**PRESENTING FUTURES PAST**

**Science Fiction and the History of Science**

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This volume of *Osiris* had, as its inspiration, the question of what science fiction could do for the history of science. Or, to put it another way, to what historiographical, intellectual and pragmatic uses have historians of science put science fiction, and how might these strategies develop in the future? Initial efforts to answer these questions were sketchy, to say the least: despite the fact that the intellectual significance of fiction, literature and the imaginaries has increasingly been recognised by the humanities in general and by science studies in particular, science fiction itself has seemed – until recently – to remain on the disciplinary sidelines.[[1]](#footnote-1) However, in the past few years, this has begun to change. Panels on science fiction (SF) have begun to appear at conferences organised by societies devoted to different aspects of the history and cultures of science, symposia and workshops that have as their focus the relationship between SF and science studies have been held, and the role that science fiction plays in both lay and professional understanding of, and engagement with, scientific knowledge is being seriously interrogated by scholars. This volume of *Osiris*, then, sought to bring together scholars involved in these recent developments to consider how the history of science should position itself in relation to SF.

The first question that might be asked is why? Why should historians worry about stories – fantastical, fictional accounts – of the future? There are a number of reasons – but the most important is this: the future itself has a history, and that history is deeply entangled in the relationship between science and society.

*Wanted – Professors of Foresight!*

Efforts to predict and assess the future are almost certainly as old as humanity – but modern attempts to do so in an organised and systematic fashion probably date back to H G Wells’ call in 1932 for ‘Professors of Foresight’, whose job it would be to prepare the country for the changes that would be wrought by technological and scientific development. In one of his many BBC radio broadcasts, Wells used the history of the motor car to illustrate the consequences of improved communication and transport technology, both desirable and unintended: alongside the facilitation of commerce, industry, and the opportunities for contact between kith and kin came, he claimed, the destruction of the railways, the congestion of the towns, and the emergence of the ‘motor bandit’. It was now possible, as he pointed out, to be doing murder in Devon at midnight and be taking breakfast in Birmingham the next morning.[[2]](#footnote-2) Nothing, he felt, was being done to anticipate or to prepare for the staggering social, economic, or political dislocations that accompanied technological and scientific change. Of course, this broadcast was neither the first or the last of Wells’ efforts to awaken his fellows to the need to think about the future – his *Anticipations of the Reaction of Mechanical and Scientific Progress Upon Human Life and Thought: An Experiment in Prophecy* had been serialised in the *Fortnightly Review* from late spring 1901, and his *The Shape of Things to Come* was to appear in 1933 – but this was one of the first times that someone had called for the institutionalisation of the systematic, scientific study of the future.[[3]](#footnote-3) Wells wanted, understandably, to make imagining the future respectable.

Wells was a prolific writer and commentator in many genres, but he is, of course, best remembered today for his science fiction work. Books such as *The War of the Worlds* and *The Island of Dr Moreau* retain their purchase on the public imagination in the West, even if – like Shelley’s *Frankenstein* – they operate now more as cultural resources than novels. Together with Shelley and Aldous Huxley, Wells is often treated as one of the progenitors of the genre of SF, credited with establishing classic themes to which later writers would return and reimagine. But what’s notable about all three figures is not whether they predicted the emergence of biotechnology, interplanetary travel, rapid communication or artificial reproduction. Science fiction is not prophecy, and any lucky hits can only be recognised retrospectively and serendipitously. What’s important is that all three writers reflected a particular understanding of science that emerged within a given social context. The key point is that they situated and explored their scientific imaginings within a lived social world. While arguments about the coproduction of science and society might be a philosophical step too far for Wells – although it might be interesting to revisit his Martians from an actor-network perspective – the core of his approach, his stress on the necessity of situating scientific, medical and technological changes in their social, political, cultural and economic contexts, clearly shares the philosophical and empirical approach of large areas of the history of science.

This makes it all the stranger, then, that historians of science have, historically, paid relatively little attention to science fiction. Partly, we would suggest, this has to do with this very question of ‘respectability’: science fiction has traditionally struggled to be acknowledged as a legitimate genre of creative expression. As Kingsley Amis famously quipped, ‘ “SF’s no good!”, they bellow till we’re deaf – and if it’s good, then it’s not SF!’.[[4]](#footnote-4) SF in the popular imagination can often mean tentacled monsters, knights battling with lasers rather than swords, and brains in jars: certainly, any examination of the (early) iconography of SF might reinforce such assumptions.[[5]](#footnote-5) Engagement with the content, however, will tell a different story, as this volume will show.

But it is important to note that this relative neglect is also related to the more general problems faced by scholars who want to study events that either have not yet happened, or will never happen outside the imagination. The ongoing methodological and philosophical problems and challenges faced by practitioners of counterfactual histories are a case in point.[[6]](#footnote-6) Efforts to write ‘what if’ history can, like Wells’ call for Foresight, be dated to the early 20th century, with the appearance of *If It Had Happened Otherwise*, edited by J C Squires and including essays by Hillaire Belloc, Andre Maurois and Winston Churchill among others.[[7]](#footnote-7) Little serious attention was paid to the field, however, until Geoffrey Hawthorn published *Plausible Worlds* in 1991, outlining and exploring three different counterfactual scenarios and prompting an ongoing historiographical debate concerning the methodological significance of this kind of ‘virtual’ history.[[8]](#footnote-8) Of course, counterfactual histories have their counterparts in alternate history, a major sub-genre of science fiction, and have also played an interesting role in some recent histories of science.[[9]](#footnote-9) In fact, recent years have seen a series of significant and substantive shifts in the attitude of scholars towards these exercises of the imagination, both in relation to thinking about and planning for the future, and in relation to the way in which fiction, literature and the not-real are treated by scholars more broadly.

