by his acquaintance the physician James Braid, Carpenter rejected the notion that hypnotic, spiritualist and other trance-like states were the result of occult outside forces acting upon the patient. He insisted that the subject’s own expectations triggered what were in fact natural physiological responses, inherent to the individual’s own nervous system, and that the spectator’s own anticipation of what they wanted to see (mis)guided their interpretation of what they were witnessing. Thus the physiology of the human mind itself, rather than supernatural agencies, was the culprit that led to such contagious “outbreaks of Epidemic Delusion”. From the early Christian flagellation manias, to the witch hunts of the Seventeenth Century, from the Catholic ‘Convulsionnaires’ in eighteenth-century France, through to the European craze for Mesmerism and Spiritualism in the Nineteenth Century, “(…) there ha(d) been a long succession of “Epidemic Delusions”, the form of which has changed from time to time, whilst their essential

[641] W. B. Carpenter, *Mesmerism, Spiritualism, etc, Historically and Scientifically Considered*. pp. 1-9

nature has remained the same throughout."[642] Carpenter's involvement in public health debates, be it through his teetotalism campaign, or through his longstanding support of small-pox vaccination[643], most probably also coloured his understanding of such trends as collective pathologies.

The implications of Carpenter's psychological theories for the debate about spiritualism were two-fold. Firstly, they backed his premise that the rational judgement of participants could be clouded and directed by 'dominant ideas' thanks to his anatomically-inspired theory of 'unconscious cerebration', previously explained. Secondly, the concept of 'ideomotor action', coupled with the notion that the brain could harbour clandestine thoughts likely to take over if the regulating effect of the patient's will was suspended, provided an explanation for certain phenomena which occurred during séances, in particular 'spirit rappings' and table-turning. Under the power of unconscious cerebration the subject would unwittingly send impulses to his or her muscles. These would in turn exert enough force— though imperceptibly-- to move objects. Michael Faraday's famous 1853 experiment,[644] which consisted in using a piece of apparatus to pick up and amplify any imperceptible lateral movement of the sitters' hands on tables during séances, was seen by many at the time to validate Carpenter's theory of ideomotor action.

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[642] Ibid. pp. 3-4

[643] For Carpenter's position in the vaccination debate, see W. B. Carpenter, "Small-Pox and Vaccination, a Letter to the Right Hon. Lyon Playfair," (London, 1883), vol.

[644] See Faraday's article of June the 30th 1853, to the Editor of the (London) Times for a full description of the experiment.

10.2- Carpenter and the temptation of thought-transference: going beyond the traditional portrait

Several historians and psychologists[645] such as Roger Smith, Kurt Danzinger and Lorraine Daston[646] have thus referred to Carpenter as one of the seminal early psycho-physiologists. However, Carpenter's deeper spiritual quest and curiosity are very seldom mentioned, thus yielding a somewhat two dimensional portrait of the scientist as a rabid anti-spiritualist. Existing studies do not highlight the changes over time and –I will argue—the strong ambivalences that characterise Carpenter's approach to unexplained phenomena. The present section therefore proposes to analyse William Carpenter's unofficial attitudes to what he himself called "pseudo-science". We can therefore conjecture that in spite of his Unitarian training which encouraged him to favour rationality, Carpenter's rejection of psychical claims was not so much based on radical rationalist assumptions as on his consistent failure to be convinced by what he witnessed. In a letter to Alfred Russel Wallace on April 9th 1864, Carpenter explained:

> I quite agree with you that the influence of one organism upon another through a force capable of acting at a distance, producing the phenomena of community of sensation, thought-reading, etc. is quite conceivable; and I have several times thought that I had satisfactory evidence of such an action. But I have never yet found that this evidence has borne careful sifting, --my experience having always been that when the first exhibition had been well thought over and the possible sources of fallacy eliminated on a second attempt, this attempt has been a failure[647].

