

The effect of social circle on the life charles darwin



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The effect of Social Circle on the life Charles Darwin Henslow, Sedgwick, Lyell, Hooker and Huxley.

Qazi Wahaj ul Haq??? I see daily more and more plainly that my unaided Book would have done absolutely nothing.??? Charles Darwin to Thomas Henry Huxley, 20 July 1860. Charles Darwin was arguably the greatest scientist of the nineteenth century. His idea of evolution, along with his geological and botanical work, forever changed the way the history of the earth would be written and theories about the earth formed. However, every scientific idea and indeed every scientist develops in a specific intellectual context and personal community. These ??? social circles??™ or ??? networks??™ that the scientist develops in are fundamental to not only understanding the theories themselves but crucial in order to understand the formation and dissemination of those theories. Given a figure like Charles Darwin, who largely kept out of the public eye whether on a voyage around the world or in his well-hidden Down house, these social circles become even more necessary because the only ways to reach the scientist are through other people.

Indeed, ??? the theories which would shake the world of academic scientists were developed not in the cloistered calm of university libraries but in his own house and garden, albeit with the indispensable expert advice he constantly sought from established scientists.???[1] Thus, the purpose of this essay would be to explore the social circle of Charles Darwin via certain personalities in order to fully understand the formation and dissemination of his theories. Before we begin we must define this ??? social circle??™ that we intend to study. In defining our social circle, I take it to be an approach to

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the study of relationships of influence which connect members of a group or network. However, Darwin's intellectual and technical influences were of course many from the uniformitarian Lyell to the natural theologian Paley to the technician who taught him how to stuff birds at Edinburgh University. On the personal front these vary from his loving wife to the family's butler Joseph Parslow to his dog Bob. Furthermore, the availability of numerous letters, records and diaries make it a treat for historians to study Darwin and the people he was connected with. However, the constraints of this essay only allow us to explore Darwin's network in a limited sense.

Thus, in this essay I will study only five personalities in connection with Darwin; personalities who were scientific and yet had an influence on the personal and the scientific direction of Darwin's life and theories. These personalities are: Henslow, Sedgwick, Lyell, Hooker and Huxley. I have chosen these personalities because I believe these are the ones of the most interest to the historian of science.

These people though having a personal connection with Darwin had a fundamentally scientific relationship with Darwin and all in some ways helped to formulate and/or disseminate his theories. Also in order to fully understand the effect of this social circle I will structure the essay in three chronological parts: Darwin's life up till the Beagle voyage, from the end of the Beagle voyage till before the publication of *Origins of Species* and the period following the publication of *Origins*. I have chosen these three periods because they correlate directly with that I believe were the three important roles of Darwin's social circle. In the first period, the social circle provided training and direction to the young Darwin eager to make his mark on

science. In the second period, the social circle provided Darwin with much needed resources whether material, intellectual or human. In the third period, the social circle ensured the defence and dissemination of his theories while Darwin himself became more and more ill and reclusive.

Thus, this essay will explain how these five personalities performed these three distinct functions in three distinct periods of time so that we can understand the formation and dissemination of Darwin's theories better. To understand Darwin is-as any evolutionist would have forecast-to understand his past and his influences.[2] Charles Darwin was born on February 12, 1809, in the town of Shrewsbury. He was the grandson of an illustrious poet and naturalist and though not an aristocrat he was a member of the rich, upper-middle class.[3] He was born and grew up in a world in which through the work of Hutton, Cuvier, and above all Sir Charles Lyell, the uniformitarian view finally prevailed, opening up for our minds the vast sketches of geological time and the constant operation of uniform natural forces.[4] Darwin will do well to absorb these new ideas which were shaping the world. He was sent to Edinburgh University to study medicine at the age of 16. At Edinburgh, One of the classes for which he enrolled was Jameson's in natural history, which included geology.

[5] Medicine, he quickly found out was not his thing and therefore he got enrolled in Cambridge's Christ's College in 1828 in order to become an Anglican clergyman. At Cambridge, Darwin made the acquaintance of two people who, in their own ways, would influence the life and work of Darwin. Both very close friends and eminent scientists were Professor Henslow and Professor Sedgwick.

??? Early in his Cambridge career he made the acquaintance of the Rev. John Stevens Henslow, the thirty-three-year-old Professor of Botany.???[6] He became very close friends with him and started getting invitations to his Friday parties. Soon he was being called over for dinners.

