Scientific Self-Fashioning after *Frankenstein*: The afterlives of Shelley's novel in Victorian sciences and medicine

Martin Willis

Cardiff University, Wales, UK.

In his polemical 1867 essay against spiritualism the influential Victorian physicist John Tyndall angrily rebuked the spiritualists' tactic of asking audiences to set aside logic and reason in favour of mere trust. In "calling upon this agency [trust]", Tyndall fumed, "he acts the part of Frankenstein. It is a monster thus evoked that we see stalking abroad, in the degrading spiritualistic phenomena of the present day." (1871, 48)[1] Tyndall's metaphoric use of Shelley's novel is both precise and damaging. He compares the spiritualist to Victor Frankenstein and spiritualism itself to his monstrous creation. In doing this he aims to create a powerful analogy that will undermine the integrity of the spiritualist while revealing the monstrous, unnatural and dangerous potential of spiritualism in Victorian culture. Nevertheless, what is interesting about this example is not how and to what end *Frankenstein* is employed as a rhetorical weapon, but the very fact of its use by a scientific figure like Tyndall. For present-day scientists, both in general commentaries and specific scholarship, *Frankenstein* is activated as a metaphor by particular interest groups against science, not used by scientists themselves.

Indeed present-day scientists writing across various media take up a position of passive victimhood when addressing the uses to which *Frankenstein* is put in representations of scientific activity and character. Metaphors of Shelley's novel are continuously wrought at sites external to science and medicine and are consistently projected (often with vicious intent) towards sites of science and medicine. In this scenario, scientists seek to avoid being

hit by these missiles, but are nevertheless often struck by them.. Robert Schwartz's 1999 review of a work of literary-historical scholarship on the *Frankenstein* mythology is exemplary. Writing in the *New England Journal of Medicine*, Schwartz concluded

> In my view, Frankenstein's creature is emblematic of superstition and ignorance about biomedical science. Almost every substantial advance in the field, from tissue culture to transplantation, and now cloning, has been misunderstood by ethicists and policy makers with little understanding of science, by a public ignorant of the fundamentals of biology, and by science writers seeking sensational stories. (1999, 244)

Schwartz may be forgiven his view as a Doctor of Medicine. His argument, after all, is offered only anecdotally. However, similar conclusions are drawn by research scientists who have turned to the methods of science communication to analyse the role played by Shelley's novel in defining present-day scientific communities for and to public audiences. In their article on the significance of *Frankenstein* for engineers Peter Nagy, Ruth Wyle, Joey Eschrich and Ed Finn argue that the "Frankensteinian stigma" has shaped scientists' self-representation to the extent that it requires conscious "debunking" to enable "scientists to reshape their professional identities" (2018, 1143). In their argument scientists are under the yoke of "people" who use metaphors of *Frankenstein* (they would say myths) to "conceptualize science in terms of warnings against the dangers of excessive ambition" (1145). This group of "people" (who are never defined with any precision) additionally use *Frankenstein* "as a framework…to imagine scientists and scientific practices" and increasingly they do this so as to "bolster an inherently conservative scientific status quo" (1146). People construct these metaphors of *Frankenstein* because they are fundamentally stupid, or as the authors put it, "often lack the knowledge to interpret complex theories and concepts" (1151). Nevertheless, the effect upon scientists is to drive them towards self-

exclusion: devalued and rejected they "may feel that they should stop interacting with laypeople in order to avoid public scrutiny and negative reactions to their work" (1151).

Humanities scholars are not exempt from taking the same view. In a 2018 editorial in *Science Magazine*, constructed around celebratory articles focussed on the continuing significance of *Frankenstein* at the point of its 200th anniversary, the philosopher Henk van den Belt implicated those outside scientific communities when he argued that "researchers, especially in the life sciences, are understandably anxious about being tainted with the 'F-word'" (137). A similar separation of citizen from scientific communities was also at the core of Michael Mulkay's article on embryo research debates in the 1990s, illuminating a perpetuation of the argument that the metaphor-making had roots outside science and medicine. As Mulkay saw it in 1996, *Frankenstein* imagery "was used by non-scientists in the press and in Parliament to criticize and condemn research on human embryos" (160). Although Mulkay claimed that scientific communities also employed the imagery, it is clear that they largely did so to articulate their recognition of the tactics of non-scientific writers, thereby reinforcing the belief that its beginnings were to be discovered outside science (160-63).

As Tyndall's attack on the spiritualists shows, the metaphoric use of *Frankenstein* can be found within scientific communities – and in the kinds of self-generated formulations that Tyndall's sharp analogy so adeptly reveals. Although not recognised now, metaphors of Shelley's novel were commonplace within a variety of scientific communities from the decade following the publication of the novel in 1818 and throughout the nineteenth century. This continued into the twentieth century. In this article I aim to reveal, categorise and analyse the different uses of these metaphors across the Victorian period, when they were most common. My focus will be on medical and scientific writing, and always on the writing of individual scientists who would identify themselves as part of one or more scientific communities. The aim in revealing these lost metaphors of *Frankenstein* is not only to shed

light on an area of scientific writing that has been elided, but to challenge the view – implicit throughout the examples above – that scientific communities, and scientists, are somehow able to live outside of culture, uninfluenced by those powerful forces of representation to which others fall prey. More than this, in revealing that scientists were just as likely as any other human actor in Victorian Britain to bring *Frankenstein* into play, I will show that the fashioning of scientific identity was not only constructed by those faceless non-scientific "people" but by scientists themselves. Far from passive victims struck by the violent metaphors of *Frankenstein*, scientists were imbricated in a culture of scientific self-fashioning where the role of Frankenstein or his creature might be one they took on as their own or tried to foist upon their colleagues and rivals.[2]

