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Monsters of modernity: Frankenstein and modern environmentalism

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The story of Frankenstein is often interpreted and mobilized as a powerful and popular symbol of concerns over the risks and dangers of science, progressive modernity and its ensuing technological creations, and – as in the recent GM 'Frankenstein food' debate – the dangers of 'messing with nature' or 'playing God'. Shelley's narrative is seen to symbolize Romantic fears, offering a dystopic tale of certain demise, one that demonizes technology in the form of Frankenstein's 'monster'. Such interpretations and mobilizations align the myth of Frankenstein with the neo-Romantic, conservative, nostalgic and counter-modern currents of elements of deep green, ecobiocentric ideology. In contrast, and in the context of contemporary environmental discourses, this paper offers a reading of Frankenstein as a critical questioning of both anti-Enlightenment Romanticism and anti-Enlightenment science that provides a framework for evaluating contemporary ecobiocentric ideals. Frankenstein is not an outdated tale. Shelley's novel is characterized and punctuated by a subtle and sophisticated appreciation of the vital role of social relations in determining the nature, direction, products and consequences of science and technology. The tale of Frankenstein presents a challenge to the usual anti-modernist, anti-science, pro-nature alignments of the Frankenstein myth, drawing our attention instead to important questions about what kind of socio-nature we want produced, by whom, for what purposes and under what conditions.

It was a dreary night in November that I beheld the accomplishment of my toils. ... I had worked hard for nearly two years, for the sole purpose of infusing life into an inanimate body. For this I had deprived myself of rest and health. I had desired it with an ardour that far exceeded moderation; but now that I had finished, the beauty of the dream vanished, and breathless horror and disgust filled my heart. Unable to endure the aspect of the being I had created, I rushed out of the room ... (Victor Frankenstein)¹

All save I were at rest or in enjoyment. I like the arch-fiend, bore a hell within me; and, finding myself unsympathised with, wished to tear up the trees, spread havoc and destruction around me, and then to have sat down and enjoyed the ruin. ... No: from that moment I declared everlasting war against the species, and, more than all, against him who had formed me, and sent me forth to this insupportable misery. (The 'being')²

Since its first publication in 1818, Mary Shelley's novel *Frankenstein or, the modern Prometheus* has, literally, taken on a life of its own, generating an array of Frankenstein myth, metaphor and imagery. Of the many readings, retellings and applications, Frankenstein has long held an important place in discourses around science and technology. Winner identified Frankenstein as 'the closest thing we have to a definitive modern parable about mankind's ambiguous relationship to technological creation and power';³ Smith as perhaps 'the most poignant image of our failure to control science and technology';⁴ and Warner as '*the* contemporary parable of perverted science'.⁵ In the last few decades, Frankenstein has become increasingly prominent as Shelley's fiction moves closer to reality in the twenty-first 'biotech' century.⁶ Clearly Frankenstein, as a tale about a scientist who creates life, selecting 'traits' as it were, stitching together body parts from various human corpses, resonates strongly with the pursuits and achievements of contemporary 'life' sciences, including the promise of human cloning and germline genetic engineering. In such arenas, Frankenstein has become perhaps the most important symbol of concerns over the risks and dangers of these new technologies (Figure 1).

Yet there is much disagreement over the *value* of the myth as it is mobilized in such arenas. From Smith's perspective, Frankenstein remains pertinent to many environmentalists today.⁷ For Warner, the tale-of-perverted-science interpretation misses Shelley's 'much more urgent message' – 'that a man might make a monster in his own image and then prove incapable of taking responsibility for him':⁸



FIGURE 1 Anti-GM protester dressed as Frankenstein's 'being'. (*The Guardian*, 18 Feb. 1999; © Raymonds Press Agency.)

The point about Frankenstein assembling the monster from body parts haunts contemporary consciousness, but the book's main philosophical argument, that his viciousness is learned, not innate, is somehow overlooked.⁹

Turney finds in Frankenstein simply an outdated tale, one that polarizes debates, posing 'all-or-nothing questions' that miss the possibility of answers more complex than 'yes' or 'no'. Thus, he argues, we need to move 'beyond our preoccupation with Frankenstein and all his hideous progeny ... we badly need new stories.'¹⁰ Conversely, Bingham is concerned to sustain the myth against the threat of reduction and closure posed, he argues, by the 'currently hegemonic Frankenstein', mobilized as it is in the genetically modified (GM) 'Frankenstein food' debate as a tale of the 'hubris so often associated with modernity ... exemplified by the desire to meddle with the workings of life'. For Bingham, this reduction of Frankenstein to a 'conservative parable of presumption' misses the more progressive potential of the myth: as a warning against taking 'short cuts' that assume a clear distinction between the social and the technical, between the cultural and the scientific, and between ourselves and our artefacts.¹¹

