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## Parsing a Victorian Sensation: The Literary Mechanics of Evolutionary Science in Vestiges of the Natural History of Creation

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**Parsing a Victorian Sensation:**  
**The Literary Mechanics of Evolutionary Science in**  
*Vestiges of the Natural History of Creation*

By Jiawen “Xavier” Xin

Honors Thesis  
Presented to the Macalester College English Department  
Faculty Advisor: Sierra Lomuto  
May 4, 2020

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### Acknowledgements

I feel so grateful for all the kind and generous help I have received in the process of writing this project. Thank you, Sierra. Thank you for always believing in me, for joining me in this hectic journey with nothing but support, for not once judging the “thought vomits” that I sent you days after the deadlines, for seeing all the connections between the mess of my ideas, for making this project possible. I loved every single moment of working with you, and I am so happy to have these moments as the culmination of my adventure as an English major. I would also like to thank Andrea. Your kind encouragement and generous understanding mean so much to me. Words cannot express my gratitude. Thank you also to my friends. Rae, thank you so much for being there for me, always. Ben, working (and having fun!) with you on our “honors nights” has been a true highlight; I am already missing it. Phuong, thank you for your couch and your companionship through the final stretch. Finally, thank you Daylanne and Bill for reading and providing such useful feedback on my project.

There are so many other people who have helped me complete this project, and I hope that I have expressed my gratitude in person. Thank you all. It’s been a ride!

## Introduction

In popular understanding, the history of evolutionary theory knows one name—Charles Darwin—and one date—1859. While scholars have come to understand the so-called “Darwinian Revolution” as an anachronistic construct that arose from the twentieth-century modern synthesis of natural selection and Mendelian genetics, Darwin remains the definitive center of scholarly attention among nineteenth-century scientific figures (Secord 1994 x; Smith 145). Attempts to move away from this Darwin-centrism have revealed a new history of evolutionary theory that affords vital importance to a work that advocated species transmutation more than a decade before *On the Origin of Species*. Its first edition published in the second week of October 1844, the anonymous *Vestiges of the Natural History of Creation* stirred tremendous sensation. James Secord, whose magisterial study of the work inspired this thesis in many ways, states that *Vestiges* was the single most controversial and discussed scientific work of the Victorian era (2000 1, 527). Its readers included Queen Victoria, Abraham Lincoln, John Stuart Mill, Charles Darwin, Alfred Russel Wallace, Florence Nightingale, Thomas Carlyle, Alfred Tennyson, George Eliot, and Ralph Waldo Emerson, among at least a hundred thousand other Victorian men and women across classes and politics (Secord 1994 ix-x; Secord 2000 2). The book was a cultural phenomenon. In the words of Secord, it was

mentioned in thousands of letters and diaries, denounced and praised in pulpits, discussed on railway journeys, and annotated on an Alabama River steamboat. It was discussed at dinner parties, pubs, and soirees, reviewed in scores of periodicals and pamphlets, and in Britain alone sold fourteen editions and almost forty thousand copies. (2000 3)

Indeed, *Vestiges* continued to enjoy considerable sales long after the publication of the first edition of *Origin* (Secord 2000 525). In fact, it was not until the twentieth century that *Origin* became definitively more popular (Secord 2000 526).<sup>1</sup> Such commercial and cultural success was unusual for *Vestiges*, as the book's subject matter had dangerous associations (which I will unpack later in the Introduction and in Chapter 2) that made it unsuitable for discussion among polite circles and within the middle-class home (Secord 2000 109). One of *Vestiges*' greatest contributions in the history of evolutionary thought is that it brought a theory about species transmutation into those places where it had once been seen as a taboo.

*Vestiges* was written by the Scottish publisher Robert Chambers. Synthesizing geology, astronomy, chemistry, the human sciences and the moral sciences, Chambers concluded that all natural processes are characterized by a divinely ordained universal progression towards a higher state. The book itself is structured as a progress narrative of the universe and nature that culminates in the emergence of humans: it starts with the formation of the solar system, then surveys the geological history of the earth, and eventually zooms in to discuss the evolution of life from inorganic matters, the lowest on the scale of creation, to the simplest organisms and then higher living beings, with humans the destination and white Europeans deemed the superior race. While Chambers offers no clear evolutionary mechanism, he suggests that species transmutation takes place through a process of recapitulation. That is, the embryo, in its development, passes through stages on the species hierarchy in which it first resembles the fish, then the reptile, then the bird, up to the mammal and eventually the human. In most cases, the

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<sup>1</sup> There were solid scientific reasons for the eclipse of *Vestiges* by *Origin*.

embryo would develop up to the form of its parent species. But for unknown reasons, the embryo would sometimes move up to the next stage, thereby giving rise to the next higher species. Chambers extends such process to humans, claiming that the human embryo passes through stages that first resemble black Africans, then “Malays” and then native Americans. The human infant then resembles “Mongolians,” and currently standing at the top of this developmental hierarchy are white Europeans.

Chambers’ theory of evolution fundamentally contradicts the biblical understanding of origins.<sup>2</sup> The earlier version of creationism imagined the six-day creation of the world by an intelligent and benevolent God, with man, designed in His own image, being the superior and last creation (Bowler 4-5, 7). Traditional creationists further held that the natural world and living beings have remained unchanged ever since their emergence (Bowler 5). These tenets, over time, have undergone modifications. However, up until the eighteenth century, the fundamental emphasis on divine intelligence and beneficence, the immutability of living organisms, as well as man’s superiority to other species and even nature has remained at the core of any creationist discourse (Bowler 4-5, 7). While by the 1830s, dominant scientific figures have agreed that scientists need not interpret everything in the scripture literally, the Bible remained an authoritative record of the history of the earth that attracted influential backings in scientific circles (Ruse 507). Further, a non-literal interpretation of the six-day creation in Genesis remained controversial (Ruse 507). And any scientific theory that jeopardizes the special providence of man would attract harsh criticism and hostility (Ruse 508). The

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<sup>2</sup> The religious context at the time was much more complicated than my reference to “religion” suggests. This project will focus on providing a more general and broad picture of Christian understandings and beliefs in Victorian England.

evolutionary theory that *Vestiges* expounds, in the words of William Whewell, the influential nineteenth-century professor of mineralogy at Cambridge and Master of Trinity, gives rise to “*a System of Order in which life grows out of dead matter, the higher out of the lower animals, and man out of brutes*” (qtd. in Secord 2000 229). Adam Sedgwick, the renowned Woodwardian professor of geology at Cambridge, berated the book as promoting “rank, unbending and degrading materialism” that would result in atheism (qtd. in Ruse 515). The theory of *Vestiges* places the book at the forefront of a series of radical theoretical standpoints, as its promotion of a law-abiding natural process directly puts into question the presence of the benevolent and intelligent God from Genesis, and its extension of evolution to humans threatens the superiority of a species thought to enjoy divine favor.

The fact that *Vestiges*, despite putting forward one of the most controversial and radical hypotheses on the origin of life at the time, was able to connect with a broad Victorian audience and brought evolution into polite circles of discussion renders it a text worthy of studying. In this thesis, I argue that a literary analysis of this book of science is central to helping us understand how *Vestiges* accomplished its contemporary status as one of the definitive sensations of the Victorian era. This is especially important as the effectiveness of the literary style and rhetoric of the book has been perhaps one of the only features of the book that both its supporters and critics agreed on. Reviews that praised the work noted the author’s sincerity, inquisitiveness, good cultivation and his “clear, pleasant, racy, self-sufficient” and “captivating” prose (Secord 2000 266, 476). Critics of the work deem its appeal seductive and manipulative and compare the work to the Sirens in the Greek myth (Secord 2000 14, 203). In both cases, how Chambers

presented himself on the page and conveyed information were deemed effective. This affords crucial importance to literary analysis in trying to understand the pleasant or seductive appeal of *Vestiges*.

Applying the lens of literary studies to *Vestiges* is especially relevant given the current academic landscape of Victorian literature. In the *Routledge Research Companion to Nineteenth-Century British Literature and Science*, first published in 2017, Jonathan Smith wrote that “scientific prose holds almost no formal place in the major anthologies of nineteenth-century British literature” and among Victorian writers of science, Darwin and Huxley remain the center of literary studies (143). Ralph O’Connor noted in the same collection the increasingly restrictive definition of “literature” to connote only works “that claimed attention on the grounds of aesthetic or emotional effect” and the “general exclusion of science writing from ‘literature’” (163-64). The result is that scientific works today are “rarely treated as literary texts worthy of study in their own right” (155). Parsing *Vestiges* as a literary text, then, is a step in the direction to fill this existing gap of scholarship. My analysis, beyond showing how the literary mechanics of *Vestiges* is central to its mass appeal, therefore the trajectory of evolutionary theory in the Victorian era, further highlights that science (both its image and content) is made as much through observation and logic as through the literary mechanics of the prose that expresses it.<sup>3</sup> Directing the lens of literary studies to Victorian scientific prose reveals the ways in which literary strategies are central to knowledge production and dissemination. Such method therefore affords us a more

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<sup>3</sup> Jonathan Smith incisively notes that “the literary” is “part of the very fabric of [Victorian] scientific prose” and participates in knowledge production (146).

complete and complicated understanding of the history of evolutionary theory in particular and science in general.

It is important to note that my thesis only intends to focus on the first edition of *Vestiges* published in October 1844. James Secord, in his *Victorian Sensation*, argues for the need to regard books, instead of “the static form of their first edition,” as “serial publications, part of a process of constant rereading and revision” (2000 152). This reorientation of how we study texts is certainly significant to *Vestiges*, a work that underwent 14 editions, each with modifications in both content and form. However, it by no means negates the importance of a limited but in-depth textual analysis of the first edition of a book and the meanings it generates. In light of Secord’s insight, I do want to clarify that by *Vestiges of the Natural History of Creation*, or *Vestiges*, I only refer to the first edition of the work. Any close readings intend only to capture the significant interactions of this version of the text with the broader cultural anxieties around it at the time of this version’s publication. It is helpful to keep in mind that *Vestiges* is not a static text, and that its continuous modifications in both form and content in later editions are part of a continuous process of responding to popular anxieties and desires that falls outside of the scope of this project.

In Chapter 1, I focus on the most important feature of *Vestiges*—its anonymity, which is noted by James Secord as “the central problem that defined the possible range of meanings for [*Vestiges*]’ original audience” (1994 xxxviii). It argues that Chambers thwarts the threat of anonymity through framing it as the basis of an ideal narratorial identity and a “democratic” process of knowledge production. In Chapter 2, I explore the intricate and intertwined ways in which Chambers reconciles the growing religious and

political anxieties surrounding the emerging disciplines of science. I conclude my thesis by situating *Vestiges* in its broader context of the British empire and tracing its troubling legacies in Darwin's *Origin* and modern-day racism. Eventually, through this project, I also hope to demonstrate the importance of Humanities in a STEM-focused world.

Literary analysis and history, in the context of my thesis, not only help us understand how crucial scientific ideas were able to gain cultural authority, but further reveal that science itself was made through literary strategies that we learn to parse as Humanists.

## Chapter 1

### The Power and Politics of Anonymous Authorship

When *Vestiges of the Natural History of Creation* was first published in October 1844, it was done so with an anonymous author. It wasn't until 1884, when the Manchester journalist Alexander Ireland—one of the seven who were told of the identity of the author and Chambers's main liaison with the publisher—revealed the secret in the introduction to the twelfth edition, that readers knew that it was Robert Chambers who had penned the most discussed scientific treatise of the Victorian era (Secord 1994 xviii, xxxviii-xxxix; Secord 2000 527). The book's anonymity didn't merely spark curiosity among its readership. In fact, it is a crucial feature of its success: the anonymity of *Vestiges*—for four decades—underpins the remarkable ways in which this book was able to connect with readers and push evolutionary scientific discourse into the polite, aristocratic and middle-class circles of Victorian society, ultimately influencing Darwin's delivery of natural selection, cementing British imperialism, and foreshadowing modern racism whose apostles include the notorious Charles Murray. As a scientific treatise, *Vestiges* may seem beyond the scope of literary criticism. However, I argue that methods of literary analysis reveal the precise mechanisms by which Chambers was able to produce one of the most influential scientific texts in history. This chapter examines the very ways in which narrative strategies underlie the book's ability to transform its anonymity from a fundamental source of suspicion to a crucial point of connection with a wide audience.

