Title: Science Fiction and the Medical Humanities

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ABSTRACT

Research on science fiction within the medical humanities should articulate interpretative frameworks that do justice to medical themes within the genre. This means challenging modes of reading that encourage unduly narrow accounts of science fiction. Admittedly, science studies has moved away from reading science fiction as a variety of scientific popularization, and instead understands science fiction as an intervention in the technoscientific imaginary that calls for investment in particular scientific enterprises, including various biomedical technologies. However, this mode of reading neglects science fiction's critical relationship to the construction of 'the future' in the present: the ways in which science fiction proposes concrete alternatives to hegemonic narratives of medical progress, and fosters critical self-awareness of the contingent activity which gives 'the future' substance in the here-and-now. Moreover, the future orientation of science fiction should not distract from the function of medical science fiction as 'cognitive estrangement': the technological innovations that dominate science-fiction narratives are less concrete predictions, and more generic devices that explain in historical time the origins of a marvellous world bearing provocative correspondences to our own, everyday reality. The editorial concludes with a series of introductions to the articles comprising the special issue, covering the print edition, and a special online-only supplement.

Keywords: Literature, Philosophy, Social science, Film

READING BEYOND THE HEADLINE

Science Fiction Becomes Science Fact. The headline is a contemporary cliché, repeated across spoken, print and visual media. Science fiction foretells technological wonders, and science brings these prophecies to fruition. Numbered amongst such promised future marvels are medical miracles of cure, treatment, and prevention: new drugs, transplant technologies, genetic engineering, prosthetics, and diagnostic devices.

Science fiction clearly matters to medicine, and so it matters to the medical humanities. Yet the complex relationship between science fiction and medicine defies a simple division of labour between writer as cultural prophet, and scientist as technological functionary. This introduction, and the special issue which it prefaces, together demonstrate the complexity of 'Science Fiction and the Medical Humanities', an intersection of interests identified and explored by the editors' Wellcome Trust-funded Seed Award project. Research in this area challenges the limitations of disciplines such as science studies, and history and philosophy of science. Lacking the analytic training and vocabulary developed in English Literature, and Film and TV Studies, the sociological and historical disciplines have great difficulty in apprehending the complex social and political engagement that may be found in science fiction. Oddly, this tendency to neglect the more sophisticated dimensions of the genre, including its critical engagement with biomedicine, persists even as science studies has directed rhetorical and dramaturgical analysis toward the scientific enterprise itself.[1 2] An explanation for this blindspot may lie in the marginal status of science fiction in the Western canon, and a consequent tendency among non-literary scholars to classify science fiction as 'entertainment' (pp. 228-30).[3] Such analytic categories neglect the constructive, interpretative activity performed by readers and viewers of science fiction, which is 'made sense of' in its reception, rather than impacting upon the audience in a 'billiard-ball' causal

relationship. Interpretative activity may remain wholly implicit, but frequently – at both popular and academic levels – interpretations are articulated and debated. Such reflective meaning-making, whether potential or actual, shows that scholarship can go far beyond merely recording and analysing how science fiction happens to be understood as 'entertainment' by a particular audience. Rather, academics can enter into conversations that reflexively inform and modify the interpretation and evaluation of science fiction by its various audiences.

Hans Robert Jauss offers the term 'horizon of expectations' (p. 18)[4] to encapsulate the framework of aesthetic norms that mould literary reception in any particular social context. The unreflexive application of one's own horizon of expectations to an aesthetic object can lead to an impoverished interpretation that misconstrues what the work has done – as Jauss points out, for example, an aesthetic norm that privileges realistic representation will fail to properly apprehend both medieval and modernist art (p. 22).[4] The task for studies of science fiction within the medical humanities is to articulate interpretative frameworks that do justice to medical thematics within the genre. This means challenging horizons of expectations that encourage unduly narrow readings of science fiction. There lingers, often among scientists, a tradition of reading science fiction as an essentially pedagogic medium tasked with the popularization of scientific knowledge. Mark C. Glassy, a professional life scientist, illustrates this tendency in *The Biology of Science-Fiction Cinema* [5], where he evaluates motion pictures according to their scientific accuracy. An account of each movie is followed by sections on 'What is Right with the Biological Science Presented' and 'What is Wrong with the Biological Science Presented'. The camp B-movie sci-fi horror flick, *Astro-Zombies* (1967), is rebuked for a scene in which the solar-powered astro-zombie survives the loss of its storage battery by applying a flashlight to its forehead-mounted solar cell. Glassy's determination to treat the movie as a science lesson is almost heroic: 'even with a 100 percent

