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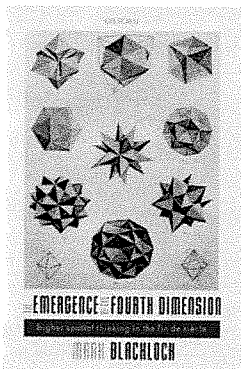
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epilogue that discusses some newer trends in the last thirty-plus years of the genre. The cut-off date of 1985 does feel somewhat halting, and this book will be most useful for those whose interest lies in sf developments pre-1985. However, Webb's text could easily and usefully be applied to later periods of sf, or other subgenres outside of hard sf, which is another of Webb's self-imposed limitations.

Webb's limitation to hard sf again follows his own familiarities in the genre, and he also tends to lean towards the sciences closest to his own expertise in physics. Most of the book considers ideas within the scientific contexts of physics and engineering, while other sciences like biology and ecology aren't as well represented. However, this limitation also allows Webb to play to his strengths. Webb makes an interesting point, for example, of distinguishing those technologies and ideas that prove relevant outside of fiction as those which were scalable. The tropes and ideas which have become a part of the future envisioned by sf are largely those technologies that were financially and intellectually suited to continued growth. Webb returns to this idea at the end of his book to explain why so much of the Golden Age imagination of the future has proved incorrect. According to Webb, it was an inadequate understanding of technologies that scale, like integrated circuits, as opposed to rocket technology. Overall, despite its limitations, Webb's method demonstrates the usefulness of maintaining a historicist background when dealing with popular tropes that have been defined and redefined by countless authors.

While scalability is an interesting solution to his initial questioning of sf's failed futures, it is the structure and thorough research of Webb's text that are most intriguing for further study. The set of tropes Webb discusses remain powerful influences on the genre today, so his more historical discussions aren't irrelevant to contemporary studies. Rather, *All the Wonders that Would Be* reminds us that each of these tropes and categories has a story and a history of its own, which needs to be considered in scholarly research to build on our own understandings of science fiction's past and futures.



Mark Blacklock, *The Emergence of the Fourth Dimension: Higher Spatial Thinking in the Fin de Siècle* (Oxford University Press, 2018, 256pp, £55)

Elizabeth L. Throesch, *Before Einstein: The Fourth Dimension in Fin-de-Siècle Literature and Culture* (Anthem, 2017, 222pp, £70)

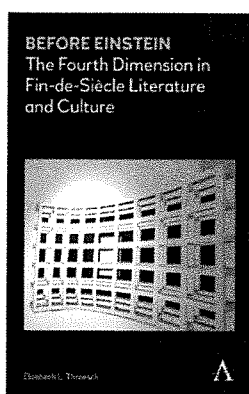
Reviewed by Paul March-Russell (University of Kent)

Robert Heinlein's 'And He Built a Crooked House' (1940), part comic fantasy, part cosmic horror, describes the construction of a life-size tesseract, a four-dimensional hypercube. Although the term is used loosely by writers as diverse as Alex Garland and Madeleine L'Engle, Heinlein's usage directly refers to the hyperspatial thinking of C.H. Hinton, a writer of interest to sf not least because of the title of his most famous book, *Scientific Romances* (1886). Hinton's popularization of higher dimensional mathematics counterpoints other theories in the period, derived from geology, biology and anthropology, which questioned an anthropocentric view of the universe. As such, these seemingly esoteric ideas from maths and physics fed into the creation of new ways of seeing humanity's relationship to the cosmos.

For thirty-five years, the go-to reference for understanding how the visual arts were transformed by thinkers like Hinton was Linda Dalrymple Henderson's magisterial study, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (1983). Now, within a year of one another, two further studies have been added that extend this line of influence to the role of literature within the same period. Although both complement one another, they take significantly different approaches to the same topic – and often the same authors. Consequently, both are invaluable in their contrasting ways to readers interested in how late Victorian physics came to influence both modernist and popular fiction. As such, both authors also build upon the pioneering work of cultural historians of science, amongst them Gillian Beer, Christopher Herbert and Alice Jenkins. (They also cite one another.)

Elizabeth Throesch's study, derived from her PhD thesis but also a series of articles including her 2004 prize-winning essay in *Foundation*, is the more traditional lit-crit of the two. The book is divided into two parts, the first of which focuses specifically upon Hinton. In the opening chapter, Throesch sets Hinton into context by looking, firstly, at how the certainties of Euclidean geometry came under scrutiny from mathematicians such as C.F. Gauss and Hermann von Helmholtz, and secondly, the formative influences upon Hinton of his father, James, a metaphysician and friend of John Ruskin, Hinton's tutor at Oxford. Of particular importance is Throesch's argument that Hinton drew directly upon Ruskin's ideas of the imagination: the desire to both possess and transcend the material object. Hinton's traversal of art and mathematics counterpointed both the scientific naturalism of figures such as J.J. Sylvester and the analogous play of novels such as Edwin Abbott's *Flatland* (1884). The next two chapters focus respectively upon the composition of *Scientific Romances* and two lesser-known works, *Stella* and *An Unfinished Communication* (both 1895). The former positions *Scientific Romances* in relation to other discourses of the period: abstraction, thermodynamics and epistemological uncertainty. The latter