In the four sections to follow I begin by asking why it is that the significance of *Frankenstein* for scientific self-identity has been effaced despite the very extensive scholarly work (from many different fields of inquiry) that has been dedicated to examinations of the novel and its influence. This is important because it speaks to another form of identity-formation – the fashioning of *Frankenstein* as a modern mythology of scientific and cultural significance. In the second section I turn to the first of a group of Victorian examples of scientific writing that employs Shelley's novel to give science and the scientist specific identity. In this section I place the focus on the human body, showing how metaphors of *Frankenstein* enable scientific writers to articulate a sense of the potentiality of certain nineteenth-century sciences and the role they should play in advancing knowledge. The third section shifts the focus to scientific conflicts, illuminating the power of the *Frankenstein* metaphor, when used by scientific rivals, to undermine scientific practice or to characterize the scientist as unfit for either the successful production of knowledge or to make a positive contribution to scientific communities. In the final section I reveal what is the most surprising deployment of the metaphor of *Frankenstein*, at least to the present-day scholarly eye: unflinchingly positive metaphors where Victor Frankenstein's fictional activity is held up as

ideal or desirable. In the short conclusion that brings the article to an end, I reflect on the significance of scientific self-fashioning with *Frankenstein* for future scholarship, and point towards the potential for other investigations that might extend our understanding of the role of imaginative literature in building scientific communities.

1. Fashioning *Frankenstein*

Considering the vast scholarly apparatus that surrounds and supports Shelley's novel it is surprising that its metaphoric appearance in scientific writing has not previously been identified and examined. This is especially confounding when considering the extensive research on other forms of *Frankenstein*'s afterlives. In the recent *Cambridge Companion to Frankenstein*, for example, there were four chapters dedicated to considering the influence (and ongoing inter-textual existence) of Frankenstein in stage and screen drama, twentieth-century fiction, and graphic novels. (Smith 2016, 175-89; 190-204; 205-18; 219-40) A year or two earlier Lester B. Friedman and Allison B. Kavey had looked closely at a wide range of Frankenstein narratives published from soon after the novel and continuing into the twenty-first century. (2016) It is not, however, the resurgence of interest around the 200th anniversary of the novel's publication that has seen this recognition of the varied and extensive afterlives of *Frankenstein*. In 1990, for example, Steven Earl Forry examined nineteenth-century adaptations, revisions, and popular representations of the novel, and particularly its two key figures of the scientist and the monster, across a wide range of different media. Most relevant to the present discussion is Jon Turney's excellent reading of the role of *Frankenstein* in informing and deforming debates about the life sciences in popular media and elsewhere from the 1930s to the 1990s in his *Frankenstein's Footsteps*. (1998)[3] Turney does offer examples of scientists employing *Frankenstein* to discuss their science (or science generally)

but these are not specifically self-generated metaphoric uses; rather they tend to be reactive comments to debates already in existence in other narrative forms.[4]

This recognition of *Frankenstein*'s fecundity for reinterpretation and multiplicity in subsequent narratives has been generative for scholarship. At the same time, research conducted in the main by scholars of literature and culture has unconsciously fixed the metaphoric use of *Frankenstein* within certain spheres. These have unhelpfully replicated the very patterns of science's relation to culture that was apparent in the earlier examples I gave of scientific victimisation. Roslynn D. Haynes, whose work has been so important in revealing the long history of the literary representation of the scientist, offers an archetypical argument in this respect. In a 2016 article, asking specifically why *Frankenstein* has remained such a potent symbol of the scientist, she focussed on what she called the "rich counter-culture produced by non-scientists" (32). She did so, because, in her view, the stories science told of itself were self-congratulatory, and therefore false "grand narratives" that revealed only the "hegemonic power of the scientific establishment" (33). By contrast *Frankenstein* was a narrative taken up by reformist non-scientific groups whose cultural perspectives on science were more accurate. Not only is there the ongoing and silent separation of science from culture in this argument, there is also an entirely inaccurate creation of an opposition between a homogenous, conservative scientific establishment and liberal, truth-telling sets of artistic cultures. This unhelpful dichotomy constructs a very particular role for *Frankenstein*: as an object for and useful only to cultural commentators and within artistic practice. It is not only useless (since false) to ask what science might do with the novel, it is unthinkable. The failure to imagine that the disciplines of science might deploy *Frankenstein* has been widespread. J. Paul Hunter (2012, ix), in introducing the excellent Norton edition of the 1818 text of *Frankenstein*, noted that the novel "is larger than itself, a text that prompts not just close reading but the pursuit of intellectual and cultural implication." Here, the novel may be larger than itself but it is not beyond the limits of

literary criticism where close reading is followed by a very fast reduction to the novel's place within cultural milieux.

Similarly Elizabeth Young (2008, 2), in a wonderful assessment of the novel's use in political life, also privileges culture over science when she argues that "the *Frankenstein* story has a long history of being used as a political metaphor…metaphors matter to culture and thought". Metaphors also matter to science, of course, but their silencing is the inevitable result of an unconscious acceptance that culture is not associated with science while it is an essential feature of the praxis of the novel. The most egregious version of the elite culture boundary constructed around *Frankenstein* is that kind of reading that attempts to create a form of feedback loop into scientific communities by employing the novel bluntly as a cultural tool for the teaching of ethical practices. As H. Davies (2004, 35) demonstrates, *Frankenstein* might be regarded as offering "an illuminating and provocative narrative" for ethical study that provides "features that are often absent in the more formal, modern ethical analyses." Having uncovered this value, Davies "propose[s] that IRB [Institutional Research Board] or REC [Research Ethics Committee] members could profitably read it to develop their understanding" (35). Not only does *Frankenstein* become the most extraordinary of pedagogic cultural documents in such instances, the argument offered here extends, indeed exacerbates, the assumed superiority of the artistic narrative of science over scientific communities' self-expression of their practices and histories. In all of these examples, and simultaneous with the valuable contribution they make to our understanding of the novel's powerful metaphoric potential, the sciences slip beneath culture to become hidden by a hierarchy of knowledge where they have no purchase. In such a context it becomes entirely understandable that the extensive metaphoric use of *Frankenstein* within scientific communities has been ignored. As the next three sections will show, there is much to be gained – especially for the relationship between the sciences and the humanities – by

bringing to light the vibrant life of these metaphors as they acted upon science and medicine in the Victorian period.