This extract shows that although Carpenter was never convinced by Spiritualism, he remained very intrigued by the possibility of 'thought reading' or

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[645] M. Gauchet, *L'Inconscient Cérébral*. J. Miller, "Going Unconscious," *Hidden Histories of Science*, ed. Robert B. Silvers (Londond, 1995). E. S. Reed, *From Soul to Mind, the Emergence of Psychology from Erasmus Darwin to William James* (New Haven & London, 1997), T. D. Wilson, *Strangers to Ourselves- Discovering the Adaptive Unconscious* (Cambridge Mass., 2002).

[646] K. Danzinger, "Constructing the Subject: Historical Origins of Psychological Research." L. Daston, "The Theory of Will versus the Science of Mind.", R. Smith, "The Human Significance of Biology: Carpenter, Darwin, and the Vera Causa," *Nature and the Victorian Imagination*, ed. U.C and Tennyson Knoepflmacher, G.B (Berkley, 1977), R. Smith, *Inhibition: History and Meaning in the Sciences of Mind and Brain* (London, 1992), R. Smith, *Free Will and the Human Sciences in Britain, 1870–1910*.

[647] See, A.R. Wallace papers, British Library Archives, ADD 46439, f.3.

‘thought transference’. Carpenter seems to have been at the very least startled by what he saw on several occasions from the mid 1870s onwards. Peter Lamont has already mentioned how, though highly sceptical of Daniel Dunglas Home’s claims, Carpenter (along with David Brewster amongst other scientists) was not able to gather any evidence to unequivocally dismiss his phenomena as fraudulent[648].

However it is Carpenter’s correspondence with William Stainton Moses that provides some of the most valuable insights into the physiologist’s ongoing curiosity about the possibility of genuine psychical phenomena. In 1876, William Stainton Moses (1839-1892) --who would become the first president of the London Spiritualist Alliance in 1883 and is famous for the note-books he kept in which he conversed with his “spirit-guides”[649]-- wrote to Carpenter to engage him on the topic of spiritualism. Carpenter’s initial replies to Moses were curt, urging his correspondent not to waste his time. When pushed on his hostility to psychical phenomena however, Carpenter gave a reply that highlights his impatience with the topic, but also --and more importantly-- his belief once again that all matter was governed by *Mind*:

> You are quite mistaken if you suppose that I have not given a very large amount of time and attention to the investigation of “spiritualistic” phenomena. I went on for *several years*, with a large basis of previous experience of mesmerism, odylism, and the like; until the absence of any positive result, and the accumulation of negative results, made me feel it a waste of time to pursue the matter further. (…) When you have had forty years of scientific experience, and have thereby gained some aptitude in the distinction between scientific and pseudo-scientific “facts”, you will perhaps entertain a little more doubt than you now express as to the reality of your “force unknown to science and governed by an intelligence outside of Man”. *I* believe *all* force (not human) to be so “governed” (…).[650]

Carpenter ended the letter with a firm intimation that their correspondence was not to be pursued. However, a few months later Stainton Moses wrote to Carpenter to inform him of the presence in London of Henry Slade whom he held to be an

[648] P. Lamont, "Spiritualism and A Mid-Victorian Crisis of Evidence." pp. 908-909
[649] W. Stainton Moses, *Spirit Teachings* (London, 1898).
[650] (Letter dated January 29th, 1876.) Correspondence kept at the College of Psychic Studies, London. Cited with the College’s kind permission. W. B. Carpenter (1876). Emphasis original.

outstandingly gifted new Medium. Carpenter accepted to attend a séance and on the 9th of August 1876 sent Moses the following remarkable reply[651]:

> I had a séance with Dr Slade yesterday; and do not hesitate to say that what I saw fully satisfied me that the matter is one deserving of further investigation. If not a piece of jugglery of the most wonderful kind, the phenomena are of a nature that no hypothesis I have hitherto applied will account for. Of course in Dr Slade's own room the possibilities of the former hypothesis are numerous, but he professes himself quite ready to come to my house, and confident that he shall succeed well with my table, slates and chairs, as with his own. (…) I must request that you will not make public in any way either the fact of my visit to Dr Slade, or what I have now written. I have made the same request to the Editor of *The Spiritualist*, who has given me his promise to that effect. I do not wish, in the present stage to be committed to anything except enquiry.

