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Author(s): Michael Nicholson

Source: *Science Fiction Studies*, Vol. 47, No. 1 (March 2020), pp. 1-29

Published by: SF-TH Inc

Stable URL: <https://www.jstor.org/stable/10.5621/sciefictstud.47.1.0001>

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Michael Nicholson

A Singular Experiment: *Frankenstein's* Creature and the Nature of Scientific Community

I was surprised that among so many men of genius, who had directed their inquiries towards the same science, that I alone should be reserved to discover so astonishing a secret.—Mary Shelley, *Frankenstein* (30)

In Mary Shelley's *Frankenstein*, Victor Frankenstein is "surprised" by his own scientific superiority: he "alone" exceeds "so many men of genius" (30). Victor ironically employs the exceptionalist rhetoric of genius in order to illuminate the common intellectual energy of "so many men" working "towards the same science." Yet he is quick to distinguish himself from this collective mass. In a markedly tautological way, he isolates his genius from that of an elite community that is itself already separated from the larger public. Victor's representations of his "astonishing ... secret" as singular involve numerous acts of denial and deception.

Many critics, including Paul Cantor, Jane Donawerth, Despina Kakoudaki, Anne K. Mellor, Alan Rauch, Patrick B. Sharp, and Paul Sherwin, have interpreted *Frankenstein* as an ethical critique of the shortcomings of Victor's intellectual exceptionalism.¹ To be sure, scholars have traditionally traced Victor's origins to well-known scientific figures such as John Hunter (Youngquist 11), Humphry Davy (Hindle 32-33), or Luigi Galvani (Mellor, *Monsters* 104). Moreover, Shelley herself represents him as identifying the work of Albertus Magnus and Paracelsus as "grand" but "useless" after M. Krempe dismisses his scientific reading as outdated (26-27). She then makes chemistry his "sole occupation," describing him as devouring M. Waldman's reading list in natural philosophy. She shows how he learns "sound sense and real information" from M. Krempe, making "discoveries in the improvement of some chemical instruments" (29). Attending to this "sole occupation" and its results, Brian W. Aldiss famously traced the origins of science fiction to *Frankenstein* and Shelley's depiction of Victor's turn away from "dusty old authorities" toward "modern experiments in the laboratory" (*Detached Retina* 78).²

Shelley's notable scientific plot, however, also describes Victor as dispensing with scientific community during his creation of the creature.³ In addition, she characterizes him as mixing "the science of anatomy" with an array of arcane methods and vocabularies: he is "animated by an almost supernatural enthusiasm" and "dizzy with the immensity of the prospect" (30).⁴ If Victor is so often viewed as promoting an immoral scientific practice, and if we can perceive his hermetic research agenda as exclusionary and pseudoscientific in part, it seems odd that literary critics and historians have effectively transformed his claim that he is "surprised" by his "astonishing" genius into an interpretive methodology. Shelley's characterization appears to

have scripted an intense desire to approach Victor as the embodiment of a single professional scientist.⁵ This analytic impulse has ensured that from its inception, the critical discourse surrounding science in *Frankenstein* has typically focused on Victor “alone.”

The longstanding tradition of ethical critiques of Victor’s anti-social science, however, raises the question of what kind of alternative values we might find in Shelley’s representation of the creature. Building on Jane Donawerth’s and Robin Roberts’s revisionary accounts of *Frankenstein* as a foundation of women’s and feminist science fiction, the present essay argues that Shelley’s portrayal of an agential experimental subject (the creature) imaginatively expands the limits of scientific participation and community.⁶ While Roberts argues that “*Frankenstein* can be read as a warning about the dangers of female exclusion from science” (25), Shelley herself represents Elizabeth as removed from Victor’s early alchemical work: “I was left by her to pursue my studies alone” (22).

Through the creature, *Frankenstein* forecasts the ways in which from the Romantic era to the present, marginalized actors and ordinary procedures have reshaped “what counts as science” (Schiebinger 190). Shelley’s novel confronts readers with a fictional thought experiment: Victor’s self-interested science produces a creature who—prior to becoming violent in the face of exclusion—analyzes social actors, addresses communal problems, and collaborates with his objects of study. The moral vision with which Shelley experiments comes into view, for instance, when the creature observes the daily life of the De Lacey family. After studying their impoverished condition, he begins to speculate:

What did their tears imply? Did they really express pain? I was at first unable to solve these questions; but perpetual attention, and time, explained to me many appearances which were at first enigmatic. A considerable period elapsed before I discovered one of the causes of the uneasiness of this amiable family; it was poverty: and they suffered that evil in a very distressing degree. (74)

The creature adopts an empirical methodology of “perpetual attention” in order to “solve” questions. His meticulous way of looking resonates with what Lorraine Daston terms the institutionalization of “the practices of taking notes and paying attention”; naturalists such as Georges Cuvier transformed “sustained, continuous observation” into “a tool to think with, a genuine logic of discovery and proof” (100, 95, 105). The creature’s focus on an immediate social problem results in his discovery of the De Lacey’s poverty. As a result, he alters his own behavior, consuming “berries, nuts, and roots” instead of the stores of the cottagers (74). Shelley counterintuitively applies Victor’s diction of discovery to the creature’s analysis of affect and affliction (“pain” and “tears”). Moreover, by juxtaposing Victor’s “inquiries” into the “secret” with the creature’s explorations of the “enigmatic,” *Frankenstein* participates in dynamic debates on the cultural boundaries governing the relations between professional scientists, amateur experimenters, and the broader public.

Shelley's fiction explores how and why the nonhuman creature cannot occupy the social position of the scientist. While *Frankenstein* portrays Victor—an asocial character who nevertheless believes he can speak for all humanity—as experiencing little apparent difficulty in becoming a scientist, the novel represents the creature as excluded from all scientific roles by human prejudice. While the creature is by no means a professional and has no academic credentials, this essay seeks to explore the scientific aspects of the various forms of abjection, othering, and oppression that, for many critics, are allegorized through his experience, at least in part because of how his story is framed by Victor's narrative.

Although there is no sustained reading of the creature's repressed scientific representation, several scholars have pointed the way forward. Darko Suvin insightfully locates the "SF novum" of *Frankenstein* in the creature's "story of awakening" and "untenable position as a subject" (150). Marilyn Butler draws attention to the fact that it is not Victor but the creature who "follows through Frankenstein's technological achievement in a scientific spirit" (xxxvi). Building on Suvin's claim, Monique R. Morgan examines the ways in which the creature's account of his childhood displays the "inductive skills" of a "travel narrative" (par. 6). Roger Luckhurst contends that the "creature is even more thoroughly a materialist" than his maker (42). In Rauch's view the creature exhibits "a moral commitment to the application of knowledge in the service of humanity" (*Useful* 109).

By recovering the moral and scientific aspects of the creature that Shelley imagines as prevented from full expression, my discussion reorients our view of arguably the first work of science fiction. *Frankenstein* portrays a socially engaged creature whose several roles—empirical observer and scientific witness, taxonomic naturalist and amateur experimenter, consumer of knowledge and metascientific critic—starkly contrast with Victor's circumscribed scientific privilege, inattention to common problems, and indifference to the social aspects of knowledge. While it is important not to neglect the creature's later links to crime, failure, and catastrophe, emphasizing his initially open empirical mindset affords us a vision of how Shelley seeks to redefine the nature of the scientific experiment.⁷ In an age in which, according to Robert Mitchell, "the term 'experiment' ... still bore an earlier, Aristotelian sense of 'experience'" (4), Shelley transforms Victor's experimental results into an individual actor confronting scientific and social discrimination. More specifically, an elite scientist's ostensibly failed experiment not only refuses to remain hidden but also attempts to produce its own experimental practice and concept of scientific community.

Shelley's account of an experiment that interrogates its own designer notably anticipates revisionary views of modern science as a process of "letting the things and persons represented" by the scientist determine whether they will "say for themselves the same thing that the representatives claimed they wanted to say" (Latour, *Science* 73).⁸ According to Bruno Latour, present-day science should seek to verify long-held assumptions by humbly attending to the expressive materiality of scientific objects once thought to be inert, passive

matter.⁹ For Evelyn Fox Keller and Hilary Rose, feminist science transforms “objects” into “subjects”; explores “interdependencies between subjectivity and objectivity”; accesses communal, “intimate knowledge”; and coordinates “hand, brain, and heart” (Keller, *Organism* 198, 200, and *Gender and Science* 9; Rose 90).¹⁰ *Frankenstein* presents an early version of the insight that instruments and objects of study are also part of the scientific community; in Shelley’s view, the scientist is not the sole agent in the experiment. Exploring the diverse ways in which ostensible subjects of experiments can also participate in scientific work, her novel describes a creature who—despite the fact that his empirical tests typically lack willing human collaborators—regards and acknowledges the nonhuman participants that Victor dismisses as “lifeless matter” (30).¹¹

As the agential experiment *par excellence*, Shelley’s creature is not a proponent of the scientific abstractions Rose associates with the “alienated knowledge” of chauvinistic scientific practice (76, 89). Instead, *Frankenstein* represents him as applying elements of the scientific method to his daily experience in a version of what Dalia Nassar calls “romantic empiricism,” a perceptual process associating accurate knowledge with communal identification, namely “the attempt to become identical with the thing known” (307). The revisionary way of looking that Shelley assigns to the creature aligns viewer and viewed, emphasizing the social construction of newfound knowledge.