2. *Frankenstein* and the Body

Susan Tyler Hitchcock (2007, 114), in her cultural history of *Frankenstein*, claims with good evidence that across the nineteenth century "references to Frankenstein and his monster seemed to shift from usage to usage, flinging associations hither and yon." While this is certainly true, too, in scientific and medical writing, there are collections of metaphors that coalesce around the same or similar topics. One of those is the body. For many medical writers, *Frankenstein* offered the linguistic and intellectual vocabulary for speaking about the relationship between medical practices and the human body. From as early as the 1820s medical writers recognised the power of the novel to offer useful metaphors for future possibilities in the artificial shaping of the body. In a quite extraordinarily prophetic lecture, recorded in the *Lancet* in November 1828, the obstetrician James Blundell (well-known for his own experimental work on the body which led to the first blood transfusion) spoke of the potential for learning more about the formation of the foetus, and perhaps reaching a point where obstetric scientists would be able to imitate its functions: "We have imitated many other of the natural operations, may we then hope to imitate this, even in the humblest manner?" (231) At this point in his lecture, Blundell pauses and invokes Shelley's novel: "But I forbear, lest you should take it into your heads that I expect to realise the extravagant fiction of the novelist, and bring from the stage *Frankenstein*, to act his part in the scenes of real life" (231).[5] Blundell recognises that the manipulation of the human body, to the point at which that body becomes a scientific object (or creation), is well represented by drawing a comparison to Victor Frankenstein. Within his metaphor Blundell accepts that his speculation

on a medical future of this kind is far-fetched and even dangerous – both because of its potential to create an unnatural body and the damage that might be caused to his own reputation as an obstetric authority for suggesting the possibility.

This doubling of meaning that the metaphor of Frankenstein provided Blundell was one taken up at other points in the Victorian period by other medical writers. In 1856, an anonymous writer to the *Lancet* on the subject of physiological advances that year contrasted the English physiologists with their "continental contemporaries" with the suggestion that "our physiologists" are able "to philosophise concerning the mysteries of the nucleus and the cell without speculating as to the construction of a Frankenstein-monster" (497). Once again, it is implicitly accepted that in discussions of the potential to alter the human body the comparison with Frankenstein is a credible one. Indeed, Blundell's earlier concern is here turned into a criticism of non-English physiologists who may, it is intimated, be unable to judge, like Victor Frankenstein, the line drawn between acceptable physiological inquiry and dangerous speculation.

Medical students would not have graduated unaware of the potential for their own clinical and scientific practice to be represented as similar to Victor Frankenstein's scientific experimentation. This was precisely because they were dealing with the human body. As John Ransome warned in an annual lecture to Cambridge medical students coming to the end of their studies in 1869, "there are not a few persons who still think that in seeking to know how the animal body is built up, and in imitating some of its actions, we are in danger like Frankenstein of constructing a monster, which will ultimately destroy our most precious faith in God and in spiritual things" (19). For Ransome, however, and for the students he urges on their way, the work of the medical scientist was to "raise another corner of the veil which conceals the mysteries of creation" (18). In language clearly reminiscent of the Bridgewater Treatises, Ransome considers another metaphor offered by Shelley's novel: the parallels between scientific knowledge and religious belief. Others were more secular. John Ferguson,

writing in the same student lecture genre as Ransome in 1877, noted that the anatomist or physiologist did not have the advantages of the watchmaker who "studies the construction of his machine by taking it to pieces, observing the form, arrangement, reciprocity of its parts" (22). It is "only Frankenstein, the anatomist of romance," joked Ferguson, "who has as yet succeeded in doing this with a human machine" (22). Shelley's novel does not support a profound point in this example, but rather enables the lecture's warmth and humour. Even so, the metaphoric significance of *Frankenstein* – in both Ransome's and Ferguson's lectures – points to certain potentialities. For both writers the metaphor articulates a sense of transgression, albeit against very different formulations of the norm.

One of the most richly suggestive examples emerges in a speech made by T.H. Huxley in the 1880s, and which was reported in *Nature* in December 1883. Huxley was speaking at the opening of the newly-built Finsbury Technical College in London. This was a very similar appointment to his better-known opening of the Mason Science College in Birmingham in 1880 where he took the opportunity of a public speech to lambast both the teaching of classics and Matthew Arnold's definition of culture. On this occasion, though, Huxley offered an analogy between the construction of a scientific building and Shelley's novel, by thinking about the creation of the Natural History Museum, opened in 1881, and other sites of science in South Kensington:

> That building was the mere bricks and stones of the Central Institute, and the business upon which…he [Huxley] and his colleagues had lately been so largely occupied was making a soul for this body. It was an immensely difficult operation, as they were always in danger, like Frankenstein in the story, of making something which would eventually devour them instead of being useful to them. ("Notes" 1883, 159)

Clearly as humorous as Ferguson's comment to the medical students, Huxley's danger is in part the common concern of the administrator who fears the weight and power of institutional bureaucracy. But, in drawing out a metaphoric comparison with Victor Frankenstein, Huxley is also offering a critique of the instability of the scientific enterprise. With fascinating insight into the novel, Huxley offers an analogy between the soulless or soulful creature and the empty or object-filled museum, between an unnatural and artificial body and a complete and cohesive new creation. What Huxley's reading of Shelley tells him is that the creation of a "useful" scientific body is in the careful management of speculation leading to the potential for new knowledge. Like Blundell before him, Huxley recognises that it is only by walking the line (with masculine bravery, inevitably) between success and failure that the line becomes tangible.