The correspondence seems to have been discontinued at this point, but the existing letters pose some important--and hitherto unasked-- questions about the true nature of Carpenter's interest in psychical phenomena. It appears unlikely that Carpenter was feigning interest, and the fact that he urged his correspondent not to divulge his opinion lends further weight to the idea that he was privately, if not publicly, thinking anew. Moses himself seemed confident that Carpenter's interest was sincere, for shortly after receiving his letter he wrote to Thomas Massey to report Carpenter's fascination, rejoicing about having at last "shot down his bird[652]"-- though whether or not this statement was based on any further admission by Carpenter remains unclear. The following October, Henry Slade was charged with fraud by the young scientist Edwin Ray Lankester. Carpenter was probably instrumental in the investigations but the exact role he played, as well as his reaction to the trial, are still currently unknown.

What is certain however, is that Carpenter's curiosity about such unexplained phenomena began to concern his colleagues T.H Huxley, John Tyndall, and George Romanes-- the latter complaining to Darwin in 1881 that he had got in a

651 Stainton Moses Correspondence, College of Psychic Studies, London.

652 Letter from Stainton Moses to Charles Carleton Massey, August 14 1876, courtesy of Jeffrey Lavoie and Leslie Price.

row with Carpenter over thought-reading[653]. The episode of Carpenter's support for the American mentalist Washington Irving Bishop (1855-1889)[654], indeed, lends further weight to the hypothesis that the physiologist may have become partial to the notion of thought-transference. The American physiologist George Miller Beard (1839-1883) had early on used Carpenter's theory of imperceptible involuntary muscular movements to debunk the claims of thought-reading professed in the 1870s by the American mentalist J. Randall Brown. After observing Brown's work, Beard had declared that no thought transference was taking place and that the activity practiced by Brown would be better explained as 'muscle reading'. Bishop, who may have been a former assistant of Brown's according to certain unverified sources[655], crossed the Atlantic in 1880 and began displaying similar aptitudes in London: just as Brown before him, and just as his own secretary Stuart Cumberland (1857-1922) would soon begin to do, Bishop proved able to guess the exact location of an object that had been hidden in a room during his absence, merely through holding his subject's hand or placing it on his forehead. Carpenter was greatly impressed by these abilities, which to all intents and purposes seemed to furnish proof of ideomotor action as an unconscious means of non-verbal communication. However, it seems that Bishop's abilities, rather than comforting Carpenter in his theory, unsettled him quite profoundly.

Faced with an increasingly 'uncarpentearian' Carpenter, Thomas Henry Huxley in particular was beginning to seethe with disapproval. The changing dynamics between both men are revealed by a letter from Carpenter to Huxley dated

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[653] G. J. Romanes, *Letter from G. J. Romanes to C. Darwin July 1st 1881*, Darwin Correspondence Project, Cambridge.

[654] For a study of Bishop's centrality in the "thought-reader craze" that swept through London in the in the 1870s, see B. H. Wiley, *The Thought-Reader Craze* (Jefferson, 2012). pp. 63-75

[655] This information can be found in several online articles (see for eg: Bishop entry in Wikipedia) but has been questioned by Barry Wiley (personal communication).

from the 16th of June 1881[656]: responding to what was most likely a remonstrance by his friend for supporting Bishop, the physiologist went to great lengths to explain why he felt the latest demonstration by the performer --whom, significantly, he had invited to his home to carry out an "experiment" on himself and members of his family in the presence of Huxley-- could not merely be dismissed as an example of fraud:

> I think you must forget the very remarkable experiment which he showed us three times – each time successfully. A card having been drawn, and recognized by the person experimented on, he dealt out sixteen cards, laying them with their faces downwards on the table. Of course he knew where the selected card was, but the "subject" did not. Having seen him do this trick (if you please to call it so) twice, I offered myself as the third subject, and describe it as I recollect it. I stood before the cards and he stood by me holding my right hand in his left. I selected the vertical row headed 2, through which I have drawn with one line[657]. Then, (2), "drop down on another". I selected the line headed 4, through which I have drawn two lines. (…) The remaining card 7 was then turned up, and proved to be the card originally chosen. Now I had been very carefully watching for any twitch or other guidance given by him, but could detect nothing; and the experiment made a very strong impression on me, as showing how, in choosing among indifferent things, we are insensibly guided by unconscious influences. The impression of all of us at the time was that, you saw it in the same light.

As can be seen in the quotation, the subject of the experiment was asked to select a card from a pack, look at it, then return it to Bishop, who spread out sixteen cards face down in four parallel rows upon a table. The subject (who no longer knew where his or her card was located) was then asked to indicate which row –either vertical or horizontal—he or she wanted Bishop to remove. This action was repeated until just a single card remained. Invariably, when flipped over, the last card turned out to be the one initially selected by the subject. This result startled Carpenter who had held Bishop's hand and had scrutinised his body language without managing to find any evidence of muscular suggestion. Thus, when faced with a performance that he could have explained in terms of ideo-motor action, Carpenter seemed on the

[656]Henry Huxley Collection, Imperial College, Scientific and General Correspondence, Box 12, Section c1, folio 21.
[657] Carpenter attached a drawing of the sixteen cards to his letter, indicating the order in which each row had been taken away.

contrary to have become aware of the limitations of his own theory, failing to find it convincing *in situ*.

With hindsight it is easy to imagine that Bishop not only knew the position of the chosen card --a possibility that Carpenter himself acknowledged-- but also controlled it, therefore placing it on the grid in a position that would leave it statistically likely to stand alone at the end[658]. I argue that in this context, both Carpenter's apparent naivety and surprising silence[659] on the topic of "ideomotor action" are significant in themselves. Had Carpenter been closed to the idea of thought-transference, the results of the experiment would have allowed him to re-assert his theory of unconscious muscular guidance and to quell Bishop's claims regarding telepathy. Yet, Carpenter not only chose to publicly recommend Bishop – *de facto* validating the performer's claims—but also went to the trouble of re-asserting to Huxley the fact that he was puzzled, even implying that Huxley was being intellectually dishonest. I suggest that these elements, when considered in context and coupled with Carpenter's insistence on the conveniently vague terms of "unconscious suggestion", may indicate his growing partiality to the hypothesis of telepathy.

Carpenter's ambivalent attitude and willingness to risk his reputation angered his colleagues. Coming from a scientist who had until then proved such a famous debunker of false claims, Carpenter's public interest in Bishop was felt to be

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658 Barry Wiley has kindly brought to my attention the letter written by Thomson Whyte in *Nature,* June 30, 1881,p.188. In response to Carpenter's letter about Bishop's card experiment published in the previous issue, Whyte suggested two methods that could explain the trick: using a deck in which all cards were the same, or controlling the selection of the final card through what is called variously, Magician's Choice, Verbal Control or Equivoque. It is once again interesting to notice that Carpenter was aware of this technique (which he alluded to his article and in his letter to Huxley) yet considered it not to have been applied by Bishop in this particular instance. A treatise written by the mentalist Phil Goldstein provides informative insights into this technique. See P. Goldstein, *Verbal Control- A Treatise on the Under-Explored Art of Equivoque* (1976).

659 Throughout his letter, Carpenter never uses the expression "ideomotor action" or "muscle-reading".

harmful to the respectability of the scientific establishment. The popular and scientific interest sparked by Carpenter's fascination for Bishop prompted Romanes, Francis Galton, E. Ray Lankester and George Croom to test Bishop's manners of proceeding. The opening lines of Romanes's report on the experiment, published in Nature on the 23rd of June 1881[660], read as a clear indictment of Carpenter's epistemological faux pas:

> There is no doubt that Mr. Bishop owes this wide and sudden celebrity to the patronage which was extended to him by the great opponent of all humbug; and although Dr. Carpenter doubtless intended his letter to exert a salutary influence by recommending Mr. Bishop to the attention of the credulous, it is to be regretted that it served to recommend him also to the attention of the scientific.