efficient conversion of flashlight energy, this is too much of a stretch to actually occur' (p. 154).[5] Glassy's horizon of expectations addresses science fiction as a form of entertainment education, presuming a 'deficit model' of 'scientific *su*fficiency and public *de*ficiency', in which science communication is 'a one-way flow from science to its publics' (pp. 5-6).[6] Science fiction is, at best, amongst the modes of '"appropriate simplification" – a necessary (albeit low status) educational activity of simplifying science for non-specialists' (p. 519).[7] Glassy's readings do no more than patrol the supposed 'boundary between "appropriate simplification" and "distortion"' (p. 534)[7] – construed as the division between legitimate extrapolation authorized by scientific plausibility, and misconceived speculation contaminated by the need for popular appeal.

Within science studies, David Kirby's work has been influential in moving discussion of science fiction away from 'simplistic notions of science literacy' (p. 228).[3] Kirby, who writes mainly on 'science-based' Hollywood film, accepts 'there is no possibility of a fictional film entirely conforming to scientific accuracy because of filmmaking constraints' (p. 228).[3] Admittedly, he distinguishes between 'speculative scenarios and fantastic science': the former 'represent situations or technologies that, while improbable or future based, at least could come to exist', while the latter has no such potential for technological realization (pp. 146-7).[3] The comet destruction mission of *Deep Impact* (1998) is a speculative scenario (pp. 152-9)[3], while the astounding metamorphosis in Ang Lee's *Hulk* (2003) is fantastic science (pp. 159-68).[3] Kirby wisely refuses though to make an evaluative hierarchy of his distinction, and asks instead how popular movies represent, and modify, the so-called 'technoscientific imaginary':

Cinema interacts with other mass media and with formal scientific discourse to create a technoscientific imaginary that impacts what science means to the public. Cinematic images

and narratives can have an impact on the public's conceptions of science by provoking reactions, from encouraging enthusiasm for the scientific endeavour to instilling fear about science and technology (p. 229).[3]

The degree, nature, and desirability of a movie's impact upon the technoscientific imaginary is clearly distinct from the credibility of its scientific extrapolations: 'the scientifically ludicrous *Armageddon* was just as useful as the more accurate *Deep Impact* in public and political debates over NEO [Near Earth Object] funding' (p. 191).[3]

Because of cinema's technoscientific impact, Hollywood science consultants deliberately use the medium 'to convince the American public that a research field or a scientific subject needs more political, financial, and scientific attention' (p. 169).[3] Popular cinema works particularly well as public relations for science because, Kirby argues, fictional referents appear within Hollywood naturalism as perceptually realistic items 'integrated within narratives and treated as a "natural" aspect of the landscape by characters' (p. 228).[3] Hollywood's 'reality effect' may even propagandize for discrete technologies, such as the artificial heart in *Threshold* (1981). This 'diegetic prototype' was consciously promoted by the film's science consultants, who hoped to quell public anxiety by establishing, '(1) the *necessity* of this technology, (2) the *normalcy* of a person with an artificial heart, and (3) the heart's *viability*' (p. 194).[3] As well as narrative elements showing the presumed need for an artificial heart, and the normalcy of the recipient, 'the film's visualization of a working technology within its realist orientation established the achievability of a permanent artificial heart (underscoring its *viability*)' (p. 194).[3]

The limitations of Kirby's questions can, however, be articulated by examining a contemporary science-fiction prototype. The Qualcomm Tricorder XPrize competition (which boasts a $10, 000, 000 prize fund) calls for a workable medical tricorder as imagined