Despite the passage of copyright laws in the eighteenth century that spurred the publications of authored works, anonymous publication remained a common feature

throughout the Victorian era (Griffin). However, while anonymity was common in genres such as periodical writings, poetry, novels, and political pamphlets, it was understandably rare among science writings (Secord 1994 xxxviii). Anonymity was “especially rare” in science literature because the credibility of a work relied on the trusted reputation of the author (Secord 2000 19). James Secord further explains that it was important for “men of science” at the time to stamp their names on the discoveries of nature, whereas unsigned authorships in science writings usually associated the work with popular science, an emerging genre that both shaped and disseminated established knowledge to mass audiences (19-20). However, as Secord argues, *Vestiges* challenges these expectations because it is specifically an anonymous work constructing theory at its highest level (20). *Vestiges* is invested in knowledge production at the same time that it maintains anonymity, setting this work apart and inviting us to think about the implications of its position at this unique intersection of generic conventions.

*Vestiges* is a book of science that theorizes the most controversial issue in the field—how evolutionary theory extends to humans. As discussed in the introduction, Chambers is already confronted with an issue of trustworthiness by nature of his subject; therefore, the fact that he chooses to publish anonymously, which would intuitively exacerbate this problem, merits particular attention. Literary and aristocratic elites, the primary audience for the first edition of *Vestiges*, experienced tremendous difficulty with it because of the deep anonymity in which the work was shrouded (Secord 2000 24, 125, 155). They relied upon knowledge about authors in order to interpret and monopolize the meaning of a book for the rest of the reading public (Secord 2000 24). Without any information on the class, gender and politics of the author, it was difficult for the elites,

or the middle class who became the intended audience with the later publications of cheaper editions, to determine whether the book contained serious scientific knowledge and “aristocratic philosophy” or only amateurish science and disestablishment propaganda (Secord 2000 23, 393). Thus the anonymity of a scientific book like *Vestiges* could stir profound anxieties about ulterior agendas (Secord 1994 xxxviii; Secord 2000 23).

The anxiety about anonymity within the socio-political context of industrial urbanization also carries over into how a Victorian public would have experienced the anonymity of *Vestiges*. Rapid industrial urbanization transformed Victorian cities into crowded places marked by “impersonal interactions of market exchange” among strangers who have “no prior knowledge of one another, no known history, no basis for trust other than that which is either inferred from immediate circumstance or through formal certification” (Secord 2000 364). Anonymity therefore constituted an emerging urban experience that was quotidian yet disturbing, bringing about the problem of trust and a sense of alienation that translate into concerns about the character of the *Vestiges* author (Secord 2000 522). The work’s anonymity therefore upset literary conventions and existing power structures of reading. Its initial presentation to its Victorian readership is done not through the trustworthiness of known authorship—an essential premise for most science writings at the time—but rather through the suspicion of an anonymous author.

For the purposes of this discussion, it is important to distinguish the author from the narrator because even though we now know that the author is Robert Chambers—that is, he is no longer anonymous—the narrator maintains an anonymity that should inform the way we interpret the relationship he builds with his readership. In this discussion, I

will use the gender-neutral pronoun “they” to mark and emphasize the anonymous narrator. This decision is important for two reasons. First, Chambers was staunchly against the church and an active member of the liberal Whig party, personal characteristics that drew a sharp contrast to the narrator who fervently justifies the Christian God (Secord 2000 85). In fact, the narrator’s final argument for their theory is that it will not impinge upon the reader’s reverence for any established beliefs. The volume ends with a sentence that projects a comforting vision of harmony between their theory and Christianity: “Thus we give, as is meet, a respectful reception to what is revealed through the medium of nature, at the same time that we fully reserve our reverence for all we have been accustomed to hold sacred, not one tittle of which it may ultimately be found necessary to alter” (Chambers 390). Chambers himself even suggested that his narrator is a separate entity that does not merely cloak Chambers, but expands the bounds of his identity. He spoke of anonymity as liberating him from the confines of his own identity and a model for public service, as it enables him to be “every thing, yet nothing; every sex and no sex; [to speak] from heaven in the character of an angel, and [howl], with equal complacency, from hell, as Belzebub,—and all to serve you, my dear public ” (qtd. in Secord 2000 367). Using Chambers to refer to the narrator would therefore be misleading, giving rise to the need to distinguish the two. I also use the pronoun “they” to refer to the anonymous narrator because there lacks a clear indication of the narrator’s gender in the prose. This manifests in the fact that the most popularly suspected authors in the early months of the publication of the first edition included both men and women (Secord 2000 98, 173, 183).

Anonymity may pose the problem of trust, but the narrator finds ways to mitigate this issue. Part of the strategy that the narrator deploys to address this issue of trust is through relying on the credentials of established authorities. In fact, trust is so crucial that this strategy is at play right from the beginning, on the cover page of the book (Figure 1). “CREATION,” by being in all capitalized letters and occupying the center of the page, centers the book’s allegiance to biblical authority, with the period that concludes the title furthering the definitive quality of such allegiance. (I will offer a closer reading of the arrangement of the book title in Chapter 2). The other important authority that the book’s cover highlights is its publisher. “John Churchill” is the only name on the cover page of the first edition. Its label occupies a conspicuous and meaningful place on the page—it is significant in size and arranged right below the center, where “CREATION” rests.<sup>4</sup> All this is important because Churchill was a highly respected publisher, whose list included *The Lancet*, a major medical weekly in the country whose circulation exceeded four thousand before 1830 (Desmond 15; Secord 1994 xxv; Secord 2000 36). By highlighting “John Churchill,” instead of an author, as the origin of the text, then, the cover page forcefully associates the book with esteemed medical or scientific circles (Secord 2000 115). The visual arrangement of the label highlights such association, thereby helping dissipate concerns about the identity and intention of an author speculating about the origin of earth and living beings.

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<sup>4</sup> Visually speaking, the title page in fact unites biblical truths and scientific publishing, as biblical truth rests on an esteemed publishing house whose publications would then for sure affirm Christianity. I will explore this point further in the next chapter.

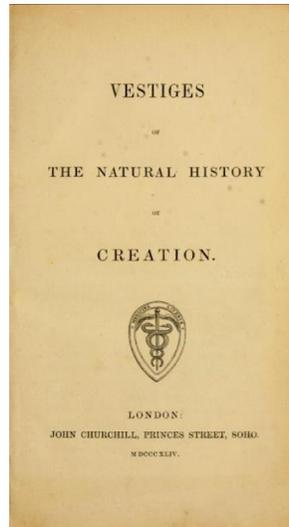


Figure 1.

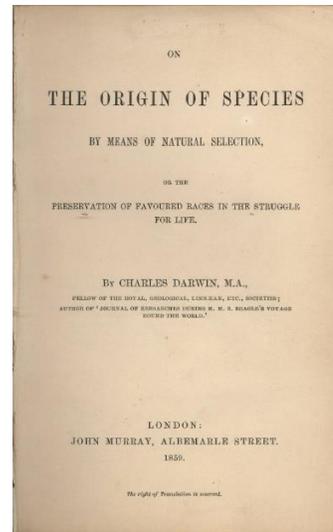


Figure 2.

As a point of comparison, we can observe the title page of the first edition of Darwin's *On the Origin of Species* (Figure 2). Darwin's name, already highly esteemed at the time, and his credentials occupied the center and served as the primary visual anchor of trust. In contrast, this strategic position of the center is occupied by "CREATION." This comparison highlights the importance of the center of the page to Victorian authors of evolutionary science in building trust with a readership that would inevitably be skeptical about their topic.

Such reliance on established authorities continues within the text. The first sentence, beginning with "It is familiar knowledge that," relies on common knowledge to launch the book's ensuing claims. Later, highly esteemed figures such as "Sir William Herschel" and provenanced individuals such as "Mr. Henderson, Professor of Astronomy in the Edinburgh University" punctuate the text's statements about nature and the universe (3). In other words, individuals who may not have been that well known were established as trustworthy authorities in the book through their titles that often suggest scientific authority and trustworthiness.

Going beyond merely citing established authorities, the narrator crafts what I call a “democratic authorship,” which I define as a collaborative mode of authorship where the author alone does not own their book’s ideas, but rather weaves together multiple authors’ voices. Each voice maintains a distinct presence through quotation, but without the rhetorical marking of that presence. For example, when the narrator argues for one of the most controversial, dangerous and important parts of their theory—the recapitulation of the human brain—they directly summon the distinguished German physiologist Friedrich Tiedemann onto the page:

The brain of man, which exceeds that of all other animals in complexity of organization and fulness of development, is, at one early period, only “a simple fold of nervous matter, with difficulty distinguishable into three parts... Now, in this state it perfectly resembles the brain of an adult fish, thus assuming *in transitu* the form that in the fish is permanent. In a short time, however, the structure is become more complex...; it is now the brain of a reptile. The change continues; by a singular motion, certain parts (*corpora quadragemina*) which had hitherto appeared on the upper surface, now pass towards the lower; the former is their permanent situation in fishes and reptiles, the latter in birds and mammalia. This is another advance in the scale, but more remains yet to be done. the complication of the organ increases...; it is now the brain of the mammalia. Its last and final change alone seems wanting, that which shall render it the brain of MAN.”\* And this change in time takes place. (200-01)

The narrator leaves the controversial and disturbing claim that is central to their theory entirely to Tiedemann, stating instead information that at first affirms the superiority of

the human brain over other species and in the end heralds the advance of the human brain to the superior stage. This maneuver cements the agreeability of the narrator while propounding their unpleasant claims through the voice of an established authority. But in the absence of a phrase such as “Tiedemann says,” and through relegating authorial attribution to the footnote, the narrator effectively incorporates Tiedemann as a fellow author *on the page*, thereby creating a democratic authorship. The reader thus experiences the anonymous author as trustworthy.

In addition to human authorities, the narrator also resorts to quantitative data and direct observations to further build trust in the text’s authorship. Trying to support their argument that it is possible for land plants to have existed in an ancient atmosphere with a much higher carbon dioxide level, the narrator speaks through the indisputable numbers: “It is important... to observe that such an atmosphere would not be inconsistent with a luxuriant land vegetation; for experiment has proved that plants will flourish in air containing one-twelfth of this gas, or 166 times more than the present charge of our atmosphere” (57). In this passage, the narrator provides detailed quantitative data to discuss environmental phenomena. Then, when the narrator argues for the correspondence between geological strata and the fossil species discovered therein, they similarly draw on indisputable geologic facts: “[Such correspondence] may have been the case without regard to the origination of new species, but more probably it was otherwise; or why, for instance, should the polypiferous zoophyte be found almost exclusively in the limestones?” (151). In both of these cases, the narrator supports their claims with very straightforward statistics and direct observations, letting these

indisputable facts speak for themselves.<sup>5</sup> The narrator's scientific authority will not be questioned because their claim is directly derived from the indisputable. This foreshadows a democratic mode of knowledge production, wherein claims about natural phenomena can be made as long as they are backed with scientific evidence; I will explore this mode in detail in the latter half of this chapter.

While the narrator presents their claims as directly emanating from logic, numbers and facts in nature, it is never impersonal. Instead, the narrator exhibits and manipulates emotions to build connections with their readers. When the narrator expresses themselves in the moments when they explicitly rely upon external authorities, for example, they express deep feelings towards the quoted scientific discoveries, portraying themselves as sharing a sincere passion for knowledge that serves to mitigate any concerns about their agendas.<sup>6</sup> In the opening chapter of the book, the narrator exclaims at the vast distance between two stars if a parallax of one degree is detected between the two: "The distance might be assumed in that instance as not less than 19,200 millions of miles!" (2). This constitutes the first time the anonymous narrator expresses themselves explicitly on the page, generating an individual, yet relatable, emotional reaction to scientific statements. From the start, *Vestiges* guarantees that it is not a cold presentation of facts and numbers; rather, it promises a text full of feelings and vivid, relatable responses to the findings of science.

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<sup>5</sup> A similar strategy can be seen in places where the narrator, through using phrases such as "give reason to presume," creates the impression that logic or reason is dictating the flow of the text, thereby producing a text that is steeped in the indisputable. For a specific example, see Chambers pp. 3.

<sup>6</sup> I use the word "share," because in exhibiting their emotions about nature, the narrator in fact also conditions a readership that possesses common emotions about nature. In other words, the narrator's confession of their emotions invite a similar feelings from the reader.