*Fiction and the Future*

The study of fiction is clearly now a well-established part of the remit of the humanities in any number of ways. In the first instance, it has been a key source of data. Anthropologists, geographers, historians and sociologists alike have mined the novels of particular times and places for information about habits, practices, manners and mindsets, for ephemeric information about fashion as much as for a sense of the variety of uses to which railway timetables were put.[[10]](#footnote-10) Historians of science have also made use of literature and fiction as data, not least as a means of accessing the ways in which contemporaries understood and acted upon science and technology in both theory and practice – but as Charlotte Sleigh points out and as we have already noted, science fiction has not historically been included within the category of ‘literature’.[[11]](#footnote-11) However, fiction has not just been of interest as a source of data. The structures of fiction – the use of narrative, the deployment of rhetorical devices – has also drawn sustained scholarly attention, as have the wider practices of fiction, and in particular, their political and conceptual deployment.[[12]](#footnote-12) Since the late 1970s, narrative in particular has been a key focus of critique from both anthropologists and historians alike, as they have identified the slippage from telling ‘a’ story to telling ‘the’ story: for both disciplines, unproblematized use of narrative structures tends to wend worrying close to claiming the status of objective neutrality. Hayden White’s deservingly influential analysis of the role of narrative in historical writing charted the way in which this style enabled the author to make reality meaningful.[[13]](#footnote-13) Just as White had treated history as literature, James Clifford and George Marcus’ *Writing Culture* (1986) took the same approach to ethnography, showing the situated and subjective nature of its production across time and space. Historians and sociologists of science have taken inspiration from this approach, showing how narrative in science writing can imbue the account with an air of omniscient objectivity: as Curtis put it, ‘you begin with unanswered questions, and end with unquestioned answers’.[[14]](#footnote-14)

But perhaps of most interest for this volume is the gathering body of interest in fiction as practice, in particular the capacity of social collectives to invent both past and future. Interest in this aspect of the imaginary stretches from at least Benedict Anderson’s *Imagined Communties* or Eric Hobsbawm and Terence Ranger’s *The Invention of Tradition* (both appearing in 1983), to Sheila Jasanoff and Sang-Huyn Kim’s more recent *Dreamscapes of Modernity* (2015). Anderson, Hobsbawn and Ranger all dealt with the capacity of communities – usually nations – to moralise (to draw on White’s term) their histories, to create a narrative of the past where veridical reality was relatively irrelevant. What mattered for the present was the collective commitment to the possibilities of the past. Jasanoff and Kim’s development of the concept of the ‘sociotechnical imaginary’ applies, in contrast, to visions of technological and social futures. In their definition, these imaginaries constitute ‘collectively held, institutionally stabilised and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology’ (2015:4). Not limited to nation-state formation, they could be supported and sustained by corporations or social movements – but crucially, they needed to be collectively held, encapsulating both the hope of progress and the fear of harm. What unites all three of these contributions, among many others, is their willingness to treat the imagination not as an exercise in fantasy or daydreaming, but as something that is done. The imaginary here is treated as organised work and performed social practice: it is aimed by practitioners at a clear, if sometimes unacknowledged, purpose.

In contrast, future studies and futureology, together with related fields such scenario planning, are more concretely aimed at developing a clear vision of potential futures, usually focused at global, corporate or local level. Although Wells’ call for Professors of Foresight had initially fallen on stony ground, by the late 1960s and early 1970s, future studies had become an established part of the intellectual landscape. Crucially, however, its background and influence stretched far outside the academy. Just as Wells’ original *Anticipations* had earlier caught the public imagination, becoming his first non-fiction bestseller, so Alvin Toffler’s 1970 bestseller, *Future Shock*, demonstrated that futurology retained its traction on the public imagination. Additionally, the period between the 1930s and 1970s was marked by increasing governmental interest in the concept of future planning, at least on the part of European nations engaged in post-war reconstruction and development. Futures studies thus had an immediate political and policy-oriented audience, together with specific methodological strategies for developing a detailed, if not necessarily comprehensive, framework within which to construct future policies. For the general public, for governments, for NGOs and for corporations, this kind of pragmatic planning for the future was both practically essential and of abiding interest.

Futurologists were not, however, the only members of the academy actively working on mapping out – and sometimes destabilising – visions of what was to come. As early as 1971, Margaret Mead had published her ‘Note on contributions of anthropology to the science of the future’, encouraging anthropologists to focus on the future as well as the past and present of the societies they studied. Anthropologists had also argued for their discipline’s potential to contribute to prospective alien contact and space colonisation.[[15]](#footnote-15) Later attention focused on sustainability alongside extra-terrestrials, but as Appadurai pointed out, since the core focus of anthropology tends to be continuity rather than change, such efforts were unlikely to gain much purchase.[[16]](#footnote-16) In contrast, geographers and sociologists have been rather more successful in establishing and retaining an (inter)disciplinary focus on futures.[[17]](#footnote-17) However, for historians – with a few prominent exceptions – the future and its past tended not to appear on the discipline’s agenda.[[18]](#footnote-18) Historians of science have been equally restrained.