What these metaphors of *Frankenstein* reveal is that it was from the decade after the novel was published that medical scientists believed they were getting closer to achieving at least some elements of the novel's speculative science. Often that is thought to be the case only in the later twentieth century. As Kim Hammond argued in 2004, "in the last few decades Frankenstein has become increasingly prominent as Shelley's fiction moves closer to reality" (182). Yet the evidence here shows this was also the view of the Victorians. In that belief, two key concerns emerge. First, scientists noted the dangers of manipulating the human body as well as the caution that should be employed in doing so. Second, and felt equally strongly, was the damage that might be done to the scientists' body of work: that at stake in their activities was not only the body on which they practised but their own reputations. In the next section I turn to more dramatic employments of the metaphor – in the internecine conflicts between competing scientific and medical groups and individuals.

3. Weaponizing *Frankenstein*

As many present-day scientific commentators have already noted, *Frankenstein* has often been invoked to critique specific scientists and particular scientific activities. One of the most striking Victorian examples of this is the anti-vivisectionist debate in which Louis Pasteur and his experimental methods were widely attacked. It was not, however, only non-scientists who employed the metaphor of *Frankenstein* to develop a perspective on Pasteur and his work. In the short "Notes" section of *Nature* on 3 May 1894, for example, the anonymous compiler of recent scientific community activity complained that "if the general public are gulled into believing half of what it sees posted on the public hoardings concerning the results of the treatment at the Pasteur Institute in Paris, it must liken the eminent head to a veritable Frankenstein" (14). While the writer here accuses public agitators of creating a particular impression of Pasteur, it is the writer himself who creates the simile with Shelley's protagonist and therefore marks the scientist as Frankenstein while attempting the opposite.[6]

For many Victorian scientists, though, a much more deliberate and conscious association of a colleague with Victor Frankenstein and his experiments was a credible piece of weaponry in the small-scale internal conflicts that often mark scientific communities. An exemplary disagreement among Victorian hospital physicians typifies its usage. In July 1864, as the *Lancet* reported, the physician at a new hospital created for the treatment of stone – William Coulson – found himself in conflict with his medical peers over claims he made for the poor treatment of the same disease at other hospitals. (Wakley 1864, 74-5)[7] Unsurprisingly, physicians working at these rival institutions were angered by his (false) analysis of their operation success rates and survival statistics. Dr William O'Connor, physician at the Royal Free Hospital, for example, wrote to the *Morning Post* to express his "surprise and amazement" at Coulson's claims, and told the *Post* that at the very moment Coulson had made his arguments, he had "immediately…call[ed] into question the accuracy of his statements" (74). Raging between various medical men for nearly a month, the conflict

itself, as much as Coulson's original claims, became (albeit briefly) central to medical gossip. Responding to this, and very much opposing Coulson's perspective, James Wakley concluded that the *Morning Post* reporting had "uncovered the FRANKENSTEIN of which this incautious young man is (and justly) shocked to find himself the parent" (75). While Wakley clearly erodes the difference between Victor Frankenstein and his creature in this statement, his capitalized text typographically indicates his replacement of Coulson's name (also capitalized) with that of Shelley's misguided scientist. Coulson has allowed the debate to become monstrous, but has also played the part of the monster's creator. Blame is therefore cast by the metaphoric comparisons to *Frankenstein*.

Other internecine conflicts were also marked by the use of *Frankenstein* to signal misguided effort or perceived misunderstandings of new knowledge. In another *Lancet* editorial, in 1874, James Wakley repeated his use of *Frankenstein* to condemn the Indian sanitary commissioner David Douglas Cunningham's views on contagion: "Dr. CUNNINGHAM spoke of contagion as if it were held to be some self-operative Frankenstein giving laws to itself, and, finding, that such is not the case, he holds contagion disproved" (482). While it is the conception of contagion that is explicitly compared to Frankenstein, the rest of the editorial makes clear comparisons between Cunningham himself – described variously as "looming", "alone among the ruins", "peculiar", and "unsparing" (482) – and Frankenstein's creature.[8] A similar attribution of *Frankenstein* was made by the psychologist John Charles Bucknill in his Lumleian Lecture on insanity, delivered to the Royal College of Physicians in 1878. Concerned by some of his colleagues' views on the actions of the will in mental activity, and the acceptance of their views in legal cases of insanity, Bucknill argued that judges should not "needlessly vivify this Frankenstein of a will" (560) created by his fellow psychologists. This, too, is an attack at a slant: Bucknill does not explicitly compare his own colleagues with Victor Frankenstein or his creature, but instead calls their scientific conclusions Frankenstein-like. The meaning here is clearly that they have produced a

monstrous body of knowledge that should not be brought to life (or vivified) by being accepted in law. In both these examples, the metaphor of *Frankenstein* illuminates apparently poor scientific judgement. It is, though, not simply the case that the metaphor therefore casts the scientist as Victor Frankenstein, as might easily be done. Rather, the metaphor collapses the scientists and scientific judgement together, so that each takes on the characteristics of monstrousness.

