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**Characters as Fields: Michael Faraday, Electromagnetism, and
Charles Dickens's *Bleak House***

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"We're each of us made up of some cluster of appurtenances," says Madame Merle in *The Portrait of a Lady* (1881), "What shall we call our 'self'? Where does it begin? where does it end? It overflows into everything that belongs to us - and then it flows back again" (James 191). Similarly, Thomas Hardy in *The Return of a Native* (1878) considers a personality's "extended mind" with an analogy that suggests how unbounded discursive and material characters are: "persons with any weight of character carry, like planets, their atmospheres along with them in their orbits" (36). Or should we simply doubt - as Dorothea of *Middlemarch* (1871) wonders about Mr. Casaubon - whether the "centre of self" functions with "the solidity of objects" (Eliot, *Middlemarch* 176)?

I propose that one way to understand the Victorian realists' description of character boundaries begins with Charles Dickens's interest in the abstract physics of objects and space, particularly Michael Faraday's field theory. In discovering a mutual relationship between electricity and magnetism in the 1830s, Faraday theorized a unified, boundaryless system in which electricity and magnetism produced mutually converting fields. Faraday then posited in papers of the 1840s that space does not consist of discrete particles, but rather convertible forces, concentrated at various centers and yet extending throughout space. Unlike his predecessor William Whewell or successors John Tyndall and James Clerk Maxwell, Faraday does not suggest ether, or any other substance, as an intermediary (Alexander 24-26). Rather than a simplified or "superfluous" substance, Faraday imagines the field of force *as* space (Crossland 7).¹ Dickens read, engaged with, and was potentially influenced by Faraday's ideas; the two authors wrote in an overlapping periodical culture. Applying Faraday's paradigm-shifting field theory to the character system of *Bleak House*, I argue for an unbounded conception of characters awash in, and consisting of, competing fields of force. Unbounded characters extend beyond the boundaries of skin to influence other

characters at distances: think gravity-fields rather than network-nodes. Characters-as-fields further reveals the latent tension between the disciplinary individual and interconnected selves.

The application of nineteenth-century scientific models, like the extended object of Faraday's fields, to interpret the Victorian novel includes a line of recent scholars, such as Isobel Armstrong, Adelene Buckland, Barri Gold, Anna Henchman, Alice Jenkins, and Caroline Levine, not to mention this tradition's progenitor Gillian Beer. But despite the outpouring of scientifically-minded literary criticism, especially in terms of thermodynamics and energy science, there has surprisingly not yet been an extended application of Faraday's enduring field theory given that theory's importance in reshaping Victorian and modern life. While the application of the electromagnetic field to the novel has been suggested, no extensive contextualization or thorough close reading has been undertaken.² As I hope to show, electromagnetic fields afford significant advantages for conceptualizing character, affordances that differ from the network model, most famously described by Bruno Latour and Caroline Levine. Field theory moves from the points and lines of a network to a more atmospheric influence such as Chancery's atmosphere ("fog everywhere"), Tulkinghorn's omniscience ("cognisient of everything"), or even Mrs. Pardiggle's gravitational pull ("little vortex in the confined room") (722, 133).³ These half-metaphorical, half-literal forces act less as point-like nodes, but rather extend beyond the bounded, physical body. Field theory further suggests the more precise dynamics of how forces, rather than point-like characters or objects, relate. It's not just that the post-office and train station are located in the same building as in network theory, but rather in field theory one set of connections induces via motion the other: electric currents produce a magnetic field. And because Faraday's fields theorize no difference between matter and force, they lead to a conception of characters less interested in the border of the individual than how they are constituted by competing external circumstances.

Field theory provides further insight in the politics of the Victorian novel. Dickens's novels in particular hold the contradictions between a belief in efficient liberal intuitions and disgust at their biopolitical project of neglect. Especially in the 1850s, Dickens foregrounds the latter in *Bleak House's* Chancery, *A Tale of Two Cities's* state departments, and *Little Dorrit's* circumlocution office. Bureaucratic institutions reliant on social science regulations fail to contain (often intentionally) Dickens's multitude, and they expose the state's interest less in the individual than the system. Such a biopolitical concern with demography - in contrast to a disciplinary concern with individuality - leaves traces on the Victorian novel, as scholars including S. Pearl Brilmyer, Emily Steinlight, and Michael Tondre have noted. Bringing field theory to bear on the Victorian novel's political imagination leads to questions like: What does it mean for me to think of myself, or for readers to think of characters, not as liberal individuals (even richly interconnected and contingent ones), and more as a part of a field of forces?

In order to understand the political questions brought by field theory, this article will first explore mid-nineteenth-century electromagnetic field theory in more detail. Specifically, that exercise entails a more extensive explanation of field theory in the context of Faraday's writing, followed by a brief discussion of how Faraday's ideas shared a readership with and potentially influenced Dickens. This history of physics lays the groundwork for field-theory-based interpretations of peripatetic secondary characters (Richard Carstone, Miss Flite) and *Bleak House's* pivotal mother-daughter plot. I offer Faraday's conception of field theory - a theory well known to Dickens and other novelists - as an alternative framework to the novel as not simply creating and

perpetuating the conception of the bourgeois liberal subject. Rather than the bounded individual with their interior life moving along in vacant space, Faraday's field reconceive characters as fields of force.