These few commentaries illustrate the diversity of interpretations of Frankenstein. Different views of the myth reflect different times, and we can read Frankenstein to make different senses for different purposes. They illustrate, then, the relevance and cultural politics of the myth. Whether such interpretations are 'right' or more true to the text is not at issue here; rather, the range of meanings reflect James and Field's observation: 'one way or another Mary Shelley ensured that, working from our own experience and historical position, we can read into the text meanings that belong to us.'¹² It is important, I would argue, to continue to examine and explore, and to extend or add to those meanings: the former because of the significance and materiality of the myth in contemporary debates; the latter because, like Bingham, I am concerned to sustain Frankenstein's vitality, to breath new life into the myth.¹³

Thus in this paper I want to add yet another interpretation to the weave of the Frankenstein myth and, in particular, to extend its meaning beyond the notions of 'perverted science', 'Playing God' and 'messing with nature' that have become prominent in the 'Frankenfears'¹⁴ of the biosciences debates and that look set to become the dominant message that we find in the myth today. In such arenas, Frankenstein is often held up as a dystopic tale of certain demise, one that demonizes technology in the form of Frankenstein's 'monster' and aligns the myth with neo-Romantic, anti-Enlightenment sentiments. I will explore this alignment and its consequences for the myth first in the context of elements of contemporary ecocentric ideals and second in the context of a detailed reading that finds in Frankenstein an Enlightenment, rather than anti-modern, tale. I will argue that Frankenstein turns on issues of ambiguity and ambivalence in relation to science, technological creation and progress, exploring themes of risk, responsibility and accountability such that it resonates more with issues surrounding the social relations of science and technological creation than with its demonology. From this reading we can find in Frankenstein a subtle criticism of both anti-Enlightenment Romanticism and anti-Enlightenment science, one that provides a framework for critically evaluating contemporary ecobiocentric ideals.

Environmentalism, Romanticism and the Frankenstein myth

Frankenstein's 'being' is *the* monster of modernity. As the first novel in the genre of science fiction stories, Frankenstein marked a departure from traditional ghost stories or tales of the supernatural to stories about the potential horrors of science and technological development. In the preface of Frankenstein, Shelley makes known her conscious intention to produce a story 'exempt from the disadvantages of a mere tale of spectres or enchantment': 'the event on which this fiction is founded has been supposed, by Dr Darwin and some of the physiological writers of Germany, as not of impossible occurrence' and thus 'I have not considered myself as merely weaving a series of supernatural terrors'.¹⁵

Shelley wrote and set Frankenstein in the midst of the first industrial revolution.¹⁶ The complexity of thought in such a short novel reflects the perplexing debates of her time, a 'period in which the removal of the boundaries of knowledge reached a peak of acceleration'.¹⁷ From 1814 to 1816 a key question debated in public lectures at the Royal College of Surgeons was: 'From whence did the principle of life proceed?'¹⁸ At this time, natural philosophers were proffering theories that there was a 'connection between electricity and life'.¹⁹ Public demonstrations of the electrical provocation of corpses²⁰ were 'widely described in the press at the time',²¹ and Shelley would have certainly read about, and possibly witnessed, this kind of sensationalist display of modern science. Vasbinder states: 'All of Victor's [Frankenstein's] scientific studies can be traced in eighteenth-century science. There is not one statement made by Shelley that does not have at least one, sometimes dozens, of echoes in the scientific literature of her age'.²²

Thus Shelley was undoubtedly 'extremely well acquainted with the science of her time'.²³ The emerging science challenged the traditional view of the 'vital spark' believed to kick-start the soul and ultimately to have come from God with a new account: that life was merely an assemblage of pieces that could be brought to life by electricity.²⁴ Shelley's launch of science fiction is an elegant historical landmark of the social changes of her time: a society committed predominantly to the promises of the Enlightenment notion of progress epitomized by advances in science and technology and characterized by the apparent (modernist) separation of 'nature' and 'society'. In Frankenstein, Shelley offers a subtle and sophisticated exploration of the potential concerns of a society facing such transformations.

