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Delving into the Ideas of Charles Darwin: A Study of His Pre-Beagle Musings, Beagle Expedition, and Subsequent Developments

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Abstract

Charles Darwin's exploration of the Galápagos Islands in 1835 and his subsequent formulation of the theory of evolution in 1839 were significantly influenced by his observations of land-birds, including finches, larks, owls, and mockingthrushes. Despite a primary focus on geology during his voyage on the HMS Beagle, Darwin meticulously documented various species in his field notebooks. Early observations during his youth at Edinburgh University and the Beagle expedition reflected Darwin's growing curiosity about species variation. However, it was not until his return to England and his interaction with ornithologist John Gould that Darwin began to recognize the significance of the finches he had observed in the Galápagos. This review synthesizes existing literature on Darwin's transition from geological interests to his groundbreaking insights into evolution. By examining primary sources, historical interpretations, and contemporary analyses, this paper highlights how Darwin's observations and Gould's influence shaped his revolutionary theory of species transmutation—the gradual transformation of one species into another over time. The review aims to provide a comprehensive understanding of Darwin's contributions, illustrating how his Galápagos observations and collaboration with Gould laid the foundation for modern evolutionary biology and continue to influence scientific thought on species adaptation and natural selection.

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Introduction

Influential Factors in Darwin's Pre-Beagle Investigations

In his exploration of the Galápagos Islands, Charles Darwin documented the remarkable diversity of land-birds, observing approximately 26 types including larks, owls, flycatchers, swallows, and mocking thrushes. Before boarding the Beagle, Darwin had already begun to conceptualize the connections between different species, consistently documenting these insights in his field notebooks. While studying medicine at Edinburgh University in 1825, Darwin often documented his observations of the various species he encountered in his surroundings. On April 26th, 1826, Darwin documented how he “saw Chimney swallows 90 miles South & redstart” and “also saw great many Water Ouzels, their flight is much similar to a Kingfisher but more undulatory” [1]. At only 16, Darwin was

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able to notice patterns among different species of birds, as he continued to document observations such as, “The White throat is a very common bird. with a brilliant patch of white on its throat. rather a long tail. sings on the wing. — The Lark night jar has white spot on the outermost tail feather” [1]. These observations revealed Darwin's early curiosity and attention to detail in studying the natural world. At the age of 22, Darwin was hired to accompany Captain Robert FitzRoy on his voyage on the Beagle. On September 11th, 1831, they embarked from Plymouth to visit the Beagle before commencing their official expedition, as noted in his journal. Reflecting on Darwin's five-year journey aboard the Beagle, he encountered an immense variety of geological formations, human societies, and local flora and fauna from South America to Australia to South Africa. Upon his return to England in October 1836, he began formulating his groundbreaking theory on the origin of new species. In the early 1800s, the idea of fixed species, meaning that species were unchanging and created in their present form, was commonly viewed as the "prevailing view," as great scientists such as Charles Lyell, Carl Linnaeus, and many more believed that species were fixed according to the divine plan. On the first page of Darwin’s, “Origin of the Species,” he intended to “throw some light on… that mystery of mysteries, as it has been called by one of our greatest philosophers” (Darwin 1859). The mystery of mysteries was used by philosopher John Herschel to describe the replacement of extinct species by others, in a letter he wrote to Charles Lyell in 1836 [2]. Although Darwin was initially influenced by the idea of fixed species during the early 1800s, he observed certain common traits among species that he deemed significant enough to document in his journal. While he did not yet understand these commonalities or their causes, these observations eventually challenged the belief in fixed speciation and led him to develop a revolutionary new perspective. But how did the Galapagos finches become a cornerstone and symbol of Darwin's theory? I will begin by presenting Darwin's observations and records from his trip to the Galapagos, highlighting the shift in his focus on the finches and how these observations transformed his view on speciation.

