

Kathleen Swain

Professor Lussier

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Science and Shelley: A Physical Reading of Percy Shelley's "The Sensitive Plant"

Despite much popular opinion, an acquaintance with modern literary criticism dispels any notions that Romantic-era poets were unquestionably anti-science. A closer reading of works by those such as Blake, Coleridge, and Shelley reveals nuances allied with anti-Newtonian criticism of Enlightenment strictures, but even this interpretation undermines the vast scientific influence present in these authors' works. In particular, Percy Bysshe Shelley's poems exhibit a significant range of contemporary scientific thought; as Matthew C. Borushko points out, Shelley had an "enthusiasm for the sciences of the day," and believed that "science, moral philosophy, and poetry" were necessary reactants for social change (1). As Shelley is an openly scientific Romantic-era poet, several literary criticisms have revolved around this subject in the context of Shelley's life and verse, varying in topics from botany and geology to physics. Little has been said about his four-part 1820 poem "The Sensitive Plant," however, though this poem vibrates with the spirit of science from its fanciful botany of a "garden in perfect prime" to the entropic echoes in its decay (Shelley 40). More specifically, a physical reading of Shelley's poem exposes innerworkings that parallel the complexity of modern physics. By creating a world in which time is relative and reality uncertain, Shelley subverts Newtonian notions of determinism and displays the intersection between literature and science.

Shelley's connection to science is both general, and implicit in "The Sensitive Plant." As Ted Underwood notes, Carl Grabo's 1930 publication *Newton Among Poets* provides the

argument “that many of Shelley’s images were modeled on the science of his time” (299). In fact, Shelley had an intense interest in science and a wide range of contemporary scientific knowledge (Borushko 2-3). Given Shelley’s background, many critics maintain that this interest informed his poetry as well—Underwood writes that Shelley sought “to incorporate scientific knowledge into poetry,” and Sophie Laniel asserts that “Shelley had always seen the scientific discourse of his time as a source of metaphors to express the nature of poetic creation,” (308; 74). Such criticism clearly demonstrates the link between Shelley’s poetry and science. This not only undermines the idea that Romantic poets uniformly opposed science, but also weakens impressions of an inherently diametric relationship between literature and science, a point of view that C.P. Snow exemplifies in his “Two Cultures” lecture. Academic literature supports, rather, Shelley’s creative intimacy with science, a view that “The Sensitive Plant” upholds.

In his poem, Shelley most obviously unites science and poetry through botany. The first part of “The Sensitive Plant” takes its inspiration from Erasmus Darwin’s long poem *The Botanic Garden*, with its list of personified plants that Shelley catalogs in a vaguely Linnaean manner (Bailes 225). In this “garden in perfect prime” there are snowdrops, violets, “pied wind-flowers and the tulip tall,” “the Naiad-like lily of the vale,” and “the rose like a nymph” (40, 13, 17, 21, 29). Shelley’s botanically diverse display has “rare blossoms from every clime,” but the most important inhabitant is the “Sensitive Plant” that oversees the mélange of sights, sounds, and smells (40, 1). Not only does this poem contain a wealth of empirical observations on the part of the observer and this central plant, but the plant’s identity itself reveals a connection to contemporary science. As Melissa Bailes notes, the “Sensitive Plant” is of “the species perhaps most central to the era’s investigations into vegetable movement, the *Mimosa pudica*, a Brazilian plant that closes and recoils its leaves when touched” (223-224). Shelley’s

inclusion of the scientific plant-du-jour in his poem substantiates the idea that he intended to build interdisciplinary analogies. Even in the latter half of the poem, when the angelic caretaker dies and takes the garden's vitality with her, Shelley continues to describe the now-wicked botany of the garden in similarly empirical terms, writing of flowers overrun by "thistles, and nettles, and darnels rank," and "agarics, and fungi, with mildew and mould" (228, 236). On the botanical side of natural philosophy, then, Shelley does not shy away from including scientific imagery and patterns in his verse.

The scientific conservatism apparent in Shelly's style and theme runs aground, however, in his poem's conclusion. Suddenly the garden's natural decay transforms into metaphysical uncertainty as Shelley urges readers to believe that the "garden sweet, [and] that lady fair... / In truth have never passed away" (304, 306). Superficially, this abrupt change of heart strikes against the predictability and empiricism present in contemporary conceptions of science, and vehemently denies the hegemony of Newtonianism. In just a few lines, Shelly seems to topple the placid scientific foundation that he builds upon in the majority of the poem, playing into what many construe as the Romantics' anti-science tendencies. This judgement is only obvious from within a classical scientific framework, however. The poem's temporal shift implies the denial of a mechanical universe ruled by determinism, but this opinion is not explicitly anti-scientific when viewed from a modern perspective. While it may be anti-Newtonian, the alternative worldview that Shelley promotes in the conclusion complements later physics, particularly quantum mechanics, retrospectively aligning with modern scientific discoveries.