It is also important to note here that the narrator's exclamation evokes a feeling of reverence, thereby giving rise to a narrator who shares sincere wonder at the immense scale of nature. Indeed, what is more crucial is that such emotional sharing of knowledge enables science to remain open to religion. The significance of the narrator's exclamation can be understood through Romanticism. An example of this movement can be seen in William Wordsworth's quintessential poem for the Romantic period, "Lines Composed a Few Miles above Tintern Abbey, On Revisiting the Banks of the Wye during a Tour. July 13, 1798." The poem captures the essence of the movement, as it lays bare how nature replaces religion in an experience of the sublime. In other words, one's experience of nature, in place of traditional practices such as church-going, becomes a religious experience. The anonymous narrator's awe at the immensity of the universe in *Vestiges*, through partaking in this Romantic tradition, becomes religious in nature. The narrator's emotions therefore bridge scientific findings and religiosity, making the former a conduit for the latter while demonstrating their own piety, which is crucial in connecting with a largely Christian public.

The narrator's subjectivity further forges a bridge to connect the audience with the scientific discourse contained within the book, as their subjectivity frames science as something that the reader can connect with, rather than shun. The information that immediately follows the narrator's exclamation, for instance, is conveyed through the subjective reactions of the narrator:

In the case of the most brilliant star, Sirius, *even* this minute parallax [of one degree] could not be found; from which *of course* it was to be inferred

that the distance of that star is something beyond the vast distance [19,200 millions of miles!] which has been stated. (2, added emphasis)

The narrator's individuality becomes distinct as "even" and "of course" express the reactions of the narrator to scientific findings, with "even" furthering the religious awe about the immensity of the cosmos from their previous exclamation at "19,200 millions of miles!" Such reactions not only animate and sanctify the otherwise dull and objective and potentially dispiriting account of the failure to gauge the distance between Sirius and the earth, but also invite similar emotional investments from the reader in scientific findings: marveling at the absence of even one degree of parallax and assured of the conclusion to which this experiment leads. In doing so, the narrator's subjectivity cultivates connection between the reader and science.

Such connection is deepened as the narrator's subjectivity begins to structure the descriptive parts of the text. The narrator details the geological findings regarding the cretaceous formation:

It is remarkable that the chalk *with* flint abounds in the north of Europe; that *without* flints in the south; while in the northern chalk siliceous animalcules are wanting, and in the southern present in great quantities...

What is more remarkable, M. Ehrenberg has ascertained that at least fifty-seven species of the microscopic animals of the chalk, being infusoria and calcareous-shelled polythalamia, are still found living in various parts of the earth...

Moreover, these species have a peculiar interest, as the only specific types of that early age which are reproduced in the present day. [More advanced species] have

been changed again and again, since the cretaceous era; and it is not till a long subsequent age that we find the first traces of any other of even the humblest species which now exist; but here have these humble infusoria and polythalamia kept their place on earth through all its revolutions since that time,—are we to say, safe in their very humility, which might adapt them to a greater variety of circumstances than most other animals, or are we required to look for some other explanation of the phenomenon? (119-21)

From “It is remarkable that” to “What is more remarkable,” “Moreover, these species have a peculiar interest,” and the narrator’s philosophical musing at the end, the flow of this self-contained description of geological phenomenon is completely dictated first by the degree of interest these phenomenon evoke and then by the moral they inspire in the narrator. Indeed, if we only look at the four claims that follow their respective signposts, these claims in themselves have no logical connection to each other and are being transitioned from one to another only through the narrator’s subjectivity. The difference in the chalk formation in northern and southern Europe, for instance, is a completely independent discovery from that of the still living infusoria and polythalamia present in the chalk. The narrator’s subjectivity, in structuring these disparate findings through their reactions, produces an ever-increasing personal relevance that starts in the form of a growing interest in the remarkable nature of geological discoveries and culminates in a delicate delivery of the importance of humility. The reader’s investment is invited to grow throughout this process, from feeling increasing interest to being directly invited to ponder the moral implication of the stated geological peculiarity through the rhetorical question at the end.

That rhetorical question, with its seeming non-coerciveness, further creates the illusion of inviting an exchange between the narrator and the reader, making the text conversational. Indeed, this conversational tone of the prose underpins the intimate presence of the narrator and frames them as a companion who is engaged in a familiar, intimate conversation with the reader.<sup>7</sup> Such tone punctuates the prose of the text. As if gesturing to the reader, the narrator speaks about the irregularities on the surface of sedimentary rocks: “From whatever cause they arose, there they were—enormous granitic mountains, interspersed with seas which sunk to a depth equally profound, and by which, perhaps, the mountains were wholly or partially covered” (50). Later, the narrator emphasizes to the reader the drastic disparity in the elevation of Sweden and Chili: “Nay, that the elevation of the former country goes on at this time at the rate of about forty-five inches in a century, and that a thousand miles of the Chilian coast rose four feet in one night, under the influence of a powerful earthquake, so lately as 1822” (141). The intimate tone of a conversation pervades both sentences, portraying the narrator as an amicable companion who is telling the reader about natural phenomenon. Paradoxically, the anonymity of the narrator makes it easier for the reader to project the idea of a companion onto the narrator, thereby subverting the anxiety and alienation that accompany the urban experience of anonymity.

The narrator is not just a companion who speaks to the reader; they care for the reader.<sup>8</sup> This is evident right from the beginning. In the opening paragraph of the book, after approximating the size of the solar system, the narrator humbly claims: “The mind

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<sup>7</sup> Secord also mentions the idea of the narrator as a companion. His discussion frames this feature of the narrator as emblematic of the periodical journalism at the time. See *Victorian Sensations*, pp. 98.

<sup>8</sup> For Secord’s discussion of the “patient, modest” and friendly narrator, see *Victorian Sensations*, pp. 102, 105

fails to form an exact notion of a portion of space so immense; but some faint idea of it may be obtained from the fact, that, if the swiftest race-horse ever known had begun to traverse it, at full speed, at the time of the birth of Moses, he would only as yet have accomplished half his journey” (1-2). The narrator demonstrates no condescension when informing the reader of the “not less than three thousand six hundred millions of miles in extent” of the solar system (1). Instead, they identify with the reader’s difficulty of grasping such expansive distance, attributing it, as Secord notes, to “characteristics of the universal ‘mind’” (2000 100).<sup>9</sup> Note also the use of “*the* mind,” instead of “*our* mind,” which would have been also fitting given that the narrator often prefers the inclusive pronoun: by referring to *the* mind, rather than *our* mind, the narrator avoids the danger of making the reader feel inadequate. There is immense care from the narrator to the reader in these intricate maneuvers.

In the last sentence, the narrator patiently resorts to what the reader would likely have been familiar with at the time—race-horse and the biblical story of the birth of Moses—to let them appreciate the unfamiliar immensity of the solar system. At this point, the image of a caring and dedicated narrator who does not assume superiority over their readers and commits fully to articulating the latest findings in science in terms of what it means to a lay, Christian audience is deftly established. The tone is attentive and understanding, never condescending. This is a narrator who does not seek to portray themselves as omniscient; in fact, they too find it difficult to grasp the immense dimensions of space. Such intellectual alignment with the reader and patience

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<sup>9</sup> For Secord’s excellent analysis of the opening paragraph that focuses on how the narrator avoids didacticism and strives to provide an accessible and engaging account, see *Victorian Sensation*, p. 100-102.

demonstrate tremendous care from the narrator to the reader, something that invites trust from the latter.

When the narrator is about to dispute the literal Scriptural interpretation of creation, they identify with the largely Christian public: “That God created animated beings, as well as the terraqueous theatre of their being, is a fact so powerfully evidenced, and so universally received, that I at once take it for granted” (152). The present tense in “take it for granted,” the eagerness conveyed through “at once,” and the personal and revelatory tone of the sentence established through the invocation of “I,” all portray an author who, even now with a different theory in mind, completely identifies with the reader’s creationist beliefs. This is a writer who is bringing forth a controversial theory but who came from and still surrenders to the appeal of the dominant creationist doctrine, one who through confiding in the reader about their intellectual shift, lets the reader know that they understand what they must be going through in the face of their own theory.

Crucially, the narrator’s care towards their reader does not single them out; rather, the prose typically subsume both parties in a collective anonymity—“we”—that is united by a shared cosmic journey whose goal is to gain “some faint idea” of the universe.<sup>10</sup> This idea is particularly appealing, as gaining knowledge through hard work was popularly understood as self-improvement at the time (Rodrick 42). This journey starts right away from the first few sentences of the book:

It is familiar knowledge that the earth which we inhabit is a globe of somewhat less than 8000 miles in diameter, being one of a series of eleven which revolve at

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<sup>10</sup> For what Secord says about the point of the book being framed as a collective exploration and accumulation of knowledge, see *Victorian Sensation*, pp. 98, 100.

different distances around the sun, and some of which have satellites in like manner revolving around them. The sun, planets, and satellites, with the less intelligible orbs termed comets, are comprehensively called the solar system, and if we take as the uttermost bounds of this system the orbit of Uranus..., we shall find that it occupies a portion of space not less than three thousand six hundred millions of miles in extent. (1)

From the beginning, the narrator and the reader are joined together in a cosmic journey that starts from a familiar, homely place—“the earth which we inhabit”—and zooms out to survey the vastness of the solar system. Throughout this shift, the reader and the narrator are subsumed in a collective “we” that share one “familiar knowledge” of the Copernican theory and participate in an intellectual estimation of the scale of the universe. “We shall find,” the narrator tells the reader, bringing the latter in a collective journey of exploration and discovery. “We find” here being the typical construction that recurs throughout the rest of the book highlights the text’s focus on collective exploration, rather than unilateral didacticism. In all these moments, it is precisely the author’s anonymity that enables the reader to be united with the narrator, because if the author is named, their provenance would alienate certain readers, not that easy to be subsumed.<sup>11</sup> While anonymity can be threatening and suspicious, the construction of a collective anonymous exploratory community shifts attention away from the anonymous author themselves. In sharing explorations, observations and consequent thought processes, such collective journey also minimizes the didactic aspect of the book, making

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<sup>11</sup> Secord also mentions this insight in his “Introduction” to *Vestiges of the Natural History of Creation and Other Evolutionary Writings*. See pp. xvii.

sure that it is not one where an anonymous author imposes their doctrines. Importantly, it creates the illusion that the reader themselves, through “their own” sight and logic, arrive at a common conclusion.

This collective journey of the narrator and the reader structures *Vestiges*.

Throughout the first section of the book that synthesize the latest scientific findings of the geological ages that the earth went through, for example, the narrative takes the reader on a collective journey of exploration with the narrator. The first chapter that talks about geological eras begin with the hypothetical scenario where “we see a mountain composed of a particular substance, with strata, or beds of other rocks, lying against its sloped sides” from which “we, of course,” form a certain inference from that particular substance (44). “We” then “walk away from the mountain across the turned up edges of the stratified rocks, and that for many miles we continue to pass over other stratified rocks... till by and by we come to a place where we begin to cross the opposite edges of the same beds; after which we pass over these rocks all in reverse order till we come to another extensive mountain,” a lengthy, physical journey that culminates in another collective inference (44-45). The inclusive pronoun “we” subsume reader and narrator in a collective that, with motion verbs and visual details, together travel through an ancient landscape and form collective conclusions. This mode of collective physical and intellectual journey marks the openings of the next few chapters. The chapter on the second geological era opens with the claim: “We can scarcely be said to have passed out of these rocks, when we begin to find new conditions in the earth” (54). The reader again joins the journey with the narrator. The following sentences visualize the “new conditions” from which collective knowledge is formed. The next chapter begins with

“We advance to a new chapter in this marvelous history [of the earth],” with “advance” giving rise to a progressive movement through space and time ( 66). In the following chapter, the narrator claims that “we now enter upon a new great epoch in the history of our globe” (76). With the turning of the pages, the reader then participates in an uncoercive and progressive journey with the narrator that form collective conclusions from common sights, thereby mitigating any threats or suspicions towards the narrator’s anonymity.<sup>12</sup>

The best example of collective exploration connects with the title of the work.

The narrator says:

While the external forms of all these various animals are so different, it is very remarkable that the whole are, after all, variations of a fundamental plan, which can be traced as a basis throughout the whole, the variations being merely modifications of that plan to suit the particular conditions in which each particular animal has been designed to live. Starting from the primeval germ, which, as we have seen, is the representative of a particular order of full-grown animals, we find all others to be merely advances from that type. (192)

The narrator adopts a creationist language—“a fundamental plan” and “designed”—to describe the internal structures of different animals, hinting that they are all God’s creations. Such evidence of creation can be “traced” through looking at the skeleton and fossil remains of these animals, alluding to the title *Vestiges of the Natural History of*

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<sup>12</sup> My incorporation of the physical act of page-turning into my analysis is partly inspired by Secord’s argument that this act, combined with “causal language and temporal sequence,” “brings out the force of progress in nature, so that the act of reading affirms progressive development” (2000 101).