Charting Evolution: Darwin's Voyage on the HMS Beagle

As Darwin boards the Beagle on December 27th, 1831, he continues to write in his journal not only observations but also his experiences traveling. His first Beagle field notebook was created when the crew first arrived at the Volcanic Cape Verde Islands, documenting the first half year of their expedition. The first entry was made on January 18th, 1832, when Darwin journals, “top of cliff Feldspathic rock. Feldspar Crystalline decomposes rock sea coral” [3]. The bulk of the notes in his Cape Verde notebook centered on observations of rocks, trees, and the gathering of samples for later study rather than birds or any specific animals, reflecting the purpose of his stop during the voyage. While the majority of his early field notebooks consisted of observations from a geological standpoint, Darwin does briefly mention sighting some ornithological differences among islands. On August 5th, 1833, he records, “only smaller Icterus; not so very tame: some pidgeons; different parrots different partridge Birds common rose starling Finch with black Sparrow” [4]. As the crew makes its way toward the port city of White Bay, on the coast of Argentina, Darwin starts to notice more similarities in birds among the different locations. On September 7th, 1833, Darwin mentions, “Petisses frequent the seaside. South of Colorado overo. feathers same structure body & neck & head, similar legs rather shorter, covered” [5]. While his observations are not focused on the Finches, one can see the progression of his curiosity as he collects samples and observes these differences. After a couple more stops, the crew finally arrives at the Galapagos Islands, where Darwin records his first-ever observation on August 4th, 1835. While his focus continues to be on geographical observations among islands, he does take note of the Finches,

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originally misidentifying them as, “Gross Beakes”, on October 12th, 1835 [6]. As the rest of the voyage resumes, Darwin frequently documents the alterations in rock formations, gathers numerous samples, and formulates conclusions regarding the variations in rocks from one island to another. Although he occasionally mentions aspects of ornithological comparisons among species and different islands, Darwin's focus seldom centers on finches unless he directly observes them, which indicates that it wasn’t much of a priority to him on the Beagle. This provides further insight into the question I previously posed about the significance of finches in Darwin’s theory. Unexpectedly, Darwin rarely mentioned finches—or birds in general—during his five-year voyage on the Beagle. This indicates that finches were not a focal point for him during the journey; his primary interest lay in geology. This raises another intriguing question: what motivated Darwin to study ornithology, specifically the variations in the Galapagos finches when he scarcely recorded anything about them in his field notebooks? I will explore these questions in the upcoming section regarding Darwin’s Post Beagle publications and interactions with famous ornithologist John Gould.

Post-Beagle Historical Tracking

Once returning to England on October 2nd, 1836, Darwin soon spent time “in arranging general collections; examining minerals, reading, & writing little journals in the evenings” [7]. As Darwin was now looking to publish some of his findings, he left Cambridge to reside in London. On July 13th, 1837, Darwin mentioned how he “opened the first notebook on " ‘transmutation of Species' . — Had been greatly struck from about month of previous March on [the] character of S. American fossils — & species on Galapagos Archipelago" in his journal, while also mentioning “From March 13th to end of September entirely employed in my journal” [7]. At this time, there are still no traces of him mentioning the Finches in any of his publications, as he mainly was focused on Geology. After releasing several publications concerning the geological facets of his Beagle expedition, he promptly redirected his focus to documenting the zoological findings he encountered during the voyage. On October 10th of 1839, Darwin mentioned in his Journal, “Correcting of Ornithology" [7], which he was relating to his zoology notes taken on the Beagle, and he later December 24th “read a little for transmutation theory.” To mention he was “correcting ornithology” indicates a possible turning point in his understanding of species, and what he recorded and saw while he was on the Beagle. As you may have noticed, I frequently emphasize the word "correcting," which Darwin often used in two distinct contexts. On a smaller scale, he refers to correcting the misidentification of a grosbeak as a finch. On a larger scale, he uses it to address the misconception of strictly separating different species instead of recognizing them as evolutionary variations. From the sparse information he had collected on his voyage; it was not until Darwin realized the connection among some of the birds. To partly address the question I posed earlier, Darwin, while immersed in his studies of geology and zoology, noticed a correlation among bird species from different islands. Recognizing the potential significance of this observation, he understood the need to seek a second opinion on his classification