Nearly two centuries on, Frankenstein is identified today as a 'modern myth',²⁵ having an independent and continued existence from the book and built upon the many interpretations and applications that have followed on from Shelley's tale.²⁶ Indeed, the sheer and growing volume of Frankenstein adaptations, media references and critical attention is a testament to the versatility, importance and ever-increasing popularity and pervasiveness of the story, and serve to fortify the potency and multiplicity of a myth already deeply embedded in (Western) consciousness.²⁷ Both Shelley's text, and the shorthand storyline that we know as 'Frankenstein' – a man, a scientist, creates a living being out of bits of corpses which, grown monstrous, turns on its creator and runs amok²⁸ – provide a versatile framework for exploring the problems of a world

that we are continually recreating and reshaping and, in the process, remaking ourselves.²⁹

Frankenstein is prominent in contemporary environmental discourses, particularly those that surround the recent biosciences debates. Given that the vitality and multiplicity of 'green' thought matches that of the myth, aligning Frankenstein–environmentalism associations runs the danger of oversimplification or misrepresentation of both. However, identifying certain alignments of the myth enables an exploration and evaluation of its *resonance*, in particular contexts, with certain strands of (Western) environmentalism. In particular, within such arenas Frankenstein has been aligned with, and reinforces, the kind of neo-Romantic, conservative, nostalgic, counter-modern image of elements of deep green ecobiocentric ideology. This alignment, if not always casting Frankenstein strictly as a dystopic 'anti-science' symbol, certainly mobilizes the myth in what Hay distinguishes as the Romantic 'reaction to a *particular* science – the technologically applied science in which the all-knowing, all-powerful human stood above and apart from nature, manipulating it in "his" own interest'.³⁰ This kind of opposition is evident in contemporary debates, for example where anti-GM direct action groups claim that '[t]he genetic engineering industry is only the most recent example of this civilisation's drive to subjugate nature to its own ends'.³¹ On the deep green neo-Romantic edge of ecocentrism, 'Nature' is to be treated with awe, and 'natural laws' and our unity with nature respected in a nonutilitarian way, indeed celebrated as the more appropriate (moral) guide for human activity.³² Thus, in the context of GM opposition, some argue that 'Frankenstein food' is 'unnatural' and that 'real progress would lie in using our knowledge in working *with nature*'.³³

It is not my intention to label such contemporary environmentalism or its mobilizations of Frankenstein simply as a revival of nineteenth century romanticism, but rather to show a tendency towards elements of this early 'ecological impulse'.³⁴ Indeed it may be, as Hay argues, that intellectually 'the environmental movement proceeds from essentially non-romantic values'.³⁵ However, *the most powerful, persuasive and influential arguments* employed to mobilize support and sympathy in a whole range of environmental campaigns, especially anti-GM food campaigns, are romantically inspired, opposing modernity's nature-dominating progressive science and technology, highlighting the destructive impact of industrialization, and claiming that contemporary (ecological) problems are the result of tampering with or working against nature, and using unnatural rather than natural processes. It is certainly these arguments that Frankenstein has come to symbolize.

The historical Romantic roots of the novel reinforce this contemporary alignment of the myth. There are of course the more obvious Romantic connections of Shelley herself: by marriage to the English Romantic poet Percy Bysshe Shelley, and through her friendships, for example with George Gordon, Lord Byron. More importantly, there are direct historical and ideological links between the eighteenth century Romantic movement, ecology, ecocentrism and the interpretation of Frankenstein as a symbol of such counter-Enlightenment philosophies. As Demeritt notes, it is generally accepted that 'the organicism of the Romantic Movement leavened the early development of ecological thought',³⁶ and Ross identifies the 'powerful sway of neo-Romanticism over

the ecology movement'.³⁷ In relation to Frankenstein, Pepper states that the Romantics' fear of the 'dehumanisation' that 'science and civilisation appeared to bring ... was symbolised by Mary Shelley's dreadful product of science, Frankenstein's monster, which ceased to be society's slave and became its destroyer'.³⁸

Thus Frankenstein becomes implicated in what Haraway calls an 'anti-science metaphysics'.³⁹ Yet Shelley's novel itself is characterized and punctuated by a subtle and sophisticated appreciation of the vital role of 'social relations' in determining the nature, direction, products and consequences of science and technology. Read as such, Frankenstein can present a challenge to the often (neo-)Romantic, anti-Enlightenment alignment so far outlined.