??? Whatever, Henslow was impressed and took him aside. By the end of the term they could be seen walking the streets together, deep in conversation.???[7] ??? An eminent geologist and botanist, Henslow was a deeply religious clergyman.???[8] Darwin himself was studying to be a clergyman and yet had always nurtured a deep interest for chemistry, botany and natural history. Thus, his fascination with the extremely intelligent and reputable Henslow is easily explained.

Henslow was impressed by Darwin??™s curiosity who would always be asking questions and enthusiasm as he would come to classes early so he could set up the classroom for the lecture.??? It was to Henslow??™s influence that Darwin in later years attributed in great part his powerful taste for natural history.???[9] We can make out his admiration for Henslow through his own words. Darwin writes in his autobiography, ??? I have not as yet mentioned a circumstance which influenced my whole career more than any other. This was my friendship with Henslow. Before coming up to Cambridge, I had heard of him from my brother as a man who knew every branch of science, and I was accordingly prepared to reverence him??. His knowledge was great in botany, entomology, chemistry, mineralogy, and geology.???[10] Not only would Henslow spark the young Darwin??™s interest in natural history but he soon realized that what Darwin needed was education in geology.

??? He therefore arranged for his protege to be given a crash course by a master of the subject, Adam Sedgwick, Professor of Geology and President of the Geological Society of London.???[11] Darwin was to take Sedgwick??™s lectures on geology which he had not tried until persuaded by Henslow because of his bad experiences with geology in Edinburgh. He was later to accompany Sedgwick on a geological tour of North Wales where he would learn fieldwork. ??? They had met before. Sedgwick, decked in stately robes, had administered his oath of matriculation. They had also seen each other occasionally at Henslow??™s parties.

???[12] However, Darwin really took to Sedgwick after attending his famous lectures. About the tour of North Wales Darwin says, ??? This tour was of decided use in teaching me a little how to make out the geology of a country.???[13] At that time, ??? geology was a science with a significant profile, if only because of its commercial importance.???[14] The two leading schools in geology were those of the catastrophists lead by people like Sedgwick who believed in random massive events of the past which changed landscapes and the uniformitarians lead by Lyell who believed that the present earth provided the key to the past. Even though, Darwin learned his geology from Sedgwick, if we see Darwin??™s early notebooks and manuscripts, the most frequently cited author is Charles Lyell. We will see later how Darwin would be converted to uniformitarianism. However, for now Sedgwick had done his job and Darwin had been given a crash course and ??? before they left the hills and headed for the coast, Darwin had fallen for the romance of geology.

???[15] However, Henslow despite having nudged Darwin towards natural history and geology was still to perform his biggest service to Darwin and to the world. When Darwin arrived home ??? there was a package waiting for him, bearing a London postmark. Its contents left his brain reeling.???[16] It is worth quoting this letter from Henslow: Cambridge, August 24, 1831 My Dear Darwin, ??|I will not now dwell upon this painful subject, as I shall hope to see you shortly, fully expecting that you will eagerly catch at the offer which is likely to be made you off a trip to Tierra del Fuego, and home by the East Indies. I have been asked by Peacock, who will read and forward this to you from London, to recommend him a Naturalist as companion to Captain Fitz-Roy, employed by Government to survey the southern extremity of America. I have stated that I consider you to be best qualified person I know of who is likely to undertake such a situation.

I state this not in the supposition of your being a finished naturalist, but as amply qualified for collecting, observing, and noting, anything worthy to be noted in Natural History.[17] This was the invitation to the HMS Beagle, a voyage that will forever rewrite science. And Henslow had chosen just the man who was ready to rewrite science forever. As Walter says, ??? No one who has attempted a biography of Darwin has seriously questioned Henslow??™s primary role.???[18] Not only did he sparked Darwin??™s interest in natural history, pushed him to study geology but also gave him the opportunity on which Darwin will base all of his geology and most of his biology and through which Darwin will start to unlock the theory of the earth by transmutation. At the same time, we should not forget Sedgwick??™s role.

He initiated Darwin into the science of geology and gave him the skills necessary to conduct studies in it. Considering that Darwin's initial reputation will be entirely based on geology, this training would prove invaluable.