Expanding the scope of scientific community, *Frankenstein* puts forward the idea of a socially responsive and responsible science: interactive, ordinary experiments that reimagine instruments and materials as cooperative agents, involve multiple points of view and pursue mutually beneficial discoveries. Through the creature, Shelley speaks to us—in the age of artificial intelligence, genetic engineering, posthuman bodies, and ecological calamity—about the concept of socially accountable experimentation from a moment in which the scientific community was transitioning between two competing drives. First, there was an entrepreneurial drive to open science up to popular consumption and investment. Second, there was a disciplinary drive to close science off to the public by means of the exclusivity of the specialized scientific community. Yet the borders dividing these emerging disciplinary communities from the broader public were by no means static. As Jan Golinski observes, portions of the scientific community interacted with the public in coffeehouses and inns as well as laboratories (6). Mi Gyung Kim adds that chemistry in particular became “a public science during the second half of the eighteenth century” (453). Although, as Marie Boas Hall argues, the Royal Society had long tried to define what was to count as science (x), Jon Klancher explains that Romantic-era Britain’s new “arts-and-sciences Institutions” cultivated a “cross-class and mixed-gender constituency,” achieving a “far greater public impact” than their institutional predecessors (3-4). The spirit of Shelley’s age motivates her own science-fictional experiment with a relational epistemology of consensus that understands knowledge as mediated by interactions between

scientific minds and nonhuman matter, disciplinary communities and the general public.

Victor Frankenstein's Anti-Social Science. Victor Frankenstein's creation of the creature contravenes three basic principles of scientific community in the period: observation, repetition, and transparency.¹² While scientific societies shared results from the late seventeenth century, by the time *Frankenstein* appeared scientists were generally working together as "so many men of genius" and conducting experiments by committee.¹³ The hermetic nature of Victor's "secret toil" to animate "lifeless clay" (32) comes sharply into focus when we consider the countless institutions and learned societies, including the Royal Institution (founded in 1799), in which actual Romantic-era scientists were organizing public lectures and events. During this period, scientific celebrities of all political and professional stripes upheld the idea that facts emerge from consensus rather than self-evidence. The radical dissenter Joseph Priestley (who discovered oxygen) describes "discovery" as a gradual process whose success rests on communal engagement: "In completing one discovery we never fail to get an imperfect knowledge of others, of which we could have no idea before" (*Air* vii). As Priestley's "we" suggests, any scientific advance results in new collective questions. Elsewhere Priestley recounts medical trials motivating "all the electricians of Europe to repeat" their procedures; he justifies these experiments by citing sources recalling how electricity itself was once of "little credit" (*Electricity* 151-52). At the opposite end of the political and institutional spectrum, Humphry Davy (who discovered a number of elements) comments: "In consequence of the discovery of ... Dr. Priestley ... I was induced to carry on the following investigation" (xi). While public references and published experiments identified scientific progress with shared results, the practices of sustained scrutiny and record keeping further facilitated the exchange of accurate information. The British physician Thomas Beddoes, for example, kept meticulously detailed experimental logs. In a compilation of case studies whose title includes the term "communications," he states that since "the elements of medical opinion," in his view, are "observation and testimony," only repeated empirical trials can "put an end to all uncertainty" (xxxii, xxix).

As Shelley's biography demonstrates, this increasingly modern scientific community engaged the broader public. In order to disseminate newfound knowledge and expertise, leading scientists such as Davy and Beddoes conducted entrepreneurial endeavors (Fullmer 74-85). While "assertions of professionalization in both literature and science" would increasingly seek to exclude women from participation in the 1820s and 1830s (Bailes 179-80; Shteir 4-5), Shelley's interest in science was sparked by the many demonstrations, lectures, performances, and commercial ventures that important scholars, scientists, and engineers presented in the hopes of generating public interest and investment. She attended scores of such events: in 1814 alone she attended a talk by the vitalist Andrew Crosse "in London on

December 28” and “went twice to see Garnerin, the scientific showman, lecture on ‘Electricity’” (Goodall and Knellwolf 7; Rauch, *Useful* 117-18).

The Shelleys familiarized themselves with both the new technologies and discoveries of ordinary entrepreneurs and Royal Society scientists and engineers. Like Mary, Percy was an avid consumer of this newly disseminated scientific knowledge. As Carl Grabo points out, scientific digests profoundly influenced his poetry; moreover, the poet’s room at Oxford contained an “electrical machine, an air-pump, the galvanic trough, a solar microscope, and large glass jars and receivers” (Hogg, qtd. in Grabo 9). Notably, the Shelleys often studied important scientific works together. Mary’s journal entry for 29 October 1816, for example, documents that she “Read Davy’s Chemistry with Shelley” (*Journals* 143). As Mellor illustrates, the author based part of Waldman’s “introductory lecture on chemistry” on Davy’s “textbook, *Elements of Chemical Philosophy* (London: 1812)” (*Monsters* 91).

Shelley associates Victor Frankenstein with an entirely different model of the scientist, one that is in many ways at odds with the scientific contours of her time. Representing him as claiming the exclusive authority of the genius, she casts him as rejecting the public discourse of open exchange and foreclosing the observation of his experiment. As he recounts his manufacture of the creature, Victor refers to his work as “secret” four times, calling it singular another five times (“sole occupation,” “one object of pursuit,” “one pursuit,” “one secret,” and “great object” [29, 32, 33]). Although the history of scientific discovery demonstrates that monomania can function within a public paradigm, *Frankenstein* portrays Victor’s relentless pursuit as rendering his eyes “insensible to the charms of nature” and driving him to “forget ... friends” (33).

Shelley describes him as taking notes but making no efforts to publish or promulgate his “hideous” experimental result when it ostensibly fails to confirm his virtuosity (35). Her fictional portrait of undisclosed singular science contrasts with actual Romantic-era admissions of fallibility: “My first publication I acknowledge to be very imperfect” (Priestley, *Air* vii). Like Priestley, the seventeenth-century English chemist Robert Boyle argued that published accounts of failed experiments engendered scientific progress, ensured transparency, and allayed anxieties (Shapin 85-87). Victor’s definition of the creature as an unsuccessful experiment would not therefore justify destroying his results.

After detailing the promise of his early methods and experiments, Shelley describes Victor as refusing to reenter the scientific community once he begins work on the creature. In order to keep his secret, he dissociates himself from his mentors, stating that the university is “no longer conducive” to his investigations (29). Experimenting on the creature near Ingolstadt, he sequesters himself in “a solitary chamber, or rather cell, at the top of the house, and separated from all the other apartments by a gallery and staircase” (32). Recovering from the “nervous fever” that follows his creation, he develops a “violent antipathy even to the name of natural philosophy” (37, 42). As a result, Henry Clerval removes his scientific “apparatus from view” (42).

Shelley envisions Victor's private purpose and "separated" workshop as undercutting the central claim that Robin Valenza reports the scientific community was making during the period: scientific advancements enriched Britain conversationally and commercially, and subsidies to universities produced "financial and intellectual" returns to the nation (14, 10). *Frankenstein* casts the cloak-and-dagger nature of Victor's experiment as accompanying his firm belief that the creature is his personal intellectual property—"the accomplishment of my toils"—rather than an independent participant in an ongoing social process of discovery (34). As Suvin explains, the creature is "a subject degradingly treated like an object" (152). Victor alone decides that his creation is morally indefensible and must die; his biased view reduces the creature to a "filthy mass" with which he "could not sympathize" (99, 100).

Shelley portrays Victor's suppression of evidence, unwillingness to share his findings, and personal idiosyncrasies in ways that would make his work nearly impossible for others to improve or revise. Though it is unclear whether she would sanction revisionary reproductions of his experiment should they adhere to more correct scientific processes, her fiction leaves open the possibility that the innovative modifications of other scientists might have helped perfect the creature. In addition, by representing Victor as refusing to reenter the profession, *Frankenstein* suggests that he fears that publicizing his work would allow others to criticize his clandestine procedures and designs.