*Creation*, as here the passive voice invites the reader on a journey to trace the evidence of creation through looking at physical remnants in nature's history. "We find" underlines the participatory mode of exploration and connects perfectly with the act of tracing the vestiges of creation. The narrator and the reader are on a collective spiritual journey to find traces of and affirm God's plan.<sup>13</sup> Through this collective journey, trust is formed through the narrator's skillful submergence of their own identity into the "we" and referencing instead shared intellectual power (or the lack thereof), experiences, perceptions, discoveries and eventually conclusions.

This collective journey, besides cementing the reader's trust in the narrator, has a significant political implication. The first edition of *Vestiges* was published at a time when the growing professionalization of science came together with the rising belief that knowledge production should be restricted to only a few people (Secord 2000 43-44). The narrator, in framing their work of science as a collective attempt with the reader to understand the most controversial subject in science, democratizes discovery and knowledge production of nature through the perspective of educated white scholars.

I want to turn now to a discussion of what John Plotz has called "textual intimacy," and how this concept elucidates the significance of *Vestiges*' anonymity to the formation of a democratic process of knowledge production. John Plotz, analyzing the works of John Stuart Mill, notes the seeming dichotomy between "impersonal reason"

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<sup>13</sup> This fundamental narrative model of a collective exploration further enables the narrator to more effectively create a correspondingly growing repository of collective knowledge that is gained along the way. As the text goes on, new knowledge keeps getting reintroduced in the form of "we've seen..." or "remember." In this way, the narrator builds a collective repository of knowledge that grows as the reader reads more. With the narrative model of the collective journey, the reader are framed as truly accruing these knowledge as they go along with the narrator to see and deduce the same things. In this way the information provided by the narrator comes across as trustworthy.

and “interpersonal relationships” (40). The former, carried to an extreme, threatens to render individual autonomy alienating; the latter, restored to the full, inevitably ushers in a social tyranny that silences the individual. With *On Liberty*, Plotz argues, Mill successfully finds in texts the possibility to mediate such dichotomy as he extracts and aligns the best features of “impersonal reason” and “interpersonal relationships.” Such balancing act “retain[s] all the benefits of solidarity and community interaction, but in forms that will not impinge on individual autonomy and freedom of expression,” values that are deemed to lie at the heart of Western democracy (41).

Plotz’s conception of the democratic textual intimacy that is inclusive but not coercive provides a productive perspective to study *Vestiges*, in particular because the book was published at a time when Christianity had become overwhelmingly domineering on all levels of private and social life and its battle with unbelief was shoved in front of the public on a daily basis (Secord 2000 302, 307; Turner 11). One crucial way in which the *Vestiges* narrator produces textual intimacy, thereby providing the reader a textual space for individual autonomy amid the intense religious and radical and atheist indoctrination at the time, is through their skillful deployment of pronouns. When professing their beliefs, the narrator frequently resorts to variations of the pronoun “I.” Their first explicit self-reference, for example, takes place when they are making an observation that is fundamental to their overall argument. After noting the mathematical patterns that underlie the distance between different planets and the sun, the narrator explains that “surely there is here a most surprising proof of the unity which I am claiming for the solar system” (11). This is the first important argument that the narrator makes in the book, that there is a unity in cosmic arrangements, a unity that is

fundamental to the narrator's theory of evolution (192, 203). The pronoun "I" in this statement, through highlighting the presence of the narrator, endows the text with the quality of a personal revelation. While all texts interact with the reader through the act of reading, the revelatory quality of the narrator's quote adds an interpersonal quality to that interaction.

Such intimacy, however, does not come at the expense of individual autonomy; the highlighted presence of the narrator also establishes a critical distance between the reader and the text by making the former aware of the subjectivity of the latter. That there is a unity in the cosmic arrangements of planets and the sun is only the narrator's opinion, one that is not to be imposed upon the public but rather should evoke the public's critical debate. The pronoun "I" thus effectively fulfills the dual task of creating an interpersonal exchange with the reader while preserving the critical distance for individual autonomy, successfully mediating the tension between "interpersonal relationships" and "impersonal reason."

Sometimes, such textual intimacy takes a more explicit form of direct "negotiation" with the reader. After describing the way planets and their satellites are formed, the narrator says: "The rule, if I can be allowed so to call it, receives a striking support from what appear to be its exceptions" (16). "The rule" hints at a natural law, a controversial concept at the time because of its implications of determinism and denial of free will (Secord 2000 73). Natural law is also the basis of the evolutionary theory in *Vestiges*. At this crucial juncture, the narrator seeks permission from the reader to apply such a term to their observations, making it explicit that it is only their opinion, thereby

inviting the reader's critical engagement while maintaining the style of a personal conversation between the narrator and the reader.

Such textual intimacy extends beyond Plotz's theorization. In fact, *Vestiges* helps us to deepen his theory. My earlier discussion about the narrator's use of the first-person plural pronoun "we" demonstrates how such intimacy need not be oppressive, as Plotz's argument suggests. This is because the narrator presents findings as ones they and the reader collectively arrive at through what they all observe and "find" along a collective journey.

Such democratic textual intimacy furthers what I suggest earlier with the book's incorporation of authorities' voices, that *Vestiges* in fact creates a democratic model of authorship that disrupts what Foucault theorizes as one of the fundamental author-functions, that of a personal stamp (303). This is because knowledge production in the book proceeds not as a unilateral transmission of arguments from the narrator to the reader, but as a collective and interactive process that requires critical participation and approval from the reader. This process is expected to continue even after the publication of the book. In the concluding chapter, the narrator expects that the author's name "will never be generally known" and repeatedly entreats a "calm and careful inquiry" or a "respectful reception" from the reader to complete the course of their theory (387, 389-90). In a place that typically sees authors of science literature summarizing the strongest appeals of their theory, the narrator instead distances themselves from attribution and sees it essential for public intellectual participation to complete this process of knowledge production, thereby creating a democratic process through reader engagement.

The most crucial moment of democratic knowledge production takes place when the narrator introduces their own theory. While the narrator emphasizes their authorship of the theory through naming it as their hypothesis, their humble portrayal of it as “simple and easily conceivable” nonetheless creates an impression that this is a theory that could be thought of by anyone (205, 231). As the narrator goes on to state that their theory is foreshadowed by Socrates’ idea of “archetypes [as] models, in imitation of which all particular beings were created” and “strikingly demonstrated by the [more recent] discoveries of Macleay, Vigors, and Swainson,” they weave their theory in a progressive history of science where their theory serves as a natural next step of long established and recently produced knowledge. Besides cementing the validity of their theory, the narrator further makes a case for the importance of democratic knowledge production as the individual genius of the author of a theory is toned down while the process of a theory emerging from an access to established information is foregrounded. Such model is particularly important because access to knowledge and the ability to produce knowledge were not thought of as rights that everyone deserves at the time, a point that I will discuss further in the next chapter.

This is further the case as the narrator deems the formulation of their own theory as a democratic attempt, that is, an attempt that anyone could do. Before expressing their hypothesis on the evolution of species, the narrator exclaims: “What mystery is there here—and how shall I proceed to enunciate the conception which I have ventured to form of what may prove to be its proper solution!” (203). In this moment, the anonymous narrator’s diffidence (so extreme to the point that they are wondering how they can continue) and humility (as evident in the verb “venture”) reveal them to be just a reverent

Victorian ordinary person who, with the access to established knowledge, took the risk to form a theory about the mysterious question of origins. In this way, the narrator's self-conscious exclamation champions a democratic mode of knowledge production where everyone has the right to study and theorize nature.

While the narrator eventually establishes these democratic modes of knowledge production that connects the text intimately with its readership, with their anonymity enabling this process, crucial contradictions exist in the ways in which the narrator presents themselves. For example, such a democratic mode of knowledge production is also in fact self-serving, as it is ultimately a strategy that serves to secure a favorable reception of the anonymous narrator's theory on one of the most controversial subjects of the time. Further, while the narrator states at the end that they "do not expect that any word of praise which the work may elicit shall ever be responded to by [them]; or that any word of censure shall ever be parried or deprecated," eleven more editions of the book were published in which Chambers made significant adjustments to respond to public receptions (387).

Ian Shaw, in analyzing Charles Darwin's strategy to present a nature that is "of plain signification," calls such strategy a "colonialism of thought," in that it implies an "attitude that says 'If you don't see things my way you must be preposterous – or simply barbarous'" (370). Shaw's argument complicates Plotz's textual intimacy as in fact textual colonialism: the "I" in *Vestiges* is a similar strategy to push for the best possible reception of Chambers' theory. The seemingly democratic and intimate pronoun in fact manipulates the reader to see, find and eventually think what the narrator wishes them to.

Perhaps the greatest contradiction, though, is that while Chambers crafted a text that is caring and democratic and that presents science in a way that unites people, he is ultimately applying evolution to categorize humans in racist ways. Such democratic knowledge production, then, is a strategy that ultimately cements the superiority of whites. It reveals that racial hierarchies are constitutive of the idea of democracy in Victorian England. This is the most important contradiction in the book that we need to keep in mind, as these contradictions testify to the process where ideologies struggle to mask their contradictions and produce themselves.

## Chapter 2

### The Literary Making of Science

Any scientific work published in the early Victorian period must contend with complex anxieties regarding the production of scientific knowledge. This is especially true for *Vestiges*, an anonymous work of science theorizing the evolution of species, including humans. At the time of its publication, Victorian England was experiencing a general anxiety about scientific knowledge. While scientific learning had been understood as a way to exercise the divine gift of intellect and a path towards enlightenment and spiritual self-realization, the growing inconsistency between scientific findings and scriptural teachings created anxiety over scientific knowledge (Secord 2000 344-45). There was also a common anxiety that science was stripping nature of its mystery and wonder (Secord 2000 190, 207).

At the same time, advances in print technology, the development of railroads, improved public education, and the establishment of public libraries and reading rooms all contributed to an unprecedented mass market for knowledge (Secord 2000 2, 68, 139, 141). In particular, there were extraordinary efforts to educate the public about the sciences. The Royal Institution, the most important national scientific organization throughout the first thirty years of the nineteenth century, was established in 1799 with the explicit aim of promoting scientific endeavors and discoveries to the public (Willis 31). The centrality of this aim manifests in the institution's very architecture: the large lecture theatre aimed at public engagement and education was located at the literal center of the institution building, with laboratories and research spaces fitting around it (Willis 31). While the Royal Institution mostly engaged with adults of the white upper-class, the

British Association for the Advancement of Science (BAAS), founded in 1831, made science accessible to the broader British public across different classes and geographies (Willis 33). The BAAS held its annual meetings across locations in the country that ranged from university towns to urban centers and suburban hubs (O'Connor 156; Willis 33). The BAAS was only one of the various efforts in the early nineteenth century to promote scientific knowledge to a lay public audience.

This period witnessed not merely a dissemination of scientific knowledge to lay audiences, but more importantly the way popular scientific exhibitions and demonstrations enabled lay people to actively construct scientific knowledge. This popular production of knowledge, which actively engaged with public interests and desires, threatened to replace knowledge produced by “men of science.”<sup>14</sup> For example, Martin Willis explains that commercial sites such as the Adelaide Gallery of Practical Science in London were established for scientific exhibitions and demonstrations, generating and disseminating scientific knowledge to virtually all regions of the country (35-36). Elites’ *fear* of losing their cultural monopoly on scientific knowledge production was accompanied by a rising *distrust* of the mass possession of knowledge. Samuel Taylor Coleridge, for example, notoriously termed such possession as the “plebification” of knowledge, i.e. its corruption, which would foreshadow societal collapses (Secord 2000 46).

Coleridge’s anxiety also concerns the politicization of science at the time, as it was simultaneously used by both the establishment to cement the authority of the State

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<sup>14</sup> While Jonathan Smith notes that there were no clear distinctions between professional and popular science in the early nineteenth century, I use a common term at the time—“men of science” to refer to scientific figures who enjoyed more established positions of authority in scientific circles (147).

Church and by radicals to promote freethought and reform (Desmond 23-24). Institutions such as the Society for the Diffusion of Useful Knowledge also set up to control the dissemination of knowledge and its content to prevent the lower classes from using knowledge to radical social or political ends (Secord 2000 48).