Physics-based readings of Shelley's poetry are not new. In "All Shapes of Light: The Quantum Mechanical Shelley," Arkady Plotnitsky analyzes Shelley's poem "The Triumph of Life" through the lens of quantum physics, arguing that "Shelley's interest[s] in science,

especially optics and atomic theory...were brought together by quantum physics a century later” (263). Similarly, Laniel turns to wave dynamics in Shelley’s poetry, and Mark Lussier argues that Shelley’s “images, his imagination, are better read from within current physical models” (142). “The Sensitive Plant” is not, however, a part of these physical analyses, though it fits within this perspective. To encounter a physical rendering of this poem, we must first turn to its temporal aspects. On a surface level, Shelley binds his poem thematically to the experience of time and the incessant passing of it, as daily and seasonal changes anchor the poem in cycles and rhythm. Consider the first stanza:

A Sensitive Plant in a garden grew,
 And the young winds fed it with silver dew,
 And it opened its fan-like leaves to the light.
 And closed them beneath the kisses of night. (Shelley 1-4)

Here, “light” and “night” establish the cyclical rhythm of a day. As the plant opens and closes its leaves, it marks the passing of time from day into darkness. Even the words “grew” and “young” indicate a temporal consciousness. The repetition of the word “And” also gives the plant’s actions a steady rhythm that partitions the plant’s life: young and old; nascent and growing; open and closed; day and night. Shelley brings specific attention to the theme of time by beginning the poem with such connotations. As main subjects of the poem, the plants themselves also communicate this theme. Bailes writes that the 18th and early 19th-century trend of using plants to tell time—the popular “Floral clock”—created an association between plants and the rhythm of days and seasons that Shelley exploits in his poem (228). The rhythm inherent in poetry also gives the poem a natural sense of time. In *Philosophy of the Inductive Sciences*, William Whewell argues that the “repetition of similar elements” in poetry is “essential in order to

impress upon us [a] measured progress of time” (255). Shelley’s theme of time therefore intensifies his poem’s fundamental rhythm.

Shelley continues to build upon this theme as the poem travels from morning, where “The unseen clouds of the dew...lie / Like fire in the flowers till the sun rides high,” to “noontide,” with its “quivering vapours,” to evening, when “the Earth was all rest,” and finally to night, when everything living is “drowned / In an ocean of dreams without a sound” (86-87, 90, 99, 102-103). As the poem moves through these various states in part 1, time is a constant presence marking the changes. Even when the “Eve in this Eden” enters in part 2 and reveals the garden as a Paradisiacal heaven apart from ordinary reality, time remains (Shelley 116). This “Lady” obeys the rules of time as she “Tended the garden from morn to even” (Shelley 119, 123). Even her being personifies time: “You might hear by the heaving of her breast, / That the coming and going of the wind / Brought pleasure there and left passion behind” (Shelley 136-138). Here, Shelley signifies that no matter how Eve-like or angelic her presence, the woman is still subject to the steady rhythm of time marked by her breathing, the movements of the wind, and the temporal associations behind the actions of bringing and leaving. Shelley then marks her sudden death with a simple exclamation—“she died!”—thus cementing her mortality, an inescapable fact bound to time (174).

Though the lady’s death is abrupt, Shelley persists in giving the reader a sense of time as we know and perceive it when the garden decays in part 3. “Three days” and then a “fourth” mark the intervening time until her funeral, and then the days continue with ordinary monotony (Shelley 175, 179). These days are changed, as “frost in the mist of the morning rode,” but they still count out morning, noon, and night (Shelley 196-199). Plants die and fall, “leaf by leaf, day after day,” and “hour by hour... / vapours arose” (Shelley 206, 244-45). The repetition of “leaf,”

“day,” and “hour” confirms the plodding, rhythmic nature of time, even in the midst of tragedy. In the end, though the garden falls from the beauty of spring and into the death of autumn and winter, “Spring came back” (Shelley 284). This is time as we know it, perceived by the ever-turning cycles of day, night, and seasons, and by the end of part 3 the poem remarks despairingly upon the inevitability of time. Something strange happens in the conclusion, however. Suddenly Shelley flies into a realm of metaphysical uncertainty, tossing out the idea of time as we know it and introducing the daring idea that:

That garden sweet, that lady fair,
 And all sweet shapes and odours there,
 In truth have never passed away:
 ‘Tis we, ‘tis ours, are changed; not they. (304-307)

After the steady rhythm and cycles of the first three parts of the poem, Shelley’s daring remarks (told, no less, in a conclusion that is of 6 stanzas, much shorter and more abrupt than part 1-3’s respective 28, 15, and 28 stanzas) unsettle and put back into question all that he has seemingly elucidated in the previous sections. Time is no longer absolute; instead, it is relative.

When speaking of time perception, Albert Einstein and his theories of relativity come to mind. Einstein describes in *Relativity: The Special and General Theory* that time does not flow as a Newtonian absolute; as he states, “[e]very reference-body...has its own particular time; unless we are told the reference-body to which the statement of time refers, there is no meaning in a statement of the time of an event” (32). Put more simply by Stephen Hawking in *A Brief History of Time*, the theories of relativity show that “there is no unique absolute time, but instead each individual has his own personal measure of time that depends on where he is and how he is moving” (34). In the context of “The Sensitive Plant,” relativity possibly explains why the

garden and everything in it are unchanged—Shelley undermines the idea that time passes in only one way by suggesting an outcome that deviates from our usual perception. The suddenness of Shelley’s final image resists the Newtonian idea that time is an absolute condition exclusive of our senses. As we see time from the general perspective, as depicted in parts 1-3 of the poem, the lady passes away and the garden falls into disrepair, but from an alternative perspective the lady and the garden are not gone. From this view, time does not pass in the manner that we are used to, but instead accommodates a viewpoint in which the lady and the garden linger beyond the limits of temporal rhythm as experienced by humans.

The passage of time present in Shelley’s poem also represents another physics concept: entropy. As formalized by the second law of thermodynamics, the disorder (entropy) “of an isolated system always increases” (Hawking 106). This idea of increasing disarray signifies parts 1-3 of “The Sensitive Plant.” The garden begins with every plant in its place, creating an “undefiled Paradise” (Shelley 58). In this prelapsarian state, the garden exemplifies beauty and “the Spirit of Love” (Shelley 6). Part 2 of the poem, however, reveals the necessity of entropy. The lady of the garden is a “Power,” working to keep the plants fed with “bright water from the stream,” propping the flowers up “tenderly” and removing pests with “gentle hands” (Shelley 115, 146, 154, 160). Though she has power, the entropic key to her actions is that they require *work*. As James Clerk Maxwell puts it, in our universe ruled by the second law of thermodynamics, order cannot be created “without the expenditure of work” (72). The fact that the lady must labor over the garden to make it Edenic shows that she, too, is not exempt from the law of entropy.

Shelley most clearly represents entropy, however, in the garden’s demise. After the lady dies—another indication of entropy—the garden falls into disrepair. As Shelley writes, “The

garden, once fair, became cold and foul, / Like the corpse of her who had been its soul” (191-92). Without her input of work, the garden cannot sustain its idyllic charm. Plants die and leaves fall, things become “rotted,” and the “eddies” in the river aimlessly move water plants “here and there” (Shelley 215, 218). What was once a place of beauty and order transforms into a chaos of weeds, but even these weeds cannot escape entropy as they too, “forms of living death / Fled from the frost to the earth beneath” (Shelley 268-69). Shelley’s depiction of entropy also reaches towards the bigger picture, hinting at the fate of the universe. As the garden decays, life doesn’t just fall into chaos and ruin, it also fades away into oblivion. For example, Shelley writes that “The sap shrank to the root through every pore / As blood to a heart that will beat no more” (258-59). This description echoes what William Thomson, Lord Kelvin proposes as the heat death of the universe, where entropy leads to a “cessation of motion and exhaustion of potential energy through the material universe...[t]he result [being] a state of universal rest and death” (60). In this view of the universe’s future, everything will fall into ultimate chaos and time will cease to exist as a relevant concept. In Shelley’s poem, the comparison of the tree’s vascular system to a heart once again suggests the concept of time as measured by rhythm, this time the rhythm of a heartbeat. As the trees in the garden die, the beat will stop, the sap will sink, and the world turns to a cold death where chaos is infinite, and time is no longer.

