

# Calculus and Context

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**Andrea K. Henderson, *Algebraic Art: Mathematical Formalism and Victorian Culture*.  
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Does intellectual history count as “historical context”? What if the intellectual history in question is devoted to the value of context-independence? Andrea Henderson’s *Algebraic Art* offers a fascinating excavation of Victorian mathematics and its resonances with an array of literary and artistic projects of the period, from the fiction of Lewis Carroll and Edwin Abbott to the poetry of Christina Rossetti, Coventry Patmore, and Algernon Charles Swinburne and the photography of Clementina Hawarden. But the book’s most startling contribution may be its upending of our methodological expectations. In the introduction to this special issue, Jeffrey Blevins and Daniel Williams write that much recent work in logic and literature “extends historicist methods, moving out from literature and science or mathematics to consider logic as a body of contextual influence, techniques, and terms” (22). The description would seem to suit Henderson’s project perfectly: her learning in Victorian math and logic is deep, and she is adept at demonstrating the relevance of that learning to a set of familiar and less-familiar documents of Victorian culture. But *Algebraic Art* is a peculiar historicist object, since the intellectual traditions it resurrects are most exciting for the way they promised to liberate art from the specificities of content and reference. Victorian mathematics, Henderson shows, if she does not quite argue, made the art it influenced less “Victorian” in most of the ways we currently recognize the meaning of that term.

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Henderson's introduction offers a commanding survey of the major trends in Victorian mathematics, and, to be sure, makes a claim that those trends themselves reflected broad aspects of the period's social reality. She shows that a common tendency across various mathematical fields was an emphasis on abstraction over concreteness, systemic coherence over referential confirmability. "The salient feature of British mathematics of the latter nineteenth century," she writes, "was its preoccupation with formal structures and procedures per se, quite apart from their practical applications" (4). Thus for non-Euclidean geometry, "internal formal coherence . . . gradually came to seem more important than descriptiveness" (5), and Boolean algebra sponsored the idea that "mathematics is symbolism" (23), an ungrounded language whose logic need have nothing to do with its terms' reference to any reality, "either noumenal or phenomenal" (69). But this very aloofness from reality, Henderson argues, itself served real ideological functions in the period, most notably by echoing the abstraction that was differently central to liberal governance and commodity capitalism. As Henderson puts it, "The formalist/proceduralist tenor of modern mathematics . . . was bound up with liberal political ideology and capitalist theory and practice. 'Critical mathematics' held a flattering mirror to a bourgeois class coming into power and looking to justify the abstracting logic of exchange that underlay that power" (16).

But what is perhaps most provocative about this claim — on the surface an eminently historicist one — is its own abstraction from the details of specific policies, political agendas, or social groups. In practice, as Henderson shows, the new math could be taken as corroborating the "recursive and even tautological character of capitalist commodity valuation" (22), or as paralleling the efforts of reformists to formalize the character of political representations along rational lines — or even as shoring up the radical anticapitalism of Karl Marx. As Henderson puts it, "In his focus on formal relations Marx shows himself to be a good nineteenth-century scientist," and she goes on to remind us that his most succinct representation of the capitalist extraction of surplus value is the formula  $M-C-M'$  (25). Of course, as Henderson is well aware, Marx's point was not to celebrate capitalist abstraction but to expose and overturn it. "On the one hand," she concludes, "Victorian mathematical theory contributed to the development and support of the liberal capitalist social order by providing a justification for the value of abstraction. On the other, its protocols facilitated critique. *Capital* thus profits from the insights of mathematical formalism even as it criticizes that formalism" (27). Henderson's absorbing discussion of Marx thus makes a strong case for mathematics as a key metalanguage for the period's political arguments, even as it raises the larger question of whether such an accommodating idiom can be said to have any determinate ideological orientation.