Throughout his time on the Beagle, Darwin kept a relatively steady correspondence with Henslow and kept sending back specimens that he collected on his travels. While he was away, Henslow was arranging for extracts from his letters to be read before scientific gatherings, ensuring that, although Darwin himself was thousands of miles away, his name was becoming well-known in scientific circles at home. [19] As soon as he returned to England in 1836 he made his way to Cambridge to discuss the specimens with Henslow who directed him to London. This was the time when he would make new acquaintances and friends who would support him in his research and personal turmoils throughout until the publication of the Origin, and sometimes even after that. Darwin himself says that, "During the early part of our life in London, I was strong enough to go into general society, and saw a good deal of several scientific men and other more or less distinguished men." [20] During this time, Darwin wrote on a variety of subjects from purely scientific like erratic boulders, earthquakes and the formation of mould to travel-writing like his Journals.

All this were providing evidence for Lyell's theories. Lyell, fired by Darwin's reports from South America, was eager to meet his disciple. Darwin too was expectant. On Saturday 29 October they finally met, when Darwin came to dinner. He found Lyell boiling with enthusiasm beneath his hushed tones. [21] This was the start of a lifelong friendship and scientific partnership. Lyell was many years Darwin's senior and Darwin had based

much of his science up until now on his theory of uniformitarianism. While in London, Darwin had also gotten married to his cousin, Emma.

But as he said, ??? I saw more of Lyell than of any other man both before and after my marriage.???[22] It comes as no surprise, considering Darwin??™s start in science and his close study of the Galapagos??™s biogeography and its correlation with evolution that his biggest scientific influence be a geologist. After his return to England both Darwin and Lyell ??? belonged to the same professional societies (The Royal Geological Society) and social clubs (the Athenaeum)???[23] and therefore saw much of each other in London. He took Lyell??™s advice seriously and ??? soon after [his return from the Beagle] he was elected a Fellow of the Royal Society, no doubt through the influence of his friend Lyell, who was quite enthusiastic over his splendid geological investigations on the rate of elevation in the Pampas and the Cordillera. Acting on Lyell??™s advice, too, he determined to seek no official appointment, but to devote himself entirely for the rest of his life to the pursuit of science.??? The other person who Darwin made an acquaintance with in London and who would prove to be a friend, confidant, supporter and researcher was Joseph Hooker. ??? Hooker and Darwin had a friendship dating back to 1843 based on mutual interests in the botanical sciences.???[24] Hooker was eight years younger than Darwin and by the time he made his correspondence Darwin was already a respected figure in the scientific community especially as a geologist.

As his family grew bigger, Darwin soon moved to a lonely countryside house called Down. He kept close correspondence with both Lyell and Hooker throughout this period in Down and they gave him regular visits. In fact

Hooker ??? was the most frequent visitor from 1844 to 1847 and from then on there are many allusions in letters to visits from Hooker and his wife??|In 1854 Charles writes to Lyell telling him that Hooker stayed at Down for a fortnight and that his old friend Professor Henslow came down from Cambridge to see them both.???[25] This passage shows how Darwin, despite being a recluse, was heavily dependant on the comfort of his social circle. There remains in archives a massive correspondence between Hooker and Darwin which pays homage to their friendship.

However, not only was Hooker there as a friend but also as a scientific companion. During his numerous visits to Down, Darwin would regularly ask him information about various fields of natural science. ??? Darwin was especially interested in Hooker??™s understanding of the variation and geographical distribution of floral species.???[26] Thus, he was actively participating in Darwin??™s research and providing him as much support as possible.

In his Autobiography, Darwin says that Hooker ??? has been one my best friends throughout life??? and that ??? I have known hardly any man more lovable than Hooker.???[27] This certainly must have been a reason why Hooker was the first scientific person that Darwin confided his ideas about transmutation in. By the time he moved to Down, Darwin was absolutely certain that transmutation had shaped the world and could explain the origins of species.

In 1842, he had written a 35 page sketch about his ideas on transmutation. He expanded them into a 230 page essay in 1844 and sent it to Hooker.

Over the next fifteen years, he would slowly convince Hooker to his side and Hooker through his scientific opinions would add to the theories of Darwin. However, Darwin was still too scared to publish such controversial views. It is a funny coincidence that just like Darwin, Hooker went on a voyage on the HMS Erebus for research purposes. How fitting then that Lyell recommended Hooker to take with him Darwin's Journal of Researches. Of course it was Darwin who had carried Lyell's Principles on to the Beagle with him.