develops Hinton's hyperspatial philosophy into an engagement with gender issues. *Stella*, a tale of invisibility that predates H.G. Wells, disappears its protagonist's physical form so as to prepare her for eternity in a four-dimensional reality. *An Unfinished Communication* engages with Nietzschean notions of self-transcendence and eternal recurrence, in which a feminized Nature is ultimately revealed to be a void: an abyss within the (masculine) powers of expression. Although Throesch responds positively to Hinton's use of female figures, his emphasis upon the unknowability of women echoes similar statements in the work of male contemporaries, most notably Sigmund Freud, as well as New Woman writers such as George Egerton.



The second half of the book offers three responses to Hinton's work. These include the correspondence between Hinton and the philosopher William James and, more indirectly, the fiction of William's brother, Henry. Of most relevance for sf readers, though, is the chapter on Wells. Throesch suggests that, in writing *The Time Machine* (1895), Wells would have already been acquainted with Hinton's thesis, but she also tends to overstate the latter's influence, rendering what is original in Wells as only an effect of Hinton's work. In particular, whereas Hinton regards the fourth dimension as a hyperspace that exists above and beyond our apprehension of three-dimensional space, Wells' Time

Traveller explicitly argues that the fourth dimension is not another space but time itself. Although, as Throesch rightly states, there are points of similarity between Hinton and Wells, it is this distinction that separates Wells' sf from other hyperspatial theories and which prefigures Albert Einstein's work on space-time. Throesch's primary focus, however, is *The Invisible Man* (1897) which she compares with Hinton's *Stella* and, which she argues, offers an emasculation of Griffin's male sexual identity through the act of becoming invisible. This act Throesch also associates with the uncanny and Wilhelm Röntgen's recent discovery of X-Rays. The narrative disruption by these framing devices which, for Virginia Woolf, produced a sense of incompleteness is read instead as a call to Wells' readers to achieve a higher consciousness. Whilst, in *The Invisible Man*, Throesch sees these techniques as prefiguring similar ideas in cubism, almost inevitably she concludes her chapter with *Boon* (1915): Wells' most caustic denunciation of the interiorized spaces favoured by his sometime friend, Henry James.

By contrast, Mark Blacklock takes a cultural historical approach to the topic, in which Throesch's book effectively becomes only one part of a much larger

narrative. Although Throesch makes reference to poststructural and postmodern theorists, such as Roland Barthes, Jean Baudrillard and Jacques Derrida, of the two, it is Blacklock's study which is the more theoretically sophisticated. Whilst he openly acknowledges the influence of his PhD supervisors, Steve Connor and Roger Luckhurst, Blacklock's methodology is most influenced by cultural historians such as Bruno Latour and Mary Poovey. Following Latour, talk of the fourth dimension is, for Blacklock, a 'knot' – an entanglement of competing and overlapping discourses – which, once pulled at, reveals the social, gendered and technological spaces that, for Poovey, constitute the human subject. Whereas Throesch closely examines Hinton's influence upon late Victorian fiction, Blacklock focuses on the idea of the fourth dimension so as to disentangle the discursive frames that shape our understanding of the *fin de siècle*.

Like Throesch, Blacklock begins with J.J. Sylvester's 1869 address to the British Association for the Advancement of Science, but in analysing Sylvester's text travels back to Immanuel Kant's conception of space as, on the one hand, inherently three-dimensional but, on the other hand, subject to individual experience with the possibility of higher dimensions. Blacklock then travels forwards, citing many of the mathematicians highlighted by Throesch, but also the rediscovery in 1881 by the Austrian philosopher, Robert Zimmermann, of Henry More's seventeenth-century notion of 'spissitude', an early mystical conception of hyperspace. Again, like Throesch, Blacklock pays attention to the issue of analogy but, whereas Throesch sees analogy as generating an interplay between mathematics and fiction, Blacklock views analogy and, in particular, the generative effects of misreading as producing slippages between mathematics and other kinds of cultural discourse.

This slippage forms, in chapter two, an interaction between mathematical theory and mysticism, in particular, J.C.F. Zöllner's patronage of the medium Henry Slade. Whereas other members of the scientific community sought to distance themselves from what they viewed as the chicanery of Slade's séances, Zöllner's advocacy of Slade in terms of hyperspatial theory drew support not only from scientists interested in psychical research, such as William Crookes, but also founding members of the British Theosophical Society, such as C.C. Massey, Slade's defence lawyer at his subsequent trial. Massey, furthermore, edited and translated Zöllner's work, such that Zöllner was (alongside Hinton) one of the most frequently cited authorities on hyperspatial mathematics.