After abandoning his experiment, Victor continues to avoid other scientists with the exception of a few terse and obligatory encounters with Professors Krempe and Waldman. Following his convalescence, he introduces "Clerval to the several professors of the university" (42). Representing scientific sociability as affliction, he conceptualizes himself as a specimen or patient rather than a colleague: "M. Waldman inflicted torture when he praised.... I felt as if he had placed carefully, one by one, in my view those instruments which were to be afterwards used in putting me to a slow and cruel death. I writhed under his words, yet dared not exhibit the pain I felt" and "[M. Krempe's] harsh blunt encomiums gave me even more pain" (42). In Shelley's view, the collaborative approach of the era's scientific culture might make Victor's work less than inimitable; her fiction depicts him as unable to persuade himself "to confide" in Clerval (42). Although *Frankenstein* at times figures Victor as reflecting on the social impact of his work, the novel typically does so only when public concerns further his personal ends. His valedictory speech to the Arctic explorer Robert Walton, for example, includes remarkably ironic allusions to the public: "My duties towards my fellow creatures had greater claims to my attention.... I refused, and I did right in refusing, to create a companion for the first creature" (151). Victor invokes an exclusionary rhetoric of human fellowship in order to justify the annihilation of a nonhuman "companion for the first creature." In a similar vein, his final description of the creature as an "instrument of mischief" (152) invites Walton to reduce him to a harmful apparatus.

The singularity of the scientific retirement that Shelley ascribes to Victor comes into view when we bear in mind that from the Romantic era to the present even most scientists conducting experiments on themselves (a situation inviting confidentiality) have aimed to publish their results. As Simon Schaffer notes, semi-private experiments conducted on individual bodies require the scientific community to verify their findings (“Self Evidence” 330).¹⁴ Noel Jackson’s account of Romantic self-experimentation similarly highlights how self-reflection supported communitarian ideals (142). By contrast, Victor conducts anti-social experiments, which, according to Mary Favret, cultivate an “impenetrable” air of authority; other scientists cannot test or replicate his findings because he combines modern scientific practices with haphazard pre-modern approaches that do not conform to any recognizable version of the scientific method (183-84). Initially planning to create “a human being,” he ultimately elects to form a “being of a gigantic stature” in order to finish faster: “the minuteness of the parts formed a great hindrance to my speed” (31-32). Victor famously pursues “midnight labours,” keeps a “workshop of filthy creation,” and follows an “almost frantic impulse.” Neglecting his own body’s role in his experiment, he works while “oppressed by a slow fever,” “emaciated with confinement,” and “nervous to a most painful degree”; moreover, he incessantly shocks and strains his senses (“my eyeballs were starting from their sockets”; “in a passing trance”; “tortured the living animal” [32-33]). His narrative vocabulary vacillates between the rigor of the physiologist (30), the hyperbole of the genius (31), and the whimsy of the dilettante (“dabbled among the unhallowed damps” [32]).

Shelley emphasizes that Victor’s experiment is the singular result of an irreproducible methodology that only he can perform. While clearly depicting his laboratory work as encompassing modern methods and technologies, she also strongly ties his model of scientific authority to antiquated cultural concepts such as the anthropocentric view of nature and the superhuman persona of the genius. *Frankenstein* routinely associates Victor with rhetoric emphasizing his privileged possession of “human nature”: “often did my human nature turn with loathing from my occupation” (32). In Shelley’s view, his experimental persona upholds the scientific inequities associated with what Gillian Beer terms the outmoded alchemical paradigm placing “man” at the top of a hierarchical “chain of being” (23).

Apart from these concerns, Shelley represents Victor’s work as incomplete. Her fiction portrays him as only partially observing and recording the stages of his experiment. Relating his astonishing discovery of the “cause of generation,” he recounts how “all the steps by which I had been progressively led to it were obliterated” (30-31). While *Frankenstein* initially describes Victor as obsessively cataloging the creature’s creation, the novel then casts him as peremptorily abandoning his work during the precise moment when the scientific community and the public most require that he scrutinize and take note. Depicting him as unscrupulous after he animates “the lifeless thing,” Shelley characterizes Victor as closing off his senses to the creature: “He might have spoken, but I did not hear” (34-35). His unfinished, undocumented

experiment lends further support to Peter Brooks's claim that all of Victor's social and sexual designs in the novel lack closure (603).

Shelley's Scientific Community: Natural History, Empiricism, and the Creature. While the creature remains isolated for most of *Frankenstein*, Shelley begins her novel by characterizing him as an attentive, if amateur, empiricist. Before his rejection by the public drives him to commit anti-social crimes, he works toward cooperative, ethical outcomes.¹⁵ *Frankenstein* represents the creature as drawn to the work of others from his first experiences:

I found a fire which had been left by some wandering beggars, and was overcome with delight.... *I thrust my hand into the live embers....* How strange, I thought, that *the same cause* should produce such opposite effects!... I quickly *collected some branches....* I *lay on the ground*, and sunk into sleep.... I awoke ... and *contrived a fan of branches*, which roused the embers.... I resolved to quit the place.... I exceedingly lamented the loss of the *fire which I had obtained through accident*, and knew not how to reproduce. (69-70; emphasis added)

Shelley's depiction of his discovery of fire in the woods revises a passage from the English natural philosopher and botanist Erasmus Darwin's *Botanic Garden* (1791):

the tall monkeys of Borneo and Sumatra *lie down with pleasure* round [sic] any *accidental fire in their woods*; and are arrived to that degree of reason, that *knowledge of causation*, that they *thrust into the remaining fire the half-burnt ends of the branches* to prevent its going out. (21; emphasis added)

Alluding to—and associating the creature with—the scientific thinking of *The Botanic Garden*, Shelley describes him as surmounting in a single experience the “many dangerous burns and wounds” that Darwin identifies with early encounters with fire (21).¹⁶ Swiftly apprehending what Darwin calls the “most important discovery of mankind” (21), the creature “examined the materials of the fire” and “collected some branches”; when the collected branches do not burn, he returns to observation, “watching the operation of the fire” (69). In the days that follow, he studies “how to reproduce” the fire *de novo* in a new location. Careful empirical analysis—“I reflected on this”; “I discovered the cause”—leads him to conclude that wet wood placed near fire dries and becomes flammable (69). The fuel that his trial-and-error tests produce makes it possible for the fire that the beggars abandoned to continue burning. Observing the ecological action of the air on the fire's remains (“a gentle breeze quickly fanned it”), he then makes a further discovery: “I ... contrived a fan of branches” (69). As this scene suggests, the creature's early experiments often focus on detecting the hidden causes of pleasure and pain, discoveries that he later applies to his encounters with others.

By means of the creature, Shelley expresses her preference for what Amanda Jo Goldstein has recently termed “Goethe's ‘tender Empiricism’”: an “experimental practice open to being passively, passionately *moved* by objects,

for the sake not of subjective fulfillment but of a fuller record of objects' efficacies" (*Sweet Science* 12; emphasis in original). By contrast, traditional "empiricism defines the body by what it excludes" (Levinson 119). Long before he pursues Victor from "the shores of the Rhine" to "the deserts of Scotland" (115), the creature makes one of his earliest findings: awakening by a brook, "half-frightened as it were instinctively, at finding myself so desolate," he discovers the pain of solitude (68). Stressing his increasing awareness of his senses, Shelley represents material media as his conscious benefactors: "I gradually saw plainly the clear stream that supplied me with drink, and the trees that shaded me with their foliage" (68). Her description—"plainly," "clear"—qualifies the stream's water and the creature's vision in the same terms.

As the wind that fans the creature's first fire suggests, Shelley takes a sociable view of environmental elements. Consistently figuring the creature's personality as receding into the background, her novel imagines his first depictions of the forest as foregrounding sensory reception and ecological activity; he views "the bright moon ... with pleasure" and begins "to observe, with greater accuracy, the forms that surrounded me, and to perceive the boundaries of the radiant roof of light which canopied me" (68, 69). The creature's initial experiences thus call to mind what Marjorie Levinson terms the Spinozan sense that "affection is synonymous with 'idea,' underscoring that the mind is an unmediated registration of the impact of other bodies on our own" (121). Shelley characterizes the creature as susceptible to his objects of study, as the recipient of environmental action ("forms that surrounded me"; "light which canopied me"). Associating him with moonlit scenes and atmospheric effects, she ties his increasingly accurate perceptions to his embedded ecological standpoint and awareness of material interconnections. While *Frankenstein* formulates Victor's scientific senses as indifferent to the world—"selfish pursuit ... cramped and narrowed me" and "made me neglect the scenes around me"—the novel casts the creature as involved in ambient impressions: "the images which this world affords ... opened upon me" (44, 33, 155). Taken together, the creature's early experiences reveal that his attribution of agency to his materials and surroundings does not simply derive from his proto-sociological work with human agents (the De Laceys).