While he was in preparation to publish the Zoology of the Voyage of the H.M.S Beagle, he consulted the advice of Ornithologist John Gould. As he had recorded so many of his observations in his field notebooks, especially while the crew was at the Galapagos Islands, he wanted a professional opinion on what he saw while he was there. He exchanged a series of letters with Dr. Gould about birds he observed and later classified them into species. While this amazing partnership was in the works to publish one of Darwin’s most famous books, there was a bit of a clash of beliefs between Gould and Darwin. In the following paragraph, I will elaborate on the differing beliefs held by Gould and Darwin, and how these differences led to their divergent opinions in the classification of species.

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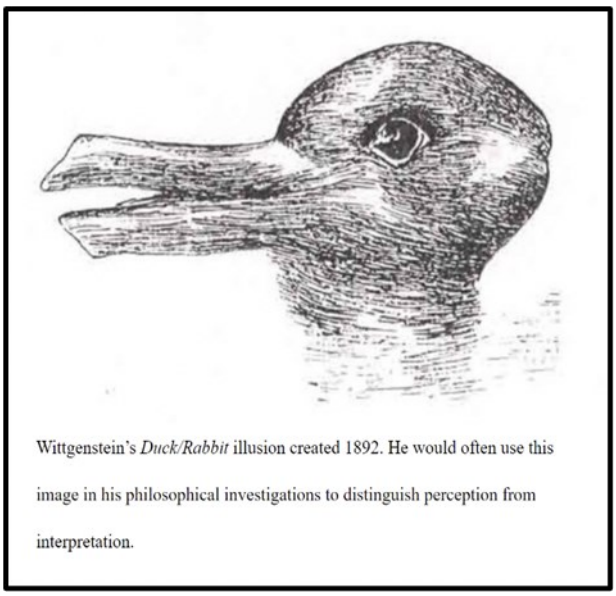
Diverging Beliefs: Darwin vs. Gould

As Charles Darwin was on the verge of forming his new theory of evolution, he knew he needed the professional opinion of renowned English Ornithologist and Taxidermist, John Gould. Gould, who was a taxidermist at the Zoological Society of London, was known not only for his amazing skills to "capture the essence of his avian subjects with quick, bold lines" in his illustrations [8] but also his manner of production. While Darwin was in the process of writing the Zoology of the H.M.S Beagle, Gould was working on his collection, called The Birds of Australia. Owing to his exceptional illustration skills, Gould had cultivated a wealthy clientele, frequently adapting his work to suit the preferences of his audience. Due to the majority of the wealthy clientele being Christian, and believing in the idea of fixed species, John Gould often found himself catering to their beliefs in his drawings. In his book, "An Introduction to The Trochilidae: Or Family of Hummingbirds", Gould mentions the hummingbirds, who "would not pause, admire and turn his mind with reverence towards the Almighty Creator, the wonders of whose hand we at every stop discover?" Gould's additional text, which suggested that the beauty of hummingbirds was purely ornamental and not useful in any other way, greatly impressed Charles Weld, the long-serving librarian at The Royal Society. In a magazine review of the hummingbird monograph, Weld noted Gould's "strong antagonistic bearing to the Darwinian theory" with enthusiasm. Although Gould never adopted Darwin's theory, he helped Darwin classify the birds he observed during the Voyage.

In examining the collaborative efforts and differing beliefs of Charles Darwin and John Gould, we see the interplay between their beliefs and observations, which then lead them to two different conclusions. For example, let's take a very common, 100-year-old optical illusion: The Duck or Rabbit illustration. If my friend and I were to examine this illustration, we might focus on different features. This could lead me to conclude that it depicts a duck, while she might interpret it as a rabbit. But what is important to acknowledge here is that we are looking at the same strokes, the same shade of color, the same eye shape, and the same structure of drawing, but we're interpreting the illustration differently. While it doesn't make me or her any righter than the other, we each have reasoning for the difference in opin-



Wittgenstein's *Duck/Rabbit* illusion created 1892. He would often use this image in his philosophical investigations to distinguish perception from interpretation.