From these two different perspectives – the study of fiction and the imaginary, and the efforts to develop concrete, practical plans or possibilities for different futures – one can see why science fiction should be the increasing focus of scholarly attention. The field of science fiction studies has done admirable work in showing, to those who were prepared to see, that bug eyed monsters were not necessarily characteristic examples of the genre’s intellectual and methodological complexity. Journals such as *Science Fiction Studies, Foundation* and *Extrapolation* have analysed, examined and interpreted the ways in which SF has deployed metaphors of machine, infection and laboratory, the contributions that it has (sometimes not) made to the public understanding of science, and the relationship between social structure and the technoscientific imaginary. Refusing to be tied to the Anglo-American centres of intellectual activities, they have specifically examined the different national and ethnic traditions of SF as well as reaching out beyond the book to consider how science, technology and medicine are deployed as source, resource and prize in games, films, comics and apps.The fact that, until very recently, there have been only limited efforts by other areas of the academy to engage with this is surprising – the fact that historians and sociologists of science have largely ignored the field is to be deeply regretted. This volume of *Osiris* hopes to remedy this situation.

*Science, History of Science and Science Fiction*

At the most basic level, science fiction should be of interest to historians of science because the two ways of knowing the world have so much in common. Like history, SF is committed to the (re)construction and exploration of an unfamiliar and often alien world; it focuses on the impact that developments in science, medicine and technology have on political, economic and cultural relationships; and it is intensely and critically aware of the different ways in which the social (class, gender, race, sex, species) has inflected the experience of the scientific in past, present and future. It is, in short, a key source of social critique in contemporary technoscientific society and, as a result, concepts, themes and strategies drawn from SF have come to be far more widely used in mainstream culture. Haraway, Baudrillard and other post-modern, feminist theorists have used SF tropes to develop their analysis, and much of the mass media consistently relies on SF referents (‘Frankenfoods’, ‘cyberpunk’, ‘warp drive’) to communicate new scientific developments to the public.[[19]](#footnote-19) It is also part of the framework through which scientists themselves experience their research, as Lisa Messeri’s fascinating ethnography of planetary science documents. Not only was Kim Stanley Robinson frequently referenced in the Mars simulation experiences, but the crew of the Arctic simulation took a photograph of themselves restaging one of space-artist Pat Rawlings’ Mars paintings, thus themselves creating ‘a present depiction of a future of the past’.[[20]](#footnote-20) At the very least, therefore, historians of science should be able to use SF as a source of data on how different groups accessed and apprehended different aspects of scientific, technological and medical material and concepts, as well as how these relationships changed over time. But as the papers included in this volume will show, the potential synergies between SF and the history of science go much more deeply than this, and have far greater epistemological, political and pedagogical potential.

But before examining this assertion in more detail, we would like to draw attention to some key absences in this volume. In the first place, we have largely concentrated on the fictions and sciences of the 20th and 21st centuries. Although the papers by Morus, Willis and Raphals touch on earlier periods in the United States, Britain and China, for the most part this collection focuses on work published in the last hundred years or so. This does not mean that we treat SF either as synonymous with modernity, or as a modernist product[[21]](#footnote-21): studies of medieval SF, as well as studies of pre-modern, medieval and early modern futures have clearly shown the genre’s capacity to stretch time on more than one level[[22]](#footnote-22). More problematically, especially given the significance we attach to SF’s capacity to act as cultural critique, we have also chosen not to explicitly foreground race, gender or sexuality as key themes in this collection. Individual essays (Milam, Radin, Garforth) touch on feminist critiques of SF, while non-Western SF is discussed in a number of contributions (Isaacson, Krementsov, Mukharji, Raphals) – but we have not included, for example, an analysis of Afrofuturism and the history of science. This is not because we consider these issues insignificant – for one thing, the connection between white masculine dominance of STEM fields and the presumption that SF (historically at least) was both for and about white men, seems very clear.

But are these presumptions accurate? Or do they reflect the problems in defining science fiction as a genre, problems which stem precisely from its relationship with ‘real’ science, and the centrality of the role played by science as (an? the?) ultimate arbiter of knowledge in Western society? This plays out in different ways in relation to both race and gender, with white women and fans assigned certain roles and places within the history of science fiction, while black people are sometimes written out of the story altogether. So, for example, one of the editors of this volume (Rees) finds herself in the same position as SF critic Justine Larbalestier: reading science fiction growing up, ‘I had no idea that science fiction was generally considered to be a ‘boy’s own’ genre’.[[23]](#footnote-23) Histories of the genre have tended to locate the institutionalisation, if not the origin, of Western SF in the appearance of the American SF magazines associated with Hugo Gernsback in the 1920s,[[24]](#footnote-24) with women entering the field in large numbers only with the rise of second-wave feminism in the sixties and seventies. But as Larbalestier shows, female readers were engaging with SF from the very first appearance of Gernsback’s *Amazing Stories* in 1926. By the sixth issue, a clearly surprised Gernsback could boast that ‘a great many women are already reading the new magazines’, quoting readers who describe their wives ‘anxiously waiting’ for their turn to read the latest issue.[[25]](#footnote-25) In fact, although Larbalestier herself does not make this argument, it is rather tempting to see the masculinisation of SF as produced through the textual performances of particular fans: one Isaac Asimov, for example, consistently portrayed himself in the magazine letters’ pages as besieged and victimised by females trying to impose their version of SF on him, and actively campaigned for their exclusion.[[26]](#footnote-26) Clearly, women have read and written SF from the earliest days – but distinctions such as those drawn between ‘hard’ and ‘soft’ SF (mirroring the ‘hard’ and ‘soft’ sciences) meant that their work, and their influence, could be treated as peripheral to the ‘real’ work being done by the genre. Many women both felt and were marginalised in the history of SF, and clearly many men felt threatened by their presence – even as those who identified with either or neither category were finding ways of exploring alternative conceptualisations of sex, sexuality and identity within the genre.[[27]](#footnote-27)

