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Abstract: This paper examines the bibliographic features of Thomas H. Huxley's *Evidence as to Man's Place in Nature* (1863) in order to focalize Huxley's public engagement with non-professional audiences and consumerist market forces. Huxley's shaping of Victorian scientific practices and his cultural contributions to natural history have been thoroughly documented, but the hermeneutic potential of the popular work's bibliographic and visual elements has not been adequately addressed. When amalgamated through a reconceived process of reading, the textual and visual features of *Evidence* materialize the evidence of evolutionary processes to which humans themselves are subject. Confronted with humans and primates in print, Huxley's audience understood that the animal/human dichotomy of humanist thought was available to rational critique. Because of its wide-ranging success as a catalyst of public (and not just professional) acknowledgment of evolution, I contend that *Evidence*'s physical and visual features should not be overlooked as major contributing factors in the dissemination and acceptance of natural explanation. Understanding *Evidence*'s status as a marketable visual product sheds light on how Victorians propagated, absorbed, and contemplated the ramifications of evolution.

Primates in Print:

Popularizing Interspecies Kinship in Huxley's *Evidence as to Man's Place in Nature*

Robert Pasquini

Charles Darwin did not popularize the idea of interspecies kinship alone. He skirted the territory of hominid evolution in *The Origin of Species* (1859) – a topic which impacted the Victorian cultural imagination in unexpected ways – until he declared in *The Descent of Man* (1871) that our bodies still bear "the indelible stamp of [our] lowly origin" (416). Because of Darwin's retreat from the public eye, his allies, such as Thomas H. Huxley, provided the necessary authority and credibility to convince the general public outside the

professional scientific establishment to confront an identifiable human form emerging from baser origins.[1]

Huxley's publication of *Evidence as to Man's Place in Nature* in 1863 intensified the debates regarding humankind's subjection to evolutionary processes. Its heavy use of visual media modeled accessible explanations of evolutionary theory. Consider one of the most striking of Huxley's figures: the depiction of the feet of a human, gorilla, and orangutan (see Figure 1). It recapitulates visually Huxley's continuity argument that humans and other primates, especially great apes, shared common ancestors before diverging into their contemporary forms. Unlike other of Huxley's images positioned in a vertical fashion (connoting hierarchical values), this particular figure places the subjects side-by-side, thereby bridging the culturally-constructed distinctions between humans and animals. The photographically-reduced diagram by Waterhouse Hawkins of the Royal College of Surgeons (a key contributor to *Evidence*) denies stability of form and prompts the viewers' reconsideration of inherited animal/human dualities as informed by Enlightenment humanist principles and anthropocentric assumptions. Viewers perform their own imaginative work in order to fill the blank spaces: they cognize the elusive missing links that linger invisibly in the glare of negative

[1] Few public realms would be left untouched by Huxley's influence or agenda. In the domain of professional science, Huxley's tireless work ethic granted him admission into major academic institutions. The Royal School of Mines needed his lecturing proficiency, the Geological Survey wanted his observational abilities, and the Royal Society (where he befriended Darwin) required Huxley's intellectual dexterity; none of these institutions released him of his duties to science for three decades.

space between the feet. Notice not only the similarities in structure, as though the proximity of their layout suggests morphic passage, but also the uneven spaces between each species: a gap exists between gorilla and orangutan; however, an even smaller space (a genealogical lacuna, nonetheless) separates human and gorilla, as though humankind's inhuman past reaches across the blank abyss to touch the present. Figuratively, many generations exist between those blank spaces. The figure's pedagogical and rhetorical success depends on the viewers' abilities to reconceive of natural history based on visual cues.

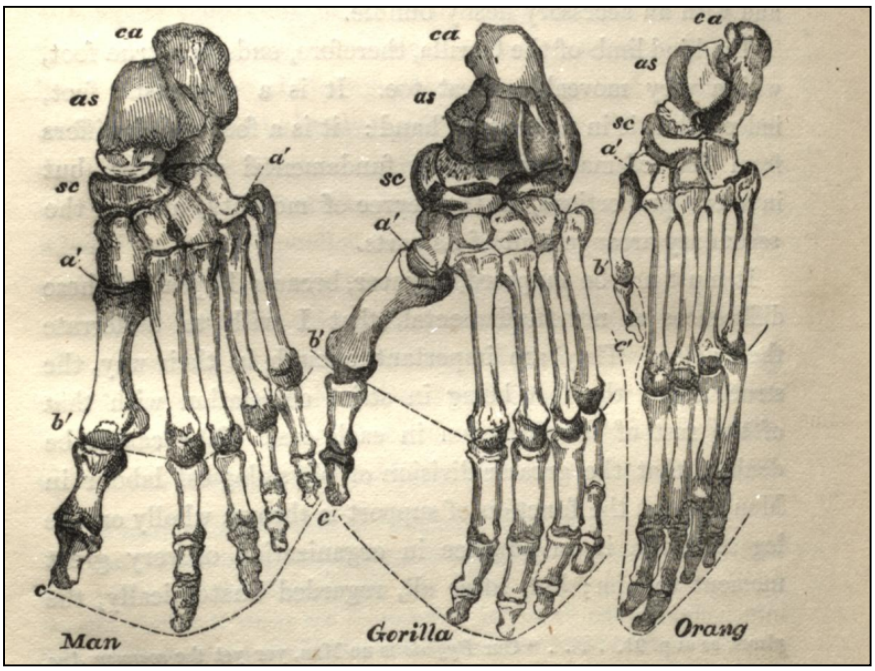

Fig. 1: The feet of human and primate relatives (Huxley, *Evidence* 92)

Huxley's shaping of Victorian scientific practices and his contributions to natural history have been thoroughly documented, yet the interpretive possibilities of the popular work's bibliographic and visual features have not been adequately addressed. I ask of

Evidence: how did decisions concerning the object's material appearance fashion its own reception? Can human evolution be successfully presented via visual rather than purely textual exposition? How immersed was Huxley's product in burgeoning capitalist forces? How could professional ideas of evolution be made accessible to the non-professional and working-class audiences?

This paper establishes how *Evidence* aided viewers in better conceiving of anatomical continuity between humans and primates. I will establish the work as a literary device – more specifically, as a visual technology tasked with cultivating, popularizing, and strengthening support from the next wave of non-professional supporters of evolution. At stake for Victorians was the viability of the natural world's ostensible moral and natural order as they deliberated the degeneration of anthropocentric models of knowledge. At stake for Huxley was an educational apparatus that could contest deep-rooted natural theological convictions about the world. At the time of *Evidence*'s publication, the cultural debates between materialist evolutionists, who believed in the gradual transmutation of species as suggested by the fossil record, and natural theologians, who believed in stable forms as hinted by biblical accounts, was incredibly fierce.