As with the general theme of time in the poem, however, Shelley questions this cold fate of the universe in his conclusion. Though he initially leads readers to the resolution that the garden and the lady have assuredly died, Shelley invokes their images again in the conclusion. This turns readers’ eyes back to the beginning of the poem, suggesting a larger cycle beyond quotidian days and seasons. If these objects “have never passed away,” then how may we view this new universe (Shelley 306)? Interestingly, Shelley’s idea of a larger cyclicity aligns with

more recent ideas in theoretical physics, particularly Hawking's "no boundary" universe (142-46). As Hawking says of his proposal that shapes the universe crudely similar to a globe, "if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be" (146). Shelley's ideas in the conclusion of his poem tantalizingly parallel this. He claims that "For love, and beauty, and delight, / There is no death nor change" (Shelley 308-309). As with the no boundary proposal, Shelley warps ideas of finite time and finite space. Death loses meaning, and so does change. In this version of Shelley's universe, things don't begin, nor do they end: they simply are. Especially intriguing, this connection deviates from classical physical conceptions of the universe, entering into the strange world of quantum mechanics. Hawking used quantum ideas to explore his no boundary proposal; so too does Shelley's proposal of an eternal garden lead away from Newtonian determinism and into a world of uncertainty and flexibility.

One of the key tenets of quantum physics is this idea of uncertainty, a concept that Shelly highlights in his poem through its conclusion. Shelley begins the conclusion by asking if the sensitive plant and the lady know of the decay that occurs. He writes:

Whether the Sensitive Plant, or that
Which within its boughs like a Spirit sat,
Ere its outward form has known decay,
Now felt this change, I cannot say.

Whether that Lady's gentle mind[...]
Found sadness, where it left delight,

I dare not guess. (Shelley 288-292, 295-296)

By questioning the status of the plant and the lady after their decay and death, Shelley necessarily brings a form of indeterminacy into his work. This connects to the core ideas of quantum mechanics which pivot around “the uncertainty principle,” a proposal that suggests particles exist in “a quantum state” where position and velocity are fluidly probabilistic (Hawking 57). The uncertain state of the lady’s and sensitive plant’s consciousnesses, then, participate in a universe “Where nothing is, but all things seem” (Shelley 298). Shelley’s further insistence that the lady and the objects of the garden have both passed away and yet live continues this idea of an uncertain universe, paralleling Erwin Schrödinger’s famous thought experiment. Just as Schrödinger’s cat is both dead and alive in its pre-entanglement quantum state, so too is Shelley’s garden both immortal and decayed (Halpern 11-12).

Schrödinger and Werner Heisenberg’s ideas of uncertainty also connect to two other specific instances in Shelley’s poem. Though the sensitive plant withers into “a leafless wreck,” Shelley never specifies—even in this more straightforward, entropically-bound, classical conception of reality—whether the plant dies (Shelley 285). The sensitive plant certainly decays and exists as a faint version of its former vital state, but Shelley does not explicitly state that it has passed away. By doing this, Shelley adds a layer of uncertainty to his poem. Another more subtle reference to uncertainty lies within Shelley’s mentioning “many an antenatal tomb, / Where butterflies dream of the life to come” (167-168). These pupae in the liminality of metamorphosis exemplify the idea of a Schrödinger thought-experiment-like state. In their cocoons, these creatures live as both butterfly and caterpillar, and yet are neither as their bodies dissolve and re-form. Shelley’s choice to mention chrysalises in his poem brings to mind an existential uncertainty, increasing tension and foreshadowing the garden’s future state.

The idea of quantum uncertainty also factors into the way Shelley ends his poem. He claims that, of “love, and beauty, and delight,” we cannot fully know: “their might / Exceeds our organs, which endure / No light, being themselves obscure” (Shelley 308, 309-311). This is Heisenberg’s uncertainty principle applied to moral and aesthetic means; the limits of our measurements disallow us from comprehending the true nature of reality (Hawking 56-57). Our instruments don’t allow us to penetrate and holistically understand the quantum realm, just as our dim senses “obscure” a recognition of certain immortal properties in their fluctuating and/or dual state. This has larger implications as well, as it indicates both a failure of empiricism and a failure of classical physics to describe the full picture of reality. There is also the alternative, more controversial view that determinism may exist, but we have not yet found these “hidden variables,” or the view that “each quantum observation...involve[s] a branching of reality into myriad parallel paths” and many worlds (Logan 210; Halpern 173). In light of Shelley’s poem, the “many worlds” hypothesis implies a failure within ourselves—a failure of our human nature to understand reality beyond what we immediately see. In this case, Shelley’s garden and its caretaker may indeed exist in two states, both alive and dead; we simply cannot rely upon our senses to see the two worlds simultaneously.