Faraday, Dickens, & Electromagnetism

Though seldom considered together, Dickens and Faraday have much in common. Both men rose from economic precarity to upper-middle class comfort through intellectual work. They benefited personally, financially, and reputationally from a disciplined professional sphere, and so in their work they reached toward systemic order - Dickens with character networks, Faraday with field theory - while, at the same time, they were haunted by precarious childhoods and the failures of Victorian efforts to organize society. While Dickens grew up in a downwardly mobile household, Faraday's family moved upward, part of a peasant Westmorland migration into London's working class - Faraday's father was under the constant "dread of being committed to a debtor's prison" but never was (Forbes and Mahon 20). Faraday first apprenticed with a bookbinder, then leveraged those skills to become the janitor in Humphrey Davy's Royal Institution - a popular alternative to the aristocratic Royal Society - and finally ended his career as that institution's chief lecturer and director. Both men were relative outsiders, ascending from near poverty with relentless effort; as a Sandemanian, Faraday remained a religious outsider as well. But Faraday's early experience with increasing fortunes versus Dickens's family's fall likely led Faraday to express greater trust in the scientific and political establishment, though both bought into an ethos of individualism.

Not only did the two men's lives unfold in parallel, they corresponded at the height of their careers. As scholars have noted, in May 1850 Dickens wrote that he would be "exceedingly glad" if Faraday would send him some of his "late lecture" notes, which Dickens had one of his contributors rewrite for early issues of *Household Words* (Wilkinson 216, 235; Gold, 187-223). Anne Wilkinson, followed by Gold, shows how Dickens shepherded Faraday's Christmas lectures on a burning candle not only into several articles, but also into a guiding metaphor for *Bleak House's* combusting systems. I take up Faraday's related work on electromagnetism to understand *Bleak House's* competing forces, and begin with a long 1846 article in *The Westminster Review* by astronomer George T. Fisher that discusses several of Faraday's electromagnetic papers.⁴ Fischer exists in the context of periodical science popularizations; for example, he takes up increasingly specialized words, like induction and transverse, for a broader audience, and thus facilitates the cultural spread of Faraday's ideas via Faraday's own language. So, though such an exercise might prove doubly challenging - abstract physics in nineteenth-century prose - Fisher's article helps to set Faraday within his scientific, cultural, and linguistic context.

Even considered singly, electricity and magnetism were exciting concepts, but until Faraday the two concepts were mainly related via analogy. Before Faraday, Fisher writes, "analogies between the phenomena of magnetism and those of electricity ... naturally lead to the belief that the forces themselves must be closely allied to each other" (285).⁵ In 1820, Hans Christian Oersted was first to describe the fact that "the two forces, electricity and magnetism, act upon each other." Oersted demonstrated that a magnetic field encircles the electric current in a wire, and that magnetic force produced at any point operates at a right angle to the current. But Oersted's work only proved that "electricity was made to evolve magnetism" not the "converse" (286). Could magnets also create electricity? In the ten years that followed "unnumbered experiments were made to produce this effect; but all these experiments failed ...

[Finally,] in the year 1831 [Faraday] proved that to render magnetism a source of electricity it was necessary to superadd to the former, motion" (286). Faraday demonstrated the true converse of Oersted's discovery: just as electrical currents created a magnetic effect, so too did magnetic movement create electricity.

Faraday's theoretical breakthrough ended up extending beyond currents and magnets and eventually helped Faraday articulate a paradigm-shifting understanding of space not as discrete objects in empty space but as amorphous centers of force spreading and intersecting. As early as this 1831 paper, Faraday began conceiving of field lines or "curves" as invisible markers of force permeating all of space (1: 33). Faraday's associated diagram depicts "a sliver knife-blade, resting across the magnet with its edge upward," where one need only to "cut the magnetic curves" to get electricity (see Figure 1).⁶ In 1832 Faraday uses the term transverse, to describe electromagnetic induction's right-angle cutting motion, and he uses the term more frequently over the next decade until it assumes a metonymic function: for example, in 1837 he describes "lateral and transverse action constituting electricity and magnetism" and in 1838 he discusses "the lateral or transverse force of the *current*," in other words "the magnetic or transverse action" (1.363, 1.527). As a descriptor of the force's right-angle motion, in a word, transverse is electromagnetic induction. The field lines model the relationship between objects, but they do more than offer an imagined model for a concrete reality. Faraday envisioned magnets sending out lines of force throughout the universe, that these lines trace its extent and power, and that cutting the lines produces a second-order, transverse force.