The role of race and ethnicity is harder to deal with, not least because of both of the editors of this volume are white. If issues of gender were pushed to the margin, then questions of race were often treated as invisible, even when – to 21st century white eyes at least – they seem glaringly obvious. Even when the humans of the future seemed all white, the way that they described and treated robots or aliens were clearly racially coded, as numerous critics have shown.[[28]](#footnote-28) The emergence of a category of individuals that were – by virtue of their physical appearance – perpetually relegated to servant/serf/slave status, or an encounter with a group which – representing an existential threat to humanity – must be eradicated root and branch, clearly reflect European and Euro-American attitudes to other human societies in both past and present.[[29]](#footnote-29) In fact, as John Rieder has suggested, it is just as valid to see SF as the product of colonialism and empire, as it is to treat it as the literature of modernity.[[30]](#footnote-30) What’s particularly interesting here, however, is the extent to which explorations of race and the future by non-white writers continue to be treated as either liminal to, or distinct from SF. So, for example, the science fiction stories of W E B Du Bois, despite appearing in his autobiographical writings, remained largely obscure for the best part of a century.[[31]](#footnote-31) A similar process can be seen alongside the recognition of black techno-culture as self-conscious Afrofuturism in the 1990s,[[32]](#footnote-32) where the fact that Afrofuturism is expressed through music, art and gaming, as much as through textual or digital narratives, can be used to distinguish it from traditional Eurocentric SF, again with a stress on the need for direct engagement with the hard sciences.[[33]](#footnote-33) Importantly, as we will suggest later on, it is precisely because of this that it might represent an even more fruitful source of methodological innovation for those historians of science who recognise its relevance to their interests.

So, one key message from considering the role that race and gender have played in the history of SF is that the question of what ‘counts’ as SF is important, having implications for the status of ‘real’ science. It is a question that has bedeviled the genre since it was recognised to exist, even within the Euro-American tradition, as readers and writers contested the texts that would become canonical in particular versions of SF’s history.[[34]](#footnote-34) It was vigorously debated by fans in the letters pages of SF magazines, carefully discussed in talks and editorials by writers in the genre, and even questioned at UNESCO meetings, as the papers by White & Sleigh, Rees, Radin and Bowler demonstrate. If one looks outside the West – as with, for example, the materials examined by Isaacson, Mukharji, and Raphals – then the boundaries of the genre become even more porous and negotiable. One could treat this as simply a matter for the writers, readers and critics of SF to analyse and assess – were it not for the fact that deciding whether something ‘is’ or ‘is not’ science fiction has crucial implications for epistemological debates surrounding the relationship between Western science, knowledge and truth.

*What is Science Fiction?*

We do not want to define SF in this introduction – indeed, one reason for using the abbreviation ‘SF’ is to broaden the range of material covered (speculative fiction? Slipstream fiction?). But we do want to draw attention to the relationship between SF and the real world, which we believe is a key element in understanding the genre’s shape and its cultural influence. SF is fiction. But it is not fantasy. This distinction may seem pedantic, but it is absolutely central to the genre’s intellectual potential and its capacity to contribute to the history of science. There have been many different efforts to define SF and to draw distinctions between it and other genres, but very early on, Darko Suvin pointed to the fact that, characteristically, SF tended to contain a ‘novum’, or ‘new thing’.[[35]](#footnote-35) This could be a wormhole or a space station – possibly a ‘Big Dumb Object’ even[[36]](#footnote-36) – a neuroactive chemical that either enhanced or inhibited intellectual or emotional response, a self-aware mainframe or a swarm of nanobots – it could even be a talking dragon. But if the story was to be SF, rather than fantasy, horror or fairy story, then there needed to be a coherent explanation that either accorded with current physical laws, or could be plausibly extrapolated from likely future developments. That is to say, Anne McCaffery’s *Dragonflight* (published in 1968, involving talking dragons) is, according to this interpretation, undoubtedly fantasy, while her *Dragonsdawn* (published in 1988, involving intelligent dragon-like creatures being bio-engineered from small, flying lizards as part of a human colony’s biological adaptation to a new planet) might, at a stretch, be defined as SF. While it’s important to remember that by distinguishing between fantasy and SF in this way, we are implicitly accepting a hierarchical valuation that ranks fantasy as less intellectually worthy than SF, we do believe that – for the purposes of the history of science – it is a distinction that we need to make.

For our purposes, while science fiction does not need to represent or reflect empirical *reality*, where it conforms to an empirical *methodology* that is based on the author’s understanding of present scientific and technological practice, then it becomes both relevant to, and inspiring for the history of science. The extent to which this needs to be an *accurate* understanding is, however, a matter for debate. Not all writers or readers would accept the dictate of Fred Hoyle, astronomer and SF writer, which he laid down in an interview with the British newspaper, *Sunday Dispatch* in March, 1958:

‘Novels based on science… must cross the bounds of probability at only one small point. Otherwise they will not be consistent with reality. Only a scientist nowadays can gauge where he (sic) can safely make that break. A scientist can usually judge where a lay writer has gone wrong – and these days, so can a lot of the public. If a chap doesn’t want to make a fool of himself on the bookstands, he’d better take a few years off and pick up a degree’[[37]](#footnote-37)

Writing at roughly the same time, another British astronomer, Patrick Moore, would have agreed – the British novelist, John Wyndham would not.[[38]](#footnote-38) Fifty years later, the Canadian writer Margaret Atwood tried to position her books (*The Handmaid’s Tale*, *The Year of the Flood*) in relation to genre: they are not realist novels, she argues, but nor are they ‘science fiction’. Instead, they are ‘speculative fiction’. Why the distinction? Because ‘science fiction’ deals with ‘tentacled Martians shot to Earth in metal canisters – things that could not possibly happen’.[[39]](#footnote-39)