The book itself represents more than just the defense of evolution: it was the first major publication to explicitly apply the evolutionary principles of anatomical continuity to humans and their inhuman relations. Sir Charles Lyell's *The Antiquity of Man* (1863) addressed similar ideas about humankind's previous forms but shied away from adding current human subjects into ongoing evolutionary

processes. For audiences already familiar with popular works such as Robert Chambers's *Vestiges of the History of Natural Creation* (1844), Lyell's *Principles of Geology* (1830–33), or especially Darwin's *Origin*, Huxley's *Evidence* would have articulated their latent suggestions of humankind's evolving form. Meanwhile, other professionals were often hesitant to engage with the topic for either their perceived lack of definite evidence or for their ideological guilt. The book's bibliographic, textual, and visual features, when amalgamated through a reconceived reading process of reading, clarified and amplified the evidence of evolutionary processes to which humans themselves are subject. As catalysts of public knowledge of evolution, *Evidence*'s physical features should not be overlooked as major factors in the dissemination and acceptance of natural explanation. While education systems expanded in Victorian England and humans became subservient to modern scientific analyses, natural theology lost much of its authority to scientific naturalism as a result of efforts like Huxley's.

Strikingly, attending to *Evidence*'s bibliographic and visual features further suggests the subtle ways in which Huxley catered to non-specialists and non-professional audiences in order to extend his educational program beyond the professional realm.[2] I contend that Huxley crafted *Evidence* as an accessible literary technology which would educate rather than alienate the non-professional public. The purposefully chosen and carefully executed bibliographic and visual

[2] Huxley's future public feud with Matthew Arnold in the 1880s demonstrated a similar motivation to increase access to scientific education. It also shows the lofty levels of celebrity and influence to which Huxley would ascend.

elements provoked a critical and investigatory attitude in its general audience akin to that of the period's professionals. In fact, *Evidence* cannot be dissociated from the working class because its material was originally created for lay audiences. In the text's unpaginated "Advertisement to the Reader," which precedes *Evidence*'s main chapters, Huxley explains he had "addressed widely different audiences in the past three years." With an optimistic and colloquial spirit, he further claims, "the readiness with which my audience followed my arguments, on these occasions, encourages me to hope that I have not committed the error . . . of obscuring my meaning by unnecessary technicalities" ("Advertisement to the Reader"). In effect, the congruency of image and text demonstrates how the working class was actively shaped by leading scientific practitioners like Huxley so they could absorb and engage with evolutionary discourse.

Huxley's personal correspondence discloses his intention to educate this type of non-professional audience and, more importantly, his audience's propensity for learning. In 1861, Huxley wrote to his wife following a series of lectures crafted specifically for labourers, saying, "My working-men stick by me wonderfully, the house being fuller than ever last night. By next Friday evening they will all be convinced that they are monkeys" (qtd. in Di Gregorio 138). These lectures, well attended and popular in working-class locales, eventually became the basis for *Evidence*. The material spread rapidly once released from the finite capacity of lecture halls. The publication therefore qualifies the depth and breadth of working-class knowledge concerning evolution. It indicates that professionals such as biologists,

anatomists, or taxonomists were not exclusively responsible for pondering or popularizing the ramifications of evolution; Huxley expanded scientific knowledge into the non-professional public sphere seriously (especially since Darwin's health status forced his reclusiveness).[3]

Drawing on his own autodidactic upbringing, Huxley was cognizant of that the working-class audiences of his traveling lectures were eager to learn. He felt compelled to make his views available and affordable through accessible means. The self-taught autodidacts of the working class to which Huxley's lectures and publications appealed were not necessarily blindly immersed in an ideological framework; they were also invested in revising dominant ideological stances that were infused by natural theology (Rose 7). While Huxley was considered a professional elite, his self-reliant upbringing aligned him with the working-class intellectuals who "resisted ideologies" and sought to absorb knowledge at rates equal to their more formally educated peers in society (Rose 12). This outlook "reverses the traditional perspective of intellectual history" by involving non-professionals and labouring folk in many of the period's cultural conversations (Rose 3). Huxley propagated secular thinking on a mass scale with the aim of stripping off "the garment of make-believe by which pious hands have hidden [humankind's] uglier features" (*Autobiography* 16). His work, evidently, carries a more universal

[3] Around the time of *Evidence*'s publication in 1863, Darwin was so ill that he could not correspond reliably with his closest peers: "bad sickness may come on," he wrote to Joseph D. Hooker in January 1863, an ally of both Darwin and Huxley (Letter to J.D. Hooker). It did. Darwin's spouse, Emma, would take over writing duties many times that year.

rather than elitist purpose. Examining the book from the perspective of a common Victorian reader captures the era's cultural tension between transformation and fixity, between progress and degeneration.

Huxley championed the expansion of scientific knowledge into the untrained public on the condition that those carrying out this popularization remained objective about the available natural-historical data, for natural theological biases could too readily seep into scientific explanations. Huxley, as Bernard Lightman tells us, had to combat an increase of "practitioners" who, in his opinion, did not adhere to the soundest scientific or interpretive practices and who threatened the chances of "realizing the agenda of scientific naturalism" according to his vision (357). The "active" decision of that group to "define and control the meaning of science in different settings for different audiences" suggests that Huxley and his peers were highly conscious of the quality and, equally as important, the accessibility of their widely-disseminated publication (Lightman 357). Visualizations particularly helped Huxley to eradicate ideational mutations of evolutionism distinct from those of his own program. He was seriously worried about the corruptive influence of residual natural theological and humanist assumptions in the scientific imagination and their impact on the future generation of learners. At one point in *Evidence*, he asks of his readers to "endeavour for a moment to disconnect our thinking selves from the mask of humanity" (69). If Huxley's agenda demanded a purification of the sciences' speciesist exclusion of humans from evolutionary

trajectories, then he would gain from the working class multitudes of informed minds that could perpetuate his schema of scientific education.