Curiously, despite the accusatory disclaimer initially levelled at Carpenter, the rest of the report seems in fact to go along with Carpenter's verdict that Bishop was not a fraud:

> From this brief summary of the results gained by following Mr. Bishop's own methods, it will be seen that on the whole his power of localising objects or places thought of by a person whose hand he clasps is unquestionably very striking. Of course the hypothesis which immediately suggests itself to explain the *modus operandi* is that Mr. Bishop is guided by the indications unconsciously given through the muscles of his subject – differential pressure playing the part of the words "hot" and "cold" in the childish game which these words signify. (…) Deeming it a remarkable thing that such precise information as to a mental picture of locality should be communicated so instantaneously by unconscious muscular movement, we thought it desirable to ascertain whether Mr. Bishop, who is able so well to interpret these indications, is endowed with any unusual degree of tactile sensibility or power of distinguishing between small variations of resistance and pressure… but found that he did not display more than a usual delicacy of tactile perception.[661]

The ambiguous tone of the report, attacking Carpenter on the one hand while concurring with him on the other, seems to reflect the very paradoxes that lay at the heart of the 'spiritualist debate' within the scientific community. The somewhat double-sided nature of Romanes' report raises many questions about the public strategies employed by sceptics, since what appears to all intents and purposes to be an inconclusive report, is nevertheless dressed in the language of dismissive

[660] G. J. Romanes, "Thought Reading," *Nature* 24 (1881).
[661] Ibid.

authority. It is also surprising that the possibility of fraud was not more seriously investigated: there was a direct personal link between the three performers who displayed these remarkable abilities—a link no doubt indicative of a certain amount of acquired technique, yet no mention is made of Bishop's assistant in the report, and one can wonder to what extend gentlemanly decorum restricted the range of objective tests carried out by investigators.

At any rate, the portrait of Carpenter that emerges from looking more closely at his relationship to psychical research appears much less straightforward than the one generally given of him by historians, and even perhaps than the one he himself tried to construct.

Conclusion to Part III

Through identifying the various philosophies that inspired Carpenter's neurophysiology, and through detailing how influential his "mental physiology" was amongst his contemporaries, this part has shown that the study of the human brain was central to Carpenter's lifelong attempts at reforming society through a reliable model of education founded on scientific facts. It has also evidenced the physiologist's quest for what might be termed a "metaphysical middle-way" in his definition of the mind-body relationship, showing once again Carpenter's efforts to overcome binary oppositions.

Carpenter's work in neurophysiology helped define some of the central concepts that would occupy psychologists for the following few generations, such as the unconscious activity of the brain, the power of suggestion and dominant ideas, as well as the role of memory in the construction of the individual psyche. It is important to stress that Carpenter's interest in the human brain was intimately tied to his lifelong preoccupations with social and educational reform: deciphering the mechanisms that lay at the heart of thought processes and beliefs was the first step in setting up a reliable educational method that would be all the more efficient at preventing gullibility, manipulation and social unrest, as it was founded on a scientific study of the physiology of thought.

Carpenter's interest in the human mind was also the extension –and one could argue, the culmination—of his metaphysical interest in the cosmos, the evolution of life on earth, and in the possibility of a human soul. Carpenter understood the human mind as being indivisible from physiological processes and from matter more generally, but his study of the interplay between body and mind enabled him to explore the philosophical concept of energy being the fundamental divine state underpinning all existence. When examined within the context of his private spiritual beliefs and against the backdrop of his wider grasp of the laws at work in the universe, Carpenter's ideas on the relationship between mind and matter appear to point to what could be defined as a scientific monism.