Having demonstrated the blurred boundaries between science and mysticism in chapter two, Blacklock next turns to a use of analogy more in keeping with Throesch's study, and a detailed account of Abbott's *Flatland*. Blacklock reviews both contemporaneous and more recent responses to the novel, concluding

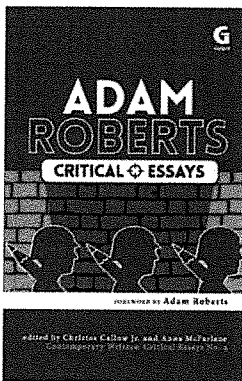
that an approach more in keeping with sf criticism, which emphasizes the ludic over the satirical aspects of the novel, is more appropriate. To substantiate this point, Blacklock not only takes to task critics who overemphasize the earlier parts of the novel but also lists a series of playful precursors from Erasmus Darwin to Lewis Carroll. Blacklock focuses on the second half of the novel, 'Other Worlds', examining how Abbott foregrounds the idea of analogy so that the novel draws attention to its own fictiveness – an analogue in itself of the many worlds that surround both reader and text. This 'other-worlding' of the novel not only, as Blacklock notes, indirectly comments on the contemporaneous 'art of fiction' debate between Walter Besant and Henry James but also contributes to *Flatland's* multivalency – its endless interpretability not least, as Blacklock shows in the next chapter, by C.H. Hinton.

Chapter four, then, most dovetails with Throesch's study. Like Throesch, Blacklock emphasizes the influence of Hinton's father but does so primarily in order to enumerate the wide cultural network that the Hintons were part of, and the connections between the son's mathematical theory and his father's metaphysical beliefs. Blacklock pays especial attention to the eclectic list of works sold by Hinton's publisher, Swan Sonnenschein, and to his acknowledgement of Abbott's *Flatland*. Unlike Throesch, Blacklock gives much more space to Hinton's *A New Era of Thought* (1888) and to the proposed educational programme for preparing his readers for a four-dimensional consciousness, including the construction of the tesseract. Whilst Blacklock compares Hinton's system with other historical manifestoes of education, and sees in the making of the hypercube another kind of Latourian discursive knot, Blacklock foregrounds the mystical aspects that Throesch tends to leave in the margins. This leads into chapter five's discussion of the Theosophical Society, looking closely at figures such as Madame Blavatsky, Edward Carpenter and W.T. Stead, and the version of hyperspace (out of Zöllner) that featured in their writings but which also complemented the transcendent aspects of Hinton's thesis.

The final chapter offers a taxonomy of how *fin-de-siècle* fictions, most of which would come under the umbrella term of 'fantastika', mediated this new hyperspatial reality that (following Isobel Armstrong) contrasted with the Kantian spaces that dominate in mid-century realist texts. Blacklock's taxonomy includes mirrors, portals, bodies, possessions, form, fear and empire, whilst his range of examples come from such authors as Algernon Blackwood, Joseph Conrad and Ford Madox Ford, George du Maurier, George Griffith, William Hope Hodgson, George MacDonald and H.G. Wells. The one wrinkle is that Blacklock also includes the work of US-based authors such as Ambrose Bierce, Mary Wilkins Freeman and H.P. Lovecraft. Although the critical literature that Blacklock surveys would have been disseminated to the US, to introduce US-

based writers without a sense of their own cultural and historical contexts into a study that is predominantly British slightly jars. It does so because it is the one time that Blacklock is anything less than specific.

Whilst Blacklock is the more wide-ranging, Throesch is the more concentrated. To choose between them is a fool's errand. Instead, they have jointly asserted that hyperspatial theories are another key factor, alongside Social Darwinism, thermodynamics and machine technology, for understanding the scientific basis of *fin-de-siècle* hopes and anxieties. In doing so, they have also shown that the study of popular fiction, such as scientific romance, is equally integral alongside the works of aesthetes, naturalists and impressionists. For readers engaged in the late nineteenth century, and the emergence of both modernist and middlebrow cultures, Blacklock and Throesch are essential authors to read.



Christos Callow Jr. and Anna McFarlane, eds.
***Adam Roberts: Critical Essays* (Gylphi, 2016,**
237pp, £17.99)

Reviewed by Kevin Power (Trinity College Dublin)

To call Adam Roberts one of contemporary sf's most important *thinkers* is probably uncontroversial – he has made substantial contributions to genre history and scholarship, producing monographs as well as histories, and publishing abundant criticism in a panoply of venues, both academic and otherwise. But to call Roberts one of

contemporary sf's most important *writers* might require some argument. His novels are not bestsellers. His showing on award ballots has been intermittent. He has attracted little in the way of formal criticism. Since the publication of *Salt* (2000), Roberts's sf has tended to provide a relatively small coterie of admirers with a range of austere pleasures. His importance to sf, in other words, is not a given. This is why the appearance of this book is to be welcomed – if not, to some, a surprise. Across ten essays and an introduction, the collection mounts a sustained argument in favour of Roberts' pre-eminence as a shaper of new-model fictions.

The chief reflection provoked by these pages is that Roberts' work expands the remit of sf – frequently, and often erroneously, described as 'a literature of ideas' – to include the history of ideas as such. Thus the *sf données* of Roberts' work are as likely to come from the fields of aesthetics, ethics, politics and history as they are from the sciences, hard or soft. To take one example: *The Thing Itself* (2015) treats Immanuel Kant's transcendental philosophy in the