in the various *Star Trek* franchises. It should be capable of diagnosing ‘12 diseases’ and recording ‘five real-time health vital signs’, all ‘independent of a health care worker or facility’.[8] The competition website hosts a promotional video in which animated typography plays out against a background of illustrations completing textual gaps in meaning: ‘in the [USA] the AVERAGE time to get an appointment is 21 Days’; ‘the AVERAGE visit to the Doctor takes nearly 2 hours. Cause you’ve got NOTHING better to do, RIGHT?’; ‘IMAGINE. It’s 2 AM. Your child has a fever. You don’t know what to do.’[8] This harangue takes for granted some contentious issues: primary care (conceived as the task of physicians) will always be slow to access; no-one can afford two hours off work to attend a clinic; homecare for a fevered child borders on the neglectful. Some of its statements defy intelligent interpretation: ‘You only receive the right diagnosis or treatment 55% of the time. Think about it … . That’s just slightly better than a coin toss.’[8] The insinuation that expert medical diagnosis barely improves upon a random decision between logically exclusive binary options of equal probability is beyond fatuous. (What is the ‘coin toss’ equivalent? To open up *ICD-10* and toss a coin for every possible disease? ‘Heads I have Aarskog’s syndrome; Tails I don’t.’ ‘Heads I have abasia; Tails I don’t’. ‘Heads I have Abderhalden-Kaufmann-Lignac syndrome; Tails I don’t.’ … .) Original *Star Trek*’s ‘Bones’ McCoy – an impassioned ‘country doctor’ in space, whose services are free at point of access (see HENDERSON) – is entirely absent, supplanted in the video’s coda by an illustration of the imperturbable science officer, Mr Spock. The human element of healthcare, represented by McCoy, has to be elided because the XPrize understands progress merely as new technological solutions within a congealed social structure; the XPrize vision is the neoliberal hegemony of Francis Fukuyama’s *The End of History*[9] plus some cool gadgets.

Missing from Kirby’s horizon of expectations is a sense of the wider cultural context in which discrete science fiction tropes are embedded, and which may contain politically

critical meanings. This interpretative omission occurs despite work in science studies mapping the fractured discursive terrain in which science fiction has so often intervened, particularly in the post-war period. In recent years, much attention has focussed on the rhetorical construction of 'the future', albeit with a marginal role for the discourses of science fiction. The 'sociology of expectations' spearheaded by Nik Brown and Mike Michael offers 'a detailed examination of the forms of action and agency through which the future is both performed (as a temporal representation) and colonized (as a spatial and temporal locus)' (p. 5).[10] As Borup et al. explain, rather than '*looking into* the future', researchers are '*looking at* the future' (p. 296)[11] as constituted or performed in the manufacture and circulation of promises, visions, and expectations under capitalism: 'future-oriented abstractions' are 'fundamentally "generative", they guide activities, provide structure and legitimation, attract interest and foster investment' (p. 285-6).[11] Michael clarifies the performative, temporal rhetoric of expectations. Typically, 'the past is represented as entailing some problem (e.g. the chaotic state of science policy), some absence (e.g. the lack of transplantable human organs), some wrong (e.g. environmental degradation), and the future is represented as the "place" where solutions are realised, presences manifested, and wrongs righted' (p. 22).[12] The imagined future may be nearer or farther in temporal 'distance' (pp. 24-5)[12], and the tempo of its arrival may vary, from the slow geological pace of 'glacial time' to the rapidity of 'nanotime' associated with information technology (p. 31).[12] Moreover, the 'subject' or 'the entity that "experiences" the future', can 'range from a human individual to a heterogeneous collective' (p. 26).[12] Different distances, tempos, and subjects legitimate different priorities. So, for instance, the immediate death of individuals from heart disease might prioritize funding in transplantation, including xenotransplantation (p. 26).[12] But if the subject is the global population, then investment might be drawn to slower developmental

agendas that aim to even out the unequal global distribution of health and healthcare over decades (or even centuries).

Such thought-provoking analysis neglects, though, the extent to which science fiction, particularly since the so-called New Wave of the 1960s, has been in critical dialogue with the hegemonic technoscientific imaginary. Science fiction proposes concrete alternatives, and fosters critical self-awareness of the contingent activity which gives 'the future' substance in the here-and-now. Marge Piercy's feminist science-fiction classic *Woman on the Edge of Time* (1976), centres on Connie Ramos, a working-class Hispanic psychiatric patient in 1970s New York, who receives telepathic visions from a future utopia in the town of Mattapoisett. The future Mattapoisett disconcerts Connie – conspicuously absent are familiar tropes such as '[r]ocket ships, skyscrapers into the stratosphere, an underground mole world miles deep, glass domes over everything' (p. 68).[13] The society she finds instead exists harmoniously with non-human life, and subordinates technology to its ecological pursuit of self-fulfilment, autonomy, and cultural difference. The masculinism of our hegemonic future is particularly interrogated when Connie encounters a local man, Barbarossa, who epitomises a quite different set of expectations: 'He had breasts. Not large ones. Small breasts, like a flat-chested woman temporarily swollen with milk. Then with his red beard, his face of a sunburnt forty-five-year-old man, stern-visaged, long-nosed, thin-lipped, he began to nurse' (p. 134).[13] Needless to say, the necessity, normality, and viability (to use Kirby's three-step model) of breastfeeding males is barely conceptualized in our dominant technoscientific imaginary. Further alternative expectations in Piercy's novel include gestation *ex utero* (freeing women from the tyranny of pregnancy), and the limitations placed upon life extension (the Mattapoisettians remain deliberately mortal beings).