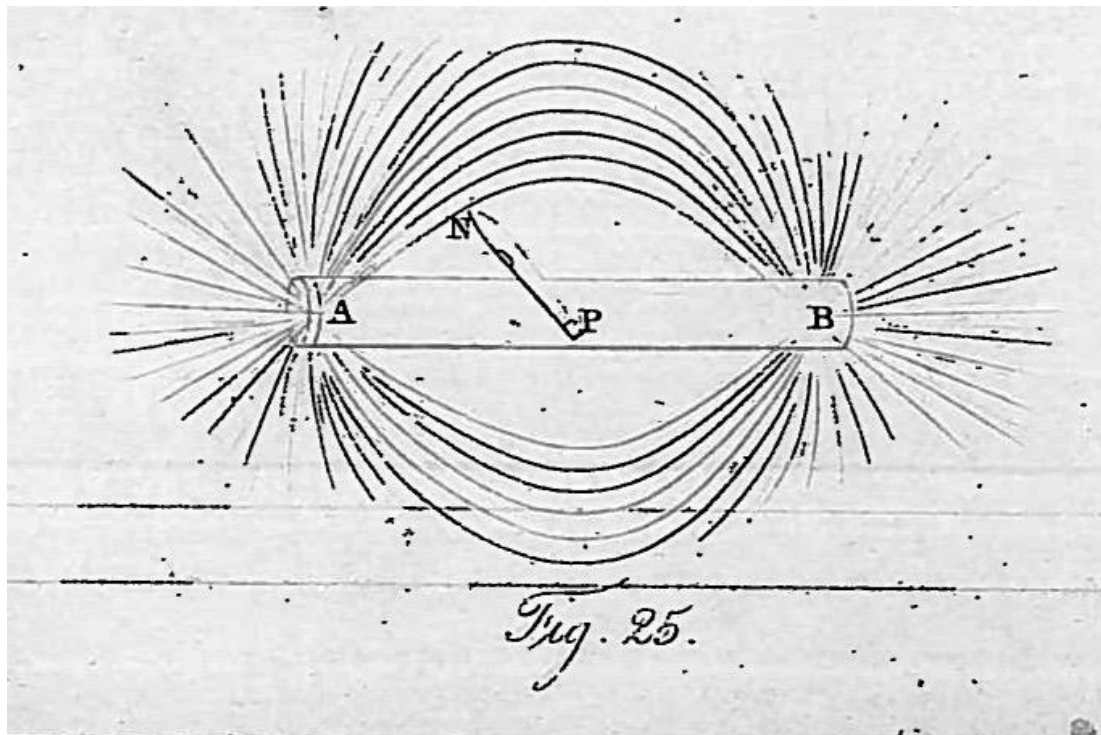


Figure 1 - "Fig. 25" from *Experimental Researches in Electricity*, vol. 1., 1839. Image courtesy of the Worcester Public Library.

Though Faraday remained cautious about abstractions early in his career, throughout the 1830s and into the 1840s he was drawn further towards metaphysics. Faraday's ideas moved from a wire "surrounded at every part by magnetic curves" in 1832, to "centres of the two forces" in 1838, with that latter phrase hinting at a

fundamental ambiguity between particle and force (1: 37, 1: 158). Then, as Jenkins observes, in the mid-1840s, Faraday was publishing "radical suggestions about the nature of space and matter" (199). In fact, these pieces began as spontaneous thoughts delivered when he had to stand in as a last-minute substitute lecturer; the anecdote shows his deep commitment to empiricism and his reluctance to wade into metaphysics (Forbes and Mahon, 102). But when Faraday did finally speak up, and then publish, about metaphysics, he did so with a fundamentally novel framework. By 1844, Faraday reveals a groundbreaking theory: rather than an "unchangeable, impenetrable piece of matter," Faraday conceives matter as an "atmosphere of force," "everywhere present," "highly *elastic*," and "conceived to be a centre of power" (2: 290, 2: 291, 2: 292). Faraday is not describing ether, because for him no secondary, imagined medium exists, nor is he describing Newton's gravitational theory of "action at a distance," because forces literally extend out from their centers (Forbes and Mahon 109). For Faraday there are neither particles nor space, only force, which is congruent with matter: "matter fills all space ... [and] each atom extends, so to say, throughout the whole of the solar system, yet always retaining its own centre of force" (2: 294). In a sense, Faraday's field more closely resembles Hayles's twentieth-century post-Einstein fields than Maxwell's ether, because Maxwell required the spectral substance (21). Rather, Faraday needs "neither particles nor space" nor ether. Here Faraday reaches the fullest articulation of this higher-order metaphysics: that space cannot exist prior to force, instead space and matter are constituted by unevenly distributed, extended forces.

Faraday's 1845 discovery that light itself could be rotated by magnetic fields further spurred his move toward abstraction and unification. Fisher, whose review's ostensible main purpose was to summarize Faraday's announcements on magnetized light, paraphrases the widely-reprinted opening of Faraday's 1845 paper: "Dr. Faraday has long entertained an opinion, that the various physical forces have one common origin, or, in other words, are so directly related, and mutually dependent, that they are convertible, as it were, one into another" (287).⁷ With the new aggregation of light into the system of forces, the curves that Faraday drew a decade and a half earlier begin to function not just as a one-off conceptual tool, but as a unified description of matter and space: "I do not perceive in any part of space, whether (to use the common phrase) vacant or filled with matter, anything but forces and the lines in which they are exerted" (3: 450). As Jenkins explicates: "the magnet must be thought of as extending as far as [its] filings, even though we perceive it as a bounded object some distance from them. The magnet, indeed, is the force it exerts" (200). Objects have no boundaries; interrelations are not governed by mere links or even a shared medium; rather the force relationships between objects constitute both space and also the objects themselves.

Finally, in a flurry of papers produced in the months before and during *Bleak House*'s serialization, Faraday advocated for field theory as a fully interpretive framework, a sign that these ideas were not just models for technical problems, but the real workings of the universe. In late 1851, Faraday affirmed the "superiority" of magnetic lines of force, defined "by the ordinary use of iron filings" (see Figure 2) (3: 328-29). In June 1852, Faraday speculated that the lines not only help to model the universe, but also exist as "the physical existence of an atmosphere of power" (3: 422). Having for two decades nurtured a maturing field theory, and for the last half-decade published on its speculative consequences, Faraday suggested forces were extended, angular, and mutually interdependent, and now a near-material reality. Beginning in 1831, Faraday unified magnetism and electricity by describing their transverse relationship, and then in the late 1830s and early 1840s Faraday postulated how forces,

as matter and space, extend via field lines, and in so doing, transformed the notion of embodied matter into converting forces.