Shelley also incorporates indeterminacy into his poem through the uncertain ontological status of the sensitive plant itself. This connects to Niels Bohr’s notion of complementarity, where light and electrons act as both a “wave and [a] particle,” as the sensitive plant’s status parallels this (Logan 208). As Richard S. Caldwell writes, the *Mimosa pudica* “was given the name ‘sensitive plant’ because of its peculiar sensitivity to external stimuli, a trait which made of it a symbolic hybrid between the vegetable and animal worlds” (221). In this, the sensitive plant “is a borderline phenomenon, possessing the attributes of two different realms” (Caldwell 222).

Just as Bohr states that light is both a wave and a particle, so too is the sensitive plant both an animal (or, more generally, a sentient being) *and* a plant. The sensitive plant grows and remains sessile, but it also “trembled and panted with bliss,” “Felt the sound of the funeral chant,” and “wept” just as an animate being does (Shelley 9, 180, 253). Shelley never resolves this dissonance; just as Bohr states that we must accept complementarity, Shelley leaves readers to endure the duality of the sensitive plant’s being. As well, the strangely participatory nature of the sensitive plant brings additional connotations of the quantum to the poem. Shelley transforms a plant, something that usually does not react so readily to its environment, into a conscious participant. This suggests a universal connectedness that echoes Schrödinger’s uncertainty and the idea of entanglement (Halpern 11-12).

Now that this analysis has expressed the physical, including quantum, facets of “The Sensitive Plant,” a question arises: What do all of these connections tell us about the larger picture of Shelley and his poem? First, there is a disclaimer. This analysis does not suggest that Shelley literally had these physics ideas in mind when he wrote his poem. While Shelley was quite aware of contemporary natural philosophy and even knew about Thomas Young’s famous 1802 double-slit experiment, no evidence implies that Shelley prophesied modern physics in anything more than an abstract sense (Laniel 81-82). This being said, Shelley may have intentionally tried to destabilize the philosophical tenets of his contemporary science. Laniel writes that Shelley “subverts scientific discourse in order to serve poetic ends” (82). As well, Underwood writes that Shelley’s own words suggest his belief “that the scientific ideas he borrowed were already informed by poetic imagination” (308). This extrapolates to the idea that Shelley purposefully searched for philosophical viewpoints of reality that rejected the rigidity of Newtonianism. Given Shelley’s interest in science and his specific aim to unite “science, moral

philosophy, and poetry” portraying him as anti-science is unfair (Borushko 1). Rather than trying to overthrow science, Shelley questions the dominance of determinism, positivism, and empiricism. By saturating “The Sensitive Plant” with uncertainty, he provides a platform for scientific and philosophical alternatives to the contemporary standard view. The result hinges upon time, perception, uncertainty, and complementarity—it just so happens that Shelley’s ideas align quite well with modern physics.

This analysis hopefully shows the benefit of interpreting Shelley’s poetry in a new scientific light. Others have successfully accomplished this, and including “The Sensitive Plant” in this conversation expands the range that scientific and physical criticism of texts offers. By re-evaluating these texts, we keep them alive in our cultural consciousness, and through well-informed extrapolation new depths of meaning are sought, and new connections forged. Such interpretation also has the benefit of uprooting the dangerous assumption that literature and science represent inherently disparate positions. Though Snow argues persuasively for such a divide with his “two cultures” proposition, this attitude ignores the subjects’ historical and philosophical entwinement. As this analysis of Shelley’s poem shows, science can be very relevant to literature, and by continuing such criticism we may close the gap between these two areas of knowledge and uncover new and important epistemic questions. With this being said, there exists the slight possibility that Shelley’s unintentional prophecy of modern physics reveals an innate “quantumness” to the universe that Shelley detected in his poetic experience of reality. Though this idea is highly speculative, it still shows the importance of avoiding knee-jerk reactions that portray Romantic poets as anti-science. By attempting to understand the world holistically, Shelley creates a poem that resonates beyond its time and place. Though we may be

just “the shadows of the dream,” there is yet hope that we may one day understand reality beyond our tiny fraction of existence (Shelley 299).