Questions of judgement were also undermined by comparisons to *Frankenstein* in institutional contexts. Particularly in the medical professions, institutional bodies – regulatory and statutory – often came under scrutiny by their members. At times they were seen as Frankensteinian. Comparisons began as early as 1829, when Thomas Wakley wrote in outrage at the decision of the Commissioner of Stamps to increase the duty payable on medicines. Giving examples of chemists who had acted outside the new legal requirements and received a summons to court, Wakley wrote that "the sudden appearance of the monster in *Frankenstein*, could not produce greater affright than would be occasioned by the sight of such a hideous and ghastly document" (378). A similarly vivid comparison befell the Chief Commissioner of Works in the late 1850s, as he battled to improve London's sanitation through engineering better sewerage systems for the river Thames. For the writer of the *Lancet*'s report on these efforts "the Chief Commissioner of Works is much in the position of that unfortunate student in Mrs. Shelley's 'Frankenstein,' who, intending to make 'a faultless monster which the world ne'er knew,' only succeeded in manufacturing an ill-conditioned creature that constantly tormented its maker" ("Banks of the Thames" 1858, 94). The writer appears to contrast the proposed ideal creature against the evil reality, and the sought-for perfect body against its physiologically abject construction. While there is sympathy for the Commissioner in this metaphor, the systemic problems, inherently bureaucratic in origin, are still made monstrous. A final indicative example reveals that the metaphor was not reserved for institutional bodies which exerted external influence on the medical profession, but was

also applied to internal structures. An 1864 discussion of the group of pharmacists who had been tasked with constructing the "new pharmacopoeia" ("New Pharmacopeia", 479) saw problems in the variability of the weights and measures indicated in the recipes for chemical compounds. This lack of uniformity, and consequent lack of authority in the new work, led the writer to claim that "like Frankenstein, the Pharmacopoeia is ever pursued by its own creation" (479). Here, and in each of these institutional examples, it is the creature rather than Victor Frankenstein who plays the most active metaphoric role. Institutional bureaucratic decisions are made monstrous. In turn the individual chemist, physician and pharmacist is cast as the victimised Victor Frankenstein; over-powered by the size and strength of the creature.

In weaponizing the *Frankenstein* metaphor, very different Victor Frankensteins emerge. When the institutions of science are criticised Victor is the unfortunate victim of error. When individual colleagues are being marked out Victor is the over-bearing madman destined for failure. The flexibility of the metaphor is certainly one reason for its continual use. It is equally telling, nevertheless, that the creature is exclusively employed in metaphors aimed at organisational structures and decision-making. It is a recognition that while Victor is singular, the creature is multiple. He is the accumulation of body parts into a whole that because it is multiple has the potential to be monstrous. So, too, is the scientific institution a constructed body that in its unnatural multiplicity might make a monster of scientific activity. Implicit in this perspective, too, is the inevitability of conflict between individual scientists and their regulatory structures. As Diana Reese has argued, the monster's "assemblage and animation are depicted as forming an inexorable chain of events that culminate in the dramatic encounter of monster and maker" (2006, 49). Seeing the metaphor of *Frankenstein* employed to depict scientific organisations brings to the light the (unconscious) acceptance among individual scientists that their own regulations and statutes will eventually be found too binding.

4. *Frankenstein* Favoured

In starting now on the third and final set of examples of metaphors, I move from those that enable criticism to those that demonstrate a positive reading of the novel and its articulation of the scientific enterprise. This seems unlikely in the present context: *Frankenstein* is presently understood as one of the central myths of scientific over-reaching and of the ethical vacuum that can present itself in flawed research cultures.[9] This is so readily apparent to present-day critical audiences that Bernard E. Rollin felt no need to explain it beyond naming it as "the Frankenstein syndrome" (1995, title page). For some nineteenth-century scientific writers, however, there were ways of drawing comparisons with *Frankenstein* that reflected positively upon the recipient. For example, John Ferguson's citing of *Frankenstein* in his lecture to students, discussed in the second section above as suggesting transgression, does not do so with any real sense of negative consequences. Indeed, Ferguson's perspective that medical science has not "as yet succeeded" (1878, 22) in replicating Victor Frankenstein's ability to put the body together from its constituent parts suggests that doing so may in fact be a desirable future benefit of progressive medical knowledge. For Ferguson, these actions are to be valued as exemplifying medical potential. He employs the Frankenstein metaphor to inspire the next generation of medical professionals rather than to warn them.

This reversal of the metaphor and its being put to use in stoking ambition is not a one-off. The *Dominion Medical Monthly*, in a humorous note about tonsils, invites its readers to imagine the benefits of being able to act as Victor Frankenstein and to construct the human frame as one would wish. "A distinguished medical luminary on the other side of the Atlantic," claims the author, "had said that were he, like Frankenstein, to attempt the artificial construction of a man, he would leave the tonsils out" ("Tonsils" 1893, 124). They are,

reports the author, “a perfectly useless appendage which cumbered the throat” (124). Although frivolous and inconsequential in one regard, the article reveals that different metaphoric associations were possible. In particular this metaphor looks forward with some enjoyment to the possibility of artificial creation for it puts into the hands of the future physiologist the potential improvement of the human frame. This latter aspect was a topic taken up, with greater seriousness, by George M. Gould and Walter L. Pye in their book on medical curiosities, published originally in the USA at the very end of the nineteenth century. In an extended discussion of what surgery was able to achieve by way of either enhancing the human body or alleviating some of its weaknesses, Gould and Pye turn to recent successes with eye surgery:

> Hansell and Clark say that the perplexities of learning to see after twenty-six years of blindness from congenital disease, as described by a patient of Franke, remind one of the experience of Shelley’s Frankenstein. Franke’s patient was successfully operated on for congenital double cataract, at twenty-six years of age. The author describes the difficulties the patient had of recognising by means of vision the objects he had hitherto known through his other senses, and his slowness in learning to estimate distances and the comparative size of objects. (Gould and Pye 1900, 268)

On first reading this metaphor looks like a further example of the conflation of Victor Frankenstein with his creature. Closer attention reveals an ambiguity. The experience of Frankenstein can be applied to the patient/creature but also to the surgeon/Victor who has to witness the coming into being of the newly-formed human. It is nevertheless a largely positive experience that is described with the metaphor. The emergence of new ways of interacting with the world, however difficult they may first appear to be, is a sign of medical advancement and human improvement. Equally striking is that none of the common

associations of Frankenstein are mobilised in this metaphor. The post-surgery eyes are not monstrous, nor is their new-found power overwhelming. Rather, there is a quiet optimism in the process of learning that speaks to the positive potential endpoints of acting like Frankenstein and seeking to promote new methods for improving the human body and alleviating distressing conditions. Neither does this metaphor create a new annex of the novel's original meaning. Victor Frankenstein did, after all, originally claim that his aim in undertaking new research was to "banish disease from the human frame" (Shelley 1993, 23).