Drawing on the interpretive strategies of book history and material culture studies allows for the witnessing of cultural fluidity between the domains of mass culture and professional science.[4] Because the materials for *Evidence* were originally developed for working-class audiences, it is reasonable to assume a cultural literacy on their behalf for evolutionary ideas which originated outside their social placements. Additionally, the same audience would have been familiar with what Gérard Genette theorizes as a book's paratextual features, the diverse, often-overlooked elements of a physical book that "[enable] a text to become a book and to be offered as such to its readers and, more generally, to the public" (1). Genette's paratextual elements, which range from frontispieces and end-papers to the various typographic choices utilized by printmakers, "surround and extend" the work's content, thereby functioning to "*present*" or "*make present*" a text (1; emphasis in original). These elements endorse a specific type of reception and guide the product's consumption (7). My analysis, therefore, focuses on the thematic and

[4] For more on cultural interconnectivity between professional and non-professional domains, see Gillian Beer's *Open Fields: Science in Cultural Encounter* (1-14), in which she applies ideas of cultural interconnectivity: "Cultural encounter occurs not only between peoples of different ethnic origins but between trades, genders, professional groups, specializations of all sorts in a society . . . Each inhabits and draws on the experience of the historical moment, the material base, the media, and community in which they all dwell . . . What may be perceived as outcrops or loose ends may prove to be part of the tracery of other connections . . . Ideas cannot survive long lodged within a single domain" (1).

visual content as well as the "pragmatic" or "functional" characteristics of the material book itself in order to demonstrate how it was intended to be consumed (4). A book's bibliographic constitution is as much an "authorial decision" as the decided diction of its passages. Contributing agents ranging from engravers to publishers are, in this view, extremely conscious of the product's manufactured materiality. Each decision influences future readings. These bibliographic affects are manifested in the "peritext" (within the book) and the "epitext" (outside the book); even seemingly trivial decisions can have extraordinary effects on a work's reception (344).

A particular type of visual imaginative force is required to represent evolution. W.J.T. Mitchell, author of the influential *Iconology: Image, Text, Ideology*, notes how an image actively enters into the dialogue between author and reader, allowing the image to partake "in the stories we tell ourselves about our own evolution, from creatures 'made in the image' of a creator to creatures who make themselves and their world in their own image" (9). Drawing on this kind of image/text interplay, Jonathan Smith suggests in *Charles Darwin and Victorian Visual Culture* (2006) that Huxley and his contemporaries did not invent visualization practices but instead reappropriated existing practices in often subtle ways (16). For Smith, the importance of evolutionary visuals depends not on their adherence to inherited visualization practices but on the conceptual "symbiosis" between forms previously represented as static by inherited taxonomic practices (16). Evolutionary visuals destabilized notions of order, permanence, and repetition. In these moments of

disruption, even a non-professional could comprehend the ramifications of evolutionary divergence when image and text worked interdependently. For this reason, visualizations were even more subversive for their casual infiltration into everyday thinking about evolution. Ranging from taxonomic diagrams to natural-historical illustrations, Victorian visual culture was thoroughly permeated by evolutionary imagery by the time of *Evidence*'s publication.

Before examining *Evidence* in detail, it is important to stress Huxley's rising popularity in the wider Victorian consciousness during a time when few others addressed the topic of hominid evolution. Huxley's status as a public celebrity contributed to his broad appeal outside the scientific community. Widely publicized confrontations with antagonists of evolution bolstered his celebrity and the reputation of his works. As a result, *Evidence* took on a self-consciously performative quality as Huxley's fame elevated *Evidence*'s epitextual presence. Although not located materially in the text, epitextual features, according to Genette, flow "freely, in a virtually limitless physical and social space"; consequently, the epitext shapes a work's popularity and can eventually become part of "the totality of the authorial discourse" (344). Huxley's imposing public persona indicates just how authoritative and influential his cultural authority really was for ordinary Victorians. His influence of the public was as extensive as his critics were uncompromising.

Two ideological combatants launched Huxley into the public eye: the famed anatomist Richard Owen and the zealous Bishop of Oxford, Samuel Wilberforce. Owen, who coined the clade name *Dinosauria,*

was a worthy intellectual adversary for Huxley. He was irked by evolutionary visions lacking divine design, feeling that Huxley's ideological camp had submitted to fantasy. It was a major piece of evidence linking primate species – the Hippocampus minor that Huxley connected to other closely related apes – that brought the pair into intellectual conflict.[5] Alarmed by Owen's unsupported public declarations that humans were indeed the greatest of God's creations because of their increased cerebral capacities, Huxley fought against these grand claims that were incommensurate with available natural-historical data.[6] Huxley scholar Mario Di Gregorio admirably suggests that *Evidence* was created not solely to champion evolution but also to refute Owen (156). Huxley's rebuttal of unverifiable claims in the sciences intensified at the annual meeting of the British Association for the Advancement of Science at Oxford on 30 June 1860. For evolutionists, it was likely one of Victorian science's most lionized exchanges, and the crowd's resounding reception of Huxley's verbal duel with Wilberforce over simian ancestry and its unsettling implications for humankind mythologized the moment.[7] The reading

[5] I would like to historicize this feud further. Huxley's thoughts on the event of Owen's death – published in an essay titled "Owen's Position in the Anatomical History of Science" in the posthumous biography *The Life of Richard Owen* – demonstrates his respect for Owen's professional and technical skills in the field, thus indicating that they clashed, like many during the period, only on the specifics of their worldviews.

[6] For more on the intellectual feud between Owen and Huxley, see Ian Hesketh's *Of Apes and Ancestors: Evolution, Christianity, and the Oxford Debate* and Christopher E. Cosans's *Owen's Ape and Darwin's Bulldog: Beyond Darwinism and Creationism*.

[7] Wilberforce delivered a speech that did not unsettle Huxley but, instead, increased his zeal. In front of an assembly of hundreds, Wilberforce asked Huxley, who had already publicly dueled with Owen at the meeting, "Was it

public learned about the quarrel in periodicals and could recognize the figures of Darwin, Huxley, Owen, and Wilberforce in caricature and illustration thereafter, and Huxley's intensity provided him with an enthralling public persona. This personality empowered *Evidence* as well as his message: the differences between primates and humans are differences of degree, not of kind. Defending Darwinism proper and denying natural theologians' control over the scientific realm thus gave Huxley enough incentive to publish *Evidence* soon after these public spats.