This becomes clearest in one of the book's extended literary readings, of Carroll's two-part novel *Sylvie and Bruno* (1889) and *Sylvie and Bruno Concluded* (1893). Henderson offers an ingenious and sympathetic interpretation of these stubbornly bizarre books, which shuttle peremptorily between the three locales of England, Outland, and Fairyland. The novel's movement between distinct ontological realms—and the reader's perception of parallels and divergences among them—becomes in Henderson's account the main engine of the pleasures the book offers: "It is the coordination of what had seemed distinct realities that is thrilling. . . . The novel's hero, finally . . . is the capacity of formal structures to reveal meaningful similarities" (83). But this purely formal account sits somewhat awkwardly with another of Henderson's claims, that Carroll's novel concerns not just conceptual difference but class difference in particular. The section on Carroll's novel is entitled "Carroll's Calculus of Classes," and Henderson writes that "the driving impulse of the book, repeated at all levels of the narrative, is the revelation of class relationships" (81). But with the latter term she directs us not to questions of poverty and wealth, political solidarity, struggles between owners and workers, and so on, but to the ways "sets of persons" can be "organized into coherent classes" by means of "formal comparative mechanisms" (81–82). Indeed, at moments Henderson comes close to hinting that one goal of Carroll's novel might be precisely to belittle the garden-variety notion of class-consciousness, as when she reads a scene in which an enraged but confused crowd demands "LESS BREAD! MORE TAXES!" as a mediation on the "empty formality of modern political relations" (83). But ultimately her interpretation forgoes this ideological reading—in which Carroll would be revealed as using logic to conduct covert class warfare—in favor of a claim that *Sylvie and Bruno* revels in the "power of form to revive the practical and spiritual efficacy of representation" (88).

A similar demurral from ideological reading protocols informs Henderson's subtle account of *Flatland*, Edwin Abbott's 1884 satirical fantasia about the social turbulence introduced into the titular two-dimensional world when it becomes aware of the three-dimensional Spaceland. With its depiction of severe hierarchies between the squares and circles in Flatland, and between blinkered Flatlanders and enlightened Spacelanders, the book has been influentially read, as Henderson notes, as a "satire on Victorian misogyny and class bigotry" (47), and she does not so much disagree with this approach as recenter analysis on the questions it bypasses. In reading Abbott's drama of circles, squares, lines, and spheres as an allegory of class antagonism, she suggests, critics have slighted the book's interest in the beauty of pure form. Paying attention to the novel's lightness of tone as well as to its flaunting of

realist conventions of readerly identification, Henderson argues that *Flatland* departs from the notion of characterological essence in favor of an attention to the formal designs that subjects make in specific social fields. Ultimately, she finds that Abbott's novel (like Carroll's) is less interested in the content of Victorian social relations than in the beauty of social life conceived of as a play of formal patterns. "The novel suggests that the loss of absolute truth"—a loss Henderson compellingly argues is informed by Abbott's interest in non-Euclidean geometry—"is amply recompensed in the beauty of aesthetic form" (57).

One of the achievements of *Algebraic Art* is thus to draw a line between Abbott's and Carroll's nerdy logic-game novels and late-century aestheticism. (Her discussion of *Sylvie and Bruno* ends with a brief account of that novel's surprising resonance with Charles Baudelaire's *Paris Spleen*; the analysis of *Flatland* ends with an excursus on James McNeill Whistler's theory of painting as itself a "kind of flatland, a beautiful surface" [61].) In Henderson's telling, the new mathematics' persistent interest in self-sufficient systems shares a conceptual shape with the autotelic nature of *l'art pour l'art*. But the resonance, which Henderson definitively establishes, raises a host of questions she does not pursue, most notably about the fact that the abstraction of aestheticism was itself motivated by a host of worldly commitments and entangled in a host of worldly consequences. Aestheticism's embrace of amorality might indeed have something in common with George Boole's insistence on the arbitrary nature of symbolic systems, but the former magnetized women and sexual minorities in a way that decisively marked the social meaning of aestheticism and that has no parallel in the case of mathematics. (Boole was not pilloried in *Punch*, parodied by Gilbert and Sullivan, or accused of "fleshly" immorality.) This fact does not undermine the force of Henderson's demonstration of the two projects' intellectual coherence, and the social consequences of that resonance is a project for future scholars to pursue. But Henderson's relative lack of interest in such questions draws an unannounced boundary around her project: when, in her discussion of Marx, she claims that "abstraction is . . . a historical phenomenon and operative force in its own right," she has in mind the abstraction that forms the basis of a money economy—but she leaves unexplored the ways abstraction figured as a refuge for bodies marked by various forms of social abjection.