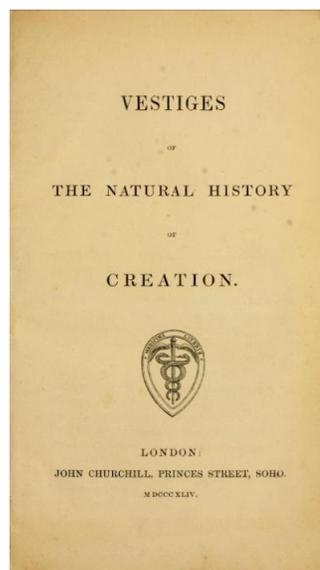
*Vestiges* not only had to contend with the general anxiety over knowledge production and dissemination, as a work on evolution, a particularly controversial topic in science, it also had to grapple with the radical implications of the topic. Any theory arguing for species transmutation was closely associated with disestablishment against the clergy (Desmond 178). This association had historical roots in the French Revolution, where science in general was used to undermine the power of established institutions including the clergy and even Christianity itself (Secord 1994 xi; Turner 12). Species transmutation was an especially powerful weapon against the clergy, because the idea, in portraying natural processes as following fixed laws, reveals a God that “had instituted self-adjusting physical and moral laws at creation, revealing them directly to Everyman through Nature and Revelation” (Desmond 179). The state, therefore, “had no right to interpose priests, any more than it had the right to enforce Anglican creeds” (Desmond 179). Jean-Baptiste Lamarck’s 1809 theory of species transmutation, for example, was quickly adopted by French radicals to further disestablishment (Qureshi 24). French works on evolution were used by British radicals to champion political reforms, with the continent’s general embroilment in revolution during the 1840s exacerbating concerns about the political implications of evolutionary theory (Secord 2000 399; Qureshi 24). Such radical association of evolutionary theory accounts for perhaps the most vehement review *Vestiges* received after its publication wherein Adam Sedgwick, the influential

British geologist whose views represented Christian orthodoxy, framed his disgust at the book in the same language of the disestablishment debate (Desmond 178).

Evolutionary theory also had troubling associations with materialism and atheism. The complete application of natural law to nature is strongly associated with the late Enlightenment materialism of Baron d'Holbach, Elihu Palmer, C.F. Volney, Lamarck among others (Secord 1994 xxiv). These works that often “united a cosmological narrative with a naturalistic origin for life and man” were frequently produced in cheap editions by craftsmen and lower-middle-class freethinkers (Secord 1994 xxiv). Their theories were typically founded upon the idea of self-activating matter and were used as “potent weapons against ‘kingcraft and priestcraft’ half a century after the French Revolution” (Secord 1994 xxiv). This attempt to theorize the history of life on earth was so controversial that it was often excluded from being a legitimate area of scientific inquiry. Scientific meetings at the time excluded the natural history of creation from their formal proceedings (Secord 2000 418). Even the Geological Society, concerned with a discipline that was crucial in providing evidence that could trace ancient and recent forms of life, did not include discussions on species origins (Secord 2000 418). These attempts to delegitimize the question of species origin mean that *Vestiges*, in order to make evolution a polite and safe subject matter of discussion among the upper and middle class and established scientific and religious authorities, had to promote a science that is free from any radical agendas. This chapter examines the interconnected and at times contradictory ways in which the work reconciles its science with the complicated and intertwined anxieties surrounding the production and dissemination of scientific knowledge in general, and evolution in particular.

### The Format of the First Edition

*Vestiges*, right from its cover page, tries to placate popular anxieties about its content. Its title, in extending natural history to creation, however, adds another challenge. Barbara T. Gates defines Victorian natural history as “an overwhelming drive to collect, witness, and catalog nature that occurred during the reign of Queen Victoria” (540). This definition includes both the professional and amateurish practice of disciplines such as physical geography, geology, and the history of plants and animals (Gates 541). These disciplines, instead of exploring causation in the natural world, concerned themselves mostly with organizing nature in ways that affirm the Scripture (Secord 1994 xii). The title of the book, *Vestiges of the Natural History of Creation*, therefore presents a disturbing contradiction: natural history, typically directed at the organization of nature that affirms the divine act of creation, should not be applied to study the latter (Secord 1994 xii). Even as the cover page presents a title that raises anxieties about the appropriate purpose of natural history, it simultaneously mitigates these anxieties through its deliberate layout.



## Figure 1.

This cover page, through intricate visual arrangements of words and image, reconciles science with the multifaceted concerns around it. Foremost, the page declares its biblical allegiance through humbly honoring the divine act of creation. The wide space between the three major lines of the title and the almost negligible size of the two prepositions (“OF”) therein invite the reader to view the title in three distinct but related segments: “VESTIGES,” “THE NATURAL HISTORY,” and “CREATION.” Most apparently, the central place of “CREATION” on the page pays homage to this divine act through rendering the word the authoritative center of attention. There are larger margins between the letters in “CREATION” than any other word and it is one of the biggest in size. These two features endow “CREATION” with a majesty that both conveys the author’s piety and heralds the book’s reverence for Creation, a divine act that underpins God’s benevolence, omnipotence and omniscience. In claiming the honor of being the last word in the title, “CREATION” gains a definitive finality that is enhanced by the period that follows it. Such positioning portrays “CREATION” as indisputable, thereby furthering the work’s biblical allegiance. In contrast, “THE NATURAL HISTORY,” despite being connected with “CREATION” in both syntax and font, looks humble with its smaller font and margin size and in its relatively off-center position. The subtext is clear: in the book, natural history will not threaten the validity and authority of creation. The latter both anchors the former and serves as its inevitable conclusion. “THE NATURAL HISTORY OF CREATION.,” arranged and styled in this manner, rationalizes the connection between natural history and creation.

The other distinctive word—“VESTIGES”—on the title page furthers the homage to creation. Secord argues that the word “vestigis,” because it indicates *traces* rather than the full picture, conveys “empirical modesty” and invites reader participation to piece together the fragments of the history of creation (104). The elongated font of “VESTIGES,” through distinguishing the word from the rest in the title, gives it a visual idiosyncrasy that emphasizes the work’s humility and call for reader participation. Its similar size to “CREATION” visually connects the two, and thereby foregrounds the idea that the empirical traces in nature are those of God’s creation. “VESTIGES” therefore promises a humble attempt to show the *traces* of God’s creation while positioning readers as active participants in a process that *tries to* understand and affirm this divine act. Readers in this process also become humble, as they can try, yet never will, know the full story of creation. “VESTIGES” therefore preserves the mystery and wonder of “CREATION” and nature that have been much feared to be removed by science.

While “THE NATURAL HISTORY” is visually downplayed in terms of its font and size as compared to “VESTIGES” and “CREATION,” its position on the cover nonetheless constitutes a compelling metaphor for the entire book. Within the title portion of the page, “THE NATURAL HISTORY” occupies the indisputable center and, with the negligible prepositions, directly connects “VESTIGES” and “CREATION.” This arrangement, together with the words’ unassuming appearance, sends a nuanced message: while natural history is of central importance to connect the traces the reader sees in nature with the idea that these traces are God’s creation, it only does so humbly, without compromising the majesty, mystery and wonder of creation or the reader’s ability to revere it. In this way, the positioning of “THE NATURAL HISTORY” visually captures

and informs the reader what the book is about. Such subtle and humble affirmation of science also manifests in the placement of “CREATION” on top of the prominent label of John Churchill, intimating that facts of creation (quite literally) rest on solid information of science from the reputed publisher. The title page, through these complex maneuvers, reconciles natural history and creation and placates popular anxieties regarding knowledge production and science.

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Figure 2.

The table of contents (Figure 2) furthers this balancing act by demonstrating its own biblical allegiance. The titles of the first eleven chapters, tracing different eras that witnessed the “commencement” and development of the cosmos, the Earth and different species, lay bare the fact that the vestiges of natural history cast doubt upon six-day creation. While by the nineteenth century, many geologists believed earth to be millions

of years old, the belief of six-day creation or that the earth being merely a few thousand years old remained popular and continued to be taught (Buckland 259). At Cambridge, for example, students prepared for exams that tested their memory of biblical chronology in the 1840s (Secord 2000 224). Nonetheless, the alternate geological history in the first eleven chapters traces the Genesis account of a divinely ordained process of “be fruitful, and multiply” through a clear sense of population growth from “Commencement of Organic Life” to “Fishes abundant,” and from “Commencement of Mammalia” to “Mammalia abundant” (*King James Bible*, Genesis. 1.22). Such biblical association is furthered through the word choice “abundant,” the adverb of which describes the divine act of creation in Genesis: “Let the waters bring forth *abundantly* the moving creature that hath life” (Genesis. 1.20, added emphasis). The titles of the first eleven chapters, then, mitigates concerns about its scriptural contradictions through presenting a history of the earth that deviates from the scriptural timeline yet retains the more important part of God’s will to let species “be fruitful, and multiply.”

The first eleven chapter titles deepen their biblical allegiance through mapping biblical hierarchy onto a progressive geological history of the earth. Creationism, besides seeking to explain the origin of life, also spurs the age-long search for a meaningful pattern that potentially forms the basis of the apparent diversity of life. If there indeed exists a rational God, there must be some connections among living beings that can weave them together into His “harmonious plan of creation” (Bowler 50). In its least sophisticated and most popularized form, the pattern took the shape of a linear “chain of being” along which all species are naturally positioned in a single hierarchy that sees humans—more specifically, white Europeans—at the top and the simplest natural form at

the bottom (Bowler 50). While the order in which inorganic and organic beings show up in first eleven chapter titles do not match exactly the order on a dominant version of the Chain of Being outlined by Peter Bowler, the majority does (57). The biblical hierarchy is therefore largely mapped onto a progressive geological history of the earth that witnesses the appearance of first rocks, then sea life, land plants, reptiles, birds and mammals. This presentation places biblical hierarchy in a chronological development, thereby constructing a geological history of progress towards the eventual appearance of “present species.” The first eleven chapter titles, then, portray astronomy and geology as providing a history of the cosmos and the earth that elongates the biblical timeline while transforming the biblical hierarchy into a narrative of universal progress. The message is implied: astronomy and geology will not contradict the biblical hierarchy that secures white Europeans’ place at the top.<sup>15</sup>

The four chapter titles that follow Chapter Eleven mark a tonal shift from the factual, indisputable character of earlier titles. The measured language—from “Considerations” and “Hypothesis” to “considered” and “indicating”—humbly presents these chapters as opinions and inferences. Nonetheless, these are opinions and inferences that extends from the factual descriptions of the geological eras that the earth has gone through. Such arrangement not only affirms the validity of these opinions and inferences, it also promotes a model of scientific hypothesis, one that underlies the book’s methodology, which derives considerations from a factual, indisputable geological history that validates the species hierarchy in Christian thinking. The last chapter in this

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<sup>15</sup> It is worth noting that the central piece to Chambers’ theory—the transmutation of species from a lower to a higher state, with white Europeans the destination—is completely absent. Humans, also, are not mentioned until the next page. These moves tone down the controversial centerpiece of the book.

grouping (“The Macleay System of Animated Nature—This System considered in connexion with the Progress of Organic Creation, and as indicating the natural status of Man”) implies “Man’s” superior status across “the Progress of Organic Creation,” as supported by the authoritative-seeming “The Macleay System of Animated Nature.”

As these chapters culminate in the “Early History of Mankind,” the book distances itself from a dogmatic declaration that Secord argues to be characteristic of Enlightenment materialism (2000 98). The placement characterizes the book’s claim on the early history of mankind as the result of careful study, after both “general” and “particular” “considerations,” as well as the application of the “Macleay System of Animated Nature.” In addition, placing a chapter about human origins at the end also conveys that the book does not seek to be sensational or radical, in which case such claims about human origins would perhaps have been foregrounded at the start and made very explicit through chapter titles. The arrangement of “The Early History of Mankind” as the last part of the geological history restores the chronology that breaks off after the eleventh chapter “The Era of the Superficial Formations.” What distinguishes this chapter title is that the chronology zooms in on the history of humans, a special treatment that creates an impression geological ages heralding the commencement of humans, thereby pandering to the dominant anthropocentrism at the time.

The concluding chapter “Note Conclusory” again distinguishes the book from a definitive proclamation by radical science: the ending chapter does not seek to offer an authoritative conclusion; it only tends towards it, with “Note” intimating the personal presence of the anonymous author. The ending chapter of the book indeed contains the most personal plea for consideration and belief in the accuracy of Chambers’ theory, but

the title name of “Note Conclusory” masks that fact, effectively lulling the reader in. The title of the ending chapter of the book, then, hinting ever slightly at a lack of resolution, again avoiding any impression of dogma while animating the role of the reader to complete the trajectory of the book. The personal touch conveyed through the word “note” also confers an intimate closing to the book that helps placate the suspicion that a Victorian reader had towards the anonymous work.