Bibliographic and Visual *Evidence* of a Visual Technology

Huxley's popularization of hominid evolution can be seen as a massive demystification of humankind's ontological condition, material body, and genealogical history. In response, untrained individuals on the peripheries of the professional domain had to reorient their observational and reading habits as well as their critical understandings of the human body and the natural world. Throughout *Evidence*, viewers recognized humankind in depictions of simians, sensing the inherent animal condition of the species. *Evidence* thus became a pedagogical visual technology used to scrutinize our genealogical history and then to teach others to reimagine it. I also

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through his grandfather or his grandmother that he traced his descent from an ape?" But Huxley was prepared to rebuff his opponent. Because of a principled refusal to misuse his impressive "faculties for the mere purpose of introducing ridicule into a grave scientific discussion" (as Wilberforce had done), Huxley responded, "I unhesitatingly affirm my preference for the ape" (Hesketh 80-82). Hesketh points out that this exchange cannot be totally authenticated. If anything, the publicized confrontation provides a sign of Huxley's mythos in-the-making.

suggest that self-conscious publishing decisions were made to enhance the work's pedagogical value. The amalgamation of eloquent prose, detailed illustrations, and paratextual elements (such as publisher advertisements and authorial disclosures) aided in disseminating public knowledge of humankind's evolved form.

The decisions Huxley made with his London publisher, Williams and Norgate, demonstrate the ways in which he authorized innovative bibliographic solutions to the conceptual problem of representing the fluidity of bodily form. The publishing house was an appropriate choice, since Williams and Norgate specialized in science texts and imports. The work also deliberately took advantage of existing consumerist models to popularize and market the topic on a grand scale. From these bibliographic clues, we can discern the work's intended reception and its interaction with popular (and profitable) market forces. Evolutionary naturalism's penetration into a wider cultural sphere (that is, beyond Huxley and Darwin's elite community of professionals) was not accidental or fortuitous but, instead, calculated and intentional.

The exterior of the book object should be closely examined before its contents. *Evidence* is bound in dark green blind-tooled cloth, which imitates the texture of more expensive goatskin covers. A series of borders are situated close to the edge of the cover, including a decorative row for increased aesthetic effect. The lettering in gilt on the spine illumes the object and attracts the viewer's gaze, yet it appears sober and therefore serious and respectable, too, traits which Huxley hoped to cultivate amongst his non-professional followers. The

seemingly simple exterior design suggests that Huxley did not intend to market his work exclusively to the specialists in the scientific community since *Origin* catalyzed the conversation in late 1859. Its look is practical rather than pretentious and uncomplicated rather than expensive to reproduce; all of these design choices suggest the work hailed as many persons as possible, as the simplified, inexpensive design implies a wider-ranging audience. The book exterior also shares similar visual traits with *Origin*'s early editions: the royal green ribbed binding and gold gilt on the spine suggest conceptual and visual affinities between *Evidence* and *Origin* that would have boosted Huxley's reputation and presence in the marketplace. Like the earliest editions of *Origin*, *Evidence* was embroiled in furious controversy. New editions followed quickly in order to appease sizeable demands for the book, which would have attracted untrained readers drawn to its unintimidating yet authoritative gravitas.

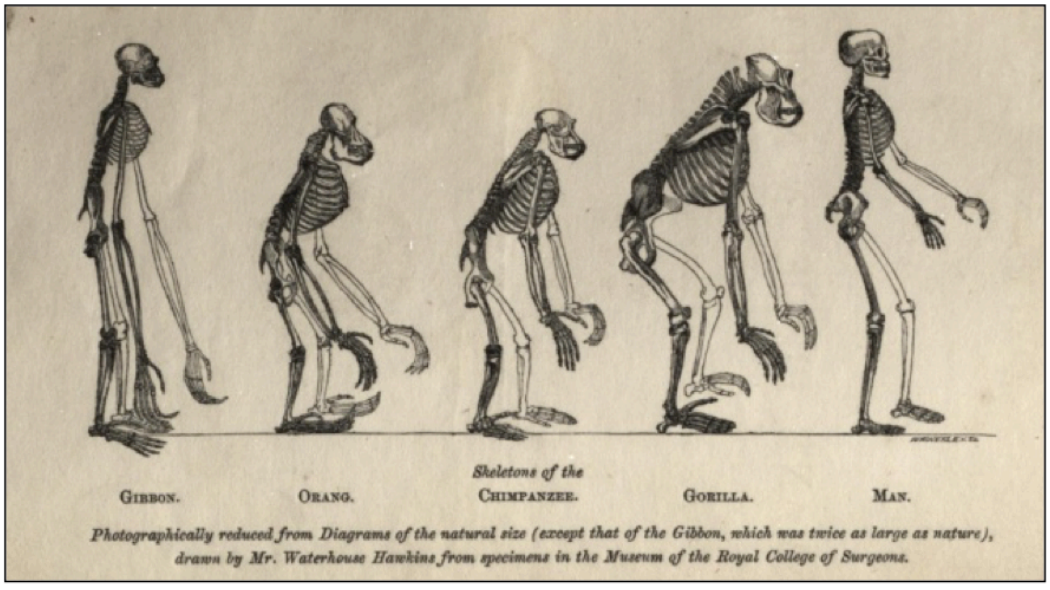


Fig. 2: Frontispiece to Huxley's *Evidence as to Man's Place in Nature*

When readers open the cover, the title page and frontispiece immediately persuade them to reconsider their biological origins. "Evidence" (which was eventually struck from the title in later editions) greets the viewer at the top of the title page, thereby emphasizing Huxley's high standards of documentation. Even if the viewer had never heard of Huxley or had not felt his presence in the Victorian consciousness, his standing as "Fellow of the Royal Society" lends to his work an aura of credibility. The frontispiece (see Figure 2) inevitably jars the reader unaccustomed with the imagery of hominid evolution. An illustration, which poses the skeleton of a human in front of a collection of distantly related anthropoids trailing behind, induces the viewer to identify the human species as the culmination of evolutionary advancement; only from humbler, animal beginnings could humans have arrived at their terrestrial pre-eminence. He draws on the era's preoccupation with gradualism to help naturalize the shocking implications of the frontispiece, though he also had to grapple with gradualism's underlying conflation of development with progress. As explained by appended descriptive material, the image had been photographically reduced from diagrams by Hawkins. The reproduction technique was brand new for the time, thereby positioning *Evidence* as a cutting-edge text. Although shaded and grey areas could not be faithfully reproduced, the new technology allowed Huxley to reproduce high-quality anatomical images at mass-market volumes (Banham 287). The frontispiece therefore alludes to two crucial factors in Huxley's popularization of the topic: humankind's inherent inhumanity and, most importantly for this

particular study, the affordability, marketability, and, indeed, the congruity of image and text.