Science fiction, through such texts, clearly enters into a critical dialogue with the troubling ideologies of progress offered by the technoscientific imaginary. For Amarnath

Amarasingam, the contemporary transhumanist movement spearheaded by charismatic leaders such as Ray Kurzweil, Hans Moravec and Frank Tipler is ‘a new religious movement (NRM)’ (p. 2)[14] whose soteriological vision of ‘release from pain, suffering, and death’ (p. 6)[14] raises expectations centring on so-called GRIN technologies (genetics, robots, information technology, and nano-technologies) – innovations which will, it is alleged, ‘soon make possible an extended lifespan, if not total immortality’ (p. 3).[14] Daniel Dinello therefore sees science fiction as a heretical counter movement to such ‘fantastic expectations of individual perfection’ offered by ‘[t]rue believers in the god Technology’ (p. 274).[15] Science fiction also plays with this rhetoric of expectations at a formal, narratological level. Brown and Michael note how progress ‘seems to have a life of its own’ as ‘an autonomous force that appears to hover outside of agency and action’ (pp. 6-7).[10] This reification (and sometimes deification) of the future is subverted in *Woman on the Edge of Time* by the appearance of alternative future timelines which seem to be contingent upon Connie’s agency in the present. The future she hopes to avert is epitomised by her encounter with an alternative timeline’s ‘contracty’ (a female sex-partner on a temporary contract), upon whom human ‘optimisation’ has enforced a body which ‘seemed a cartoon of femininity’, ‘[h]er stomach was flat but her hips and buttocks were oversized and audaciously curved’ (p. 288).[13] The intensification of gender divisions in the name of supposed optimization contrasts with the degendering of roles in the Mattapoisett society. Moreover, Piercy’s novel even leaves undecided the ontological status of Connie’s future visions. Are they genuine telepathic contact with a future to which her own actions are crucial? Or are they the hallucinations of an institutionalized psychotic patient? The ontological ambiguity leaves Connie’s visions of Mattapoisett in a hypothetical mood, denying them the deceptive assertoric force of official technoscientific prognostications and prophecies. Piercy’s promulgation of a dissident, contingent future anticipates Brown’s remarks that ‘futures are

not only contested in respect to a plural politics but also in respect to differing degrees of indeterminacy' (p. 6).[16] Science fiction is clearly an agent in this contestation over the future (well exemplified in the ambivalent trope of the 'cyborg'), and can speak from alternative positions (e.g. feminist, Latina, service user) which are denied official voice.

Science fiction's critical engagement with the dominant technoscientific imaginary must be given due recognition. As much as science studies, science fiction is concerned with why 'some futures come to prevail over others, why once seemingly certain futures happened to fail, how other futures are marginalised as a consequence of the dominant metaphors and motifs used in everyday life, and the consequences of particular framings of the future' (p. 4).[16] But there are further horizons of expectations for science fiction, beyond its ability to endorse, supplement, or gainsay, the dominant 'future'. Marxist criticism largely disregards the genre's apparent extrapolation of concrete technological and social developments. For Darko Suvin,

> the use of themes based on evolution and biotechnology, including genetic manipulation, cloning, and other biological or medical innovations, does not function in sf as any straightforward extrapolation seriously developing scientific horizons. […] scientific extrapolation is not and cannot be the function of sf as fiction. (p. 131)[17]