Shelley's Frankenstein

Three crucial aspects of Shelley's novel help in this regard. First, the text offers a subtle criticism of Romantic ideals and sensibilities through the characterization and actions of the three central characters: the scientist, Victor Frankenstein; his creation, 'the being'; and the romantic adventurer Captain Walton, whom Victor meets in the high Arctic whilst pursuing his 'being'. Second, the character of Victor can be used to explore what is termed here 'anti-Enlightenment science', that is, science void of genuine humanitarianism. The characterization of a scientist with Romantic tendencies whose work has terrible consequences poses a challenge both to Romanticism and to the notion that developments in science and technology necessarily equate with Enlightenment notions of progress. Third, and related, Shelley presents us with a 'being' made monstrous, but not by his 'unnaturalness' nor because Victor somehow transgresses natural or God-given boundaries, but rather because Victor abandons the creature, unequipped, to a hostile world, taking no responsibility for his work.

Frankenstein and passionate science

My temper was sometimes *violent*, and *my passions vehement*; but by some law in my temperature they were turned ... to an eager desire to learn, and not to learn all things indiscriminately. I confess that neither the structure of languages, nor the code of governments, nor the politics of various states, possessed attractions for me. It was *the secrets of heaven and earth that I desired to learn*; and whether that was the outward substance of things, or the inner spirit of nature and the mysterious soul of man that occupied me, still my inquiries were directed to the metaphysical, or, in its highest sense, the physical secrets of the world. (Victor Frankenstein)⁴⁰

The main protagonist in Shelley's text, the scientist Victor Frankenstein, is characterized as having the qualities of passion, individualism, imagination and spontaneity; he is *a romantically inclined scientist*. As Dowse and Palmer state: 'Unlike Prometheus or Faustus, Frankenstein creates. In this respect he is both Romantic artist and the modern image of the scientist as inventor.'⁴¹ For Victor, the alchemist's science stirs the imagination as well as the intellect; and with 'high hopes and a lofty ambition' from an early age he is inspired and 'embued with a *fervent* longing to penetrate the secrets

of nature'; 'the world was a secret which I desired to divine'.⁴² And Shelley is at pains to contrast Victor with his best friend, Clerval, who is in Victor's words 'more inclined towards the moral relations of things', and with Elizabeth, Victor's adopted sister and intended bride, who is 'satisfied' with 'the magnificent appearance of things' as opposed to Victor, who 'delights in investigating their causes'. Indeed, Elizabeth's 'saintly' presence and 'gentleness' keeps Victor from being 'sullen in my study, rough through the *ardour of my nature*'.⁴³

At university, away from the moral and saintly influence of Clerval and Elizabeth, Victor becomes 'engaged *heart and soul* in one pursuit', 'to bestow animation upon lifeless matter', employment that took an 'irresistible hold on [his] *imagination*':

... a resistless, and almost frantic, impulse urged me forward; I seemed to have lost all soul or sensation but for this one pursuit.⁴⁴

I wished, as it were, to procrastinate all that related to my feelings of affection until the great object, which swallowed up every habit of my nature, should be completed.⁴⁵

As Victor relates the tale of his '*selfish* pursuit', Captain Walton observes how Victor had to conquer the '*violence of his feelings*', and that he 'appeared to despise himself for being the *slave of passion*'. Victor himself fears advising Walton because he (Victor) 'may still be *misled by passion*'. Moreover, Victor describes his creation as 'the living monument of *presumption* and *rash ignorance* which I had let loose upon the world'.⁴⁶

I had gazed upon the fortifications and impediments that seemed to keep human beings from entering the citadel of nature, and *rashly and ignorantly I had repined*.⁴⁷

I had been *the author of unalterable evils*... I ardently wished to extinguish that life which *I had so thoughtlessly bestowed*.⁴⁸

It seems unlikely therefore that Shelley is presenting simply a favourable view of Romantic ideals given that her scientist, endowed as he is with Romantic tendencies, creates a murderous 'being'. This subtle criticism is extended through the characterizations of Captain Walton – 'another obsessive knowledge seeker'⁴⁹ – and Victor's 'being'.