These three (Lyell, Darwin and Hooker), all eminent scientists in their own right, separated by a few years, would form a network based on scientific respect and personal comfort for many years to come. Darwin had been inspired by Lyell and Hooker by Darwin. However, both Lyell and Hooker would come to the support of Darwin once they recognised the immensity of his vision and would lead to the Origin's publication as well as provide support once it had become public property. It is clear that people did truly love Darwin, for in person he was warm and friendly and no doubt genuinely so. However, he used his friends and many, many correspondents as his eyes and ears, to do much of the groundwork of science for him, particularly information collecting, as he turned into a truly obsessive worker, labouring without a break, save only for periods of inactivity brought on by illness.

[28] Not only was his social circle all over his natural science, but his natural science was all over his social circle too. From his study in Down house he built up a worldwide network of scientific contacts and sources of material.[29] Thus, during this second period we see that Lyell and Hooker amongst many others provide support, both on a personal and a

scientific level, to Darwin who worked untiringly throughout this period especially on his classification of barnacles while staying away from major research centres in Down. If Lyell and Hooker had quietly supported Darwin for nearly fifteen years while he worked on his theories, they were going to prove even more valuable when it came to the publication of those views. Darwin had been torn by his ideas of natural selection and could not bear to make them public.

In 1856, he finally shared his ideas about natural selection with Lyell. Lyell was thoroughly shaken but took the ideas seriously and told Darwin to hurry up with a publishable form of his ideas. Darwin was scared of publishing, ??? Yet the thought of being forestalled, and seeing all his work go for nothing, was even more painful to contemplate. On this point, at least, Lyell was right.???[30] (188). He also went to London to show the ideas to Hooker and then started on a book to encompass his ideas.

In 1858, he received a paper from Wallace, which mirrored his ideas. Wallace had sent it to Darwin in order to ask his opinion. ??? In his distress, he turned to the two men ??“ Lyell and Hooker ??“ who had been his intellectual soul mates and sounding boards for so long. Within hours of reading Wallace??™s paper, he had written to Lyell what was not so much a letter as a cry of pain.???[31] On 1 July 1858, it was not Darwin or Wallace who presented the theory of evolution and natural selection for the first time to the world in some concrete shape. It was Charles Lyell and Joseph Hooker, Darwin??™s two closest friends, who presented Wallace??™s paper and an extract from Darwin, explaining his intentions to write about the origin of species to the Linnean Society of London.

In his greatest time of need, when he was busy burying an infant son and in his own words ??? smashed??? after reading Wallace??™s letter, it was his friends who had come to protect his science and personality in front of the world. This was not the first time and would definitely not be the last time that Darwin would be presented to the world through close friends. Once the theory was out, Darwin started work on an outlining essay which was published in November 1859 and is today known as the *Origins of Species*. It was an instant success and ripples of controversy ran not only throughout Victorian England but through most of Europe and Northern America. The history of the earth, as mankind had speculated until now, had been completely changed. However, before we embark on the story of the success of the *Origins*, we must introduce the fifth personality in Darwin??™s social circle.

Thomas Huxley, or ??? Darwin??™s Bulldog??™ as he would come to be known, can be considered the second most important person after Darwin in the success of the *Origins*. As Hesketh tells us, ??? It may have been Darwin who provided the scientific manifesto for the evolution of species, but it was Huxley who became the theory??™s chief ideologue and paladin.???[32] Once Darwin had decided he was going to publish his views about natural selection, he knew that he would need supporters from within the core of the scientific community to support his ideas. He also knew that no one from the old guard, apart from maybe Lyell, would support his ideas. Huxley, along with Darwin??™s old friend Hooker, was notorious for destroying the old guard in science. Thus in 1856, Huxley was invited to Down along with Hooker although he had probably met Darwin for the first time at a

Geological Society meeting in 1853. ??? The men on their way to Darwin??
™s were marking out a profession. They were distancing themselves from
the vicar-naturalists, sneering at the Cambridge old boys.

And, incongruously, awaiting them at Down was squire Darwin, Cambridge-
trained for the Church and about to provide their legitimating philosophy, a
naturalistic science of creation with a competitive edge.???[33] Huxley was
soon won over to the idea of evolution. After this meeting, he continued in
London to dispose of old notions. ??? It was a job he relished, trashing
reputations and received wisdom-and perhaps essential work if Darwin??™s
big book was to sweep the world before it.