The materialization and visualization of evolutionary development became essential to the comprehension of evolution for non-professional members of society. That is, the act of making the theory present and persuasive on a physical and tangible (rather than just an imagined or noumenal) level increased the non-professional's understanding of the dynamism of hominid evolution. The frontispiece and other related images accomplished a sense of ongoing speciation that, for example, Darwin's diagram of divergence in *Origin* had also achieved.[8] The physical features of *Evidence* also demonstrate the extent to which Huxley intended to train non-professional readers in methods of empirical observation. In effect, Huxley animalized humans to properly study them. Yet his argument and authority depended on more than his eloquence.

Huxley's decision to rely on diagrammatic material and visual stimuli reveals the kinship between Victorian visual culture and evolution's everyday popularization. Later in his career, Huxley commented on the relationship between the aesthetic and scientific. In an 1894 essay written for Owen's posthumous biography, Huxley worried that "the eyes of contemporaries are obnoxious" ("Owen's Position" 274) – and perhaps not just for failing to authenticate the available evidence for hominid evolution. His hope for a revitalized

[8] Heather Brink-Roby suggests that Darwin's diagram of divergence was able to capture the material complexity and interdependency of his theory in ways that text could not. Textual exposition struggles to accurately depict evolutionary passage because of the medium's focus on linearity and progress (249).

scientific vision "came partly from the purely scientific anatomists, [and] partly from men of more or less anatomical knowledge, in whom the artistic habit of visualising ideas was superadded to that capacity for exact observation" (285). Huxley claims a person's "artistic visualising faculty" (286) is necessary in order to accurately compare species, signaling that the artist (or engraver, or illustrator, or sketcher) could be just as useful to the progress of science as the scientific expert: "Science has need of servants of very various qualifications," he asserts (296). This statement can be read as an appreciation for strong visual presences in scientific popularization. As Kate Flint's research on Victorian preoccupations with vision (and its reliability) illustrates, post-Darwinian scientists were fixated, as much as plebeian autodidacts, on "the very practice of looking" (2). Many Victorians interested in scientific matters, on either a professional or a casual level, were concerned with visually interpreting the world's disaggregation of material forces, but they were also concerned with the accuracy and exactness of conclusions based on emergent visual technologies. Power struggles over visual media and access to wide audiences became common in the interclass realm of scientific popularization. They propagated myriad scientific stances, "provided an endless source of comments filtering into popular culture" (Flint 8), and stirred Huxley into action.

The abundance of "man-like apes" (*Evidence* 5), to which Huxley compares humans, compels the contemplation of what many recognized as uncomfortable semblances between species. Moreover, the etymological roots of the term "ape" grounds simian encounters

within the realm of the uncanny. According to the *Oxford English Dictionary*, the term's presence in Old English similarly connoted, like one of our own contemporary usages of the word, "uncouth resemblance" to and "mimicry" of human features and behaviours ("Ape, n."). Encounters between simians and humans tread into the territory of the uncanny because overwhelming interspecies similarities induce anxieties regarding the possibility of affiliation. The encounters that Huxley granted his readership rationalized his audience's sensation of impending degeneration or relapse into unevolved primitivism. The artificiality of speciation exacerbated Victorian ontological discomfort, leading to the realization that the Western conception of nature is a "cultural system" that disenfranchises animals by enabling their subservience to human-specific epistemologies and systems of knowledge (Sabloff 10). Staunch materialists such as Huxley condoned the erosive power of scientific naturalism working against embedded models of knowledge, which is why he drew attention to the cultural constructedness of human exceptionality and worked to unwind its complex ideological formation.

Visual media like *Evidence*'s frontispiece helped to promote the growth of the scientific community. Steve Shapin's research on the topic shows the tradition of integrating text and image in the scientific practices Huxley inherited. In "Pump and Circumstance: Robert Boyle's Literary Technology," Shapin explains that the popularization of science involves "the extension of experience from the few to many" in order to reinforce the ranks of a properly informed scientific

public (481). Authoritative figures such as Huxley wanted to ensure "a multiplication of the witnessing experience" so that, ultimately, the process which transforms results into facts could be relatable (483). The inclusion of visuals alleviates distrust in the practitioner. Increased transparency from visually depicted procedures makes the act of witnessing "a collective enterprise" between professionals and untrained viewers (487), and the impression is akin to actually being present at the immediate site of investigation.[9] Across multiple social spheres, *Evidence*, a "technology of virtual witness" based on "trust and assurance," established its presence as an authoritative visual technology that instructed the untrained public to critique the human body in more productive ways than previously imagined (491).

Once the reader has studied the frontispiece, the "Advertisement to the Reader" is most likely to draw the viewer's attention. In it, Huxley clarifies that the scientific topics in his book are open to the untrained autodidacts who sought such knowledge – "the Working Men," as he calls them. The viewer recognizes here that the work is composed of a series of lectures delivered between 1860 and 1863. Huxley insists that his conclusions, "be they right or be they wrong, have not been formed hastily or enunciated crudely" ("Advertisement"), demonstrating the wide appeal he intended for his work as well as *Evidence*'s aim to promote empirical methods. As the

[9] *Evidence* relates to multiple technologies, which Shapin clarifies: a "material technology" which exists in the textual and visualized form of the book object itself; the "literary technology" of the publishing industry which manufactures Huxley's reception; and, lastly, a "social technology" which establishes conventions for others to follow, such as the scrupulous standards and methodologies Huxley demanded of his supporters (491).

reader negotiates the textual segments of *Evidence*, he or she understands that visualizations will not detract from the textual content or alienate potential spectators.

Fig. 3: The travels of Eduardo Lopez (Huxley, *Evidence* 1)

Evidence's first chapter, titled "On the Natural History of the Man-Like Apes," exhibits a unique image/text dynamic which sets the investigatory tone for the remainder of the work. This interdependent relationship is most apparent at the start of the chapter. The viewer sees an illustration depicting the travels of Eduardo Lopez, a Portuguese sailor who, during a 1598 voyage, encountered animals uncannily similar to humans (see Figure 3). The viewer recognizes striking affinities between the playful "MAN LIKE APES" (boldly emphasized for effect) and the humans against whom they are juxtaposed (1). The illustration is distinctive for its invasive presence within the body of the text, compelling the viewer to contemplate a suggested act of interspecies mimesis. Before entering any theoretical

territory or comparisons of anatomical features between species, Huxley eases his audience into the unsettling notion of their primordial ancestry with a playful depiction of primates stealing footwear. It seems that wit resides alongside scrupulousness in Huxley's rhetorical repertoire. The inclusion of these primates virtually unsettles prior convictions about the uniqueness of humankind. Unfortunately, the decision to include the native figure also demonstrates a lack of racial sensitivity on Huxley's part. It evokes underlying race arguments of the period that intertwined with the evolutionary and anthropological discourses with which Huxley was engaged. Nonetheless, he understood that, while his facts, figures, and illustrations about primates "may be truth," as far as humans were concerned, there was "not evidence" enough of an explicit connection between humans and primates; he required a more effective visual strategy for the human species (54).