All four authors are struggling with the same issue, which is central to the relationship between history of science and science fiction. First, despite being fiction, SF can’t just be made up. It must at some level reflect a scientific, realistic understanding of the world as it tells a story that could, plausibly, eventually come to pass. Second, that these understandings will change over time, whether or not the predictions of individual writers prove to be accurate, or come to pass. In 1865, it was plausible that a space gun might shoot people to the moon. In 1895, it was possible that life might exist on Mars. The fact that Verne and Wells included in their novels information and experimental practices that have since been shown to be incorrect or inappropriate does not mean that they are not valuable sources for the historian interested in considering how people – especially people who were not professional scientists – thought about and used scientific concepts, methodologies and institutions. As such, as we argued at the outset of this introduction, at the most basic level, SF represents an important source of data for those interested in how different publics understood different kinds of science at different times. This is, for example, how the authors in the section ‘Mediating Science’ are deploying the genre. Morus uses the imaginary ‘telectroscope’ to examine attitudes to electricity and the future amongst different communities at the turn of the previous century. Krementsov shows how a scientist in Bolshevik Russia used science fiction to transform specialised biomedical knowledge into a broader cultural resource that other scientists, journalists and writers could use to create both hope and fear for the future. Kirby examines the way that SF films deployed evolutionary and Darwinian concepts, to show how different groups sought to control the meaning and morality of evolution in US culture. Raphals asks a rather different question, which returns us to the broader political question raised by these discussions of SF: what would modern Chinese SF look like, if it had taken – or took – indigenous Chinese natural philosophy seriously?

This is, of course, the unspoken assumption at the heart of the ‘realism’ of Western SF: to what extent is Western science to be treated as the ultimate arbiter of knowledge? The empirical definition given earlier implicitly downgrades ‘fantasy’ as inferior in comparison to SF because of its non-realist nature: the relationship between ‘fantasy novels’, ‘science fiction’ and ‘magical realist literature’ is often contested precisely because of this question. So how should imaginative explorations that reflect indigenous (that is, non-Western) traditions of interacting with and attempting to manipulate the non-human world be treated, especially if they don’t operate according to a human/non-human binary? The Afrofuturist novelist Nalo Hopkinson, for example, defined ‘speculative fiction’ as the literature that examines the impact that tool-making has had, and will have, on human societies.[[40]](#footnote-40) What might historians of science learn about non-Western attitudes to nature by examining indigenous fictions of the near and far future?

*The History of the Future*

But the question of accuracy and plausibility is still central to the relationship between history of science and science fiction, as the papers in the section ‘Delineating Science’ show. Both Bowler and Isaacson focus on the relationship between popular science and science fiction, and the concern with understanding the role that science could play in creating a better future by educating young and old. Isaacson examines the relationship between Western science, the notion of social ‘progress’ and indigenous forms of fiction in China in the 1950s. Bowler considers much the same period in Britain, looking at both the extent to which writers sought to warn the public about the dangers of new technology, and the relationship between scientific accuracy and entertainment in the inspiration of the next generation of scientists. Mukharji investigates the extent to which Bengali writers used Western-inspired SF to challenge European intellectual authority, creating a post-Western universalism in which modern scientific knowledge was shown to have been prefigured in indigenous knowledge of nature. Slocombe presents intellectual historians and historians of technology with a challenge by showing how certain computer games both implicitly and explicitly provide their players with a profoundly deterministic approach to both technology and the history of civilisation. Examining the lessons that can be learnt about how different technologies develop, and how they relate to the notion of ‘civilisation’ from the game ‘*Civilisation*’, he asks whether these should be borne in mind by those presenting ‘professional’ history of technology to the public? One might also like to consider this in the broader context of the engagement of science and the public, and the kind of work that has been done on the category of ‘popular science’ as a genre in and of itself: will we need to do the same work in apprehending the plausibility and accuracy of popular history? Does it matter if the material is inaccurate, as long as it inspires the next generation of historians?

Although every paper in this volume deals, in one way or another, with dreams about the future, the papers in ‘Inspiring Science’ take this as their particular focus. In different ways, each of them examines strategies for thinking about or actively creating the future, dealing with professional scientists, politicians and the lay public. White and Sleigh examine the culture of SF fandom in Britain in the period immediately before and during World War II, showing how fans debated the definitions of science and science fiction, and how they used SF as a means of formulating and formalising their ideas of the future – something that was especially important during the years of conflict. Milburn and Milam both deal – in different ways – with the impact that SF had on both the human future and the nature of scientific development. Milburn shows how Gerald Feinberg was inspired to think about tachyons by reading SF, and demonstrates the extent to which SF represents a set of conceptual and practical resources for scientists when it comes to constructing thought experiments. Milam looks at the relationship between fiction, evolution and feminism in her examination of the ways in which Elaine Morgan’s popularisation of the Aquatic Ape theory – a dramatic reworking of the understanding of humanity’s evolutionary past – enabled writers and scientists to develop new models and narratives of human futures. Both authors demonstrate, with absorbing clarity, the difficulty of charting the line between fiction and science, real and not-real, in these episodes. Garforth’s study is, unfortunately, all too real, as she shows the centrality of science fiction to the understanding of ecological crisis. Moving between science, sociology, popular science and fiction, she models the different ways in which thinking science-fictionally about ‘catastrophe’ can impact the understanding – both popular and political – of ‘crisis’, both in relation to the history of ecological sciences and at the present day . We may indeed live long – but will our children prosper?