Works Cited

- Bailes, Melissa. "Linnaeus's botanical clocks: Chronobiological mechanisms in the scientific poetry of Erasmus Darwin, Charlotte Smith, and Felicia Hemans." *Studies in Romanticism*, vol. 56, no. 2, 2017, pp. 223-252. *Gale Literature Resource Center*, link.gale.com/apps/doc/A507966045/LitRC?u=asuniv&sid=LitRC&xid=ae00af71. Accessed 27 Sept. 2020.
- Borushko, Matthew C. "Percy Bysshe Shelley and the Sciences." *Literature Compass*, vol. 2, 2005, pp. 1-6. *Wiley Online Library*, doi-org.ezproxy1.lib.asu.edu/10.1111/j.1741-4113.2005.00205.x. Accessed 27 Sept. 2020.
- Caldwell, Richard S. "'The Sensitive Plant' as Original Fantasy." *Studies in Romanticism*, vol. 15, no. 2, 1976, pp. 221-252. *JSTOR*, www.jstor.org/stable/25600009. Accessed 29 Sept. 2020.
- Einstein, Albert. *Relativity: The Special and General Theory*. Translated by Robert W. Lawson, M.Sc., digital edition edited by José Menéndez, Henry Holt and Company, 1920. www.f.waseda.jp/sidoli/Einstein_Relativity.pdf. Accessed 25 Sept. 2020.
- Halpern, Paul. *Einstein's Dice and Schrödinger's Cat: How Two Great Minds Battled Quantum Randomness to Create a Unified Theory of Physics*. Basic Books, 2015. *ProQuest Ebook Central*, ebookcentral-proquest-com.ezproxy1.lib.asu.edu/lib/asulib-ebooks/detail.action?docID=1948796. Accessed 2 Oct. 2020.
- Hawking, Stephen. *A Brief History of Time*. Bantam Books, 2017.
- Laniel, Sophie. "The Anatomy of Light: Astronomy, Optics and Wave Dynamics in Percy B. Shelley's *Epipsychidion* and *The Triumph of Life*." *Études Anglaises*, vol. 63, no. 1, 2010,

- pp. 73-87. *ProQuest*, login.ezproxy1.lib.asu.edu/login?url=https://www-proquest-com.ezproxy1.lib.asu.edu/docview/734767014?accountid=4485. Accessed 27 Sept. 2020.
- Logan, Robert K. *The Poetry of Physics and the Physics of Poetry*. World Scientific Publishing Company, 2010. *ProQuest Ebook Central*, ebookcentral-proquest-com.ezproxy1.lib.asu.edu/lib/asulib-ebooks/detail.action?docID=731298. Accessed 1 Oct. 2020.
- Lussier, Mark. "The Rhythmic Universe, or Spatial Dynamics in Shelley's Poetics." *Romantic Dynamics*, Palgrave MacMillan, 2000, pp. 136-164.
- Maxwell, James Clerk. "From *Theory of Heat*." *Literature and Science in the Nineteenth Century*, edited by Laura Otis, Oxford UP, 2002, pp. 70-73.
- Plotnitsky, Arkady. "All Shapes of Light: The Quantum Mechanical Shelley." *Shelley: Poet and Legislator of the World*, edited by Stuart Curran and Betty Bennett, Johns Hopkins University Press, 1995. web.ics.purdue.edu/~plotnits/PDFs/All%20Shapes.pdf. Accessed 27 Sept. 2020.
- Shelley, Percy Bysshe. "The Sensitive Plant." *Kalliope*, 2020. kalliope.org/en/text/shelley2003060601. Accessed 31 Aug. 2020.
- Snow, C.P. "The Two Cultures." *Leonardo*, vol. 23, no. 2/3, 1990, pp. 169-173. classes.dma.ucla.edu/Spring07/9-1/_pdf/1-snow_the-two-cultures.pdf. Accessed 19 Aug. 2020.
- Thomson, William Lord Kelvin. "On the Age of the Sun's Heat." *Literature and Science in the Nineteenth Century*, edited by Laura Otis, Oxford UP, 2002, pp. 60-63.
- Underwood, Ted. "The science in Shelley's Theory of poetry." *Modern Language Quarterly*, vol. 58, issue 3, 1997, pp. 299-311. *Gale Literature Resource Center*,

link.gale.com/apps/doc/A20423118/LitRC?u=asuniv&sid=LitRC&xid=5e315d7e.

Accessed 27 Sept. 2020.

Whewell, William. "From *Philosophy of the Inductive Sciences*." *Literature and Science in the Nineteenth Century*, edited by Laura Otis, Oxford UP, 2002, pp. 252-255.