In this historical moment, the aura of dubiety which permeated post-Darwinian Victoriana undermined claims to human exceptionality and allowed for the questioning of deep-rooted theological convictions. According to Foucauldian observations, the nineteenth century's epistemological shifts indicate that the very abstractions, language, and representations utilized by the sciences to depict human dominance had lost or elided their universality and functionality. During this period, professionals sought to reinstate to the domain "its rifts, its instability, its flaws" (Foucault xxiv). Catherine Gallagher and Stephen Greenblatt expand on Foucault's notion of an emergent modern episteme by stressing that the

Victorian mode of meaning-making "aimed to take nothing for granted and relentlessly converted much of what we've been calling the bedrock of ideology . . . into the stuff of its investigations" (189). Of the utmost importance to Huxley was uprooting the previously unchallenged conceptual foundations upon which humans had operated.

Chapter Two, "On the Relations of Man to the Lower Animals," is incendiary for its textual explication of humankind's animal ancestry as well as its revealing illustrations and anatomical diagrams, which reinforce Huxley's message. It is evident here that Huxley wanted to address the widest possible audience, regardless of class or status, since he opens the chapter by establishing hominid evolution as the "question of questions for mankind – the problem which underlies all other" (57). Huxley's willingness to encourage the wider public to participate in rewriting human histories and revisualizing genealogical narratives made evolutionary theory a generative and impactful force in the Victorian consciousness: it offered an alternative to "the men of genius [who] propound solutions which grow into systems of Theology or of Philosophy" (58). His method was much more interventionist (and inventive, even). He believed that, with enough accumulated evidence, humans could be "transfigured from [our] grosser nature by reflecting, here and there, a ray from the infinite source of truth" (112). And Huxley was aware of the effect his selected diagrammatic material would create, asserting that, "brought face to face with these blurred copies of himself, the least thoughtful of men is conscious of a certain shock, due . . . to the awakening of a sudden and profound

mistrust of time-honoured theories and strongly-rooted prejudices regarding his own position in nature" (59). Quite literally, Huxley brought his readers "face to face" with inhuman near-facsimiles, not anthropomorphized versions or caricatures of these related species.

Evidence portrays, in text and diagram, human bodies based on anatomical truths rather than ideological truisms. Liberated from the contortive influence of purely humanist thinking, Huxley's visual rhetoric conveys the kind of evolutionary passage that was more customarily appropriate for animals. Anatomical illustrations of human bodies were not novel at this time in history – the enormously popular *Gray's Anatomy* was published in 1858 – but direct anatomical comparisons between humans and primates, in such intimate detail, were more revelatory. Huxley knew that not all consumers who encountered primates were educated or trained in the type of critical inquiry required to see through their ideological constructions as figures of otherness or abjection. *Evidence* can be considered a bibliographic spectacle of sorts for its furnishing of a tangible space in which animal/human encounters could be negotiated outside the professional milieu of the scientific community. Huxley dispersed through print media the type of uncanny encounters already on display in cultural establishments that housed simian collections (alive and preserved), such as the Zoological Gardens or the British Museum. Upon holding, viewing, and absorbing *Evidence*, an interclass readership was compelled to re-evaluate its species' placement within a classificatory system that privileged the anthropic over the biotic. Through ultra-realism, Huxley did away with

ideological fantasies presupposing human superiority. The uncanny encounter profoundly ruptured a cultural classificatory system that dictated which entities were animals and which were superior to the rest – i.e., humans. Cultural constructions of humanness could no longer reasonably vilify the previously abject animal: the animal had thoroughly permeated the idea of what it meant to be human.

The decision to include imagery of early development stages bolsters Huxley's textual elucidation on the conflation of human and animal traits. He shows the progression from a simplified fertilized ovum to a more complex fetus on the brink of birth (66). He then turns "with impatience to inquire" whether humankind did, indeed, "originate in a similar germ, [and] pass through the same and gradually progressive modifications" as primates and other mammals (65), piquing the reader's curiosity. Simply through the performative act of turning pages, the reader is struck with the visual resemblances between the dog and human rudiment, a sight "startling" to the untrained Victorian observer (67). Only in the later stages of development do humans differ more noticeably from other animals. Here, we arrive at the turning point of Huxley's agenda: after characterizing stable human identity as illusory, Huxley proceeds to render this human the subject of his own virtual examination and analysis. As anatomical comparisons of human and animal features campaign for interspecies continuities, recognizable kinship between the animals on display bring Huxley's viewers in contact with glimpses of their inferred primordial past. After bombarding (though not exhausting) viewers with anatomical facts comparing humans and

primates, such as the length of limbs or the similarities among muscle groups, Huxley "cannot attempt in this place to follow out all these comparisons in detail, and it is unnecessary" (84); the visual power of the images compels viewers to contemplate their inherent implications. Although some of the figures display an apparent hierarchical positioning of subjects in the same way that the frontispiece does, they do not deviate from Huxley's continuity argument. Viewers still assume innumerable generations of creeping divergence between species.

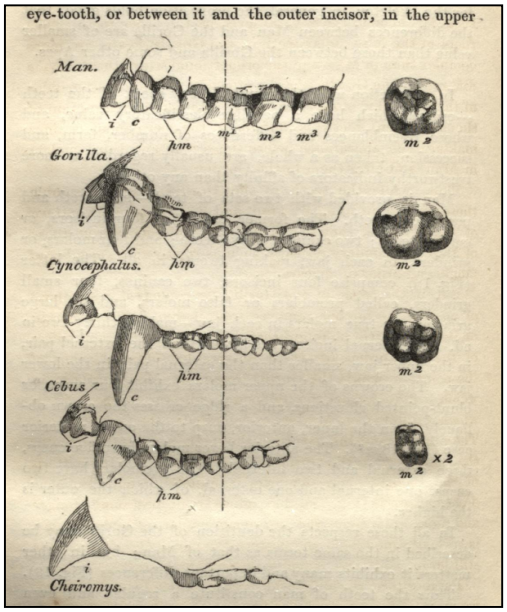


Fig. 4: Anatomical comparison of humans and primates (Huxley, *Evidence* 82)

The figures depicting various primate body parts (including skulls, upper jaws, pelvises, feet) in direct anatomical comparison to their human counterparts visually reinforce interspecies continuities (see Figures 1 and 4). "[T]he structural differences which separate Man from the Gorilla and Chimpanzee," Huxley clarifies, "are not so great as those which separate the Gorilla from the lower apes" (103).