The so-called '*"novum" (novelty, innovation) validated by cognitive logic*' (p. 63, emphasis in original)[18] that dominates science-fiction narrative is less a concrete prediction, and more a generic device that explains in historical time the origins of a marvellous world bearing provocative correspondences to our own, everyday reality. (This point is reinforced by the genealogical forerunners of science fiction in the 'fantastic voyage': as the globe

became increasingly mapped, the implicitly colonial journey moved outwards into space, and then, as science fiction, forward into the future.[19])

Suvin's counter-intuitive manoeuvre recognizes science fiction's function as '*literature of cognitive estrangement*' (p. 4, emphasis in original)[18] – as a literature in which we know our world better through its estranged (non-mimetic) representation. Suvin's horizon of expectations, in which science fiction 'is a developed oxymoron, a realistic irreality, with humanized nonhumans, this-worldly Other Worlds, and so forth' (p. viii),[18] can be readily applied to science-fiction narratives dominated by a medical novum. Ward Moore and Robert Bradford's 1978 dystopian novel, *Caduceus Wild* (based on an earlier 1959 serial co-authored with Jean Ariss) imagines a future caste society ruled by 'the Medarchy':

Supreme authority vested in a select few. For at the time of the exploding of the aerosol germ bombs in the last stages of the war, the ascendancy of physicians went unquestioned. Doctors had to be in complete charge of survivors in order to prevent further epidemics, dietary mistakes, and total chaos. Doctors' orders thus became the only legal and legitimate orders. Unchallenged. (p. 8)[20]

The Medarchy (or 'Iatrarchy') is in no way meant as a serious science-fiction 'prophecy'. Rather this unlikely state of affairs provides the historical rationale for a picaresque narrative exploring an estranged reality which intensifies and exaggerates the biopolitical structures and concerns of contemporary Western society. The global 'Iatrarchy' believes that 'scrupulous and detailed regulation of every phase of living' is 'the only way to retain a firm, paternalistic hold over the bodies and minds of all Patients' (p. 27).[20] Every Patient carries a coded health passport, and is subject to frequent health checks by higher caste functionaries

such as the ‘Medcops’ or the cyborg ‘Subcutes (Surgical Bacterial Custodial Technicians, the elite corps of the police, assigned to emergency cases)’ (p. 14).[20] Patients fear being identified as an ‘Ab’, which officially stands for ‘Abnormal’, someone ‘whose anomaly might be physical, psychological, or even congenital’ (p. 12),[20] but also unofficially ‘stands for Abscess. An abscess on the body politic’ (p. 81).[20] Abs are a threat to the secular *summum bonum* of Public Health, and must be treated accordingly, whether this means being ‘cured’ or euphemistically ‘thanatized’ (p. 33).[20] Ill-health is construed so as to include not only illness and disability, but also late motherhood, so-called ‘degenerate art’, and, as one character explains, any form of political dissent: ‘once the suffering, discontent, anxiety or whatever one calls it has appeared, it must be dealt with, because it affects Public Health. It can spread as surely as typhus’ (p. 59).[20] Medicalization runs rampant: the protagonist, an unemployed architect and widower, recalls his bereavement, and his ‘own wild refusal of all comfort for months, for years. Does any state no matter how benevolent have a right to interfere with such a private emotion as grief?’ (p. 72).[20] Meanwhile, the non-medical sciences have atrophied, such is their irrelevance to Public Health, while the ‘arts disciplines’ are disdained as being ‘little or no practical value to the society’ (p. 28).[20]

In *Caduceus Wild*, the medical *novum* (the Iatrarchic society) motivates an otherworldly version of our own biopolitical reality (a tactic echoed more recently in Juli Zeh’s *The Method* [21]), and many other science-fiction texts dominated by medical extrapolations work in a similar way. Greg Bear’s *Darwin’s Radio* (1999), for instance, cognitively estranges both the AIDS epidemic in its narrative of the fictional SHEVA virus, and the extension of state control over the bodies of pregnant women (p. 81-3).[22] Nonetheless, medical science fiction can be used to defamiliarize other areas of life. Daniel Keyes’s *Flowers for Algernon* (1966) is the story of Charlie Gordon, a man with learning disabilities given a cognitive enhancing therapy that turns him, temporarily, into a genius. To