???[34] Soon after he finished reading the Origins he sent a letter to Darwin
saying that, ??? Since I read Von Bar??™s essays, nine years ago, no work on
Natural History Science I have met with has made so great an impression
upon me??|I am sharpening up my claws and beak in readiness.???[35] ???
To Darwin, Huxley was a man of jutting jaw and searing wit.???[36] In some
ways exactly the man he needed in the public sphere where he could not
make an appearance due to illnesses. Huxley on the other hand, armed with
wit and youthful energy was out to make his mark. He understood science
and was one of the rising stars of the scientific community which gave him
access to lecture halls and journals alike, where he left no stone untouched
in propagating Darwin??™s theories. Huxley wrote no less than three reviews
in Macmillan??™s Magazine, Westminster Review and the Times. ???
Huxley??™s tentacles now penetrated every literary crevice.???[37] Darwin
was so pleased with his review in the Times that he wrote him a letter
praising it highly and saying that, ??? Certainly I should have said that there
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is only one man in England who could have written this essay, and that you were the man.

[38] Hooker also wrote a very favourable review in the *Gardners*™ Chronicle and remained a steadfast ally to the Darwinian cause. Huxley continued with lectures and classes while all the while writing reviews. One moment to remember in Huxley and Hooker™s campaign was the Oxford debate. Wilberforce, the Bishop of Oxford was pitched against Huxley and Hooker in front of a packed audience at a meeting of the British Association for the Advancement of Sciences. In an emotionally charged speech Wilberforce tried to morally destroy the Origins and in a fit of anger turned towards Huxley and inquired if he traced the apes from his mother™s side or his father™s side. Huxley and Hooker both defended the Origins valiantly and Huxley made a memorable response when he said, ??? I am not ashamed to have a monkey for my ancestor; but I would be ashamed to be connected with a man who used great gifts to obscure the truth.???[39] After the debate Darwin wrote to Huxley saying, ??? From all that I hear from several quarters, it seems that Oxford did the subject great good.

It is of enormous importance, the showing the world that a few first-rate men are not afraid of expressing their opinion.???[40] This is exactly what Darwin™s supporters, especially Huxley, achieved in the third period. Their contribution in the defence and dissemination of Darwin™s theories was vital and indeed nobody can predict what the fate of the Origins would have been if Darwin had not had his social circle. As Henketh says, ??? Charles Darwin™s *Origin of Species*, published in 1859, would have made little impact had it not been defended by important scientific allies who were

willing to give shape and meaning to its contents, putting their own reputations on the line in doing so.???[41] Thus, in the third period we see Darwin??™s social circle working once again in the absence of Darwin from the public sphere.

In conclusion, we have studied the importance of the ??? social circle??™ or the ??? network??™ of a scientist in developing his scientific theories. We did this by studying the particular roles of Henslow, Sedgwick, Lyell, Hooker and Huxley in the life of Charles Darwin. We understood how in the first period of Darwin??™s scientific activity, Henslow and Sedgwick provided him with training and direction. We saw Lyell and Hooker providing personal and scientific support to Darwin during the years that he was quietly working at his theories. And in the final period of Darwin??™s scientific activity we saw how Huxley especially played a crucial role in the spread and defence of the *Origins of Species*. Thus, it becomes obvious after observing this Darwin??™s science would not have been the same or reached the same levels of influence had it not been for his social circle which played a fundamental role in the formation of transmission of that science. Bibliography ??? Charles Darwin, Allen, Grant, (Appleton and Company, 1885, New York) ??? Darwin??™s vision and Christian perspectives ed. Ong, Walter, (Macmillan Company, New York, 1960) ??? Down: The Home of the Darwins, Atkins, Sir Hedley, (The Curwen Press, 1974, London) ??? The Evolution of Darwin??™s Religious Views, Frank Burch Brown, (Mercer University Press, 1986, Georgia) ??? Charles Darwin, Ruse, Michael, (Blackwell, 2008, Oxford) ??? Charles Darwin, Geologist, Herbert, Sandra (From the course packet) ??? Emma Darwin, Healey, Edna (Headline, 2001, England) ??? Darwin??™s Mentor, Walter and

Stow, (Cambridge University Press, 2001, Cambridge) ??? The Young Darwin and his Cultural Circle, Manier, Edward, (Reidel, 1978, Massachusetts) ??? Life and Letters of Charles Darwin, Vol.