Shelley ensures that her readers appreciate the Romantic disposition of Captain Walton. He 'greatly need[s] a friend who would have sense enough not to despise me as Romantic, and affection enough for me to endeavour to regulate my mind'. Walton attributes his '*passionate enthusiasm* for the dangerous mysteries of the sea' to Coleridge's *Ancient mariner* – 'that production of the most imaginative of modern poets' – and to 'a love for the marvellous, a belief in the marvellous, intertwined in all my projects'. Walton has failed in his attempts to become a poet, and now sets his hopes on a voyage of discovery where 'success shall crown my endeavours'. Like Victor, Walton is passionately dedicated 'to the furtherance of [his] own enterprise'⁵⁰:

One man's life or death were but a small price to pay for the acquirements of the knowledge which I sought; for the dominion I should acquire and transmit over the elemental foes of our race.⁵¹

Walton asks: 'what can stop the determined heart and resolved will of man?' When the lives of his crew are endangered through his 'mad schemes', his crew fear that if they survive this peril, Walton would 'be rash enough to continue [his] voyage and lead

them into fresh dangers',⁵² so they call for a retreat. Victor challenges the crew's request to return:

... ye need not have come thus far, and dragged your captain to the shame of a defeat, merely to prove yourselves cowards. Oh! Be men, be more than men.⁵³

It is this combination of strong passion and individual will, regardless of social consequence, which characterizes the Romantics' standard of values to which Shelley draws our attention. Pepper cites Bertrand Russell's criticism of Romantics:

They admire strong passions, of no matter what kind, and whatever may be their social consequences ... Romantic love is strong enough to win their approval ... but most of the strongest passions are destructive ... Hence the type of man encouraged by romanticism ... is violent and anti-social, an anarchic rebel or a conquering tyrant.⁵⁴

Shelley might have shared Russell's reservations; the Romantic Walton is certainly anti-social in pursuing his goals, and it seems that his crew view him as something of a tyrant. And the Romantic Victor Frankenstein, characterized by a sometimes 'violent' temper and 'vehement' passions, is antisocial in his 'sole', 'selfish' purpose'.⁵⁵

Similarly, Shelley endows Victor's creation, the 'being', with a Romantic education through his reading of the *Sorrows of Werter* and *Paradise lost*,⁵⁶ and with noble sentiments: 'Believe me Frankenstein, I was benevolent, my soul glowed with love and humanity'.⁵⁷ The 'being' 'admired virtue and good feelings',⁵⁸ yet becomes a murderer of innocent victims. Pepper notes how 'Russell wryly observed that even while the monster is gazing on the fruits of his murders its sentiments remain noble':⁵⁹

When I run over the frightful catalogue of my sins I cannot believe that I am the same creature whose thoughts were once filled with the sublime and transcendent visions of the beauty and majesty of goodness.⁶⁰

Although Shelley uses the character of the 'being' to explore social injustice and irresponsible, unaccountable science, she also uses him, as she does Victor and Walton, as an expression of the destructive aspects of *socially unconstrained* strong passion, whatever forms that passion takes. In the case of the 'being', this passion is to take revenge on Victor, his creator, for abandoning him to the world, a revenge that results in numerous murders including Victor's brother, his best friend and his wife. For Victor and Walton, it is their all-consuming passion for discovery, and for the glory that success might bring them. Shelley highlights the *irresponsibility* of the individualist self-absorbed and self-centred aspects of Romanticism, with its focus on the freedom of the individual, presumably over and above collective social needs and rights.

Frankenstein and the well-intentioned scientist

... and soon my mind was filled with one thought, one conception, one purpose. So much has been done, exclaimed the soul of Frankenstein – more, far more, will I achieve: treading in the steps already marked, I will pioneer a new way, explore unknown powers, and unfold to the world the deepest mysteries of creation. (Victor Frankenstein)⁶¹

Shelley's Romantically predisposed scientist is further endowed with anti-Enlightenment overtones through his education at Ingolstadt University. James and Field state that 'whatever Mary Shelley's personal beliefs were, she could certainly rely on her English, largely protestant, readership finding anti-Enlightenment overtones in the name of Ingolstadt'.⁶² At university, the charismatic professor of chemistry, M. Waldman, who praises the practitioners and promises of modern chemistry, inspires Victor:

These philosophers, whose hands seem only made to dabble in dirt, and their eyes to pore over microscopes and crucible, have indeed performed miracles. They penetrate into the recesses of nature, and show her in her hiding places. They ascend into the heavens: they have discovered new and unlimited powers; they can command the thunders of heaven, mimic the earthquake, and even mock the invisible world with its own shadow.⁶³