Here, we arrive at what we believe is perhaps the most important reason why historians should consider serious engagement with SF – and that is the affective, emotive capacity of the genre. SF does not just extrapolate from present technological or scientific trends, but places these developments within a moral universe, unsettling its audiences’ sense of the everyday while enabling them to recognise the fundamentally familiar within the apparently strange. It is a genre based on the habitual deployment of the sense of cognitive estrangement, usually delivered via technoscientific means (the novum), such as a clock that strikes thirteen, a rather simian looking Abe Lincoln or a computer with a split personality.[[41]](#footnote-41) The crucial point here is that these sometimes-dramatic technical or physical estrangements have – and are immediately shown to have had – important, even if apparently infinitesimal, influences over other aspects of human life and interaction. Changes to the physical landscape are produced, or imply, or demand, changes in the social contract. Different social structures influence the kind and type of scientific and technological change within their frameworks, as novelists as diverse as Ursula Le Guin, Adam Roberts, C J Cherryh and Stephen Baxter have demonstrated.[[42]](#footnote-42) SF authors long predated Bruno Latour and Michal Callon in assuming equivalences between human and non-human actors, as well as in their exploration of different kinds of agency in action – collective, vari-located, sometimes chronologically dislocated – and importantly, without ever losing sight of the fact that power tends to be differentially distributed both within and between groups. In many ways, we would want to argue that SF is a form of STS in action, and one that has been far more effective in engaging the public imagination than has the history of science.

The papers in the section ‘Applied (history of) Science’ deal with different aspects of this question. Rees and Radin examine the work of (respectively) SF authors John Wyndham and Michael Crichton to show how both focus on understanding ‘science-in-the-making’ and the complex interdependence and co-production of science and society. Both wonder what impact these writers would have had, if they had undertaken academic, rather than literary careers, and both examine the extent to which SF writers bear, and are aware of, a wider social responsibility to democratic debate in societies dependent on the operation of expertise and technocracy. Servitje analyses the operation of narratives of apocalypse in relation to the rise of anti-microbial resistance (AMR), showing how a gaming app developed to teach the history of AMR both recapitulates that history (encouraging players to see this as a battle between bacteria and humanity) and challenge it (the only way to not lose is to learn to live with the bugs). In this way, he demonstrates strategies through which ludological practice can both mirror and subvert historiographical understanding. Willis also focuses on methodologies, using literary analysis alongside ethnography to understand how different communities have understood sleep. Asking whether we can, in fact, do STS science-fictionally, he combines the practices of different temporalities in order to show how both past and future can be put to work to broaden and deepen the understanding of the present.

*The Future of the History of Science?*

In many ways, this sums up the hope and desire of the editors and contributors to this volume of *Osiris*. Historians of science should engage with SF because these imaginary explorations of how changes in knowledge and developments in technique influence changes in social organisation, which in turn provides the context within which scientists, engineers and technicians work. That is to say, while we argue that SF represents a crucial resource for understanding the historical relationship between the sciences and their different audiences, we also want to suggest that, as a model for historical understanding, it warrants serious historiographical attention. In parallel with recent efforts by scientists to engage with the public, SF has sought to recognise and to deploy scientific knowledge and practice through a multiplicity of genres and media. Historians of science, with its focus on the written text, would do well to consider how they might also widen their intellectual focus in a digital age, both in terms of producing and communicating their work. This is particularly important when the potential pedagogic role of SF for the history of science is taken into consideration, and when issues of power and influence are considered in the light of the different approaches to defining SF, especially in relation to race, gender and sexuality.

There are four principal trajectories along which the authors of these papers have aligned their investigations of the relationship between SF and the history of science. They have considered how SF has been used to investigate the cultural status and authority afforded to the category ‘science’ at different times and by different human communities – that is, they have looked at how SF has **delineated,** or defined,science and the scientist. They have examined the role of SF in exploring specific scientific disciplines, topics or cultures and in moving scientific concepts, methodologies and practices between wider cultural arenas – in other words, they have considered SF, in all its different formats, as a means of **mediating** science. They have explored what SF can tell us about the histories of how different communities have envisaged their futures, and thus how it conveys the socio-scientific concerns of past presents – how it has **inspired** different futures. Finally, they have investigated how SF has and could function as a resource through which historians and laypeople alike can conceptualise the context and consequences of scientific change – or, how SF might be considered as **applied** history or sociology of science, and used to develop a greater variety ofmodels and practices for understanding science in society. These imaginary explorations of the futures contained within different times and places are themselves experiments that have consequences, both for the present-day and for the time to come.

1. The authors would like to thank *Osiris* editors Patrick McCray and Suman Seth for their intellectual and emotional contribution to this volume. Their critical commentary was enormously useful and very productive. We are also tremendously grateful to the anonymous reviewers for the staggering amount of work they put in to providing thoughtful, helpful and stimulating feedback to each of the essays contained herein. Additionally, the participants at the ‘Imagining the History of the Future’ conference, held at the University of York in March 2018 played a crucial role in developing our thinking about the future, as were the rest of the Unsettling Scientific Stories team – especially Sam Robinson – and we thank them. Finally, we acknowledge with deep gratitude the financial support of the Arts and Humanities Research Council of the United Kingdom, without which neither the conference, nor the Unsettling Scientific Stories project, would have been possible.