To be sure, the juvenile Victor reads "Pliny and Buffon with delight" before he hears M. Waldman speak of modern chemistry's "almost unlimited powers" or undertakes "the great object, which swallowed up every habit of my nature" (23, 28, 33). Alan Bewell's suggestive comment that the creature "enters into the debates opened up by Buffon" (125), however, invites a more comprehensive consideration of the ways in which Shelley identifies him with the major concerns, texts, and methods of perhaps the most celebrated eighteenth-century naturalist.¹⁷ The first ten paragraphs of the creature's narrative repeatedly employ terms associated with Buffon's naturalist lexicon, including forty-six variants of the terms "sense," "examine," "observe," "perceive," "eye," "distinguish," "find," "discover," and "distinct" (68-71). As the creature begins "to distinguish between the operations of my various

senses,” he rehearses Buffon’s naturalist language of discrimination and classification (68).

The creature’s first field notes replicate the structure and terms of English translations of Buffon’s multi-volume *Natural History* (begun in 1749). As he comes into consciousness, he moves from vague descriptions of “pleasant sound” and “little winged animals” to accurate ornithological classifications—“I found that the sparrow uttered none but harsh notes, whilst those of the blackbird and thrush were sweet and enticing”; “sweeter than the voice of the thrush or the nightingale” (68, 69, 72)—that replicate the taxonomic sequence of Buffon’s volume, whose first three headings were “Of the Sparrow Kind,” “The Blackbird,” and “The Thrush” (“The Nightingale” appears sixth). Shelley also aligns the creature’s empirical observations with those appearing in Buffon’s *Natural History*. His “sweet and enticing” descriptions of the blackbird and thrush allude to Buffon’s respective entries on the blackbird and the “sweet modulation of his tuneful accents,” as well as the thrush that “sings most sweetly” (2:20, 25). When considered alongside Buffon’s comments that the sparrow lacks “any peculiar beauty” and “any melody of song,” the creature’s remark that “the sparrow uttered none but harsh notes” becomes a tragic allegory. According to Buffon, the sparrow’s apparent defects do “not arise from want of powers in this bird to imitate others, but because he only attends to the parental note” (2:184-85). Lacking even the “parental note” that Buffon associates with the sparrow’s failed mimicry, the creature seeks “to imitate the pleasant songs of the birds,” but is “unable” (69). *Frankenstein* later literalizes this cross-species comparison when the creature depicts his own voice in terms of the sparrow’s “harsh notes”: “My voice, although harsh, had nothing terrible in it” (89). By contrast, through the creature’s characterization of Safie’s song—that “flowed in a rich cadence, swelling or dying away, like a nightingale” (79)—Shelley approximates Buffon’s classification of the nightingale’s “melodious voice”: “now stealing off into a different cadence, now interrupted by a break” (2:35-36).

As these instances make clear, the creature works to understand self and others by means of interspecies contact: identification, taxonomy, and analogy. *Frankenstein* therefore provides further confirmation of Theresa M. Kelley’s claim that “Romantic attention to taxonomy” became “a vehicle for asking questions about parts and wholes, the problem of species, and alien or monstrous kinds” (“Romantic Exemplarity” 232). If Kelley’s Romantic plants conduct “clandestine marriages,” blur animal and mineral lines, and exert “the pull of singularity against supposed secure categories” (*Clandestine* 5, 8), then so too does the creature’s anomalous form put scientific systems under pressure. Positioning him as working to define the limits of his species, Shelley assigns the creature a taxonomic model that rejects the hierarchy of the great chain of being. No less than Kelley’s monstrous, mimicking plants, the creature’s body presents “a material invitation to figure” that cuts across botanical and literary lines (*Clandestine* 13). His composite form

simultaneously represents a stitched together whole and the community of individuals from which his detached parts were derived.

Like the Romantic botanist, the creature has a keen botanical eye: “I distinguished the insect from the herb, and, by degrees, one herb from another” (69). While Victor does “not watch the blossom” during his “one pursuit” (33), the creature continually studies plants: “the first little white flower that peeped out from beneath the snowy ground”; “I beheld the bare trees”; “the black ground was covered with herbage, and the green banks interspersed with innumerable flowers” (75, 76, 79). Shelley portrays him as deriving culture from material culture. After the creature’s initial searches for sustenance—“I again went out in search of berries”; “I often spent the whole day searching in vain for a few acorns” (68, 69-70)—he benefits from his observations of the local flora and fauna, including the vegetal signs of seasonal change. He takes a keen interest in the horticultural activity of the De Laceys: “[Agatha] went into the garden for some roots and plants, which she placed in water, and then upon the fire”; “Several new kinds of plants sprung up in the garden, which they dressed” (72, 76). Shelley envisions his reflections on the cultivation of the De Laceys’ garden as closely approximating the aims of the era’s natural historians. The English naturalist Gilbert White, for example, called for “useful” species distinctions, arguing that the botanist should “be by no means content with a list of names ... [but] should study plants philosophically, should investigate the laws of vegetation, should examine the powers and virtues of efficacious herbs, should promote their cultivation, and graft the gardener ... on the phytologist” (183-84).

While White’s botanical figure of the “graft” applies to the botanist the lexicon of the plants he ostensibly arranges, Shelley’s fiction goes further: the creature conducts the natural historical work of taxonomizing his own species. *Frankenstein* stages his increasing awareness of how “the human senses are insurmountable barriers” to all other scientists (98). Forced to serve as both observer and observed, he begins to undertake the work of analogization and self-anatomization. As he plans his introduction to the De Laceys, he notes: “My organs were indeed harsh, but supple.... [M]y voice was very unlike the soft music of their tones”; “I was better fitted by my conformation for the endurance of cold” (77, 89). The creature’s comparative analysis of species difference avoids Victor’s anthropocentric discourse of defect: “I was not even of the same nature as man. I was more agile ... and could subsist upon coarser diet; I bore the extremes of heat and cold with less injury to my frame; my stature far exceeded their’s [*sic*]” (80).

The creature’s discovery of affirmative dimensions of difference—“better fitted,” “not even of the same nature as man”—derives from an empirical process that accords well with the definition of natural history provided by Buffon’s English translator: to investigate “the relations and differences which connect and distinguish the various tribes”; “to examine, describe, and delineate from the life, all the animals” (Smellie ix, xvi). *Frankenstein* contrasts the creature’s precise categorizations of self and species with his maker’s gothic vocabulary of subhuman monstrosity (“strange nature of the

animal,” “almost too horrible for human eyes,” “vile insect,” “ghastly and distorted shape” [49, 65, 141]).

Following Buffon’s rules—“natural history depends entirely on experience, and is limited to the method of reasoning by induction” (1:4)—the creature famously compares his own reflection “in a transparent pool” to “the perfect forms” of the cottagers (76). Seeking to inhabit the ostensibly oxymoronic role of the nonhuman scientist, he persistently returns to the central line of inquiry that prompts his various hypotheses: “I had never yet seen a being resembling me.... What was I? The question again recurred” (81). Reviewing his reading, he again pursues this guiding question:

I applied much personally to my own feelings and condition. I found myself similar, yet at the same time strangely unlike the beings concerning whom I read.... My person was hideous, and my stature gigantic: what did this mean? Who was I? What was I? Whence did I come? What was my destination? These questions continually recurred, but I was unable to solve them. (86)

Although Shelley at times casts the creature as reiterating Victor’s anthropocentric lexicon of deformity and disgust, she more often associates him with an analytic approach involving application and discrimination (“applied much,” “strangely unlike”). His unfinished natural history, “questions ... I was unable to solve,” returns the reader to his earlier observations of the De Laceys: “What did their tears imply? Did they really express pain? I was at first unable to solve these questions” (74). By means of reiterated syntax, *Frankenstein* draws a comparison between the creature’s ongoing process of self-examination and prior study of human suffering. Tragically, he cannot consult others about his detailed self-descriptions since human responses to him substitute dread for empiricism.