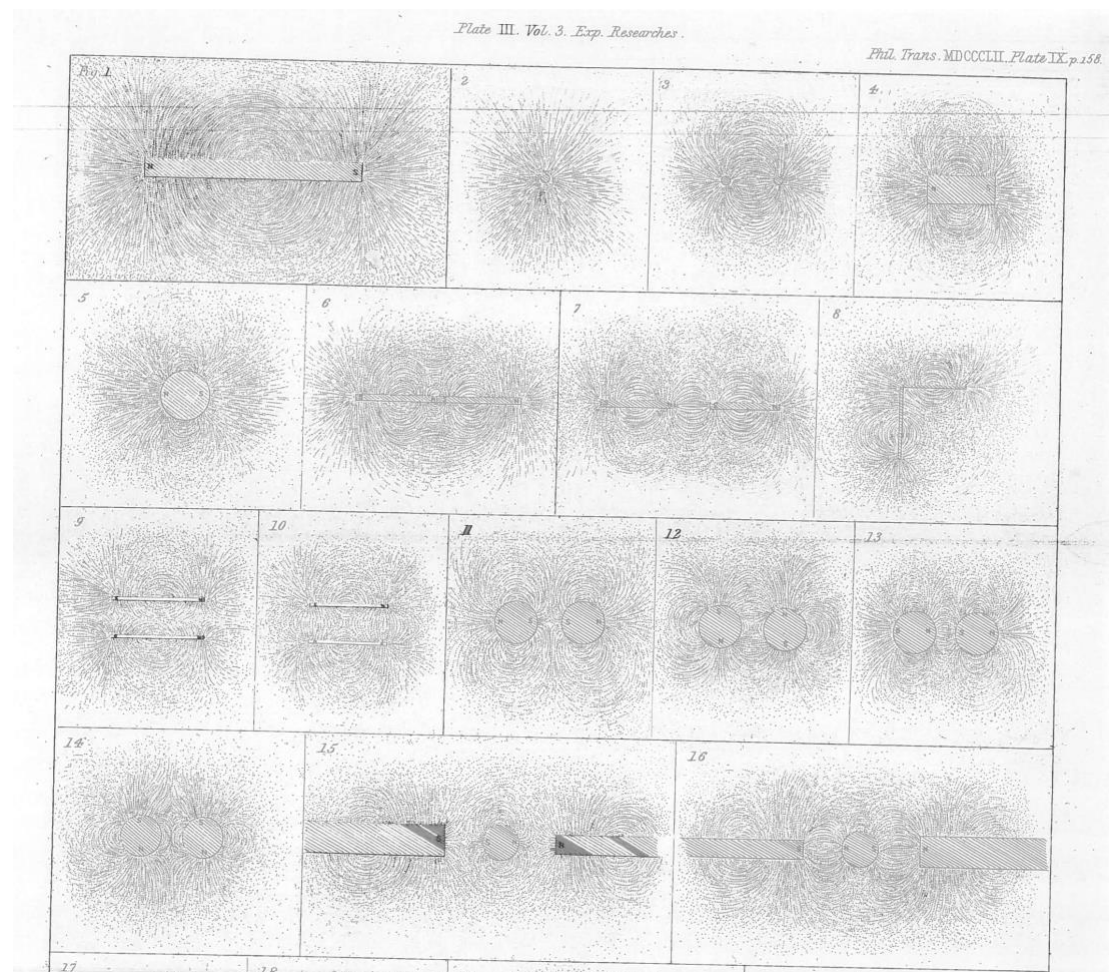


Figure 2 - "Fig. 2-16" from *Experimental Researches in Electricity*, vol. 3, 1855. Image courtesy of Worcester Public Library.

Faraday's empirical discoveries and metaphysical models quickly entered the cultural discourse; electromagnetic induction and field theory appeared in magazines on both sides of the Atlantic from the early 1830s throughout the rest of Dickens's career. Faraday's impact in popular culture began peaking around the mid-1840s especially with his link between light and electromagnetism. As far as Concord, Massachusetts, Amos Bronson Alcott read about Faraday's 1846 lecture and connected his transcendental metaphysics to Faraday's "magnetic current" (Francis 282). Over the next decade, not least because of Faraday's own efforts at popularization, he had come to stand for a sort of clichéd middle-class science, enough so that George Eliot used his name to mock the conformity of bourgeois fashion in *The Mill on the Floss*: "good society has its claret and its velvet carpets, [and] ... gets its science done by Faraday" (304). But beyond the mention of Faraday, Eliot's novel hints at the applicable power of field theory, via electricity more so than magnetism (297, 308, 392), as well as the discourse of forces (238-239), "influence" (309, 368), and natural "laws" of human relationships (351, 481). Just as Dickens's novels and magazines reached the height of their popularity, Faraday's discoveries and speculations occupied the very same cultural and imaginative space.

Besides the brief correspondence Wilkinson and Gold mention, additional evidence shows Dickens knew of Faraday's fields. In general, as many scholars have shown, Dickens immersed himself in scientific communities, though perhaps in a more irreverent way than "famous Victorian literary figures such as Eliot, Huxley, and Kingsley" (Zerbe 204; Buckland 273). But Dickens engaged deeply and specifically with Faraday's ideas. In 1848, Dickens reviewed Robert Hunt's *Poetry of Science*, which discusses electromagnetism at length and cites Faraday throughout (Buckland 679-94). Hunt writes how Faraday "proved magnetism to have the power of influencing a ray of light" and later quotes Faraday summarizing a view Faraday himself opposes, where "particles are considered as separated" (116, 339n1); rather, Faraday actually suggests no "distinction between... atoms and intervening space" (2: 291). Hunt's misleading quotations demonstrate the controversial, nearly incomprehensible, and so more intriguing, concepts involved.