### **Humble Seekers of Knowledge**

As the cover page and contents of the book demonstrate, humility is crucial in making science safe and preserving both the book and the reader’s reverence towards God. As the Reverend Robert Candlish of Free Saint George’s in Edinburgh observes, a common and powerful appeal of the Bible as opposed to books of science is that the latter often become self-serving as “a discovery of our own reason, following a train of thought” (qtd. in Secord 2000 273). The author, in humbly positioning the reader and the book, enables *Vestiges* to function just like the Bible in eliciting human reverence for the wonder and majesty of nature.

The importance of humility is evidenced by the fact that it extends to the very first paragraph of the entire book. As the opening paragraph subsumes the narrator and the reader in a collective journey of physical and intellectual exploration, it also assigns important roles to science that place “us” and the “earth which we inhabit” in a humble position. *Vestiges* opens with a description of the earth in relation to the universe:

It is familiar knowledge that the earth which we inhabit is a globe of somewhat less than 8000 miles in diameter... The sun, planets, and satellites... are comprehensively called the solar system, and... it occupies a portion of space not

less than three thousand six hundred millions of miles in extent. The mind fails to form an exact notion of a portion of space so immense; but some faint idea of it may be obtained from the fact, that, if the swiftest race-horse ever known had begun to traverse it, at full speed, at the time of the birth of Moses, he would only as yet have accomplished half his journey (1-2)

There is a deliberate set of juxtapositions between the way the narrator describes the dimension of the earth and that of the solar system. The earth's size is "somewhat less than," whereas the solar system's size is "not less than." This juxtaposition creates a sharp contrast that highlights the smallness of the earth and the boundlessness of the solar system—the former's size is under an upper limit whereas the latter's denies that limit. The narrator goes on to place the earth's size under a clear, straightforward number ("8000 miles") while approximating the solar system's size in lengthy words that are difficult to grasp ("three thousand six hundred millions of miles"). The smallness of the earth is furthered, as its size is at once more accessible to the reader when juxtaposed with the almost incomprehensibly grand dimension of the solar system. Last but not least, the earth's size can be gauged by a finite "diameter," whereas the solar system's size must be understood as an "extent," a word that connotes boundless extension through its Latin roots in "extendere," meaning "to spread out" ("extend"). These juxtapositions portray an astronomy that reveals the smallness of the earth and the grandness of the universe, thereby testifying to the majesty of God's creation. The opening paragraph also portrays the human endeavor to understand the cosmos as humble: "we" can gain a "faint" understanding while maintaining that awe—science is never meant to reduce "our" reverence for nature; it only enhances "our" understanding of "our" own

insignificance and inability to grasp God's creation and therefore His greatness. Nonetheless, such massive scale can and shall be attempted to be "faint[ly]" grasped (this pious attempt to gain some faint understanding of the unknowable is a motif throughout the book), that despite the mind-bogglingly expansive time and distance, "we" shall survey through them and grasp "some faint idea" of creation. This further portrays science as an innocent endeavor, one whose objective is for humans, with their limited faculties, to nonetheless strive for some understanding of the divine creation. The pious undertone of such endeavor renders science almost religious. At the end of this opening paragraph, astronomy reveals an expanse that overtakes what is imaginable within a biblical scale of time. The ending example, while adhering to a biblical chronology, subtly suggests that, contrary to Candlish's reasoning of the superiority of the Bible to books of science, scientific disciplines in fact are a superior means of revealing God's greatness.

The image of scientific practice as humble is further emphasized by the fact that the first scientific experiment that the narrator describes in the book ends in a failure. The experiment resorts to parallax to gauge the distance between stars but ends in "no sensible parallax [being] detected" (2). The paragraph starts with "It has long been concluded amongst astronomers," an invocation of specialist knowledge that contrasts with that of "familiar knowledge" in the opening paragraph (2). Nonetheless, the conclusions that both specialist and familiar knowledge reaches in this opening of the text are the same, that the vast expanse of the universe is immeasurable and exceeds "all powers of conception." As the narrator exclaims that "the distance [between two stars with one degree of parallax in between] might be assumed... as not less than 19,200

millions of miles!,” they make clear that science will not strip nature or the universe of its mystery or wonder; it only enhances one’s wonder at the universe’s inability to be rigidly and unfeelingly quantified (2). Science affirms the majestic expanse of the universe, thereby giving an empirical basis for “our” wonder at God’s creation.

Indeed, it is precisely through empirical science that readers can better appreciate the sublime. Continuing their discussion about the distance between the stars, the narrator says: “If we suppose that similar intervals [twenty thousand millions of miles] exist between all the stars, we shall readily see that the space occupied by even the comparatively small number visible to the naked eye, must be vast beyond all powers of conception” (3). The narrator balances the empirical with its limits. “Our” faculty of vision testifies to the immensity of space. In fact, the only thing that “the naked eye” affirms is the mind’s own impossibility to conceive the scale of the universe. Empirical science is not threatening, as instead of lifting the veil of nature’s mystery, it can only lead “us” to further realize and appreciate the unknowable.

Similarly, the spiritual can be more accurately observed and better revered with the aid of technology. The narrator speaks of the power of the telescope: “The number of stars visible to the eye is about three thousand; but when a telescope of small power is directed to the heavens, a great number more come into view, and the number is ever increased in proportion to the increased power of the instrument” (3). The human eye, with the aid of the telescope, can better behold the immensity of “the heavens,” with this choice of words, instead of “the sky,” for example, aligning scientific observation with religious worship. The focus of the last part of the sentence is on the increased number of stars “we” can see with better powered telescopes. This helps further frame science and

technology as harmless, unthreatening things that only enable “us” to better appreciate “the heavens.”

The humble positioning of science continues as the narrator goes on to state the attempts by two prominent astronomers to measure the sky. The concern about science becoming the superior way of knowing manifests, and is smartly dealt with, as the narrator states: “By the joint labours of the two Herschels, the sky has been ‘gauged’ in all directions by the telescope, so as to ascertain the conditions of different parts with respect to the frequency of the stars” (4). The word “gauge” is dangerous because it portrays an omnipotent science that can measure the universe. This grants science too much power and is precisely the kind of science that people feared to strip nature of its wonder and mystery, as in this case it can reduce that wonder and mystery to a number. Placing the word “gauge” in quotation marks diffuses that threat because the quotation marks suggest that the narrator is aware of the pomposity associated with the word and is telling the reader that science will not be able to truly “gauge” the sky. Indeed, the Herschels’ experiment did not succeed in gauging the sky at all. Rather, it led to a realization of just how boundless the sky is: “As the planets are parts of solar systems, so are solar systems parts of what may be called astral systems” (4). And this understanding is carefully termed as a “conviction,” rather than a definitive, indisputable “conclusion” or “fact” which potentially reek of arrogance and didacticism (4). More importantly, the religious connotation of “conviction” further aligns science with Christian teachings: just like the latter, the former also produces convictions that testify to the grand scale of nature, thereby the greatness of God.

### **Science as Labor**

The alignment between science and religion manifests in a more fundamental way: the practice of science becomes religious through the idea of labor. This transformation of science into a religious practice dissipates its association with disestablishment and incorporates it within Christianity. Speaking of the stars that form the Milky Way, the narrator describes them as “thickly sown in the outer parts of this vast ring [the astral system]” (4). This is the first direct reference to God in the book, one that portrays His creation as labor in the fields. The word “sow” also describes God’s action in the Bible: for example, “Behold, the days come, saith the LORD, that I will sow the house of Israel and the house of Judah with the seed of man, and with the seed of beast” (Jeremiah. 31.27). The word “sow” therefore enables the narrative of science about the Milky Way to conform to the biblical narrative. Portraying God’s creation as labor, “sow” also implies care, patience, diligence, the hard work that He is willing to take to create the universe.

The narrator portrays the human practice of science as labor. The narrator’s first reference to scientific experiments consists in their account of astronomers’ multiple attempts to “ascertain the distance of some of the stars by calculations founded on parallax” (2). The idea of labor is implicit in the way the narrator characterizes astronomers’ efforts to scan the sky and find “a parallax of so much as one second, or the 3600th of a degree”: “In the case of the most brilliant star, Sirius, even this minute parallax could not be found... In some others, on which the experiment has been tried, no sensible parallax could be detected... But a sensible parallax of about one second has been ascertained in the case of the double star,  $\alpha$   $\alpha$ , of the constellation of the Centaur,\* and one of the third of that amount for the double star, 61 Cygni” (2-3). The paragraph

soon ends in the narrator inferring from these experiments the immensity of the space that “must be vast beyond all powers of conception” (3). The idea that science consists in painstaking human labor to locate a parallax as “minute” as “the 3600th of a degree” so that “we” can appreciate the immense scale of God’s work is compellingly brought out.

More importantly, the early established parallel between Creation as divine labor and science as human labor sanctifies the latter as a practice of reverence. Implicitly alluding to the idea that humans are created in God’s image, science is presented as humans following God’s example as the divine laborer, which shows appreciation for His Creation. Indeed, as quoted earlier, in the paragraph where the first allusion to the Creator as the sower of stars is made, the narrator directly speaks of the Herschels’ telescoping the sky as “joint labours” (4). These portrayals of science and the Creator change later in the book, yet they help create a sanctity-by-association for science that elevates the discipline above the worldly disputes about its associations with radicalism and atheism.

A fissure begins to emerge, as a crucial argument in the book for natural law is that God is too smart to be attending to each and every being and determine their forms. So in this case, God cannot be a laborer. Similarly, while the narrator portrays the human practice of scientific observation and exploration as “labour,” they simultaneously portray emerging scientific disciplines as authoritative sources of knowledge that are devoid of human labor. I refer to the many places in the book where the narrator foregrounds conclusions of scientific experiments and effaces the physical act of experimentation that produces these very conclusions. For example, when arguing that the coal strata “may have comprehended forms [of plants] we have no memorial,” the narrator erases human labor and directly claims that “experiments shew that some great

classes of plants become decomposed in water in a much less space of time than others, and it is remarkable that those which decompose soonest, are of the classes found most rare, or not at all, in the coal strata” (82-83). Experiments here become disembodied. They are authoritative sources of scientific information, rather than painstaking processes that involve human error and failure, that can reliably enable “us” to interpret nature. This contradiction shows that the science-as-labor model is insufficient in a work that also repeatedly calls attention to the finite faculties of human beings.

### **Negotiating the Authority of Science**

For a work that relies on the authority of science to produce its own hypothesis, *Vestiges* needs to give science a validity that is free from human fallibility, while at the same time the book also needs to draw clear boundaries on what science can do so that it does not completely supersede the Scripture. This crucial balancing takes place early in the first chapter where the definition of science walks the line between asserting the importance of science and not letting it overtake religion. While early on, the narrator, in stating that “the nebular hypothesis is, indeed, supported... by so many calculations of exact science,” portrays science as an authoritative source of information (19-20). This image is qualified at the end of the first chapter, where the narrator claims that, when it comes to the First Cause, that is, “Whence have come all these beautiful regulations?”, here science leaves us, but only to conclude, from other grounds, that there is a First Cause to which all others are secondary and ministrative, a primitive almighty will, of which these laws are merely the mandates. That great Being, who shall say where is his dwelling-place, or what his history! Man pauses

breathless at the contemplation of a subject so much above his finite faculties, and only can wonder and adore! (25-26)

The fact that the ending of the opening chapter, usually a place for synthesizing the most important points in the chapter and setting up what comes next, which in the case of *Vestiges* is the rest of the entire book, ends on the definition of the role of science testifies to the importance of the subject. In the phrase “science leaves us,” science is the subject acting upon the object “us.” In describing science in this way, the anonymous narrator naturalizes what is in fact a human construct, making the discipline a given, just like how religion was understood to be. Not only is science natural and uninflected by worldly agendas, science also knows its own place in explaining worldly phenomenon: it exhibits the laws that are “merely the mandates” of “a primitive almighty will.” The discipline is not meant to explain the realm of the First Cause—a crucial premise for the existence of a Christian God. Besides exhibiting humble laws, science further won’t boost human pomposity, something that the final sentence passionately reassures. The threat science poses to religion is completely thawed here, as science becomes a natural branch of theology that has its natural place in explaining mechanisms ordained after the First Cause. It aids humans in better understanding His way without losing their humility and reverence in front of the divine.