It is important to recognise that the metaphoric use of *Frankenstein* was not always in the gothic mode or staged as a Cassandra-like warning of future disaster. In these favourable analogies with the novel's characters and actions medical scientists revealed a much more positive perspective on their future research and its potential to enhance the human condition without fear of further and more negative consequences. In such examples these metaphors come closer to light-hearted representations from a century later. Jon Cohen sees these as using *Frankenstein* as a shorthand for the "delightfully chimeric" combinations of "disparate parts" (2018, 149) in which several scientific studies of the late twentieth century revel. Viewing them in combination with those other Victorian metaphors gives a different impression. They are, despite their very much more positive reading of Victor Frankenstein's research, similarly focussed on the production of knowledge. While this is obviously configured optimistically, it is still epistemological possibility that remains at stake. Indeed, these positive representations of *Frankenstein* reveal just how often all metaphors of *Frankenstein* focus on the fragility of knowledge production. Shelley's novel, when repurposed in scientific writing, may not offer up epistemic crisis – as present-day scientists claim is true of popular representations – but they do provide access to an ever-present epistemological crisis. That is, the validation of science itself is not at risk, but the ways in which scientific knowledge is formed and managed is undoubtedly under investigation.

5. Conclusion: Transnational Frankenstein and the Democratic Deficit

Scientific self-fashioning with metaphors of *Frankenstein* includes the image of individual scientists, the nature of scientific institutions and the potential power of new scientific knowledge. Each of these speaks to the representation of the ur-scientist; an original type that does not exist, and never has existed, but yet which has symbolic power in relation to individual types. That is the power of Shelley's novel – to have managed to be so malleable in response to different historical moments that its characterisation of the scientist is almost identical with the characterisation of the ur-scientist. And while I have focussed almost exclusively on British examples of *Frankenstein* metaphors this malleability means that there are many more to be uncovered across the Anglophone world. In the first part of this conclusion I wish to show the extent to which Frankenstein metaphors have travelled globally, and yet how they continue to depict concerns with the same themes as I have identified here. To do so I will consider briefly select examples from nineteenth-century Australian scientific writing. Finally, I will turn to the wider implications in present-day science and its communication of the metaphors I have uncovered. For it is absolutely the case that the study of these metaphors is revealing of the politics that underpins present complaints about the "stigma" (Nagy et al. 2018, 1143) of *Frankenstein*.

Similar to Britain, Australian culture was replete with references to *Frankenstein* across the Victorian period. Commonly, across the popular print media and in political commentary, *Frankenstein* was used metaphorically, and with a clear sense that the metaphor would be readily understood by readers and listeners. During the 1891 debate on the Commonwealth of Australia Bill, which confederated Australia as a single nation a decade later, George Dibbs, representing the colony of New South Wales, argued that the present principles of organisation would "create a federal Frankenstein" unless he and his colleagues

were able to "lay the foundation first" (n.p.). Dibbs, aiming for persuasive rhetoric, employs *Frankenstein* as a popular, forceful, and readily graspable metaphor for a powerful and uncontrollable force. Writing about scientific activity assumed the same common recognition. The Sydney-based *Freeman's Journal*, reporting on the explosion of a new oil-based substance called "Nitro-glycerine", warned against the stoppage of further experiments by stating that "No body…would wish to restrain the research and experiments of philosophers from any fear lest their inventions or discoveries might possibly turn out monsters. The days of Frankensteins, we may hope, are over" ("Bridge Street Explosion" 1866, 152). The writing here assumes a collective recognition that "Frankensteins" connote dangerous science undertaken by immoderate experimenters. In Australian medicine, too, *Frankenstein* was employed, as it had been in British medical and scientific communities, to interrogate institutional practices. The *Australasian Medical Gazette*, for example, was concerned by systemic problems of over-recruitment at the University of Sydney's Medical School. This was leading, claimed the writer, to poor graduate physicians who were taking up positions as surgeons long before they were skilled enough to do so. ("Medical School" 1899) "Those who originated and fostered the Medical School of Sydney," the article warned, "little knew the Frankenstein that they were constructing" but which was now "contributing towards the creation of a soulless fabric calculated to destroy the medical practitioners of New South Wales" (n.p.)[10]

The parallels to the metaphors in British scientific writing are obvious. The "Frankenstein" referenced in this article pertains to the creature rather than to Victor. It continues the tradition of seeing institutional structures of science as collectives. But the metaphor is extended here in interestingly different ways. The Medical School, now as Frankenstein's creature, is constructing "a soulless fabric" which will destroy the state's medical community. This is yet another monster, the soulless figure bringing destruction on the medical family. This extended metaphor draws on both the specific plot of the novel and

its symbolic concerns with a new species of monster which might overpower its creators. It reveals, in powerful terms, the concern with institutionalised power that many British scientists shared with their Australian counterparts.[11]