For Victor, these are 'the words of fate, enounced to destroy me'.⁶⁴ Waldman advises Victor 'to apply every branch of natural philosophy', and after several years of study Victor settle his focus on 'a bold question, and one that has ever been considered as a mystery: Whence, I often asked myself, did the principle of life proceed?' In pursuing his ambition – to create life and maybe even to 'renew life where death had apparently devoted the body to corruption' – he is 'animated by an almost supernatural enthusiasm' until, at last, he discovers the secret of the spark of life and 'begins the creation of a human being'.⁶⁵ His 'selfish pursuit' presents us with a double meaning: it is selfish as his 'sole occupation' (above all other concerns) and it is a self-centred ambition for power and glory that drives Victor:

Life and death appeared to me ideal bounds, which I should first break through, and pour a torrent of light into our dark world. *A new species would bless me as its creator and source*; many happy and excellent natures would owe their being to me. No father could *claim the gratitude* of his child so completely as I should *deserve* theirs.⁶⁶

Shelley presents us with an arrogant and egocentric scientist – revelling in his own powers and achievements:

When I reflect on the work I had completed, no less a one than the creation of a sensitive and rational animal, *I could not rank myself with the herd of common projectors* . . . Even now I cannot recollect without passion my reveries while the work was incomplete. *I trod heaven in my thoughts, now exulting in my powers, now burning with the idea of their effects*.⁶⁷

Yet both Bingham and Turney find only good intentions in Victor's research plans. Bingham states:

So familiar has the story – or rather the myth – become that it is easy to forget that *the original intention of Victor's work was to be useful to humanity* by eliminating disease.⁶⁸

Similarly, Turney takes film director Kenneth Branagh's position: that Victor Frankenstein is just 'a man trying to do the right thing'.⁶⁹

We can distinguish in Frankenstein models for the scientist whose *good intentions* blind him to the true nature of his enterprise: 'wealth was an inferior object; but what glory would attend the discovery if I could banish disease from the human frame and render man invulnerable to all but a violent death!' Victor proclaims. And so say all of us mortal readers.⁷⁰

I am less convinced we can view Victor as simply 'a man trying to do the right thing'. If anything, Frankenstein contributes to the now well-rehearsed criticisms of the naively well-intentioned scientist. Frankenstein is not a pillar of reason; detached, objective, rational, measured and cautious, working only for the benefit of advancing humanity. His intended experiment is potentially dangerous and ethically flawed. His rush to develop the technology is motivated by the anticipation of his own reward over and above due care and caution. He is, it seems to me, more concerned with his own 'great enterprise', his dreams of the 'glory' and 'rank' that 'the powers placed within [his] hands',⁷¹ promised, than with 'doing the right thing'. Both Victor Frankenstein's characterization and the narrative are not focused on the unintended consequences of well-intentioned science, but rather on the entangling of science with ego, power and status.

Frankenstein, technology, risk and social responsibility

One secret which I alone possessed was the hope to which I had dedicated myself; and the moon gazed on my midnight labours, with unrelaxed and breathless eagerness, I pursued nature in her hiding places. Who shall conceive of the horrors of my secret toil, as I dabbled among the unhallowed damps of the grave, or tortured the living animal to animate the lifeless clay? (Victor Frankenstein)⁷²

As a corollary of his unfavourable (Romantic) predisposition and dubious (scientific) intentions, Victor Frankenstein's work lacks democracy and transparency. The seclusion necessary to carry out his *secret* experiments, coupled with his obsession with his work, renders him socially isolated. Thus Victor discusses with no one his research plans or their implications; no debates serve to warn of the dangers or ethical implications of his intended experiments; he lacks a community whose presence may have served to guide him.

In part, we can read this as a cautionary tale concerned with the controllability and predictability of our technological creations, with our ability to assess their consequences. In Baldick's summary of the popularised skeleton story of Frankenstein, Victor 'creates a living being ... and the creature turns against him and runs amok'.⁷³ Yet this common sketch of Frankenstein misses vital aspects of Shelley's tale, in particular that Victor takes no responsibility for his creation and that it is Victor's abandonment of the 'being' that is *the cause* of the 'being's' real monstrosity. Thus Frankenstein turns on issues of risk and uncertainty *in relation to* responsibility and accountability.