Shelley also conceptualizes the creature’s more open empirical eye by means of remarkable references to scientific ways of looking associated with the naturalist’s microscope, Baconian empiricism, and Newtonian optics. If Victor is reckless and impetuous—“No one can conceive the variety of feelings which bore me onwards, like a hurricane” (32)—the creature is deliberate and methodical; he watches the De Lacey family for two years by means of “a small and almost imperceptible chink, through which the eye could just penetrate” (72). The examples listed in Johnson’s *Dictionary* under the entries for “chink” (and related definitions, “closure” and “crack,” citing the term) derive from Bacon’s *Natural History* (1626), Newton’s *Opticks* (1704), and Boyle’s *Spring of the Air* (1660). Bacon’s discussion of sonic perception—“sound will pass through a small chink”; “sounds are carried with wind” (296, 320)—elucidates the initial empirical advantages of the creature’s porous hovel: “the wind entered it by innumerable chinks” (71). Open to the wind as a result of its “innumerable” fissures, his shelter affords not only panoramic vision, but also sensory access to ambient sounds and smells.

Establishing a further resonance with Newton’s *Opticks*, Shelley ultimately represents the creature as covering “every crevice by which I might be perceived” before discovering an inward-looking aperture in a windowpane

“filled up with wood” (71-2). Seeking to prove that “The Light of the Sun consists of Rays differently Refrangible,” Newton conducts the following trial: “*Exper.* 6. In the middle of two thin Boards I made round holes a third part of an Inch in Diameter, and in the Window-shut [*sic*] a much broader hole, being made to let into my darkned [*sic*] Chamber a large beam of the Sun’s Light” (18, 30). Whether or not *Frankenstein* puts readers in mind of Newton’s *Opticks*, the creature’s boarded-up window “chink” makes it possible to imagine that a camera obscura projects moving images onto his hovel’s walls at night. Shelley’s novel creates an observational situation paralleling that of Benjamin West in John Galt’s *Life and Studies of Benjamin West* (1816). Discovering a camera obscura constituted by “seams and fissures,” West relates how a “diagonal knot-hole in one of the window shutters” projects and animates a cow on his wall (45, 47).¹⁸

Percy Shelley notably owned a so-called camera obscura or solar microscope: “whenever he entered a house his first care was to choose some window of a southern aspect, and, if permission could be obtained by prayer or by purchase, straightway to cut a hole through the shutter to receive it” (Hogg 35: 513). The naturalist Henry Baker describes “The Solar, or Camera Obscura Microscope” as an instrument used “in a darken’d Chamber” and fitted to a “Hole in the Shutter of a Window” (22). According to Baker, the solar microscope’s projected images facilitate a collaborative empiricism that improves individual perception: “People may view any Object together ... discoursing on what lies before them” (25).

The creature neither possesses Percy’s microscope nor conducts Buffon’s observations of “impalpable molecules” (2:352), but his “unseen and unknown” (81) examinations of another species through a small hole analogize aspects of the era’s rudimentary microscope: “By making a pin-hole through a piece of brown paper, then bringing the eye close to the hole ... the object will apparently be much magnified” (Platts 123-24). Shelley casts his unique, nonhuman senses as collaborating instruments. Encased within the hovel-microscope, the creature serves as both the means (body) and agent (mind) of the experiment.

Besides putting readers in mind of empirical and optical scientific technologies, *Frankenstein* portrays the creature’s surveillance of the De Laceys as applying to observed human behavior the naturalist forms of conjectural reasoning that Kevis Goodman argues address the “problem of how to reason from observed particulars, to phenomena one could not see” (995). Perceiving a pause in De Lacey’s music, the creature “conjectured by his manner that he inquired the cause of his son’s sorrow”; hearing Safie’s name repeated, he “conjectured that their lovely guest was the subject of their conversation” (78, 79). Speculating on the social origins of impressions, he reasons that if he had first encountered “a young soldier,” he would “have been imbued with different sensations” (87). His conjectures on “manner,” language, “sensations,” and affect embrace what Goodman also terms the word’s origins in “*conjectus*—literally ‘thrown together’” (996; emphasis in original).

In an age in which, according to Peter Dear, abstract theories began to take cultural precedence over experiments of “evident usefulness” (81), Shelley depicts the creature’s quotidian conjectures as benefitting others. Her novel connects him to a pragmatic empiricism that addresses specific needs and solves common problems. The creature’s observations of the De Lacey family, for example, transform discovery into assistance: “I discovered also another means through which I was enabled to assist their labors.... I often took his tools, the use of which I quickly discovered, and brought home firing” (74). Shelley represents the creature as participating in his everyday experiments, as “quickly” translating passive scrutiny into active labor (“took his tools”). Moreover, she figures him as finishing what he begins; after collecting “firing” he fully details his results: “I observed, with pleasure, that he [Felix] did not go to the forest that day, but spent it in repairing the cottage, and cultivating the garden” (74). The benefit is mutual; the creature’s collaborative labor allows him to study garden work that otherwise would not transpire. *Frankenstein* envisions his sensitive, attuned empiricism as serving the same social ends as White’s pragmatic botany.

As the creature works to discover himself to others—to disclose Victor’s scientific secret—he applies inductive reasoning to human relations. Inferring from his observations and weighing “many projects,” he hypothesizes a “plan of introducing” himself to the De Lacey family: entering “the dwelling when the blind old man should be alone” (89). *Frankenstein*’s depiction of his well-studied design resonates with the scientific test as much as the juridical or ecclesiastical judgment: “this was the hour and moment of trial” (89). Aware that “prejudice clouds their eyes,” the creature attempts to mediate his appearance by constructing a third-person narrative—“These amiable people to whom I go have never seen me”—and alter ego—“a traveller in want of a little rest” (90). Unfortunately for the creature, Felix, Safie, and Agatha disrupt the carefully orchestrated “trial” of his “plan.” Instead of forsaking his failed experiment, however, he immediately revises and repeats it:

I could not help believing that I had been too hasty in my conclusions. I had certainly acted imprudently.... I ought to have familiarized the old De Lacy [*sic*] to me, and by degrees have discovered myself to the rest of his family, when they should have been prepared for my approach. But I did not believe my errors to be irretrievable; and, after much consideration, I resolved to return to the cottage, seek the old man, and by my representations win him to my party. (92)

Despite imagining “a thousand pictures of presenting myself” and working “in every way to fit myself for an interview,” the creature critiques himself for being “too hasty in my conclusions” (77, 88). Believing no “errors to be irretrievable,” he is quick to acknowledge his flawed design. In addition, he notes the role this failure might play in enabling future success. His “thousand pictures” seek to inspire innovation; his mistakes intend to “win” individuals to a “party.”

Besides depicting the creature as correcting his own designs and associating “every day’s experience” with intellectual progress, Shelley portrays him as working to improve Victor’s science (88). She crafts a world in which creator and creation continually dispute the veracity of M. Waldman’s claim that the “labours of men of genius, however erroneously directed, scarcely ever fail in ultimately turning to the solid advantage of mankind” (28). Belying Victor’s claim that “There can be no community between you and me” (66), the creature becomes what Steven Shapin terms a “virtual witness”: an individual (often a reader) who confirms the validity of experiments and authorizes their protocols and results (83). Accessing his creator’s scientific papers and reviewing the procedures that brought him to life, the creature gains an awareness of his status as a scientific experiment (Brooks 595). After relating how Safie learns of Felix’s exile from “some papers of her father’s,” the creature informs Victor of his own discovery of “some papers in the pocket of the dress which I had taken from your laboratory” (85, 87). Mastering “the science of letters” (79), he scrupulously reviews his creator’s lab notes:

I began to study them with diligence. It was your journal of the four months that preceded my creation. You minutely described in these papers every step you took in the progress of your work.... You, doubtless, recollect these papers. Here they are. Every thing is related in them which bears reference to my accursed origin; the whole detail of that series of disgusting circumstances which produced it is set in view; the minutest description of my odious and loathsome person is given, in language which painted your own horrors, and rendered mine ineffaceable. (87-88)

Frankenstein characterizes the creature as simultaneously evincing a natural talent for scientific “study” and moral evaluation. Presenting Victor with his own papers, he recalls his maker’s work to him: “You, doubtless, recollect these papers. Here they are.” Shelley’s “recollect” resonates as much with communal gathering as with individual memory. In addition, her variations on “minute”—“minutely described,” “minutest description”—exhibit the creature’s intelligent understanding of the intricacies of his maker’s experiment and results. The creature correctly interprets how Victor’s “minutest description” includes his personal responses to the experiment (“painted your own horrors”). His moral analysis of Victor’s records as “disgusting circumstances” threatens the ostensibly singular status of his creator’s scientific practice.