Such issues are particularly insistent in one of the book's most revelatory chapters, on the amateur photography of Lady Hawarden. The chapter begins by establishing the scientific context for Hawarden's work, in which Newtonian particle physics was being abandoned in favor of the wave theory of light. Under the influence of scientist and photographer Sir John Herschel,

light was no longer understood as substance but as movement—a shift that Henderson shows encouraged Victorians to discuss light in terms of formal arrangement. Increasingly, analysts of photography spoke of reality as itself composed of the kinds of formal oppositions and polarities made strikingly visible in photographic negatives—“as if,” Henderson writes, “the real itself partook of the formal character of the aesthetic” (96). This material provides the intellectual background for Henderson’s dazzling interpretations of Hawarden’s dazzling photographs. In those images, many of them reproduced here, Hawarden repeatedly poses her daughters in aggressively formalized arrangements—dressing them in contrasting black-and-white outfits, arranging them across dramatic chiaroscuro backdrops, or staging a series so that a single woman appears in consecutive exposures as a mirror image of herself. Henderson notes that modern critics who have discussed these photographs have focused on the issues of gender, domesticity, and family that they seem so clearly to invoke. And yet, she powerfully argues, the images’ creative energy insistently points in different directions—toward an abstraction that makes them look less like mediations on Victorian womanhood than considerations of the nature of photography itself. “The meanings generated by these groupings tend . . . to unsettle thematic, content-driven interpretations of individual pictures,” she writes (121).

One can be utterly convinced by this claim and still wonder about what it leaves unsaid. Surely it matters to the distinctive texture of Hawarden’s work that the material on which it performs its striking formalizations is a pair of attractive young women who resemble one another and who appear in mysteriously charged physical proximity to one another? Surely it matters that the outfits they sport—outfits Henderson compellingly argues are pressed into service for the work’s overarching formalizing impulse—include nuns’ habits, men’s clothing, and other unlikely garments? The images’ sheer kinkiness (about which Henderson is mostly silent) derives at once from their stylization and from the fact that what they are stylizing is so thematically volatile. As I looked at these intense and strange photographs, a set of discrepant critical and artistic contexts came to mind: I thought of the advertisements featuring paired women that Sharon Marcus reads in terms of desire in *Between Women* (2007), and I wondered if the cultural meanings of Hawarden’s formalism could include such access to homoerotic energies. I also thought of Leo Bersani and Ulysse Dutoit’s (1998, 1999) books on Derek Jarman and Caravaggio—works that strikingly resemble Henderson’s in arguing that these artists’ outlandish thematic material (decapitations, naked boys, and so on) is upstaged by their insistent formal patterning of that material. Henderson’s book offers a surprising genealogy for the kind of

reading practice shared by these fairly different critics. But it also made me wonder how her own project would look if it took on board what these critics share — namely, an interest in the reasons formalism appeals to certain social actors, and a sense that a working definition of aestheticism might not be formalism per se but the formalization of specifically troubling or destabilizing content.

Henderson's final two chapters deal with such questions most frontally. Reading Swinburne's poetry in relation to the development of electromagnetic field theory, and Patmore's and Rossetti's in terms of the Victorian conflation of natural, civic, and aesthetic "law," Henderson offers new contexts for the formal features of all three writers. Her exploration of Michael Faraday's and James Clerk Maxwell's work on electromagnetism yields a background for Swinburne's interest in the poem as a unified field of forces, a "space replete with tensions" (166), while her examination of Victorian philology's conflicted accounts of the agency behind linguistic change sets the stage for Rossetti's and Patmore's sense of poetic meter as a force that binds the unruly matter of poetic diction — a binding, Henderson shows, with gendered and sadomasochistic resonances. But while she takes pains to show how Victorian physics and philology resonated with the period's liberalism, these more outré themes are persistently read not as social contexts in their own right but as figures for the scientific issues they emblemize. Thus Henderson argues that "the lesbian eroticism that characterizes . . . many of Swinburne's poems is a particularly apt figure for the productive tension that subsists between mirroring pairs" (167), and that Patmore's "sadomasochistic nuptial aesthetic . . . seems inspired as much by the conflicted form/content relation as by any sexual inclination or ideology" (181).

It is no doubt owing to my own thematic peculiarities that after reading this book's stunning prehistory of formalist reading, I wanted more precisely at such moments — wanted a method that would tarry with these figures (which after all refer to their own social content and command their own loyalties, passions, and politics) and think about their relation to mathematical formalism as itself a context worth exploring. It is a peculiarly energizing book that teaches you this much and leaves you wanting to see what might happen next. *Algebraic Art* is a major accomplishment, and it deserves to be widely read for its lucid exploration of a range of difficult and (to most humanists) unfamiliar thinkers, for its powerful synthesis of their disparate arguments, and for its adroit use of that synthesis to illuminate the dynamics of key documents of Victorian culture. Rarely is such an achieved piece of scholarship also something of a methodological cliff-hanger.

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