Finally, this third part overturns the widely entertained notion among historians of psychology and parapsychology, that Carpenter was a rabid rationalist, by revealing the limits of his adhesion to eighteenth-century rationalist philosophy, as well as his fascination with certain areas of psychical research --most notably thought transference. This section has argued that when properly understood, and taken within the context of Carpenter's effort to formulate his own panpsychist philosophy, the label "Unitarian" can in fact be compatible both with Carpenter's emphasis on rational thought, and with his interest in potential psychical phenomena.

Conclusion

William Benjamin Carpenter was a highly respected public intellectual who mingled with members of the aristocracy, lectured throughout the country to popular audiences, and moved within the spheres of the London scientific, literary and political elite. His name circulated widely during his lifetime in periodicals and other publications, and his vast correspondence cut across social, disciplinary and national boundaries, featuring discussions with other prominent Victorians such as John Stuart Mill, William Gladstone and Benjamin Disraeli, as well as with ordinary members of society who wrote to him to share their observations on the workings of the human mind. Today, Carpenter's name is still frequently cited in scholarly articles about the Victorian era and its social and scientific transformations. However, the consensus about Carpenter's intellectual legacy --both amongst his contemporaries at the time of his death and amongst historians today-- seems to be that the physiologist distinguished himself as an exceptionally active intellectual and educationalist, rather than as an original thinker or groundbreaking scientist.

This thesis has therefore reviewed the full range of Carpenter's professional and scientific undertakings, and in doing so has probed the commonly shared view that Carpenter lacked originality. Through taking an integrative approach to Carpenter's life and situating his prolific work into its wider biographical and cultural context, it has shown that it would be a simplification to reduce the physiologist to a mere textbook writer or armchair scientist. Firstly, Carpenter's originality as a young writer resided in his efforts to update British medical culture by converting a generation of new physicians to innovative morphological theories emerging from France and Germany. Indeed Carpenter was one of the few authors adapting continental morphology to physiology and using it as a central premise in medical education. This choice of a new philosophical angle was in itself non-conventional, and considering the currency enjoyed by Carpenter's medical textbooks during his lifetime, the Victorian canon of scientific literature ought arguably to be expanded so as to include his works. Secondly, Carpenter's extensive research on the foraminifera was unique in its efforts to renew zoological classification by basing it on evolutionary filiations, and still stands today as a monumental contribution to marine biology. In addition to this, Carpenter's work in neurophysiology, most notably his theorisations on the unconscious activity of the brain and his principle of 'ideo-motor' action, had a far-reaching influence on other thinkers and unquestionably helped shape the modern field of psychology. Finally, Carpenter's pivotal role in setting up a nation-wide scheme of scientific education, and in securing legitimacy for the developing science of oceanography, was an important and transformative contribution to British scientific culture.

From his own point of view, Carpenter believed he had hit upon two potentially momentous finds: he remained convinced that he was on the cusp of a major discovery about the origins of life on earth and about the nature of evolutionary processes themselves, if he could only prove that the Eozoön Canadense was indeed a fossilized organism. He also considered his attempts at theorizing a correlation between physical and vital forces to be a truly revolutionary way of looking at the natural world. A few of his contemporaries seemed to share his sense of how important his correlation theory was, such as Mary Somerville, who wrote to Carpenter in 1860 that: "no doubt it would mark the nineteenth century as a great scientific epoch, the discoveries arising from which who could predict?"[662] Nevertheless, the Eozoön debate was settled in favour of the geologists who argued that the foraminifera-like patterns were metamorphic artefacts, and Carpenter's theory of the mutually convertible vital and physical forces lacked the firm backing of experimental proof or of clearly identified biological mechanisms.