Though Dickens rarely used electromagnetic terminology in his fiction, the magazines under his tightly-controlled editorial purview often did (Pratt-Smith 11-2). Besides the chemistry articles that grew out of their 1850 exchange, as well as an 1868 profile of Faraday which mentions the "discovery of magneto-electricity," in those two decades Dickens's magazines contain no less than 40 explicit references to electromagnetism ("Faraday").⁸ These references demonstrate not only a wide-ranging familiarity with Faraday and his discoveries, but that Faraday was a household name; one essay even uses Faraday's name as we might Einstein's now, in praise of a student: "He must have something of a Faraday in him" ("The Schoolmaster" 317). Of the two *Household Words* issues published before *Bleak House*, and the six published concurrently with the novel, all but the last reference magnetism; eleven articles in these eight issues concern physical magnets, electrical discoveries, and electromagnetic fields.

In aggregate, frequent references across Dickens's magazines demonstrate more than a surface-level familiarity, but rather a knowledge of the relationships articulated in the theories themselves; for example, one article correctly notes the right angles of the magnetic field produced by an electrical current (F. Hunt 243). References to Faraday and electromagnetism also appeared in *Bleak House*'s American publisher Harper's both prior to and during the novel's serialization.⁹ The fact that such popular magazines with such close proximity to Dickens published so many and such varying representations of Faraday's theories, in addition to the personal relationship discussed by Wilkinson, attests to the likelihood that Dickens's exposure to electromagnetism came from a place of knowledge and with a license to play with electromagnetism as a conceptual metaphor.

***Bleak House* as a Field of Force**

Applying Faraday's ideas to Dickens's discursive narrative world yields a new understanding of the layered and competing forces that constitute characters in his urban novels. Field theory refigures relationships from nodal interactions between particulate objects to extended, angular interactions between forces. This rethinking implies two specific consequences for understanding character: first, field theory describes extended, unbounded influence reaching across distances without nodal connections (thus, for instance, a character might influence another without apparent relationships), and second, it describes multiple forces in transverse intersections. Dickens knew of Faraday, electromagnetism, and the reach of field theory, which helped him conceptualize an expansive view of social relations and a distinctive aesthetic of how characters fit into those relations.

With respect to field theory's first affordance, influence without direct contact, consider how early in *Bleak House* Guppy's infatuation with Esther, which follows from isolated in-person interactions, continues across vast distances. Esther's figure, first seen in London then later via the portrait of Lady Dedlock, "acts upon him like a charm": "Guppy has no eyes for either of these magnates," a light pun on "magnets" for the Sir Leicesters (109-10). Magnetic induction via electricity - a demonstration of Oersted's principle - was a common enough trick that Melville replicates the experiment in *Moby-Dick's* "The Needle" chapter; a scene that "almost perfectly mirrors" the experiments of Joseph Henry, the American who discovered electromagnetic induction nearly simultaneously with Faraday (Farmer 25). Here, Lady Dedlock magnetizes Guppy without being physically present, and so her character has been extended beyond the bounds of her body, her "centre of force," via her portrait. Once magnetized, both Guppy, and of course Tulkinghorn, cannot let go of Lady Dedlock, and both men's induced obsession drives the plot.

We might define induction via Faraday as influence produced by motion; "among actions, Faraday writes, "none... excels, or even equals in importance that which is called *induction* (1: 360). Induction—like lightning to a needle; one character flitting past producing deep attraction—sets up many Victorian novels: Gwendolen enchants Deronda, the woman in white mesmerizes Walter, or Tess discovers her own ancestry. Guppy's repetition of the phrase "imprinted on my 'eart," in a novel so burdened with text draws attention to the absence of its referent, and the way discourse in addition to the visual representation can extend a character's bounds (464-5, 510-1, 852, 970). Likewise, the pull between Esther and her mother - the third main plot driver - is also better expressed as a field. The first words Esther records herself speaking (besides to her doll) tell of this lack of a physical link: Esther "had never heard my mama spoken of ... had never been shown my mama's grave" and "had never been told where [her grave] was," yet forms an obsession, despite direct contact (29). Dickens outlines a specific logic of relations wherein a character, once induced by another having passed by, carries the bond beyond physical links and limits.

That pervasive, distance-spanning induced influence experienced by Guppy, Tulkinghorn, and Esther appears as a more literal "atmosphere of force," to use Faraday's phrase, throughout the novel. Characters, as Hardy would later say, generate atmospheres, a pervasive concept in the novel that Diana Rose Newby aptly connects to "the question of the environment's role in the shaping of individual circumstances" (180): Bucket "walks in an atmosphere of mysterious greatness" and Tulkinghorn, as much a magnetic field as Gold's "heat sink," exerts so powerful an influence that neighborhood "chimney-stacks telegraph family secrets to him" (804, 220, 747). Like "atmospheric magnetism" or "physical lines of force," Dickens's atmospheres hover between the material and immaterial. In the novel, the term signals liminality, sometimes more embodied as in "the atmosphere is otherwise stale and close" and sometimes conceptual as in the "atmosphere of secrecy" (621, 416). Consider the preponderance of the "thick air," as Henchman calls it, in the novel's animal product candles and Krook's spontaneous combustion (Henchman "Tallow Candles"). Dickens's webs "hang" like three-dimensional mist "over all the legal neighbourhood," "some great veil of rust or gigantic cobweb," where characters find themselves "entangled ... in the web of very different lives" (301, 732). London's summer fog and Fate's web imply more dimensions than a 2-D grid, and more materiality than imagined ether: they manifest as forces crossing in at least three dimensions that blur the boundary between material and abstract.