The concern shown by Victorian scientists for institutional over-reaching and aberrant behaviour, combined with their obsession with knowledge production, can shed light on the present-day scientific opposition to what Bernard Rollin called "the Frankenstein thing" (1995, 5). In Peter Nagy and his colleagues' view, this "thing" is the perceived stigma of being compared to Victor Frankenstein and/or his creature. It is so powerful a metaphor that even scientific communities come to believe the stigmatising of their fellow scientists. (2018, 1143) For those scientists who believe that *Frankenstein* alters the represention of science for public audiences the answer appears to be to develop strategies to devalue its power and replace it with "more accurate and favourable public perceptions" (Nagy et al. 2018, 1154). But the evidence of Victorian scientific use of the *Frankenstein* metaphor suggests that it was an important tool in keeping a check upon both individual practices and institutional activity. More than this, the metaphor enabled some vital thinking about the politics of knowledge production and its value. Present-day scientific commentators do not appear to be concerned about scientists making use of "the Frankenstein thing". Their concern is its use by external audiences. In attempting to eradicate the power of the *Frankenstein* metaphor from popular usage, scientists may unwittingly (like Victor Frankenstein) be undermining an important element that allows science to take its place within society: its acceptance of the principle that all democratic citizen have the right to speak freely within the law about science's aims, methods and activities. As Martha Augoustinos and her co-writers have argued, the increasing politicization of the sciences "will only intensify the need for inclusive and democratic modes of decision-making in science policy" (2010, 112). To advocate for the rejection of a mode of public involvement in science, and especially one that draws imaginatively on one of culture's most successful studies of science within the world, is to

invite an increasing democratic deficit in public engagement with science. It is also a misreading of the novel. Victor Frankenstein was of course an over-reacher whose hubris blinded him to the consequences of experimental work. His monster was of course a symbol of transgressive science, its monstrosity and its power. But the novel also warns us against isolation, and against allowing only the voices we wish to hear enter into our practice. That is, it remains an important metaphor for understanding how vital it is to continue to ask questions about our production of new knowledge – and at times even to compare that with *Frankenstein*. Victorian scientists knew this, and we would do well to remember their gleeful employment of Shelley's novel as we consider the scientific challenges ahead.

Notes on Contributor

Martin Willis is Professor of English Literature and Head of the School of English, Communication and Philosophy at Cardiff University. He is editor of the *Journal of Literature and Science*, former Chair of the British Society for Literature and Science, and co-Director of the Wellcome-funded ScienceHumanities Initiative. His previous work includes *Staging Science* (Palgrave, 2016), *Literature and Science* (2014) and the award-winning *Vision, Science and Literature, 1870-1920: Ocular Horizons* (Pickering & Chatto, 2011).

Works Cited

Augoustinos, Martha, Shona Crabb, and Richard Shepherd. 2010. "Genetically Modified Food in the News: Media Representations of the GM Debate in the UK." *Public Understanding of Science* 19 (1): 98-114. doi:10.1177/0963662508088669.

"The Banks of the Thames." 1858. *Lancet*, Jan. 23: 94.

"The Bridge Street Explosion." 1866. *Freeman's Journal*, Mar. 10: 152.

Blundell, James. 1828. "Lectures on the Gravid Uterus, and on the Diseases of Women and Children." *Lancet*, Nov. 22: 225-231.

Bucknill, John Charles. 1878. "Lumleian Lectures on Insanity in its Legal Relations." *Lancet*, Apr. 20: 558-61.

Cohen, Jon. 2018. "How a Horror Story Haunts Science." *Science*, Jan. 12: 148-50.

"Critical and Explanatory Notes on the New Pharmacopoeia." 1864. *Lancet*, Apr. 23: 479-81.

Davies, H. 2004. "Can Mary Shelley's *Frankenstein* be read as an early medical ethics text?" *Medical Humanities* 30 (1): 32-5. doi:10.1136/jmh.2003.000153.

Dibbs, George, "From April 2nd. Debate on the Commonwealth of Australia Bill at the 1891 National Convention in Sydney." In *Official Record of the Proceedings and Debates of the National Australasian Convention/Held in the Parliament House, Sydney, New South Wales, in the Months of March and April 1891*. Trove (National Library of Australia Database; accessed December 11, 2018). https://trove.nla.gov.au/work/8285187.

Ferguson, John. 1878. *On Some Relations of Chemistry to Medicine: Address to the Medical Students*. Glasgow: James Maclehose.

Forry, Steven Earl. 1990. *Hideous Progenies: Dramatizations of Frankenstein from the Nineteenth Century to the Present*. Philadelphia: University of Pennsylvania Press.

Friedman, Lester B., and Allison B. Kavey. 2016. *Monstrous Progeny: A History of the Frankenstein Narratives*. New York: Rutgers University Press.

Hammond, Kim. 2004. "Monsters of Modernity: Frankenstein and Modern Environmentalism." *Cultural Geographies* 11 (2): 181-98. doi:10.1191/1474474400eu301oa.

Gould, George M., and Walter L. Pye. 1900. *Anomalies and Curiosities of Medicine*. Philadelphia: W.B. Saunders.

Haynes, Roslynn D. 2016. "Whatever happened to the 'mad, bad' scientist? Overturning the stereotype." *Pubic Understanding of Science* 25 (1): 31-44. doi:10.1177/0963662514535689.

Hitchcock, Susan Tyler. 2007. *Frankenstein: A Cultural History*. New York: W.W. Norton.

"Increase in Number of Medical Men." 1899. *Telegraph*, Jun. 26: 4.

"Medical School." 1899. *Australasian Medical Gazette*, Apr. 20: n.p.

Mulkay, Michael. 1996. "Frankenstein and the Debate over Embryo Research." *Science, Technology and Human Values* 21 (2): 157-76. url: https://journals.sagepub.com/doi/pdf/10.1177/016224399602100202.

Nagy, Peter, Ruth Wyle, Joey Eschrich and Ed Finn. 2018. "Why Frankenstein is a stigma among scientists." *Science and Engineering Ethics* 24 (4): 1143-59. doi:10.1007/s11948-017-9936-9.