This portrayal of science as a natural, as opposed to artificial, source of authority is sustained throughout the book. Speaking of the grand scale of time that spanned the formation of the universe, the narrator separates science from human limits: “The time intervening between the formation of the moon and the earth’s diminution to its present size, was probably one of those vast sums in which astronomy deals so largely, but which

the mind altogether fails to grasp” (37). Astronomy is not affected by the failure of the human mind. Science retains its authority despite human fallibility.

The early reception of the book helps us further understand what it has accomplished about the authority of science. In the first few months of *Vestiges*' publication, no prestigious religious periodical spoke against the book, as their editors found that they now had to resort to a reviewer with scientific authority to criticize *Vestiges* (Secord 2000 133). The fact that these periodicals, despite their hostility to the theory proposed in the book, had to enlist established scientific figures to rebut *Vestiges* demonstrates the book's success in transforming science into a solid source of knowledge.

### **Intimate Science**

The narrator furthers this particular authority of science in the book, as the discipline becomes a sentient being ordained by God to provide humans with clues to understand His Creation. Concluding after their description of the constituent materials of the earth, the narrator calls the description “an outline of the information which chemistry gives us regarding the constituent materials of our globe” (35). Similarly, in conveying geological information, the narrator begins with phrases such as “geology tells us as plainly as possible” and “the very first principles of geology assure us” (49-50). These are the first times in which the narrator mentions “chemistry” and “geology.” The very first mentions of these scientific disciplines, then, naturalize them and characterize them as wanting to communicate with the reader the vestiges that enable “us” to trace God's creation. Geology, an area of study that has fundamental significance in revealing earth's history, is particularly portrayed as dedicated to making “us” understand its message,

while the word “assure” furthers the impression of a geology that is actively interacting with “us”: instead of merely conveying messages, it anticipates and allays “our” doubts or concerns.

In the ending moment of the first section of the book that deals with earth’s geological history, the narrator reveals the true author to be geology and characterizes it as a faithful recorder of all the natural events on earth. Having surveyed all of the earth’s geological stages, the narrator sums up his eleven chapters of synthesis as “all the great natural transactions chronicled by geology” (144). This is a move that effaces the narrator, creating an illusion of direct transmission of information from geology to the reader: the book becomes a medium through which geology communicates with the reader.<sup>1617</sup> More importantly, geology has a patient investment in earth’s history. It is not a scientific discipline that could be read as inflected with human agendas.

As the start of the twelfth chapter sums up the first section of the book on the earth’s history, geology, in place of the narrator, becomes the “wondrous” storyteller of this history:

Thus concludes the wondrous chapter of the earth’s history which is told by geology. It takes up our globe at the period when its original incandescent state had nearly ceased; conducts it through what we have every reason to believe were vast, or at least very considerable, spaces of time, in the course of which many

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<sup>16</sup> Secord mentions a similar idea, that the first section of the book presents itself as “a direct transcript of nature” (2000 100). He uses this idea to argue how the physical process of turning the pages then “brings out the force of progress in nature, so that the act of reading affirms progressive development” (2000 101). For his full analysis, see *Victorian Sensation*, pp. 100-01.

<sup>17</sup> The effacement of the narrator is another contradiction in the book that is worth highlighting—the tension between narratorial presence and the need to completely erase the narrator—this tension testifies to the demands for writing about science, evolution science in particular, i.e. demands on this kind of writing produce such tension in this text.

superficial changes took place, and vegetable and animal life was gradually developed; and drops it just at the point when man was apparently about to enter on the scene. (145)

The narrator portrays geology as authorial. In portraying geology this way, the narrator cements the discipline's intimate character: instead of a rigid field that produces facts of the earth, it narrates its past, a past that is about the habitat of all living beings: the earth. The patient investment of geology in earth is described in greater details, as the discipline begins describing "our globe" when it nearly stopped burning, guides it with a patience that spans "spaces of time," records its slow changes and the birth of plants and animals, and, knowing its natural place in explaining world phenomenon and never attempting to intrude into other areas, concludes just when humans came into being. The image of a discipline that is earnest about communicating with us and faithful in its recording of earth's history, formerly sprinkled across earlier chapters, culminates in this passage. It is also worth noting the correspondence that "spaces of time" sets up with the contents page of the book where the titles of the first eleven chapters, in their enumeration of the geological eras that the earth went through, guides the reader through literal "spaces of time." This correspondence furthers the characterization of the first section of the book as the medium through which geology directly speaks to readers.

The portrayal of geology and of the book creates an intimacy that helps unarm a readership whose knowledge of the history of the earth comes from Genesis, where the several stages of "our globe's" transitions are accomplished in six days. The story told by geology has the same kind of patience as the story told by Genesis. In Genesis, God is patient and invested. This manifests in the lines "And God said, Let the earth bring forth

grass, the herb yielding seed, *and* the fruit tree yielding fruit after his kind, whose seed *is* in itself, upon the earth... and God saw that *it was* good” (Genesis. 1.11-12). These lines portray a God meticulously creating grass, herb, trees with fruits. His patience manifests in these sections where God performs a lot of tremendous tasks in one day. Here the portrayal of geology works by making the reader think of the conventional image of God. Geology’s story carefully leads the earth through its formations. The story told by geology is therefore sanctified through its association with Genesis.

This is further important in light of Candlish’s comparison between books of science and the Bible, a comparison that speaks to a common opinion at the time:

Consider this subject of creation in the light simply of an argument of natural philosophy, and all is vague and dim abstraction. It may be close and cogent as a demonstration in mathematics; but it is as cold and unreal; or if there be emotion at all, it is but the emotion of a fine taste, and a sensibility for the grand or the lovely in nature. But consider the momentous fact in the light of a direct message from the Creator himself to you. Regard him as standing near to you, and telling you, himself, personally, all that he did on that wonderful week. Are you not differently impressed and affected? (qtd. in Secord 2000 273-74)

The common opinion is that science gives “dull,” “cold” and “unreal” information, without the intimacy or holiness of the Bible as words directly communicated to the reader through God. *Vestiges*, in portraying geology as sentient, invested and sanctified, directly addresses this concern. The book offers the same divine intimacy as the religious text.

Religiosity in fact forms the very fabric of the text. The previously quoted sentence, “as the planets are parts of solar systems, so are solar systems parts of what may be called astral systems,” for example, is analogical in its construction, in that the structure of solar systems is comparable to that of astral systems, clarifying the latter. Analogy aptly draws out the pattern and order underlying this shift of scale, so even though the information is new and potentially disconcerting, it reveals the same logic that underlies Christian understanding of the world as created by God in an orderly way. This is important because the literary technique of analogy later becomes a trope in the book. As the logic of analogy lies in the fundamental similarities, order and pattern underlying different things, it is the perfect trope in a work that tries to show that there is an underlying pattern and order in the formation and arrangement of the universe and nature, intimating a divine plan. This is important as the prose directly unites religion and science.

Readers can see clearly how the prose itself unites science and religion when the narrator discusses the galaxy:

The astral system to which we belong, is conceived to be of an oblong, flattish form, with a space wholly or comparatively vacant in the centre, while the extremity in one direction parts into two. The stars are most thickly sown in the outer parts of this vast ring, and these constitute the Milky Way. Our sun is believed to be placed in the southern portion of the ring, near its inner edge, so that we are presented with many more stars, and see the Milky Way much more clearly, in that direction, than towards the north, in which line our eye has to traverse the vacant central space. (4-5)

In this passage, the narrator immerses the reader in the galaxy, offering us one of the most complex and superb examples of the text's unity of science and religion. The narrator describes the relative spatial positions of the sun, the Milky Way, the stars, and the earth. The narrator reminds readers that this is the astral system to which they belong. The narrator's use of the word "belong," besides connoting an unquestionable rightness, also evokes the idea of "fitting" ("belong, v.," 1.b.). Readers are intended to *inhabit* this astral system. The comma after the verb "belong" creates a pause that emphasizes the divine intention of "us" being in this particular astral system. In the following sentence, the image of a Creator sowing stars is again invoked to remind the reader of the Creator's intentional cosmic arrangements.

The unity between science and religion climaxes in the next and final line of the passage. Right from the start, through naming the sun as "ours," the narrator conforms to and extends humans' supreme ownership of all beings on earth in Genesis, where God commands that "every herb bearing seed... and every tree" and "every beast of the earth... every fowl of the air... every thing that creepeth upon the earth, wherein *there is* life" "shall be for meat" (1.29-30). The passive voice of "placed," in hinting at the divine placement of "our sun" in the southern portion of the galaxy, shows that astronomical observation can reveal the divine arrangement of the universe. The narrator's use of the verb "presented" furthers the anthropomorphism, as if these cosmological bodies are specially presented for humans.<sup>18</sup> The comma that comes after again creates pause that emphasizes the impression that God wants to present readers with "many more stars."

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<sup>18</sup> While I use the term "anthropocentrism" here to refer to the idea that humans are centered, I want to make clear that, when Chambers resorts to an anthropocentric discourse, he is referring specifically to white Europeans. As I will elaborate in Conclusion, white Europeans are the ones that enjoy divine providence.

The narrator relies on the doubling meanings of “so that” to further the union between science and religion. On the one hand, the phrase implies a causal relationship between the two parts it connects. In the context of the sentence (“so that we are presented with many more stars, and see the Milky Way more clearly, in that direction”), astronomy explains *why* the reader sees more stars and a clearer galaxy in the direction of the sun. On the other hand, “so that” also indicates purpose. In the context of the sentence, then, “so that” implies also that the reader is *meant* to see more stars and a clearer galaxy in the direction of the sun. Astronomical explanation of cause therefore commits divine purpose; the reader seeing more stars in the sun’s direction is at once predestined and explicable through astronomy. “So that” expertly unites religion and science. This sense of predestination is further enhanced by the passive “are presented,” a word ripe with a sense of anthropocentric purpose. The comma after “in that direction” deepens this union of science and religion, as the pause created here invites the reader to think that it is *meant* to be the case that the reader will see more stars in that direction.<sup>19</sup>

These nuanced and subtle maneuvers conform to the title, in that these moves plant vestiges of the divine in the prose itself. The idea of “vestiges” is important. Strategically, the presence of the divine needs mediation because uninhibited mention of God might undermine the focus on natural law that needs to be established early on, while the entire absence of God would make the text too materialistic. Further, planting vestiges of the divine in the prose makes God’s presence immanent in the text,

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<sup>19</sup> There are more places in the text where the narrator brings together science and religion on the prose level. For examples of analogy, see pp. 237, 240, 328; for an example of the use of the concept of “light,” as in “throw light upon,” see pp. 236; for examples of the adoption of a creationist language, see pp. 236, 241.

transforming a book of science into one imbued with a sanctity that approaches that of the Bible.

Through these intricate, intertwined, yet at times incompatible interventions, the book strives to placate multifold anxieties that science and evolution provoked in the Victorian era. It is precisely through these literary strategies that Chambers was able to create a book that became suitable and appealing to a broad audience across political spectrums and class divides. However, while recognizing its literary prowess, it is important we remember that this is a text preoccupied with racial hierarchy and imperialism, which I will discuss in my conclusion.

## Conclusion

### The Vestiges of *Vestiges*

The literary mechanics of *Vestiges* is central in connecting the work with a broad Victorian audience and bringing evolutionary theory into polite circles of discussion. Through intricate and intertwined literary techniques, *Vestiges* frames its anonymity as the basis of a “democratic” process of knowledge production and defines science and evolution in ways that enable the two to affirm existing political and religious authority. In doing so, the book was able to cultivate trust among its readers and establish emerging disciplines of science as legitimate and profitable sources of knowledge. While literary analysis helps us appreciate the literary prowess of Chambers and the scientific significance it brought to the work, which has been the focus of this project, it is also important to keep in mind that the book’s democratic process of knowledge production is a veneer for the textual colonialism beneath the surface. Its literary prowess ultimately promotes a theory that stems from and reinforces racist and imperialist ideologies that privilege white Europeans and legitimize the British empire. As early as 1994, James Secord astutely noted the need to understand nineteenth century evolutionary writings as works concerned with topics beyond the one “technical problem” of evolution (xlv). More than two decades later, however, in an article titled “The Wider Cultural Significance of *Vestiges*” on *The Victorian Web*, Stephen Foster once again discussed the work mainly in terms of its contribution to the evolutionary debate. *Vestiges*’ significant relationship with British imperialism remains unacknowledged as in fact the more enduring “wider cultural significance” of the work whose impacts reverberate in modern racism. The evolutionary theory in *Vestiges* was debunked by the scientific community

even during its publication across the fourteen editions, yet the racist and imperialist ideologies it feeds upon and sanctions last to the modern day. This conclusion seeks to explore the text's relationship to the British empire and expose the racism and imperialism that enabled its theory and popular reception at the time.