The most obvious and pervasive referent for atmospheric backdrops remains Chancery, from the novel's opening lines to its anti-climactic end, and Richard Carstone in particular exposes the lines of the lawsuit's force. Richard's induction into Chancery does not follow from equal and opposite Newtonian motion (see, for example, the often-cited example of how Smallweed's pillow "recoils" him "back into his porter's chair" (337); lateral, or rather transverse - perpendicular motion - career moves, first as a sailor, then doctor, then lawyer, then soldier draw Richard towards Chancery. By Chapter XXXVII "Jarndyce and Jarndyce," the reader witnesses the near culmination of Chancery's effects from Esther's perspective, as it threatens to destroy Richard's relationship with his soon-to-be wife:

He admired her very much—any one must have done that [...]. Still, I had a tormenting idea that the influence upon him extended even here: that he was postponing his best truth and earnestness, in this as in all things, until Jarndyce and Jarndyce should be off his mind. Ah me! what Richard would have been without that blight, I never shall know now! (594)

Esther sees the lawsuit as having "extended even here," to the metaphorical space of familial and romantic love and to the physical space of Boythorn's hospitality. As Richard says, perhaps in earnest, though it reads as irony, "None of the jar and discord of law-suits here!" (595). But Richard does not need to be present to fall under that "influence", a word, used 52 times, that etymologically describes a process which, like induction, depends on motion. Like Mrs. Snagsby's "hovering" or Guppy's "oscillating," Richard's escapades carry a frenetic motion associated with characters undergoing a transverse transformation (663, 620). To explain Richard's attraction to Chancery using network theory, we would need some specific connection or line of influence - a singular encounter in which we see in definitive terms the force that Chancery exerts on him. Instead, Richard moves as if a metal filling in a magnetic field, his own unbounded character interacting with the governing force about and around him.

Variety of character matters as well; different extensions of objects-as-characters react differently to different forces. That different characters respond differently also finds an analogy in Series XXV of Faraday's *Researches*, which dealt with the "magnetic and diamagnetic" condition of objects; in other words, all objects respond to magnetic fields, but with varying degrees and valences (3: 169). In the conversation at Chesney Wold quoted above, Richard remarks, of the elder Jarndyce: "If I have the misfortune to be under that influence, so has he. If it has a little twisted me, it may have a little twisted him, too," to which Esther replies, "Because [...] his is an uncommon character, and he has resolutely kept himself outside the circle" (597). Richard finds himself caught in the same almost-physical "taint" - a word elsewhere used to describe atmospheric forces like viral infection and shame - that brought Tom and Krook to their deaths, but observes how John Jarndyce keeps himself away (507, 710, 745). Richard's restless lateral movements leave him susceptible, in contrast to John Jarndyce's particular steadfastness; though all characters, like all metals, respond to fields, and by the end of the novel it seems Esther "may have induced" even him (948). Similarly, other characters, including Gridley, Flite, and Jarndyce all have, in different ways, found stasis as an antidote to Chancery, unlike Richard's frantic transverse movement which propels him towards it.

Miss Flite, locked in psychotic equilibrium, offers an exception that seems to prove the rule. The first character mentioned after the Chancellor, Dickens describes

Miss Flite as "a little mad old woman in a squeezed bonnet [...] always in court, from its sitting to its rising" (15). Rather than, as in Richard's case, presenting her drama during the narrative, in Miss Flite's case, Dickens reveals the present by revealing the past. Only much later does Miss Flite tell her story:

"First, our father was drawn—slowly. Home was drawn with him [...]. He was drawn to a debtors' prison. There he died. Then our brother was drawn—swiftly—to drunkenness. And rags. And death. Then my sister was drawn. Hush! Never ask to what! Then I was ill and in misery, and heard, as I had often heard before, that this was all the work of Chancery. When I got better, I went to look at the monster. And then I found out how it was, and I was drawn to stay there." (566-7).

Simultaneously idiosyncratic, delightful, and disturbing, Miss Flite's traumatic family history has left traces. Although she posits a magical cause to Chancery's "dreadful attraction," she knows well its effect "when the attraction has begun": the various victims of Chancery as filings drawn to the magnet, draw the field (566). Occupying different temporalities, both Miss Flite and Richard, have been or are induced toward a Chancery obsession.

But, is the force exerted on Miss Flite and Richard disciplinary (that is, targeted and individualized) or in Michel Foucault's terms, biopolitical (that is, demographic and non-individualized)? Emily Steinlight, following Foucault, argues that Victorian novels respond *both* to discipline and also to biopolitics: to controlling bodies and to governing masses (Foucault 239-63). Even as Victorian novels include representations of both forces, discipline and biopolitics "aim at distinct objectives": "the former seeks to produce individuals capable of regulating themselves, whereas the latter yields a statistically generalizable population from which a certain subset can be devalued and eliminated" (Steinlight 116). The disciplinary state punishes individuals in service of personal compliance, the biopolitical state creates policies (often of explicit neglect, "to live and let die" says Foucault) in service of demographic control ("*Society*" 241).

Chancery certainly produces disciplinary effects, but our reading thus far shows it as primarily biopolitical. Chancery could care less who it targets, because it operates on the level of demographic forces. The system of dead-end law exists at a higher level, as regulatory policy concerning itself with larger groups of people. Or as Foucault writes, the biopolitical state "build[s] viruses that cannot be controlled and that are universally destructive." Chancery functions as such a state-built virus (254). Chancery governs life and death, specifically the passive deaths Miss Flite recounts. Miss Flite's sister and father are also Steinlight's supernumeraries, barely mentioned less-than-minor characters who make up the mass to be regulated. Both Miss Flite's movements in the field, as well as the supernumerary deaths, reveal Chancery as a built biopolitical "monster" or "virus," an entity that seems to have exceeded its purpose (Foucault "*Society*" 254). Chancery operates as part of a system of exhaustive state regulation designed to oversee populations and not just the bounded individual subject.