Shelley’s nuanced critique of Victor’s anti-social science rejects neither scientific research nor laboratory work. Instead, her novel takes a more comprehensive view of the laboratory as any space that facilitates the work of a scientific community whose methods and aims are transparent to the public.¹⁹ Desiring to “live in communion with an equal” and “feel the affections of a sensitive being,” the creature—who has read *Paradise Lost*—aims to persuade his maker to repeat Eve’s creation in the real world (100). Although the peripatetic creature views the world itself as his laboratory, he also serves as Victor’s scientific witness “on one of the remotest of the Orkneys” (112). In Shelley’s view, the creature’s appearance transforms his creator’s ad hoc “retreat” on a “solitary isle” (113, 117) into the modern scientific laboratory

Shapin describes: “The ‘laboratory’ was contrasted to the alchemist’s closet precisely in that the former was said to be a public and the latter a private space” (80).

Countering detachment with attachment, the creature persistently scrutinizes his creator. Victor’s first description of him as sentient focuses on the “dull yellow eye” that continually marks him: “he had followed me in my travels ... and he now came to mark my progress” (34, 115). While Victor represents his second experiment as a “filthy process” conducted with his eyes “shut to the horror” (113), he also delineates the differences between his first experiment and his second, which the creature initiates: “During my first experiment, a kind of enthusiastic frenzy had blinded me.... But now I went to it in cold blood” (113). Testing and tracking his maker’s work, the creature attempts to ensure its satisfactory completion.

In Shelley’s view, monitoring witnesses improve experimental practices and results. The creature constantly presses himself up against windows. Throughout *Frankenstein* he asks to be seen differently: “turn a favourable eye upon thy creature” (66). Victor, by contrast, expresses his desire to remain out of sight; retreating to a remote Scottish archipelago, he sits “with my eyes fixed on the ground, fearing to raise them lest they should encounter [the creature]” (113). Anticipating sf’s later propensity for inverting or reconfiguring “the colonial gaze” (Rieder 7), *Frankenstein* envisions the creature’s gaze as so potent that Victor’s sudden awareness of it—“I saw, by the light of the moon, the daemon at the casement” (115)—plays a role in his decision to destroy the female creature. In this scene and others, Shelley aligns the creature’s famously “clouded eyes” with the often overcast “eye of the quiet moon” symbolizing an observing ecology (126, 115). By contrast, she figures Victor as detesting the accountability that having a witness entails; unable to avoid returning the creature’s stare, he recounts how, “As I looked on him ... I thought with a sensation of madness on my promise of creating another like to him, and, trembling with passion, tore to pieces the thing on which I was engaged” (115).

Frankenstein, however, arguably invalidates Victor’s antifeminist, anthropocentric objections to the construction of a female creature: “she might become ten thousand times more malignant than her mate”; “a race of devils would be propagated upon the earth, who might make the very existence of the species of man a condition precarious and full of terror” (114). Shelley’s novel suggests that these well-known assumptions about nonhuman reproduction have no basis in science. Her fiction implies Victor as failing to consider the crucial question of how his manufactured male and female creatures could sexually reproduce (in Lamarckian fashion) their gigantic, stitched-together forms. Detached from corpses, their ovaries and testes would presumably reproduce the human bodies from which they originated. By means of Victor’s certainty that his creatures could reproduce without science, Shelley establishes a tension between scientific and sexual concepts of reproduction. *Frankenstein* imagines a posthuman problem: represented creatures that exist only *as* experiments—that can only reproduce, and their species continue, by means of

endlessly repeating the experiment. Shelley's novel portrays Victor as overlooking these and other related questions (of maternity, gestation, and viability). Refusing to renew his work, he peremptorily dismisses "every thought that could lead to a different conclusion" (118).

Although Victor's disregard bars what Butler terms the creature's exercises in "self-observation" from becoming fully generative, the fact that he independently records and reports his life story (the results of the experiment) calls to mind the era's scientific mores of civic-minded self-experimentation (xxxvi). In addition to providing Victor with an accurate record of the outcome of his abandoned experiment, the creature authenticates his own narrative by producing physical evidence, facsimiles of the letters of Felix and Safie: "I have copies of these letters; for I found means, during my residence in the hovel, to procure the implements of writing.... I will give them to you, they will prove the truth of my tale" (83). Only this documentary evidence, accompanied by the creature's nonhuman body, can verify and "prove the truth of" Victor's experiment. As Walton later testifies, "the letters of Felix and Safie ... and the apparition of the monster ... brought to me a greater conviction of the truth of his narrative than his asseverations, however earnest and connected" (146). As this passage indicates, the creature's appearance prevents Walton from interpreting Victor's story as unsubstantiated madness. By means of his presentation of evidence, *Frankenstein* models an attempt at scientific popularization in an age in which researchers often partnered with the public.

Through the creature's conversation with Walton, Shelley further destabilizes the fixed boundaries dividing experiment and experimenter. Her concluding scene positions Victor as an experimental sample: the creature calls him "the select specimen of all that is worthy of love and admiration among men" (155). The word "specimen" resonates with taxonomic discourse, "selected or regarded as typical of its class" (*OED* sense 4a), and derives from the Latin for "to look." By means of the phrase "among men," however, Shelley also plays on another definition of the term that marks the creature's exclusion: "persons as typical ... of the human species" (sense 5). In a similar way, *Frankenstein* coordinates conscience and natural history when the creature informs Walton that "vice has degraded me beneath the meanest animal" (154). The term "vice" refers as much to moral imperfection as to "physical defect" (sense 5b).

Radically reconfiguring traditional concepts of scientific agency, Shelley portrays a physically uncategorizable being that defies the authority of its genius progenitor. In becoming an experimenter while remaining an experiment, the creature develops a self-reflexive voice that allows him to take control of his creator's research agenda. While Victor expressly dreads that his solitary experiment might "discover himself" (112), the creature self-consciously refers to his "reception" during his first encounters with Victor and the De Lacey (65, 77).

Frankenstein imagines an experiment that develops a life and voice of its own, that involves others and does not end when the scientific genius declares

it a failure. As Kakoudaki contends, Shelley's novel conceptualizes the experiment "as a circular or palindromic process" (292). Her fiction represents all experiments as plural, open-ended cultural processes (rather than one-time events). Moreover, *Frankenstein* intimates that scientists should learn to view themselves as reciprocal experiments, shedding new light on the now familiar critical claim that Victor and the creature are doppelgängers, "the two halves of a divided self" (Brantlinger 64-65).

Allegorizing the history of scientific development, Shelley's fiction shows how Victor's and the creature's apparently antithetical outlooks are finally mutually constitutive. Rewriting the terms of a scientific research program, the creature simultaneously calls into question his maker's authority to determine the experiment and advances a revisionary concept of scientific community. To the extent that *Frankenstein* envisions him as autonomously working to cultivate one of the "happy and excellent natures" (32) that his creator initially imagines, the novel calls to mind the Romantic era's many conversions of failed into successful science. As another potential example of productive scientific failure, her creature confirms the truth of Albert Einstein's claim that "science can progress on the basis of error" (qtd. in Koshland 1261).

Ending the Experiment. Tragically, the creature ultimately decides to sacrifice himself and others. As the novel concludes, he comes to understand himself as an "excluded," inescapably singular experiment whose very existence hurts others (100). As the novel comes to a close, he assures Walton: "Fear not that I shall be the instrument of further mischief.... I shall collect my funeral pile, and consume to ashes this miserable frame, that its remains may afford no light to any curious and unhallowed wretch" (155). Most critical discussions of this episode, including George E. Haggerty's, rightly focus on the pathos of the psychological spectacle that results from the creature's valedictory vacillations between vengeance and self-loathing: "the power of his final suffering is surely superhuman, titanic" (63). What these present-day accounts of the novel's conclusion tend to overlook, however, are the ways in which Shelley's admittedly ambiguous phrasings also intimate that the creature believes his body could spur others to "further" replicate Victor's scientific "mischief." *Frankenstein*'s final scene implies that if the creature were to annihilate the "instrument" of his body, he would destroy the organic blueprint of Victor's singular science and prevent any others from reproducing a second solitary being: "the very remembrance of us both will speedily vanish" (155). Shelley's ending, according to Andrew Burkett, juxtaposes the creature's corporeal, experiential concept of knowledge with Victor's understanding of the body as an information medium (128-29), a contrast that has only become starker in the era of the genetic code.