What this thesis has also shown, therefore, is that Carpenter did not propose any clear new paradigm that was felt to be either fully his own, or entirely revolutionary. The common view that "there was nothing visionary about Dr. Carpenter's modes of thought[663]" and that "he would go no further than the most careful reasoning allowed him[664]" seems in that respect to be largely correct. However, drawing on recurrent choices of topics and on similar narrative strategies that become apparent when taking a comprehensive look at Carpenter's work, I have argued that this perceived lack of complete originality is in itself significant. Indeed, the relative consistency in Carpenter's manner of approaching sensitive subjects points to a carefully crafted approach. My analysis has shown how Carpenter's systematic attempts to overcome dualisms can be read as a strategy of compromise and assimilation that deliberately aimed to smooth away the asperities of controversial new ideas, so as to introduce them into contemporary culture in a way that made them more easily acceptable. I have also argued that Carpenter used a similar logic in his political and professional choices as a Dissenter, by navigating his social environment in a conciliatory way that enabled him to fit into the Establishment more comfortably. In doing so, Carpenter appears representative of the many British intellectuals in the mid-nineteenth century who sought to preserve the political status quo and promote social stability following decades of European-

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662 Extract from a letter by Mary Sommerville to William Carpenter, dated from June the 12th 1860 and sent from Florence, Italy. Cited in J. E. Carpenter, "Memorial Sketch." pp. 81-82.

663 Ibid. p. 137

664 Ibid. p. 138.

wide popular unrest, a notion previously put forward by historians such as W.L. Burn. One could say, in other words, that the dismissal by twentieth-century scholars of Carpenter as unoriginal or as a second-rate intellectual figure, merely proves how successful his attempts at escaping categorisations and controversy were.

Another central aim of this analysis was to elucidate the links between science and religion in William Carpenter's life and work. I have suggested that Carpenter's professional choices and intellectual stance are best understood when taken within the context of his life as a practicing Unitarian, and that, in turn, his endeavours and achievements throw light on the social and political shifts taking place within nineteenth-century Unitarian circles. For instance, studying Carpenter's upbringing shows to what extent his agenda as an educationalist was strongly influenced by Unitarian traditions of curricular innovation, as well as by his family's strong involvement in social reform. I have also argued that Carpenter's efforts to push new scientific education forward in Britain from within the emerging structure of the University of London, provides evidence of how the intellectual elite was becoming increasingly more permeable to members of Dissenting circles, by accommodating curricular reforms that might previously have been considered radical. Carpenter's Unitarianism therefore appears to have been a determining factor underpinning both his educational priorities and the care he took not to be branded as radical at a time of increased social mobility for previously excluded religious minorities.

This thesis has also argued that Carpenter's personal spirituality and interpretation of the Unitarian faith played a fundamental part in shaping his scientific pursuits. It has shown that the physiologist's conception of an indivisible divine entity motivated his interest in new morphological theories in the 1830s, as well as his enthusiasm for Darwin's theory in 1859. The importance that Carpenter attached to the notion of the universality of divine law, and his conviction that God's power would be all the more admired if it could be shown to pervade the world in a consistent and harmonious way, encouraged him to support theories such as evolution, or his proposed correlation of vital and physical forces, precisely because they postulated an underlying unity in nature. Carpenter's conflation of force and intellect also point towards a form of monism which he developed at a time when Unitarians were being encouraged by their spiritual leaders to re-invent their faith in more romantic and more personal terms.

I have therefore suggested that Carpenter's psychology and personal priorities are important factors that must be taken into account by historians, and that the physiologist's constant endeavour to overcome theoretical and metaphysical divisions must thus be analysed from the angle of his deep and enduring spirituality. Finally, I have also argued that whilst Carpenter's Unitarian training shaped his rationalist approach to scientific enquiry and pedagogy, it did not prevent him from taking an interest in certain psychical phenomena. On the contrary, Carpenter's religious devotion and unique conception of force as a divine mental power might have enabled him to make allowances for certain undiscovered mental phenomena, a subject that he seemed poised to research in more detail when his life was tragically cut short by a gas lamp accident in 1885.

Figure 5: Portrait of William Carpenter from the Oxford Bodleian Library Special Collections, Carpenter archive, MS Autogr. b 9, p. 79-81

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