Further, the analogy between Miss Flite and Richard, which Dickens sets up earlier as a "fatal link" - a term which Esther repeats throughout - demonstrates a pattern of analogic links that reveal other governing, biopolitical forces (369, 592, 406). Richard resembles Miss Flite not just through their interactions, but as two experimented-on objects, which when moved in similar ways, produce similar results. And Miss Flite resembles a set of older characters - Mrs. Smallweed, Hawdon, and Gridley - who, like Mr. Jelyby, "seemed to have been completely exhausted long before

I knew him," exhausted by Chancery, by poverty, and by a socioeconomic system of forced, repetitive labor (481); Woloch would say that in this set "flatness is already fully developed" (145). The exhausted set implies how another set - Mr. and Mrs. Snagsby, George, Krook, and Richard - are in the process of being driven towards exhaustion; these characters are not yet law scriveners writing for their lives in darkened bachelor rooms, but they might be soon. The unbounded character reveals in greater detail the function of some of these biopolitical forces of economic and social control. Because in this conception of character, their movements and stasis expose the multiplicity of abstractions that surround, influence, and so constitute them.

Character, Agency, & Field Theory in *Bleak House*

It is worth explicating the consequences of applying Faraday's field theory to an understanding of character, which following the work of Diedre Lynch and Catherine Gallagher has been examined as a political discursive project. Questions dealing with the extent to which a character corresponds to a type are intimately bound up with questions of power. Brilmyer, guided by the concept of "dynamic fields of force," gets at this nexus of particularity and agency in her discussions about the extent to which *Middlemarch's* characters are "plastic" - if characters are responsive, fluid entities, how do they exert their power (*Science of Character* 61)? In other words, field theory prioritizes external forces, so much so that characters find themselves subsumed. Using Faraday's fields to read *Bleak House* ought to reveal this same result: what at first seem to be bounded characters look more like fields of circumstance. But a detailed examination of two characters - Esther and Lady Dedlock - shows that Dickens's depiction does not align completely. This disjunction - specifically, the wills of Dickens's characters transcending their fields - further suggests the dialectic between biopolitical devaluing of individuals in favor of systems, and Dickens's own attraction to disciplinary individualism (Reed 23).

Esther and Lady Dedlock's circumstances are intimately bound together. Their earlier meetings obliquely refer to electromagnetism: first, Esther wonders, "whether it drew me towards here or made me shrink from her"; the second meeting features atmospheric lightning; and in the confrontation between Guppy and Lady Dedlock about Esther, the former "sees a tremor pass across [Lady Dedlock's] frame [...] which, struck by the air like lightning, vanish in a breath" (296, 366, 466). Just before their final encounter, Esther feels a "mysterious interest" attracting her to Chesney Wold while another "influence [is] keeping me from the house": attraction follows from their maturing kinship bond, while repulsion comes from the social risk of public exposure (576). Yet Esther chooses to meet her mother, even at her lowest moment: "I must keep this secret, if by any means it can be kept, not wholly for myself. I have a husband, wretched and dishonouring creature that I am!" (579). It is not sufficient to say that Lady Dedlock had no control over her final movements. We find her bound by two well-matched forces: the propriety she spent her life mastering, and an increasing bond with her daughter. For Dickens, balancing forces on some proverbial scale could not predict the outcome; systems alone cannot produce choices, as Gridley might say: "I am told, on all hands, it's the system. I mustn't look to individuals. [...] for I know they gain by it while I lose, don't I? [...] [But] I will accuse the individual workers of that system against me, face to face, before the great eternal bar!" (252). In the world of the novel, the system, as Gridley's sarcasm indicates, must include the responsibility of individuals.

In the end, Lady Dedlock chooses love for her daughter, which prompts her to cut against the lines of class and gendered forces. Lady Dedlock's exposure, and her

own decision to flee, comes as a "thunderbolt so long foreseen for her, but not by [Guppy]" (854). When Tulkinghorn starts "Closing In" - a chapter title punning on atmospheric proximity - Lady Dedlock still remains the one "pivot it all turns on," a container of the forces clustered at her character. In the same scene where Bucket describes Lady Dedlock as a pivot, Mademoiselle Hortense experiences her own "Closing In," where "the atmosphere she breathes seems to narrow and contract, as if a close net, or a pall, were being drawn nearer and yet nearer around her breathless figure"; Hortense serves as a more overdetermined foil to Lady Dedlock (819, 835). Because on the one hand, Lady Dedlock's movement seems to reveal, again like Faraday's iron filings, the system around her. But on the other hand, the "thunderbolt and pivot" exceed that swirl of forces. Such a reading navigates between the panoptical and vitalist, which give too little and too much attention to individuals respectively, but ends up aligning well with Gold's thermodynamic reading of Lady Dedlock as "novelist engine" who "may find, in the apparently deterministic universe of ever-increasing entropy, a small space for useful work (220-21). Lady Dedlock's path, a "small space," reveals, and then also resists the fields which enclose and constrain: "I will outlive this danger, and outdie it, if I can. It has closed around me, almost as awfully as if these woods of Chesney Wold had closed around the house; but my course through it is the same" (581). We see her fatal choice as first revealing, yet ultimately transcending, external forces.