Victorian science critically engages with British imperialism. Sadiya Qureshi notes that the former “depended upon practices [such as topography, fieldwork, specimen collection] that both constituted and benefited imperialism” and “made knowledge claims in the service of empire” (19). Imperialism further underlay the professionalization of science. In their introduction to *Science, Race and Imperialism*, Marwa Elshakry and Sujit Sivasundaram explain that “an imperial posting was often the first step to a metropolitan career as a technical expert or professional scientist” and that “the expansion of vocational possibilities for scientists in an imperial context was also spurred by the consolidation of universities, laboratories and research stations throughout the British Empire” (xxxii).

The empire also enabled an effort to categorize and hierarchize people on a scientific basis. Colonized people were often taken from their homes to be put on exhibit in major European and North American cities where they had to “[sing, dance and perform] cultural rites as exemplars of their ethnic origin” (Qureshi 22). These exhibitions, serving as the primary evidence for contemporary anthropologists who then published their studies of foreign peoples in scientific journals, were “vital” for the conception of race (Elshakry and Sivasundaram xi; Qureshi 23). Travelogues from imperial voyages and expeditions also crucially facilitated the production of the so-called “scientific knowledge of human difference” (Qureshi 23). In fact, such scientific racism

constituted “one of the most important and globalized attempts to order life in nineteenth-century Europe” (Qureshi 22). Victorian science has now been understood as one of the principal drivers through which endemic racism gained new vigor and authority (Elshakry and Sivasundaram xi).

Nineteenth-century British science therefore must be understood within its imperialist context, as something that in crucial ways stems from and supports imperialist desires and self-definition. As a work that unites multiple scientific disciplines in the construction of a theory of evolution, *Vestiges* and its appeal must also then be understood within this imperialist context. Imperialist thinking filters the narrator’s seemingly scientific descriptions. For example, it informs the language of science. Substantiating their claim that skin colors might be a more superficial characteristic of a people than previously thought, the narrator says that “there are nations, such as the inhabitants of Hindostan, known to be one in descent, which nevertheless contain groups of people of almost all shades of colour” (278-79).<sup>20</sup> “Hindostan” was a term that was “originally coined by the early Islamic marauders to refer to the northern plains [of India] they conquered” and was later adopted by European colonizers (Edney 11). Here, then, a term that connotes imperialist conquest and therefore the subjugation of the people it describes is applied in a scientific context to produce knowledge about that people, making evident the fact that the science in the book is built upon and perpetuates imperialist ideologies.

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<sup>20</sup> This example in fact demonstrates the ideological work in process—skin color in a couple of pages earlier and later in fact becomes heavily racialized as the fundamental marker of human difference. In addition, one can perceive the racialization of nationality here—as nations become the marker of different groups of humans.

The seemingly scientific language of the text further reveals the intersection of Victorian racism and imperialism. Categorizing humans into five races, the narrator says that “the Caucasian... extends from India into Europe and Northern Africa” whereas “the Negro [is] chiefly confined to Africa” (277-78). The racism is clear in how it represents the two geographical areas that the two groups of humans inhabit: the verb “extend” portrays white Europeans as enjoying a great expanse of land that has the potential of future growth, whereas “confined” dismisses black Africans as being physically constrained to a continent that is connoted as relatively small and undesirable. The contrast between the passive “confined” and the active “extends” further hints at a dangerous message: in portraying black Africans as passive, as being acted upon, it legitimizes them as the target of actions; white Europeans, as active agents that enjoy the potential of growth in geographical representation, can see their colonial conquests as natural.<sup>21</sup>

Imperialist thinking’s influence on knowledge production manifests in more subtle ways. The narrator introduces the geological period that witnessed the development of mammals—the era of the oolite:

The chronicles of this period consist of a series of beds, mostly calcareous, taking their general name (*Oolite System*) from a conspicuous member of them—the oolite... The oolite system is largely developed in England, France, Westphalia, and Northern Italy; it appears in Northern India and Africa, and patches of it exist

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<sup>21</sup> For an interesting passage that hierarchizes the plants and animals of the Americas, Africa, Asia and Australia, see Chambers pp. 251-61. There seems to be some orientalist moves at play too—Asia is considered as the eldest continent, so hosts plants and animals that are the most developed. In addition, considering *Vestiges* in the context of the British empire also complicates the wonder and awe at nature in British colonies, because it can be argued that these sentiments are fundamentally imperial in nature. The religiosity manufactured in the text that forms its crucial appeal is built on imperialism too.

in Scotland, and in the vale of the Mississippi. It may of course be yet discovered in many other parts of the world. (105)

Here, the anonymous narrator is essentially making a significant knowledge claim about the earth's geological eras from European and their former and current colonial sites. The ending sentence, in using the verb "discovered," suggests that the oolite system found in the previously mentioned locations must be present, only hidden from sight. The phrase "of course" further conveys the narrator's confidence in the future discovery of these rocks. As such, what is present within the European empire becomes the basis for one to imagine the entire world and determine its ancient history. Discoveries within the European empire underpin constructions of global time, which in turn affirms the Eurocentrism therein.

Even more crucially, imperialism directly gives rise to the narrator's theory on human evolution. On this controversial subject, they state:

After completing the animal transformations, [our brain] passes through the characters in which it appears, in the Negro, Malay, American, and Mongolian nations, and finally is Caucasian. The face partakes of these alterations. 'One of the earliest points in which ossification commences is the lower jaw. This bone is consequently sooner completed than the other bones of the head, and acquires a predominance, which, as is well known, it never loses in the Negro. During the soft pliant state of the bones of the skull, the oblong form which they naturally assume, approaches nearly the permanent shape of the Americans. At birth, the flattened face, and broad smooth forehead of the infant, the position of the eyes rather towards the side of the head, and the widened space between, represent the

Mongolian form; while it is only as the child advances to maturity, that the oval face, the arched forehead, and the marked features of the true Caucasian, become perfectly developed.’\* *The leading characters, in short, of the various races of mankind, are simply representations of particular stages in the development of the highest or Caucasian type. (306-07)*

The purported logic of human evolution here is that the physiognomy of different groups of humans, observed to resemble different stages in the physiognomical development of white Europeans, suggests that these groups belong to different developmental stages that culminate in white Europeans. However, the selective focus on the purportedly universal physiognomical features of the different human groups (the lower jaws among Africans, the skull shape of native Americans, the facial features of “Mongolians”) and the blatant absence of any descriptions of the physical transition between these human groups both make clear that this is a developmental scale that presupposes a purportedly universal white physiognomy as the highest point of development. They expose the actual process that produces such theory and its fallacies: stereotyping selected physical features of different human groups and mapping them onto convenient stereotypes of the different developmental stages of white physiognomy that correspond to a preconceived hierarchy of these human groups. The narrator’s theory of human evolution is therefore constructed upon a racist hierarchy that places Africans at the bottom and white Europeans at the top. Science enables the racialization of their physiognomy which is then perpetuated by a theory that cements the superiority of white Europeans and the self-definition of white physiognomy as the ordained norm.

For the narrator, this white supremacy even dictates the future development of the human species. The narrator theorizes about the future: “There may then be occasion for a nobler type of humanity, which shall complete the zoological circle on this planet, and realize some of the dreams of the purest spirits of the present race” (276). With the racial hierarchy that *Vestiges* advocates in mind, it is clear that the narrator refers to the aspirations of white Europeans as the goals that the “nobler type of humanity”—a human species more advanced than the present—will accomplish. Even though there will be higher humans than white Europeans, then, the latter’s value system defines the very purpose of the former’s existence and underlies a fundamental logic of the developmental law—to produce higher forms of beings that eventually accomplish white fantasies.

Indeed, white Europeans occupy such a privileged position in the text that they are directly subsumed together with the future “nobler type” of humans. In the very first chapter of the book, the narrator declares: “[With the movement of the sun,] a time may come when we shall be much more in the thick of the stars of our astral system than we are now, and have of course much more brilliant nocturnal skies; but it may be countless ages before the eyes which are to see this added resplendence shall exist” (6). It is important to note that, as we excavate the racism embedded in the text, the “us” that the narrator invokes is a white European “us” that excludes other human groupings. The narrator lays out an astronomy-enabled vision of the future that is conveyed with intimate immediacy (white Europeans, instead of the earth they inhabit, will be “in the thick of the stars” in a very distant future). This vision in fact is not accessible to any of the white Europeans currently living, and the de-racialized “eye which are to see this added resplendence” suggests the emergence of a higher human being. Nonetheless, white

Europeans are granted the privilege to be subsumed together with this future human species to peek at the beautiful future through this imperial “we.” This is a beautiful passage with a beautiful rendition of what science enables one to imagine. However, beneath this veneer of beauty is the violence of racialization that this scientific discourse would justify.

While Chambers’ scientific discourse has received harsh criticism from the scientific community, the imperialist idea of a white-centric human evolutionary hierarchy that Chambers’ discourse feeds on and promotes can be traced in other important texts at the time, including Charles Darwin’s *On the Origin of Species*. In the concluding chapter of the first edition of *Origin*, Charles Darwin entreats the reader to be open to a scientific inquiry over the history of organic beings:

When we no longer look at an organic being as a savage looks at a ship, as at something wholly beyond his comprehension; when we regard every production of nature as one which has had a history; when we contemplate every complex structure and instinct as the summing up of many contrivances, each useful to the possessor, nearly in the same way as when we look at any great mechanical invention as the summing up of the labour, the experience, the reason, and even the blunders of numerous workmen; when we thus view each organic being, how far more interesting, I speak from experience, will the study of natural history become! (304)

Understanding and proficiency in technology were benchmarks through which Victorians “evaluated other peoples and created a grid of civilizations” (Elshakry and Sivasundaram xxviii). Stephen G. Adler notes that the image of the ship connotes modern civilization for

both Darwin and his contemporaries such as Humphry Davy and Bernard Mandeville, whose use of the ship image was crucial in helping Darwin formulate the quoted passage (453-59). Darwin starts this lengthy argument with the inclusive and collective pronoun “we,” directly implicating everyone including himself in what he portrays as an erroneous and inferior (“savage”) understanding of organic beings. Indeed, the “we” sets up the speaker as a person whose voice “we” need to follow. Darwin then argues that his theory offers comfort to that Victorian anxiety offered at the start (that “we” are “savages”), as a reclamation of the status as a modern subject is intimately linked with observing organic beings in a different way. Darwin, the humble guide, provides a series of guidance that transforms “us” from a savage/Creationist to a person who is able to employ a historical [here history culminates in the machine] perspective to eventually a person who, as opposed to the savage, understands organic life as in a complex process of formation just like a Victorian “civilized” individual who understand the proud industrial and technological accomplishments of their time as formed through sophisticated processes of trial and error. This fundamentally echoes *Vestiges* in that here the savage is a racialized other that white Victorians start with and grow out of to become subjects that understand modern technology that marks modern civilization. This is a progress that rhetorically echoes the biological progress of evolution in *Vestiges* where white Europeans evolve from “savage” races into themselves. As Alter notes, this passage occupies prominent positions in Darwin’s evolutionary writing: it is located close to the end of each of the six editions of *Origin* and also occupies the end of Darwin’s several earlier writings on natural selection (443). The prominence of this savage-ship passage testifies to the appeal of the imperialist rhetoric therein.

The racist and imperialist ideologies in *Vestiges* further reverberate to the modern day. Its portrayal of “Mongolians” as resembling white European infants and therefore childlike, for example, foreshadows today’s racist infantilization of Asians (289). Its arguments on racial intelligence further anticipate the racist claims of scholars such as Charles Murray. While literary analysis of *Vestiges* helps us appreciate Chambers’ literary prowess and understand how it empowered the work to alter the course of evolutionary theory and gain popular reception, its enduring racist and imperialist legacy makes it even more important for us to understand that such literary prowess also promoted a work that partakes in the maintenance of the British empire. Its racism and imperialism are essential to its appeal, and have gone on to influence Charles Darwin’s delivery of his theory and anticipate modern-day racism. The literary mechanics of evolutionary science in *Vestiges* reveals a text at the crucial intersection of domestic anxieties and global empire-building. Parsing how the text engages with these issues hopefully enables us to understand how it caused a tremendous sensation at the time and was able to leave a troubling legacy to this day.

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