Accordingly, the imagined connection that viewers make during the interpretation process relates the message again that the differences between humans and animals are differences of degree rather than of kind. His figures also implicate humans in evolutionary passage. The reproduction method of many of the previous images was wood engraving, yet Hawkins's occasional use of photographic reproduction was very progressive for the period. To Huxley, the minutiae of details mattered, so he selected the most accurate reproduction method that could still be produced in mass quantities. Moreover, these clear and clean visuals can also be read as an attempt to abate the disorder that anthropocentric knowledge systems usually associated with evolution.

The anatomical continuity that Huxley perceived between other anthropoids and *Homo sapiens* is characterized by contingent rather than preordained dynamics. Out of modification and subsequent divergence come bodily reformations and metamorphoses which often yield forms most ambiguous. Although Huxley had his theoretical differences with some of Darwin's thinking, he similarly recognized the incessant transformation and sense of unbounded becomingness in the natural world.[10] The recognition of unrestrained biotic abundances and – more severe to Victorian moral standards – genealogical affinities which enchained even the most well bred citizen to bestial ancestors did not deter Victorian popularizers. After all, Darwinism (and other deviating evolutionisms) became "a form of

[10] For the ways in which Huxley differed at times from Darwinian principles, see Mario Di Gregorio's *T.H. Huxley's Place in Natural Science*, especially at xviii.

imaginative history" that professionals proffered to the wider public, inviting them to enter into cultural debates about ontological reimaginings (Beer, *Darwin's Plots* 6). Visual technologies as employed by Huxley granted his readership the appropriate imaginative dexterity to bridge the divides between the primates on display, and the primate body that Huxley utilized so frequently in his work came to represent a transitional figure that clashed with entrenched Victorian values.

Multiple anxieties destabilized positive representations of the human to the extent that all facets of human-specific identity came under threat. Kelly Hurley's *The Gothic Body: Sexuality, Materialism, and Degeneration at the Fin de Siècle* crucially illuminates the dynamism of evolutional bodies. Hurley argues that evolutionary theory has provoked the "ruination of traditional constructs of human identity" and highlights the "abhuman subject" (3), a body which epitomizes "morphic variability" and which is "continually in danger of becoming not-itself, becoming other" (3-4). The simian body, that pathologized signifier of animal semblance, came to represent of a pervasive cultural anxiety about humanity's animal condition. As though abiding by a Gothicized stratagem, *Evidence* joined in on the proliferation of "interstitial creatures" in Victorian print culture (Hurley 24) and, thus, prepared viewers to deal with their apprehensions by negating the normative value of the human figure. The human could no longer be classified as unique or resistant to alteration.

Throughout his career, Huxley insisted that bodily forms could not be contained within taxonomies vainly awaiting completion. In his

1893 lecture "Evolution and Ethics," Huxley continued to propagate the view that "the state of the cosmos is the expression of a transitory adjustment of contending forces," and there always exists the "nebulous potentiality" of ongoing development and speciation regardless of human interventions ("Evolution" 50). Moreover, species-specific longevity or rigid classification could not be guaranteed. Like labyrinthine deferrals of closure, bodily forms concede to the continued becomingness and sprawling speciation of an existence outside anthropocentric interests. The passage of one species into another is unnoticeable along the span of a single human generation as genetic possibilities branch out over the long span of a species' descent. Giorgio Agamben's biopolitical critique of an "anthropological machine" (27), constituted by speciesist forces of inclusion and exclusion, offers another pathway to revealing how our species becomes "neither a clearly defined species nor a substance" (26). Huxley took great pains to ensure that his audience disregarded their inherited biases and embraced the startling (rather than immutable) outcomes of ongoing speciation.

Collectively, Huxley's images popularize the ontological fluidity of the human's still-evolving form. Elizabeth Grosz's work on Darwinian discourse is relevant here. She advances the overcoming of the animal/human divide by advocating for an ideation of the human as amorphous, multivalent, and assimilable into an inhuman form. She maintains that such a conception of inhumanness demonstrates the "precariousness of the human as a state of being, a condition of sovereignty, or an ideal of self-regulation" (12); in effect, she

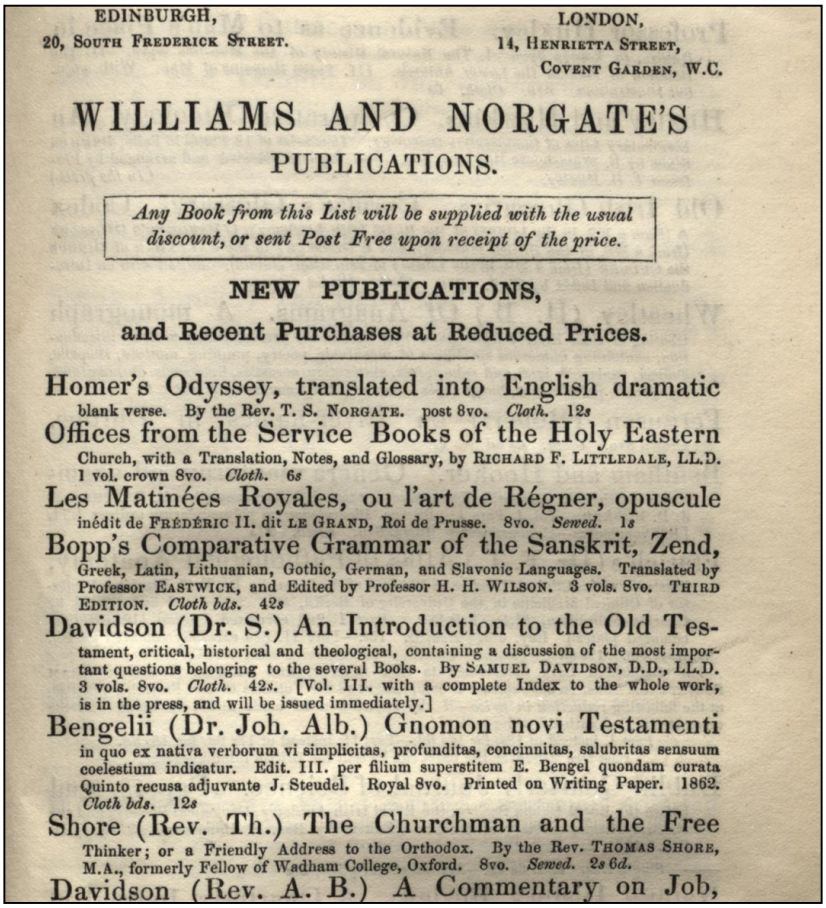
positions the human as animal and negates any definition of humankind as a superior species. As *Evidence* demonstrates, our species could not have come into being without passing through a stage of inhumanity first. More precisely, human form does not plateau. A startling implication of Huxley's work is that the human species' trajectory points toward a future abject form. As Grosz relates, "[t]he animal is that from which the human tentatively and precariously emerges; the animal is that inhuman destination to which the human always tends" (12).