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2. H G Wells, ‘Wanted - Professors of Foresight!, first broadcast on the National Programme, November 19th, 1932. [↑](#footnote-ref-2)
3. In the USA, *Anticipations* appeared in the *North American Review* from summer 1901. The series appeared in book form in winter of that year, and was reissued by Chapman and Hall just prior to the outbreak of World War 1. [↑](#footnote-ref-3)
4. Kingsley Amis and Robert Conquest, *Spectrum I: A Science Fiction Anthology*, Macmillan, London, 1964. [↑](#footnote-ref-4)
5. Frank M Robinson, *Science Fiction of the 20th Century: an Illustrated History*, Portland OR, Collectors Press, 1999 [↑](#footnote-ref-5)
6. Catherine Gallagher, *Telling it Like it Wasn’t: the counterfactual imagination in history and fiction*, University of Chicago Press, Chicago, 2018. [↑](#footnote-ref-6)
7. J C Squires, *If It Had Happened Otherwise,* Longmans, Green, London, 1931 [↑](#footnote-ref-7)
8. Geoffrey Hawthorn, *Plausible Worlds: possibility and understanding in history and the social sciences*, Cambridge University Press, Cambridge, 1991. [↑](#footnote-ref-8)
9. Peter Bowler, *Darwin Deleted: imagining a world without Darwin,* University of Chicago Press, Chicago (2013); see also the work of Gregory Radick and others on genetic pedagogies and the possibilities of thinking counterfactually about Mendel - https://arts.leeds.ac.uk/geneticspedagogiesproject/ . Those interested in fictional counterfactuals might usefully look at Kim Stanley Robinson’s *The Years of Rice and Salt* (Bantam Books, 2002) which imagines the history of science in a world where the Black Death eliminated 99% of Europe’s population, or Ted Chiang’s story ‘Seventy-Two Letters’, which describes a Victorian industrial revolution driven by golems, rather than steam engines (in *Stories of Your Life and Others*, Picador, London, 2015). [↑](#footnote-ref-9)
10. For geography, see Kitchen & Kneale (eds.), *Lost in Space: Geographies of Science Fiction*, Continuum, London, 2002, Daniels & Rycroft, ‘Mapping the modern city: Alan Sillitoe’s Nottingham novels’, *Transactions of the Institute of British Geographers* (1993) 18: 460-80, or Darby, ‘The regional geography of Hardy’s Wessex’, *Geographical Review* (1948), 38: 426-43. For sociology, see Penfold-Mounce et al, ‘*The Wire* as social science fiction’ *Sociology,* (2011) 45:152-167, or Corbett, ‘Novel perspectives on probation: fiction as sociology’, *Sociological Forum* (1993), 9: 307-314. Anth & hist – pick refs. [↑](#footnote-ref-10)
11. Sleigh cit. no. 1. [↑](#footnote-ref-11)
12. Gillian Beer, *Darwin’s Plots: Evolutionary Narratives in Darwin, George Eliot and 19th century fiction*, Routledge & Kegan Paul, London, 1983; N Katherine Hayles, *Chaos and Order: Complex Dynamics in Literature and Science*, Chicago: Chicago UP, 1991 [↑](#footnote-ref-12)
13. White, 1975, 1980 [↑](#footnote-ref-13)
14. Ron Curtis ‘Narrative form and normative force: Baconian story-telling in popular science’, *Social Studies of Science* (1994) 24: 419-461 [↑](#footnote-ref-14)
15. Magoroh Maruyama & Arthur Hawkins (eds.), *Cultures Beyond the Earth* (1975) *Cultures of the Future* (1978). [↑](#footnote-ref-15)
16. A Appadurai, *The future as cultural fact*, London, Verso, 2013. See also Juan Fransisco Salazar et al (eds.) *Anthropologies and futures: researching emerging and uncertain world*, Bloomsbury, London, 2017 [↑](#footnote-ref-16)
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18. Those exceptions include Daniel Rosenberg and Susan Harding (eds.) *Histories of the Future*, Duke University Press: Durham NC, 2005; Reinhart Koselleck (trans. Keith Tribe) *Futures Past: on the semantics of historic time*, Columbia University Press, New York, 2004. [↑](#footnote-ref-18)
19. Jon Turney, *Frankenstein’s Footsteps: science, genetics and popular culture*, Yale UP, 2000. The influence, naturally, goes both ways – see Mark Decker’s ‘They want unfreedom and one-dimensional thought? I'll give them unfreedom and one-dimensional thought: George Lucas, THX-1138, and the persistence of Marcusian social critique in *American Graffiti* and the *Star Wars* films’, *Extrapolation* (2010) 50: 417–441 [↑](#footnote-ref-19)
20. Lisa Messeri, *Placing outer space: an earthly ethnography of other worlds*, Duke University Press: Durham NC, 2016, p. 65 [↑](#footnote-ref-20)
21. See, for example Andrew Milner *Locating Science Fiction*, Liverpool University Press: Liverpool, 2012, for a compelling challenge to conceptions of SF, as well as Anindita Banerjee’s *We Modern People: Science Fiction and the Making of Russian Modernity*, Wesleyan University Press, Middletown CT, 2012. For a consideration of the relationship between SF and modernism more generally, see Paul March Russell, *Modernism and Science Fiction*, Palgrave Macmillan, 2015. [↑](#footnote-ref-21)