some extent this extrapolation of contemporary psychological and neurological technologies is a way of challenging society's denigration of persons with learning disabilities. What if, the text asks, someone with these conditions was suddenly able to recognize and articulate the everyday humiliations that are heaped upon them – as Charlie does when he realizes 'that all the time people were laughing and making fun of me' (p. 38).[23] But this text, which is far more sophisticated than *Caduceus Wild*, can be read as estranging realities other than disability, its manifest concern. Charlie's trajectory can be read as a compressed version of our own life cycle, and as a reminder of the uncomfortable truth that we are only for a temporary period the competent and autonomous 'self-contained individual' presumed by our prevailing social myths. Other texts have a similar, non-medical surplus of meaning. Richard Matheson's well-known *The Shrinking Man* (1956) presents a highly implausible biomedical novum, an accidental radiation-induced shrinking effect, and uses it for a series of defamiliarizing meditations.[24] These include not only post-war atomic anxiety, but also patriarchy (the male protagonist loses his patriarchal power over his family, and his sexual attractiveness to his wife, as he shrinks), or myths of childhood innocence (as the protagonist becomes smaller, and more superficially child-like, so he becomes the object of abuse by both adults and children.) Biomedicine may be the engine of a fictional 'fantastic voyage', but it need not be the only or primary concern of the new world thereby reached.

Despite the dystopian lineaments of texts such as *Caduceus Wild*, science fiction, in the Marxist horizon of expectations, is an implicitly utopian genre in its critical denial of the present (via cognitive estrangement) and its willingness to imagine alternative social orders (to varying degrees of concretion). As Tom Moylan argues, 'The utopian moment' – the element of hopeful political action – 'must always speak in figures which call out structurally for completion and exegesis in theory and practice' (p. 23).[25] Active exegetical engagement is vital to these texts, which are impoverished if consumed simply as ideological

blueprints, as the social equivalent to a technological 'diegetic prototype'. The challenge in making sense of 'science fiction and the medical humanities' is to recognize the autonomy of science fiction texts themselves, which frequently bear a highly self-conscious and critical relationship to the 'future' as constructed in the present, and to the present as it is naturalized in workaday narrative 'realism'. The headline *Science Fiction becomes Science Fact* compels science fiction into servitude as the handmaiden of scientific enterprise. This special issue of *BMJ Medical Humanities* aims to show that the collaboration of science fiction and medicine has a higher vocation.

CALLING OCCUPANTS OF INTERDISCIPLINARY CRAFT

The original articles, and scholarly book reviews, that make up this special issue were solicited by an open call for papers originating from the authors' research project Science Fiction and the Medical Humanities. The aim was to extend interest and activity beyond familiar networks, and to stimulate international interest amongst a scholarly audience for whom the 'medical humanities' might be an unfamiliar term.

The print issue begins with Luna Dolezal, who shows how Gary Shteyngart's satirical novel *Super Sad True Love Story* (2010) offers a cognitive estrangement of our contemporary data-driven society. The novel intensifies and exaggerates the tendency, facilitated by various consumer technologies, to quantify the self, in all its manifold complexity. The utopian potential of new biometric technologies is, though, betrayed by the entanglement of data with neoliberal power: in *SSTLS*, data is the ultimate determiner of intimate relationships, personal and collective identity, and status in the workplace and society at large. Implicit throughout Dolezal's article is an ethical and phenomenological concern with the potential for thought, emotion, and lived embodiment to be supplanted by an impoverished digital shorthand.

Ari Schick gives a history of speculative bioethics, a discipline that attempts to parse the ethics of technoscientific innovations before they have been invented, or before ethical dilemmas have been posed. While Schick accepts that this idea sounds attractive, particularly in a culture where we feel ourselves rushing into the future with such speed that there is no time to prepare, he also highlights the problems with situating ethics in an imagined future. Such an approach removes ethical agency from the present and places ethical considerations in a future that may not come to pass. Schick situates the impulse towards a speculative bioethics in the increasing science-fictionality of our culture but urges the discipline to adopt a critical attitude, viewing imagined futures as political ideologies rather than as morally-neutral arenas for the practice of bioethics.