1, Darwin, Francis, (Appleton and Company, 1919, New York) ??? Life and Letters of Charles Darwin, Vol. 2, Darwin, Francis, (Appleton and Company, 1919, New York) ??? The Autobiography of Charles Darwin, (Norton and Company, 1958, New York) ??? Charles Darwin, Aydon, Cyril, (Carroll and Graf, 2002, New York) ??? Darwin??™s Dangerous idea, Dennett, Daniel, (Simon and Schuster, 1995, New York) ??? Of Apes and Ancestors, Hesketh, (University of Toronto Press, Toronto, 2009) ??? Huxley, Desmond, Adrian, (Michael Joseph, 1994, London) ??? Apes, Angels and Victorians, Irvine, William, (Mc-Graw Hill, 1955, New York) ??? Darwinism and its Discontents, Ruse, Michael, (Cambridge University Press, 2006, Cambridge) ??? Darwin, Desmond, Adrian, (Michael Joseph, 1991, London)———[1] Emma Darwin, Healey, Edna (Headline, 2001, England), page 232[2] Charles Darwin, Ruse, Michael, (Blackwell, 2008, Oxford), page 2[3] Ibid. page 2[4] Darwin??™s vision and Christian perspectives ed.

Ong, Walter, (Macmillan Company, New York, 1960), page 39.[5] Charles Darwin, Geologist, Herbert, Sandra (From the course packet), page 185[6] Charles Darwin, Aydon, Cyril, (Carroll and Graf, 2002, New York), page 33. [7] Darwin, Desmond, Adrian, (Michael Joseph, 1991, London), page 80[8] The Evolution of Darwin??™s Religious Views, Frank Burch Brown, (Mercer University Press, 1986, Georgia), page 5[9] Charles Darwin, Allen, Grant, (Appleton and Company, 1885, New York), page 35[10] The Autobiography of Charles Darwin, (Norton and Company, 1958, New York), page 64.[11] <https://assignbuster.com/the-effect-of-social-circle-on-the-life-charles-darwin/>

Charles Darwin, Aydon, Cyril, (Carroll and Graf, 2002, New York), page 35.

[12] Darwin, Desmond, page 94.[13] Autobiography, page 70.[14] Charles

Darwin, Ruse, page 4.[15] Darwin, Desmond, page 96[16] Charles Darwin,

Cyril Aydon, page 37[17] Life and Letters of Charles Darwin, Vol.

1, Darwin, Francis, (Appleton and Company, 1919, New York)[18] Darwin??

™'s Mentor, Walter and Stow, (Cambridge University Press, 2001,

Cambridge), page 78.[19] Charles Darwin, Cyril, page 78[20] Autobiography,

page 100[21] Darwin, Desmond, page 201-2[22] Autobiography, page

100[23] Apes, Angels and Victorians, Irvine, William, (Mc-Graw Hill, 1955,

New York), page 23.[24] Of Apes and Ancestors, Hesketh, (University of

Toronto Press, Toronto, 2009), page 65.[25] Down: The Home of the Darwins,

Atkins, Sir Hedley, (The Curwen Press, 1974, London), page 89[26] Of A and

A, Hesketh, page 71.[27] Autobiography, page 105-6[28] Charles Darwin,

Ruse, page 12[29] Charles Darwin, Aydon, page 172[30] Ibid.

188[31] Charles Darwin, Aydon, page 202[32] Of A and A, Hesketh, page

47[33] Huxley, Desmond, 227[34] Ibid. page 227[35] Life and Letters of

Charles Darwin, Vol. 2, Darwin, Francis, (Appleton and Company, 1919, New

York)[36] Huxley, Desmond, 222[37] Ibid. 264[38] Life and Letters of Charles

Darwin, Vol. 2, Darwin, Francis, (Appleton and Company, 1919, New York)

[39] Darwin??™'s Dangerous idea, Dennett, Daniel, (Simon and Schuster,

1995, New York), page 336[40] Life and Letters of Charles Darwin, Vol.

2, Darwin, Francis, (Appleton and Company, 1919, New York)[41] Of A and A,

Hesketh, page 3