22. Carl Kears and James Paz (eds), *Medieval Science Fiction*, Boydell & Brewer, 2016, examines the relationship between key SF themes and the Middle Ages in past and present. J A Burrows and Ian Wei (eds.) *Medieval Futures: Attitudes to the Future in the Middle Ages* (Boydell Press, Woodbridge, 2000) and Andrea Brady & Emily Butterworth (eds) *The Uses of the Future in Early Modern Europe* (Routledge, London, 2009)considers the wide range of ways and reasons for imagining the future in the past. See also Adam Roberts, *The History of Science Fiction*, Palgrave Macmillan, London, 2016. For a sustained and serious effort to imagine the impact that alien contact might have had on the mediaeval mind, see Michael Flynn’s *Eifelheim* (Tor Books, 2006), twice nominated for a Hugo Award; for an exploration of how space flight might work within Aristotelian physics, see Richard Garfinkle, *Celestial Matters*, (Tor books, 1996). [↑](#footnote-ref-22)
23. Justine Larbalestier, *The Battle of the Sexes in Science Fiction*, Wesleyan University Press, Middetown CT, 2002, p. xi. [↑](#footnote-ref-23)
24. Mark Bould and Sherryl Vint, *The Routledge Concise History of Science Fiction*, Routledge, Abingdon, 2011; John Rieder, *Science Fiction and the Mass Cultural Genre System*, Wesleyan University Press, Middleton CT, 2017; Edward James, *Science Fiction in the 20th Century*, Oxford University Press, Oxford, 1994; Roger Luckhurst, *Science Fiction: A Literary History*, The British Library, London, 2017; Charles Platt, *Dream Makers: The Uncommon People who Write Science Fiction*, Berkley Books, NY, 1980; Charles Platt, *Dream Makers Volume II: The Uncommon Men and Women Who Write Science Fiction*, Berkley Books, NY, 1983. [↑](#footnote-ref-24)
25. Larbalestier, (cit. 6, p. 23). [↑](#footnote-ref-25)
26. Larbalestier (cit. 6, pp. 104-143). [↑](#footnote-ref-26)
27. The literature on gender, sex and SF is too broad to explore effectively here. Useful sources for the debates about representation can be found in Connie Willis ‘The women SF doesn’t see’, *Asimov’s Science Fiction Magazine*, 16 (11) 4-8, 1992, and Joanna Russ ‘*Amor Vincit Foeminam:* the battle of the sexes in science fiction’ *Science-Fiction Studies*, 7 (1) 2-15, 1980, Charles Platt, ‘The rape of science fiction’, *Science Fiction Eye* 1 (5) 45-49, 1989. For those interested in exploring some of the ways in which writers have used SF to challenge the biology, psychology and history of gender, the three *James Tiptree Award Anthology* volumes edited by Karen Joy Fowler, Pat Murphy, Debbie Notkin and Jeffrey D Smith, Tachyon Publications, San Francisco, 2005, 2006 and 2007 represent excellent introductions to the range and impact of this strategy. [↑](#footnote-ref-27)
28. See, for example, Elisabeth Leonard’s pioneering *Into Darkness Peering: Race and Colour in the Fantastic*, Greenwood Press, Westport Connecticut, 1997; De Witt Douglas Kilgore’s *Astrofuturism: Science, Race and Visions of Utopia in Space*, University of Pennsylvania Press, Philadelphia, 2003; Isiah Lavender III (ed.) *Black and Brown Planets: the Politics of Race in Science Fiction*, University Press of Mississippi, Jackson, 2014. [↑](#footnote-ref-28)
29. The classic example here is obviously Asimov’s Robots (who are often referred to as ‘boy’). [↑](#footnote-ref-29)
30. John Rieder, *Colonialism and the Emergence of Science Fiction*, Wesleyan University Press, Middletown, Connecticut, 2008. [↑](#footnote-ref-30)
31. The short story, ‘The Comet’ appeared in W E B Du Bois, *Darkwater: Voices from Within the Veil,* in1920, but received little attention until it appeared in Sheree R Thomas’s *Dark Matter: A Century of Speculative Fiction from the African Diaspora*, Aspect Press, 2000. Another writer whose contribution to science fiction has also recently received more recognition is the journalist and social commentator, George Schulyer – so, for example, his *Black No More*, Macaulay, New York, 1931 [↑](#footnote-ref-31)
32. Mark Dery (ed.) *Flame Wars: The Discourse of Cyberculture*, Duke University Press, Indiana, 1994; Alondra Nelson (ed) *Afrofuturism*, *Social Text* 20 (2), 2002 [↑](#footnote-ref-32)
33. Mark Bould (ed.) *Paradoxa – Africa SF*, 25, 2013. [↑](#footnote-ref-33)
34. As John Rieder shows through an examination of contemporary reviews (cit.no. 7, pp. 65-81), the status and the interpretation of texts like *Frankenstein* were deeply unstable, with the creature’s ability to speak treated as far more significant than its initial creation. [↑](#footnote-ref-34)
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36. Christopher Palmer, ‘Big dumb objects in science fiction: sublimity, banality and modernity’, *Extrapolation*, 47(1) 95-111, 2006. [↑](#footnote-ref-36)
37. Elizabeth Hickson, ‘Off to outer space go the bug-eyed monsters’, *Sunday Dispatch,* March 2, 1958. [↑](#footnote-ref-37)
38. Patrick Moore, *Science and Fiction*, Harrap and Co, London, 1958. See also Bowler’s discussion of Moore, and Rees’ consideration of Wyndham in this volume. [↑](#footnote-ref-38)
39. Margaret Atwood, ‘The road to Ustopia’, *Guardian*, October 14th, 2011, and see also Margarat Atwood ‘*The Handmaid’s Tale* and *Oryx and Crake* ‘in context’’, *PMLA* (2004), 119: 513-17<https://www.theguardian.com/books/2011/oct/14/margaret-atwood-road-to-ustopia> [↑](#footnote-ref-39)
40. Alondra Nelson, ‘Making the impossible possible: an interview with Nalo Hopkinson’ cit. 14, pp. 91-113. [↑](#footnote-ref-40)
41. See Adam Roberts, *Science Fiction: the New Critical Idiom*, Routledge, Oxford, 2006, for further valuable discussion here. [↑](#footnote-ref-41)
42. See Le Guin’s *The Dispossessed,* C J Cherryh’s *Downbelow Station,* Adam Roberts’ *Salt,* Stephen Baxter’s *Flood*. [↑](#footnote-ref-42)