If the field constitutes and composes everything, as in Faraday's model, then the individual is merely a function of it. Brilmyer seems to come to the same conclusion in her 2015 essay, where "the stability and autonomy of character is illusory" (*Science of Character* 66). But then Brilmyer explicitly revises this conclusion in her more recent book, arguing that a more stable, individuated reality, "emerges from the motions of particles which are themselves unstable."¹⁰ Adding the theory of emergence to that of plasticity, Brilmyer finds the chaotic, "fluid and dynamic" forces resolve into an autonomous "solid and unified" character (*Science of Character* 71). Looking at character behavior in *Bleak House*, I read unified characters as not emergent, but transcendent. Dickens resists fully describing urban life without the agency of the bounded individual; the biopolitical turn from discipline proves too much for him. In so doing, Dickens demonstrates precisely the reformism of his politics: his belief in the *je ne sais quoi* outside collective history. Here I explicitly use the word reformism in contrast to radicalism. Foucault etymologically defines the latter word as those who "wanted to assert those famous original rights ... a position which involves continually questioning government, and governmentality in general" (*Biopolitics* 41) That Dickens questions government actions seems obvious, but whether he questions the fundamental purpose of the technocratic state seems more ambiguous; perhaps Dickens is after a more efficient governmental logic rather than a different one.

While the application of Faraday's field model to *Bleak House* reveals a tendency in the realist novel to extend the conception of character beyond what Clark and Chalmers call the "the boundaries of skin and skull;" such an application reveals, dialectically, Dickens's enduring, recalcitrant faith in the individual as discrete (9). Dickens both reaches for a conception of characters as atmospheric clusters of force, but also retains a commitment to the transcendent, bounded character-object. Dickens's liberalism, and his related aesthetic of liberal individualism, makes him unable to embrace field theory's totalizing impulse.

We might recall that individual agency, or at least the private individual as a figure, is a principle that until recently critics of novel remained tied to as well. Or, as Steinlight, summarizing decades of debates over the Victorian novel, writes: "whether

it precedes the novel or is invented by its form, the private individual - as critics from [Ian] Watt to [Frederic] Jameson to [Nancy] Armstrong maintain - seems unquestionably to give fiction its reason for being" (116). But as Foucault argues, it is "a mistake to think of the individual as a sort of elementary nucleus, a primitive atom or some multiple, inert matter to which power is applied [...] [T]he individual is not, in other words, power's opposite number; the individual is one of power's first effects." The Victorian novel produced and reproduced the concept of individual: it was an ideological power-effect Dickens could not escape. But even while Dickens could not escape individualistic agency, *Bleak House* also imagined the character in reference to an emerging biopolitical governance, as an unbounded field of force. Reading Dickens via Faraday, I offer a theory of extended character as a conception that rhymes with Foucault's directive: that we must study power, and perhaps character as well, not as "a single form" but "as relations of force that intersect, refer to one another, converge, or, on the contrary come into conflict" (265-66).

Notes

1. See also Hayles on how fields describe a self-referential, relativistic system that collapses the distinction between both cause and effect and also subject and object. Hayles, however, ignores Faraday and only mentions Maxwell via Einstein's attribution (24).
2. Wilkinson passingly describes Dickens's characters as "magnetic centers" (247); Brilmyer mentions that field theory helps explain how "what appear to be bounded and singular forms are often shown to be nebulous" ("Plasticity" 72); and Jenkins briefly reads *Middlemarch* as an electromagnetic field in which "people are not bounded, self-contained units operating in neutral space but extend as far as their influence does" (200). For mentions of field theory, but with a focus on electricity in particular see: Halliday, *Science and Technology* and Pratt-Smith, *Transformations of Electricity*. For electromagnetism and poetry, see: Tondre, *The Physics of Possibility* and Brown, *Hopkins' Idealism*. For a comprehensive survey of Dickens and science scholarship, see Nixon, "Dickens and Science."
3. By "gravity," I mean the common perception of gravitational fields post Einstein. For the differences between field theory and action-at-a-distance, see B. Hunt, *Imperial Science* (3-36).
4. The author of the article is listed as "G.T.F."; William Cushing identifies Fisher as "G.T.F. An English writer in the 'Westminster Review'" (218). According to A. M. Clerke in the *DNB*, Fisher, a member of the Royal Society, acted as "chaplain as well as astronomer to Parry's expedition for exploring the northwest passage in 1821-3." (56).
5. Fisher overstates the pre-1820 enthusiasm for finding the connections between electricity and magnetism; prior to 1820, the "majority" of sciences held to a Newtonian model of separate forces, and so were not searching for unification *until* Oersted (Forbes and Mahon 40).
6. In a rare footnote, Faraday clarifies: "By the magnetic curves, I mean lines of magnetic forces ... which would be depicted by iron filings." For a more precise description of the diagram: "the current of electricity produced will be from P to N, provided the intersected curves proceeding from A about the notched surface" (1: 32-33).
7. See Gold and Pratt-Smith on *The Coming Race*'s reprinting of Faraday; Pratt-Smith suggests that the lines likely come to Bulwer-Lytton via John Tyndall (80, 31-2).
8. I estimate this number using *Dickens Journals Online*. This is a conservative estimate; I exclude alternative spellings, and related technologies like the telegraph, about which appears a serialized article in 1862 (B. Hunt 218-19). Of particular interest, see Bulwer-Lytton's serialized *A Strange Story*, which contains scenes of mesmerism and an elixir "described repeatedly in terms of light, heat, and electricity" (Pratt-Smith 24).
9. *Harper's* printed several of Faraday chemistry articles, including "The Chemistry of a Candle," "A Shilling's Worth of Science," and "The Mysteries of a Tea-Kettle." In 1852, the year of *Bleak House*'s serialization, there are three more references to Faraday.
10. Courageously, Brilmyer writes of her earlier point, "I have come to believe this was a misstep" (*Science of Character* 66-67).

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