Through his suicide, Shelley returns us to the ethical vision of the creature's early experiences. She ultimately represents him as being consumed by the element that gave him life: the "spark" that is both electricity and fire. *Frankenstein*'s conclusion suggests that Victor's experimental designs die with the creature. Although the novel's manuscript contains an alternative ending

that leaves open the possibility that he lives on after Victor's death (Mellor, *Monsters* 68), this earlier version still retains the creature's explanation of his plan to immolate himself. In the bleaker published version of the ending to which I attend here, the creature's death results as much from his desire to benefit the public interest as from his realization that the monstrous body that Victor has designed for him will frustrate all future attempts to contact others. Through no fault of his own, humans find his physiognomy appalling. Experiencing solitude as a traumatic rather than sublime state, he is entirely excluded from social and scientific participation; he is forced, for example, to try "to cure" himself after he is shot while saving a life (96). The rhetorical question that he poses near Montanvert resounds throughout the text: "am I not alone, miserably alone?" (66).

Shelley's fiction suggests that the creature might have socialized Victor's scientific genius, but her novel also shows how he cannot establish himself as a scientific fact, for to do so would require others to verify his existence. *Frankenstein* describes a situation in which Victor has constructed an experiment that is impossible to make public, in part because the public has not yet accepted that it is possible for a scientist to animate lifeless matter. The creature's only possible auditor, his creator, remains as intransigent as he is absent. As Stephen Jay Gould demonstrates, Victor refuses to introduce him to others or to frame his entrance into society (61). In addition, he neither names nor classifies his creation. The only individual whom Victor prepares for the creature's appearance is Walton, and even in this instance he provides no positive reference.

Frankenstein, however, also points to the scientific factors motivating Walton's rejection of the creature. Latour's description of the late eighteenth-century exploration ship as an "instrument" (*Science* 218) elucidates how the novel aligns Victor's anti-social experiment with Walton's failed voyage: "discovering a passage near the pole"; "ascertaining the secret of the magnet" (8). As Latour points out, during Shelley's day scientific explorers defined "knowledge as familiarity with events, places and people seen many times over"; the inaugural voyage, by contrast, "disappears without trace" (*Science* 220). Shelley portrays Walton as breaking with the scientific terms of her time—as more preoccupied with making the first trip to "a land surpassing in wonders ... every region hitherto discovered" than with taking the notes that would support subsequent visits (7). Desiring to continue in the heroic tradition of the Arctic explorers of his childhood reading (8), Walton expresses little interest in the cartographical records that Latour links to the development of an increasingly accurate map. Moreover, he neither employs a naturalist nor speaks of collecting specimens. Shelley connects his concept of the voyage (a one-time experience of "wonders") to Victor's conception of the experiment (an enclosed, intoxicating event).

Like Victor, Walton desires to define what counts as science and who counts as a scientist, seeking complete control over his experiment. *Frankenstein* characterizes him as similarly neglecting to consider his collaborators. Despite being an autodidact like the creature, he espouses

privileged and exclusionary models of science and sociability. Overlooking the labor that makes possible his search for the “wondrous power which attracts the needle,” the captain views his sailors as scientific instruments until they force him and Victor to attend to them (7). What Victor calls Walton’s “glorious expedition” famously fails when the crew, “unsupported by ideas of glory and honour,” takes over and redirects the course of the experiment (149–50). By accentuating the active role that a so-called nonscientific community plays in the explorer’s experiment, Shelley sets the stage for Walton’s subsequent meeting with the creature.

To be sure, *Frankenstein* represents Walton’s rebuff of the creature as by no means assured. Although he befriends Victor and calls the mutiny an “injustice,” Walton also writes letters to his sister Margaret Saville and intermittently references heroic service (“hopes of utility and glory” [150]). He notably transcribes Victor’s history, refusing to leave the narrative record “incomplete” (152). In addition, he accurately describes the creature’s speech, “a sound as of a human voice, but hoarser,” before he comes into view, and pauses to experience “a mixture of curiosity and compassion” (152, 153).

Despite these auspicious signs, Walton ultimately acts on Victor’s repeated requests “to undertake my unfinished work”—to end an experiment conducted in “a fit of enthusiastic madness” (151). Shelley’s novel emphasizes how Walton ultimately follows his friend’s biased script rather than his own empirical view. After allowing Victor to review and revise his log—“giving the life and spirit to the conversations he held with his enemy” (146)—Walton condemns the creature’s “diabolical vengeance”; refusing to “raise my looks upon his face,” he calls “to mind what Frankenstein had said” (153–54). In the wake of this final repudiation, the creature accepts that he will never be able to participate in the communities he desires to benefit.

Shelley’s fiction shows that a social being can only remain isolated for so long. *Frankenstein* implies that if Victor had finished the female, the creature would have been the first to observe and assist her, to examine and improve his creator’s science. Expressing his desire to serve as the companion he himself has not had, he instructs Victor to “create a female for me, with whom I can live in the interchange of those sympathies necessary for my being” (98). The creature seeks to fulfill the “necessary” terms of his maker’s initial experiment, the “interchange” of “sympathies.”

Frankenstein’s tragic events anticipate the models of exclusion encompassing present-day science and society. Victor aborts the sole experiment that he allows the creature to observe, tearing apart his potential female interlocutor without consultation.²⁰ Denied direct participation in his creator’s science and excluded from schooling, the creature does not work independently to reproduce the terms of his creation. Prohibited by prejudice from consulting other scientists, he does not try to fashion a companion by himself even though he holds Victor’s lab notes in his pocket, demonstrates an intelligent understanding of scientific practice, witnesses his maker’s partial construction of a female, and enjoys easy access to cemeteries, slaughterhouses, and laboratory equipment. Alone, the creature refuses to try

to “renew life where death had apparently devoted the body to corruption” (32).

In Shelley’s view, the cultivation of socially accountable science requires much more than a lone moral voice, even a virtuous and determined one. Her novel endorses a version of Latour’s claim that only the public can convert an experiment into a fact as “an isolated person builds only dreams, claims, and feelings” (*Science* 41). Although Shelley portrays preconceptions as constraining the creature’s sociable experiments, it is possible that she sought to depict his suicide in such a way as to generate the pathos necessary to move her readers toward a more participatory scientific practice. Attending to the scientific aspects of the creature’s self-destruction brings to light the important role that he plays in defining *Frankenstein*’s final rallying cry for a more inclusive scientific community. Shelley’s farsighted fiction promotes this vision in an age when the scientific revolution had made science truly popular. As scientific methods, discoveries, and protocols became more deeply embedded in the cultural fabric of everyday life, they began to change how ordinary men and women wrote, understood one another, and related to their world. Shelley’s novel reflects the revolutions that science was bringing about in the perceptions and lives of everyday Britons.

As arguably the first work of science fiction, *Frankenstein* also helped to establish the interdisciplinary genre that continues to popularize, inspire, and critique scientific developments to the present day.²¹ Shelley’s foundational text simultaneously stresses the importance of empiricism to the novel’s development and fiction’s ability to shape the practice of science in the real world.²² On the one hand, Percy Shelley’s preface cites Erasmus Darwin, a well-known scientist of the day, to confirm the possibility of Victor’s experiment: “The event on which this fiction is founded has been supposed, by Dr. Darwin, and some of the physiological writers of Germany, as not of impossible occurrence” (5).²³ On the other hand, *Frankenstein* explores the ways in which science fiction not only imagines future technologies but also engages “in anticipatory negotiations of socio-technical contracts” (Conley 256) and defines the “ground on which we can negotiate the criteria for judging science” (Sleigh 24).²⁴ Shelley’s novel takes advantage of how, according to Tita Chico, the British Enlightenment combined an increasing literary awareness of science’s “efficacy and shortcomings” with a new scientific sense of “literary knowledge as an epistemology” (1, 3). Moreover, *Frankenstein* builds on how, according to John Bender, eighteenth-century science and fiction “defined the most accurate representations of reality as those that contextualized empirical, sense-based facts by arraying them in probable explanatory networks” (55).²⁵

Shelley’s depiction of an experimental subject who speaks back to an elite scientist imaginatively expands the concept of scientific community to encompass nature and culture, experiment and experimenter, and scientist and public. Her far-sighted science fiction offers both an ethic of intellectual partnership and a critique of singular science. *Frankenstein*, however, does not envision either the destruction of Victor’s experiment or the creature’s

collaborative empiricism as ever ensuring a fully responsible scientific practice. From Shelley's time to the present, countless intellectually and morally flawed scientific and pseudoscientific movements—from phrenology and eugenics to the appropriations of indigenous maps that Latour describes (*Science* 224)—have won the approval of the scientific community and the public.²⁶ In considering *Frankenstein*, it is necessary to acknowledge the many instances in which specialized and unspecialized communities alike have failed to provide science with an infallible conscience.