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ion. She explains to me how she sees the rabbit ears instead of a beak, and the face as a rabbit face, while I might see a beak and a duck face. This is precisely what we can understand happened between Darwin and Gould. Darwin saw these species of birds in person, he saw their habitat, their mannerisms, the way they interacted with each other, and much more, while Gould may have focused more on their physical features. So, while they were looking at the same species of birds, they were focused on different features and had past beliefs which led them to think differently. Despite the difference in beliefs, Gould and Darwin had immense respect for each other, and Darwin also esteemed Gould's talent in Ornithology. I want to emphasize that the decision between fixed speciation and possibly species evolving isn't a black-and-white one, and it introduced a new, yet difficult way to differentiate. Perhaps the differences are not due to strictly defined species distinctions, but rather relative divergences from a common ancestor. These differences led some finches to develop large beaks like grosbeaks, while others evolved to resemble hummingbirds or house finches, depending on the food sources available in their habitats. Darwin, in his book, The Voyage of the Beagle, mentions how "The most curious fact is the perfect gradation in the size of the beaks in the different species of Geospiza [finches], from one as large as that of a hawfinch to that of a chaffinch, and (if Mr. Gould is right in including his sub-group Certhidea in the main group)" [9]. This supports my view that Darwin aimed to convey that variations in beak size are not merely fixed characteristics but rather adaptations influenced by environmental factors. While discussing the differences of opinion between Gould and Darwin is important, it's equally crucial to understand the shifts in focus within Darwin himself. Initially, Darwin interpreted his observations through a geological lens, focusing on physical characteristics during his voyage. At just 22 years old, the majority of what Darwin saw on his voyage was very fascinating to him, and he often would see birds that weren't observable in London. But the ones that were somewhat similar to ones he saw in London, he would record them as "finches" or "gross beakes", to mark their similarities. It wasn't until after he arrived back in London and finished publishing material for his geological observations, that he noticed some of these ornithological corrections. Given that his focus was rarely on birds during the voyage, it is often questioned why he contacted Gould and decided to further investigate the observed changes between London and the Galapagos Islands. We can see how before he left for the Beagle, he had certain beliefs regarding fixed speciation ingrained in him due to big philosophers such as Charles Lyell or Lamarck, but during his voyage, through recording and observing the finch-like birds in their habitat, he challenged the beliefs of the 1800s and created his own conclusion, answering the mystery of mysteries.

References

1. Wyhe, J. V. (Ed.). (2009, August 13). Edinburgh Diary for 1826. The complete work of Charles Darwin Online.
2. Carey, T. V. (2014). "That mystery of mysteries." Philosophy Now: a magazine of ideas.
3. Chancellor, G., & Wyhe, J. V. (Eds.). (2008a, April). Cape de Verds Notebook. The complete work of Charles Darwin Online.
4. Wyhe, J. V. (2008, December 9). Falkland Notebook. The Complete Work of Charles Darwin Online.
5. Chancellor, G., & Wyhe, J. V. (Eds.). (2008b, December 6). B. Blanca Notebook. The Complete Work of Charles Darwin Online.
6. Wyhe, J. V., & Chancellor, G. (Eds.). (2008, December 8). Galapagos Notebook. The complete

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work of Charles Darwin Online. https://darwin-online.org.uk/content/frameset?itemID=EH88202337&viewtype=text&pageseq=1

7. Wyhe, J. V. (Ed.). (2022, October). Darwin Journal. The complete work of Charles Darwin Online.
8. Moyer, S., Browne, J., Heitman, D., Staff, H., & Gillis, A. M. (n.d.). Bird artist John Gould and the man who lost a fortune collecting him. The National Endowment for the Humanities.
9. Darwin, C. (1997). In T. Griffith (Ed.), The Voyage of the Beagle (pp. 0–325). Essay, Wordsworth Edition.
10. Gould, J. (1994). A monograph of the Trochilidae, or, family of humming-birds. Hill House.
11. Vickers, P. (2017, April). 1: Wittgenstein's duck/rabbit picture. This is a public ... Research Gate.

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