Stina Attebery argues that science fiction is uniquely placed to challenge anthropomorphic accounts of the biomedical industry, given that science fiction can allow non-human biomedical materials, such as microbes and tissue samples, to speak and claim agency. Atteberry adopts Melinda Cooper and Catherine Waldby's term 'clinical labour', which describes biomedical work such as tissue donation and surrogacy, in order to explore the relationships of exploitation and symbiosis increasingly found in the medical system and expressed through the figure of the parasite in Mira Grant's Parasitology trilogy, comprising *Parasite* (2013), *Symbiont* (2014) and *Chimera* (2015). The science-fictional parasites of Grant's novels capture the co-dependent bodies of neoliberalism, connected by their mutual subjection to capital. This in turn questions the common assumption that the scientist's cognitive labour is the value-adding mechanism in the laboratory, an assumption that relegates clinical labour to the position of a free resource.

Frances Pheasant-Kelly traces a bodily turn in our contemporary 'structure of feeling' via a particular focus on two post-1970s science-fiction 'mutation' films, *The Fly* (1986) and *District 9* (2009). A sensibility favouring scenes of bodily abjection – the body corrupted,

leaking, and decomposing – conveys a mood of distrust towards biomedicine and the medical establishment. The content and visual style of *The Fly* and *District 9* represent the destabilizing force of the AIDS epidemic symbolically expressed through the decomposing, mutant, and potential contagious bodies of their protagonists.

John Carlo Pasco, Camille Anderson, and Sayantani DasGupta give an account of the role that science fiction can play in the #blacklivesmatter movement, specifically in the movement's expression among black medical students in the USA. 'Die-ins' were staged in medical schools across the country to protest the continued abuse and killing of black people by the police, and the group WhiteCoats4BlackLives (WC4BL) was established to sustain that solidarity beyond the moment of protest. The authors argue that such actions can be can be described as building a 'visionary medicine', taking inspiration from Walidah Imarisha's description of Octavia Butler's work as 'visionary fiction'. In teasing out these connections the authors analyse Butler's *Bloodchild* (1995) and suggest that Afrofuturism and other forms of science fiction can be a valuable route to imagining socially-just futures for medicine.

Donna McCormack points out that organ transplantation, by representing violation and exploitation, is often used to express anxieties about transplantation's challenge to individualism. As a counterpoint to such narratives, McCormack turns to Nalo Hopkinson's award-winning novel *Brown Girl in the Ring* (1998). She argues that Hopkinson's description of a war-torn Canada suffering from segregation and race-based poverty uses organ transplantation as a means of exploring the connections between different people, races, and ideologies. Myalism offers an alternative to a biomedical model based on the discrete separation of donor and recipient while, at the same time, acting as a reminder that the white body politic is too often based on the consumption or zombification of black bodies.

Susan Smith challenges the assumptions about disability made by Limbitless Solutions, a prosthetics company who have used Robert Downey Jr. (the actor who plays

Tony Stark, or Iron Man, in the *Iron Man* film franchise) in their promotional materials. Smith argues that the construction of disability as a problem that needs to be fixed through technological means ripe for capitalist exploitation is at odds with the more helpful understanding of disability as limiting because of social failures to engineer truly accessible solutions and to accept disabled people without stigma or discrimination. Smith's analysis shows the intrinsic problem with prosthetics, especially when they are marketed as a means of achieving 'normality', or of avoiding judgement and abuse by communities ill-prepared to deal with difference.

Fran Bigman discusses the interwar dialogue concerning ectogenesis, or pregnancy outside of the human body, in order to find some of the lesser-known precursors to Aldous Huxley's *Brave New World* (1932). Bigman analyses Charlotte Haldane's *Man's World* (1926), Vera Brittain's *Halcyon* (1929), and Naomi Mitchison's *Comments on Birth Control* (1930) to show how speculative thinking and science fiction were used by these writers to challenge male technocratic narratives premised on scientific progress. Interwar women writers were particularly interested in reproduction and birth control as scientific and social progress made such issues more pressing, and in these writings the authors challenge their readers to see pregnancy not as pathology but as a source of female power that should not be submitted to male domination.

Richard Howard examines the medical science fiction of the neglected Northern Irish writer, James White (1928-1999), particularly his Sector General stories set in a vast hospital space station inhabited by a multitude of peacefully co-existing humanoid and non-humanoid species. Howard shows how White's science fiction expresses a utopian impulse, conceiving of a peaceful society organized around the recognition of differences far more complex and ingrained than the ethnic and religious identities of the Northern Irish Troubles. The potential, and the limitations, of White's medical tropes are carefully weighed by Howard.