Keeping the limits of socially engaged science in mind, we can recognize how Shelley's representation of the creature embraces the progressive principles of critique, testing, and consensus that scientists still advocate today. Seeing through the creature's eyes, we might also better understand how *Frankenstein* inaugurates science fiction's visionary capacity to imagine new sciences and publics, new "possible future selves ... as possible sites for identification" (Vint 20). Through the creature's narrative, Shelley invites us to experience the simultaneous estrangement and cognition that Suvin famously called sf's quintessential generic expression (20). To be sure, Shelley's vision of a more open scientific community—one accounting for plural perspectives and reflecting on its results and materials—aspired to a potentially impossible ideal. Perhaps we should too.

ACKNOWLEDGMENT

I am grateful to colleagues at UCLA, the University of Toronto, and McGill University for their insightful comments on previous versions of this essay.

NOTES

1. Cantor examines how Victor's design overlooks "the interests of his creature" (115); Donawerth associates him with "the exclusion of women from science" (xx); Kakoudaki links him to a "racist epistemology" obsessed with "questions of origin" (296); Mellor sees him as prosecuting a "rape of nature" (*Monsters* 89, 122); Rauch explores his inability to apply "knowledge in the service of society" (*Useful* 110); Sharp discusses how he "desecrates and tortures nature" (33); and Sherwin calls him "a secretly selfish utopian idealist" (895). On genius, solitude, and social status, see Andrew Elfenbein (5) and David Higgins (8-9).

2. On *Frankenstein* and the origins of science fiction, see Aldiss (*Trillion Year* 18, 37). Paul K. Alkon similarly contends that *Frankenstein* inaugurates the genre by discriminating "between natural and supernatural" (1-2). Sf scholars have, however, also often commented on the novel's generic hybridity. On *Frankenstein*, sf, and the Gothic, see Aldiss (*Trillion Year* 16-17) and Roger Luckhurst (38-39). On *Frankenstein*, sf, and travel narrative, see Carl Freedman (50). While Shelley's claim is strong, as Eric Carl Link and Gerry Canavan note, "It sometimes seems that science fiction has as many proposed origin points as it has critics" (1). Drawing on Darko Suvin's influential account, Link and Canavan describe sf as an aesthetic encompassing "some discontinuity with the empirical world" and "a principally post-Enlightenment value system" (7).

3. As Harriet Hustis notes, *Frankenstein* foregrounds the "issue of responsible creativity" (845).

4. While not neglecting Victor's admittedly concrete results and laboratory work, Marilyn Butler sees his scientific practice as derived in part from the cultures of "natural magic and so-called necromancy of the later Middle Ages" (xlv). In addition, Christa Knellwolf (65) and Rauch ("Monstrous" 234) associate the obscure and unsound aspects of his work with the intuitive experiments of several early sixteenth-century alchemists from Cornelius Agrippa to Paracelsus.

5. In 1818 the term "science" could refer broadly to "the state or fact of knowing" or more specifically to "a particular area of knowledge" (*OED*, senses 1a, 3a). This essay considers the latter meaning in the context of Shelley's various experiments. While the word scientist was not introduced into English until 1834, as Aldiss has noted, "the world has adopted *Frankenstein* as the model of the irresponsible scientist" (*Trillion Year* 51). As a result of this pervasive critical and popular anachronism, this paper employs the term to mean what we today *think* "scientist" meant in 1818.

6. Donawerth argues that *Frankenstein* marks the origins of "women's science fiction" (xvii). Roberts contends that the novel creates "a central paradigm for the female science fiction tradition" (20). Sharp traces Shelley's influence on "women writing in the early SF pulps" (34).

7. Attending to the novel's productive failures revises scholarly views of *Frankenstein* as either a series of catastrophes (Sherwin 883) or a "parable about the failure of sympathy" (Marshall 195).

8. Shelley's critique of top-down science conducted *in propria persona* anticipates the insights of actor-network theory, particularly Latour's portrayal of ordinary assemblages as active social entities; nonhuman "actors" come to life "when they are reshuffled" (*Social* 10; emphasis in original, 65).

9. *Frankenstein* foreshadows the Victorian discourse of scientific objectivity that, according to Daston and Peter Galison, replaced "natural regularities" and idealized types with aberrant natures and "knowledge that bears no trace of the knower" (17, 67). By the Victorian era, "the power to observe accurately becomes a moral as well as an epistemological virtue" (Levine 5).

10. Feminist science comprehends material and affective forms of knowledge, including "emotionally demanding labor," "reproduction," and "shared experience of oppression" (Rose 83, 88). Shelley's depiction of the creature resonates with both Keller's "dynamic objectivity," an "other-centered" perspective putting "subjective experience" into the service of "a more effective objectivity" (*Gender and Science* 117-18), and Sandra Harding's "strong objectivity," a capacious empiricism accounting for the various standpoints bearing on any single experiment or event (142). On the Romantic era and the rise of disciplinary boundaries, including the divide between a so-called subjective literature and objective science, see Sharon Ruston (10, 27).

11. Shelley's expansive idea of scientific community resonates with Jane Bennett's "theory of action that more explicitly accepts nonhuman bodies as members of a public" (103) and Noortje Marres's account of "material publics" and "the role of things in the enactment of public participation" (xv, 9).

12. As Rauch points out, Victor subverts science by subverting "narrative"; he spurns "the central tenets of scientific practice: application, dissemination, or exchange" ("Monstrous" 233).

13. On the eighteenth-century emergence of an accessible "public science" encompassing readers and auditors, see Larry Stewart (xvi). On Romantic sociability and scientific community, see Jon Mee (38). On "scientific knowledge as social knowledge," see Helen E. Longino (15).

14. As Schaffer explains, scientific genius is not anti-social by definition; the potency of genius was also tied to the “dangerous collectivization” of Romantic radical societies (“Genius” 85-88).

15. Shelley stresses the tragic results of the creature’s repudiation but declines to depict him as a guiltless innocent. On the adverse effects of his “reaching out for sympathy,” see Cantor (125).

16. On Shelley, Darwin, and the origins of sf, see Aldiss (*Trillion Year* 29-32) and Luckhurst (39).

17. As Bewell notes, Shelley read Buffon’s *Natural History* “while writing *Frankenstein*” (125).

18. By means of the creature’s descriptions of spring—“arts of cultivation”; “enchanting appearance of nature” (77)—Shelley evokes Darwin’s description of “the botanic garden” as a metaphorical “Camera Obscura” magnifying an “Enchanted Garden” (vii-viii). Goldstein’s “Libertine Botany” drew my attention to this passage.

19. Graeme Gooday explores the “networked” nature of the nineteenth-century laboratory (784-86). Latour examines the communal nature of present-day laboratory work (*Modern* 21).

20. *Frankenstein* calls into question whether Victor can in fact create a female. As Rauch observes, he also does not try to reanimate “the individuals whom he supposedly loves” (*Useful* 112).

21. On sf’s origins and the nineteenth-century “popularization of science,” see Terry Harpold (51).

22. As George Levine states, “Scientific epistemology” is “always based in narrative” (42).

23. Percy Shelley’s preface aligns the novel’s “cold and rainy” origins in fireside Genevan ghost stories with Mary’s depiction of the creature’s “strange” alpine tale told “by the fire” during “cold” and “rain” (6, 67).

24. On *Frankenstein* and debates about “assisted reproductive technologies,” see Conley (245). On the creature’s “self-consciously political view” and the idea of “the artificial person,” see Kakoudaki (289, 297). On Shelley’s influence on later sf critiques of “mad science,” see Sharp (33).

25. On the “Romantics’ hybridization of scientific and literary experimentalism,” see Mitchell (4).

26. On the creature and race, see Debbie Lee (171), H.L. Malchow (9-40), Mellor (“Racial” 2), and Gayatri Chakravorty Spivak (28).

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ABSTRACT

Victor Frankenstein fails in his profession because he consistently contravenes three basic tenets of scientific community: observation, repetition, and transparency. Critics of *Frankenstein* have generally failed to recognize the socially responsible scientific values that Shelley attempts to define through the character of the creature. This article argues that Shelley's novel puts forward the idea of socially responsible science: cooperative forms of experimentation that reimagine the scientist's materials and instruments as agents, involve multiple points of view, and pursue mutually beneficial discoveries. Shelley depicts the creature's trial-and-error tests as the natural and instinctual antithesis of Victor's unnatural and artificial laboratory work; the creature's empiricism satisfies needs and solves specific human problems. Shelley's farsighted fiction promotes this vision in an age when the scientific revolution had made science truly popular. Her fictional experiments with the idea of socially responsible science enable us to read *Frankenstein* as a work of science fiction that offers both a utopian ethic of intellectual partnership and a critique of singular science. If Shelley's vision of a more open and reflective scientific community aspired to a potentially impossible ideal, it is one toward which she thought her age should aspire.