"Notes." 1883. *Nature*, Dec. 13: 158-9.

"Notes." 1894. *Nature*, May 3: 14.

"Overcrowding the Medical Profession." 1899. *Toowoomba Chronicle and Darling Downs General Advertiser*, May 13: 3.

Oxford Stone Group. 2018. “History of Stone Disease.” Accessed 10 December 2018. https://www.ndm.ox.ac.uk/osg/history-of- stone-disease.

Ransome, Arthur. 1869. *The Thruston Speech upon the Progress of Medicine*. London: Macmillan & Co.

Reese, Diana. 2006. “A Troubled Legacy: Mary Shelley’s Frankenstein and the Inheritance of Human Rights.” *Representations* 96 (1): 48-72. doi:10.1525/rep.2006.96.1.48.

Rollin, Bernard E. 1995. *The Frankenstein Syndrome: Ethical and Social Issues in the Genetic Engineering of Animals*. Cambridge: Cambridge University Press.

Schwartz, Robert S. 1999. “Frankenstein’s Footsteps: Science, Genetics and Popular Culture.” Review of *Frankenstein’s Footsteps: Science, Genetics and Popular Culture*, by Jon Turney. *New England Journal of Medicine* 340 (3): 243-4. doi:10.1056/NEJM199901213400322.

Shelley, Mary. 1993. *Frankenstein*. Ed Marilyn Butler. Oxford: Oxford World’s Classics.

Smith, Andrew, ed. 2016. *The Cambridge Companion to Frankenstein*. Cambridge: Cambridge University Press.

Stubber, Claire and Maggie Kirkman. 2016. “The Persistence of the Frankenstein Myth: Organ Transplantation and Surrogate Motherhood.” *Soundings: An Interdisciplinary Journal* 99 (1): 29-53. url: http://muse.jhu.edu/article/609296.

"Tonsils." 1893. *Dominion Medical Monthly* 13 (January): 124.

Turney, Jon. 1998. *Frankenstein's Footsteps: Science, Genetics and Popular Culture*. New Haven: Yale University Press.

Tyndall, John. 1871. "Miracles and Special Providences." Chap. 2 in *Fragments of Science: A Series of Detached Essays, Lectures and Reviews*. Vol. 2. London: Longmans, Green & Co.

"Untitled." 1856. *Lancet*, Nov. 1: 497-8.

van den Belt, Henk. 2018. "Frankenstein Lives On." *Science*, Jan. 12: 137.

Wakley, James. 1864. "The Hospital for Stone." *Lancet*, Jul. 16: 74-75.

Wakley, James. 1874. "The Discussion on Cholera." *Lancet*, Apr. 4: 482-3.

Wakley, Thomas. 1829 "Attorney General Pills." *Lancet*, Dec. 12: 377-81.

Young, Elizabeth. 2008. *Black Frankenstein: The Making of an American Metaphor*." New York: New York University Press.

Notes

[1] This article was partly researched and entirely written during a Visiting Fellowship at the Humanities Research Centre of the Australian National University. I am indebted to the support, both financial and intellectual, of the HRC and of the ANU community more widely.

[2] My term scientific self-fashioning is a conscious amendment of Stephen Greenblatt's influential work on Renaissance self-fashioning, which was the subject of his 1980 book of that title published by the University of Chicago Press. Greenblatt showed in that book the influence upon identity that different forms of literature could have, which is one of the aims, albeit very specifically focussed on a single fictional text, of the present article. It is worth noting that I use the term "scientist" in this context as the majority of examples I employ come from a period in the second half of the nineteenth century when that term was in common usage. I recognise, of course, that my earlier examples fall in the period when other titles (natural philosopher, man of science, and savant, for example) were still more regularly used. My use of a single term is done to ease any complexity in the mixing of terminology.

[3] Additionally interesting, as it is written by a scientist rather than media scholar, is the slightly earlier work by Rollin (1995).

[4] There are numerous other examples of the use of *Frankenstein* focussed on the late twentieth and twenty-first century, when the prefix 'Franken' came into use, often to describe scientific manipulations of objects perceived as natural: Frankenfoods or Frankenbabies, to give two particularly striking examples. There is nothing to be gained by my citing an extensive list here, but Hammond (2004) and Stubber and Kirkman (2016), offer two very different approaches and include extensive citations to further scholarship.

[5] Blundell's phrasing makes clear that he is thinking not only of the novel but also its various stage adaptations, which had been common in London theatres in the 1820s.

[6] A masculine descriptor seems most appropriate for an anonymous author in *Nature*, considering the gender imbalance of its overall authorship.

[7] Stone is the generic term for a range of conditions such as bladder stone, urinary tract stone and kidney stone. See the Oxford Stone Group's brief history. (Oxford Stone Group 2018, n.p.)

[8] Cunningham's views on cholera and contagion were proven at least partly correct by Robert Koch's discovery of cholera's bacterial source in the 1880s.

[9] Jon Cohen (2018, 148-50), writing in *Science*, gave some examples of the use of Frankenstein to celebrate new scientific discovery. His examples are actually uses of the prefix "Franken", which is used with wider symbolism, often humorously. Specific reference to the novel and its main actors remains almost wholly negative in other media.

[10] The section on *Frankenstein* was almost always quoted directly when this article was summarised or reported in the popular press. See, for example, "Overcrowding the Medical Profession" (1899) and "Increase in Number of Medical Men" (1899).

[11] This example also uncovers the rich metaphors of *Frankenstein* that exist across the Anglophone scientific world. A further examination of Australian, or American or Canadian materials would clearly extend the work undertaken in this article, and while there is not time to develop more of it here, there are fruitful possibilities in doing so.