Furthermore, Huxley was not the sole agent responsible for all of *Evidence*'s successes: his collaborators attest to the high standards that brought Huxley to his controversial conclusions. For example, zoologist Sir William H. Flower of the Royal College of Surgeons also contributed significant visuals for the work. His correspondence reveals insights into Huxley's demands and attention to detail. For example, Flower generously supplied Huxley with an image of dissected human and chimpanzee brains to aid in the hippocampus minor debate. The differences between species are not very visually striking at all. In fact, Huxley reserves an entire page for the illustration, as if indicating to his antagonists that the resemblances between humans and primates overwhelm their differences (*Evidence* 101). Moreover, in an 1862 letter describing Huxley's trademark professionalism, Flower explains that Huxley was strictly obliged "never to make a statement in a lecture which was not founded upon his own actual observation, [so] he set to work to make a series of original dissections of all the forms he treated of" (Flower 254). He

outlines just how far Huxley endeavoured for the utmost accuracy: in a laboratory at the College, there were stored for Huxley "dissected animals preserved in spirit, which, unlike those mounted in the museum, were available for further investigation in any direction, and these, supplemented occasionally by fresh subjects from the Zoological Gardens" (255). These animals, many of which were utilized in his public lectures as well as in *Evidence*, became indispensible to Huxley's agenda. Interpreting standards of professionalism in *Evidence*'s bibliographic and visual features also supports my view that Huxley was compelled to train the untrained to examine details and facts as scrupulously as he had, and to leave no specimen – including curious examiners – unexamined.

The reading experience concludes when the text draws the viewers to prominent advertisements for the publisher, Williams and Norgate (see Figure 5). Huxley's audience would have noticed this common consumerist feature of *Evidence*, thus positioning the book as a mass marketable object rather than an exclusive niche publication. Advertisements catalogue the publisher's available works, including translated imports, famed geographer Heinrich Kiepert's *New Atlas Antiquus*, and Homer's *Odyssey*. Thus, science is not the primary topic on this list of merchandise, although all the catalogued works on the list claim some sort of intellectual or educational value. Last, the rusty, red-brick shade of the end-papers captivate viewers and compel them to linger on subsequent ads. Huxley and his publishers did not alienate potential customers by seeking huge profits. An advertisement for *Evidence* placed in *The Athenæum* in

1864 shows that the selling price had dropped within a year to 6 shillings (142). Looking to the end-papers and fly-leaves between the covers, the reader understands that Huxley's product fits comfortably among other textbooks and educational content in its price range. The book's price point was not totally out of reach for lower-income learners, thus corroborating the bibliographic intent for Huxley's popular audience.



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Bengelii (Dr. Joh. Alb.) Gnomon novi Testamenti in quo ex nativa verborum vi simplicitas, profunditas, concinnitas, salubritas sensuum coelestium indicatur. Edit. III. per filium superstitem E. Bengel quondam curata Quinto recusa adjuvante J. Steudel. Royal 8vo. Printed on Writing Paper. 1862. *Cloth bds.* 12*s*

Shore (Rev. Th.) The Churchman and the Free Thinker; or a Friendly Address to the Orthodox. By the Rev. THOMAS SHORE, M.A., formerly Fellow of Wadham College, Oxford. 8vo. *Sewed.* 2*s* 6*d*.

Davidson (Rev. A. B.) A Commentary on Job,

Fig. 5: Endnote advertisements for publisher Williams and Norgate (Huxley, *Evidence*)

Aware of the accessibility of the press and popular culture's growing emphasis on visual innovations, Huxley invited his audience into a functional dialogue which existed between both teacher and

student as much as manufacturer and consumer. Janet Browne's work on depictions of evolutionism in Victorian visual culture reminds readers that "science as an activity appears in images created for viewing" and that these "consumer products" made the effects of scientific advancement "fully tangible" (20). *Evidence*'s undisguised commercialization and popularization suggests a fashioning of the scientific community on Huxley's behalf to make the sciences more palatable to members of the public who wished to enlighten themselves. Print products like *Evidence* were the primary means by which the non-professional public could absorb evolutionary ideas. Huxley's work confirms how evolutionary ideas transcended class boundaries as they circulated according to the Victorians' everyday consumerist habits. Huxley's public persona, bolstered by the performance of his text in a ravenous marketplace, became unmistakable and unavoidable.

Ultimately, as this investigation shows, popular interest in scientific matters can be gleaned from bibliographic and visual clues, and I point to the ways in which this immersion in intellectual materials might enable freedom of thought, heighten social awareness, and transcend inherited ideological positions. Jonathan Rose's work on the recovery of working-class intellectual experiences suggests that the literary awakening of autodidacts was a drive "to be more than passive consumers of literature, to be active thinkers and writers . . . [T]he only true education is self-education" (57). Anthroponormative ideals deteriorated in a single glance at the primates in print. The hegemonic view of nature as dependent on

humans acquiesced to a view of nature in which humans were subject to evolutionary pressures themselves, thanks in part to Huxley. He popularized what few others at the time were equipped to make known to the general public. In destabilizing the prevailing myth of progress, especially in terms of phenotypic or visual attributions of pre-eminence, he catalyzed future research into interspecies kinship. The bibliographic and visual features of *Evidence* taught us to abstain from perpetuating those cultural constructions of the human which conceal our most bestial tendencies.

The encounters between human and primate in an increasingly image-laden commodity culture coerced audiences to contemplate the ramifications of Darwinism: unruliness, interdependency, and contingency had debased organization, hierarchy, and fate. Through his voracious inquisitiveness, his steadfast conviction in the material processes of the universe rather than the intangible mythologies of theology, and his concession that humanity does not have complete dominion over nature, Huxley helped nurture the public's link with the rapidly expanding sciences so that all potential learners, regardless of ability or class, could accept that they were "one with the brutes" (*Evidence* 112).

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