White's fondness for medical settings and diagnostic puzzles is a fertile context in which to explore and celebrate difference. On the other hand, his idealized view of the medical profession leads to an authoritarian deployment of medical metaphors for social problems (of the kind so stringently critiqued by Susan Sontag).

In the final article in the print issue, Lesley Henderson and Simon Carter examine the figure of the 'space doctor' in television science fiction, particularly as represented in the various *Star Trek* franchises. The most famous of these, Leonard 'Bones' McCoy from the original series (1966-1969), functions as a reassuring moral presence in the narrative, offering a continuity in medicine as a humanistic calling, even amidst the high tech gadgetry of his sick bay. As the figure of the space doctor diversifies in gender and biology, this stabilizing function continues: the more transgressive narrative possibilities, such as alternative sexuality, are projected onto alien or non-human others.

In the first article in the online-only special supplement, Laura Tisdall examines the connections between developmental psychology and the trope of 'extraordinary children' in post-war British science fiction. The ominous narratives of Arthur C. Clarke's *Childhood's End* (1953), William Golding's *Lord of the Flies* (1954) and John Wyndham's *The Midwich Cuckoos* (1957) react against a tradition of utopian, progressive education, and deploy instead a psychologically authorized discourse in which children with extraordinary abilities are a pathological phenomenon threatening to society.

Laura Hirshbein traces the development of L. Ron Hubbard's distrust of psychiatry from his 1940s stories in the pulp magazines of America's Golden Age of science fiction to his establishment of the Church of Scientology and his return to science fiction with 1980's *Battlefield Earth*. Hirshbein argues that Hubbard's critique is based on the conservative or even fascist ideal of the strong, independent man who can master his situation without resorting to elite groups, which are coded as effeminate in Hubbard's works. Hirshbein

therefore argues that Hubbard's crusade against psychiatry cannot be separated from his sexism and his anti-intellectualism and that this must be recognised even today if psychiatry as a profession is to understand the attacks it still faces, both from Scientology and other communities.

Christopher Strachan introduces the reader to the field of Speculative and Critical Design (SCD), a branch of the medical humanities which allows designers to raise ethical questions through provocative, futuristic designs (in contrast with the Qualcomm Tricorder XPrize's assumption that design must pursue technological progress rather than reflecting on its implications and limitations). While Strachan identifies several problems with SCD, including the field's tendency to focus on so-called 'first world problems', he also argues that the movement shows promise, offering innovative ways to design not only our environments, but our political and social structures. SCD challenges the relationship between design and capitalism, urging designers to address the social good in their work and allowing them to participate in science-fictional futures.

Karin Sellberg looks at the ways in which gender is constructed as a fiction in novels by Gore Vidal and Angela Carter, reading the works as responses to the career of the significant (while now somewhat discredited) sexologist John Money. In arguing that the novels should be read as science fiction, Sellberg shows how they intervene in sociological and political debates by extrapolating from the possibilities of contemporary medical science and surgery, by producing (anti-)heroes for transitioning communities, and by exploring the 'nature versus nurture' debates that characterised popular contemporary understandings and constructions of gender.

Anita Wohlmann and Ruth Steinberg explore the science fiction trope of advanced organ transplantation in Neal Shusterman's young adult series, Unwind, a dystopian tetralogy consisting of *Unwind* (2007), *Unwholly* (2012), *Unsouled* (2013) and *Undivided* (2014). The

series' protagonist, Camus Comprix, is a Frankenstein-like assemblage of donated body parts. The story of Cam's coming-of-age pushes beyond familiar dystopian meanings, and finds instead an estranging metaphor for adolescence in the multi-ethnic Cam's struggle with his bodily alienation and social exclusion. The metaphorical equivalence offered between transplantation and coming-of-age also, the authors suggest, offers interesting potential for reconfiguring real-world organ recipient narratives.

In the final online supplement article, Arthur Rose explores the tension in science fiction between the technoscientific significance of respiration and the affective, non-scientific qualities of breathing. Breathing may indeed be deployed as a predominantly scientific representation, exploited for its metaphorical significance. However, in science-fiction cinema, breath may also be exploited for its non-scientific meanings. In his reading of 'liquid breathing' in the science-fiction movie, *The Abyss* (1989), Rose explores the movie's technoscientific attempt to tame the troubling affective quality of a drowning experience that anticipates continued life.

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