Victor had 'selected [the 'beings'] 'features as beautiful', yet the unfinished body is 'ugly' and 'when those muscles and joints were rendered capable of motion, it became a thing such as even Dante could not have conceived'. When Victor beholds his 'being', he is surprised and horrified by the 'hideous' 'wretch' and rushes out of the room:⁷⁴

He held up the curtain of the bed; and his eyes, if eyes they may be called, were fixed on me. His jaws opened, and he muttered some inarticulate sounds, while a grin wrinkled his cheeks. He might have spoken, but I did not hear; one hand was stretched out, seemingly to detain me, but I escaped, and rushed down the stairs.⁷⁵

I passed the night wretchedly. ... Mingled with this horror, I felt the bitterness of disappointment; dreams that had been my food and pleasant rest for so long a space were now become hell to me; and the change was so rapid, the overthrow so complete!⁷⁶

Thus, when his much dreamed of creation appears to him to be a hideous wretch and not a pioneering development, Victor abandons the 'being', taking no responsibility for the creature he has developed. When Victor returns home to find his apartment empty – 'freed from its hideous guest'⁷⁷ – he is overcome with joy and cannot believe his 'great . . . good fortune'. The good fortune, however, is not extended to his 'sensitive and rational' 'being' who endures 'hours and months of misery' to be 'spurned at, kicked, and trampled on' – 'miserable and abandoned' to a hostile world.⁷⁸ The being's 'blood boils at the recollection of this injustice'.⁷⁹

Shelley's story implies that science and technological endeavour is not necessarily synonymous with Enlightenment ideals; that science, like Romanticism, can be anti-Enlightenment. After all, Victor's disastrous science can hardly be considered to constitute enlightened humanitarian progress. In fact, we can read the text as *a critical questioning of anti-Enlightenment Romanticism and anti-Enlightenment science*, both of which are characterized, essentially, by a lack of the social responsibility, accountability and liability necessary for a rational and free society.

In the context of contemporary environmental discourse, Beck's risk society theory is echoed in Frankenstein.⁸⁰ For Beck, the risk society begins when external (natural) threats are replaced by risks and uncertainties 'manufactured' within society: when science and technology are no longer society's response to external or natural risks, but rather are responsible for the uncertainties that we all face. Beck argues that where the pre-risk society 'logic of scientific discovery presuppose[s] testing before putting into practice', this is 'breaking down in the age of risk':

Nuclear technologies have to be built *in order* to study their functioning and risks. Test tube babies have to be born *in order* to find out theories and assumptions of biotechnologies. Genetically engineered plants have to be grown *in order* to test the theory. The controllability of the experiment is lost. This causes serious problems . . . In the risk society, mistakes mean that nuclear reactors leak or explode, test tube babies are born deformed, people are killed by CJD.⁸¹

Such a view echoes the Frankenstein story. Victor Frankenstein 'manufactures uncertainty'. He does not know what will happen before he begins his research; he creates a 'being' whose hideousness surprises him, and he abandons the creature with no knowledge about the effects that his new 'hideous' technology will have on society. Certainly Frankenstein can be read as pointing to the potential for a risk society in the early stages of modernity, both in the kinds of 'high' technology that appeared to be on the horizons of early nineteenth century science and in the social, political and economic context within which that science was practised. Barry states:

Recalling the shorthand description of modernity as being made up of the French and industrial revolutions, where the former represents the democratic imperative of modernity, while the latter represents its quest for material comfort and wealth, one could say that with 'risk society' we come full circle. In many respects Beck can be said to be using the democratic imperative of the French revolution to control the potentially negative effects of the industrial revolution and its legacy. That is, 'risk society' and its model of 'reflexive modernisation' can be seen as requiring enhanced democratic control of and public accountability of industrial progress, a central part of which leads to the democratic 'redefinition' of what constitutes progress.⁸²

Perhaps the Frankenstein story, written in the era of the French and industrial revolutions, embodies this very message, that a responsible, humanitarian modernity required and still requires a 'redefinition of what constitutes progress'.

In Frankenstein we see that knowledge and expertise, in the wrong hands, and with no structures of social accountability, can be dangerous, and as such present a risk to society. Shelley's elitist expert, working in secrecy, causes terrible destruction that is no unfortunate accident, but rather the product of his self-centred, ambitious, unreflecting and irresponsible actions. Read as such, we can take from Frankenstein the message that avoiding the potentially monstrous consequences of modernity requires transparent, responsible and accountable science and technological development within a democratic arena with an emphasis on communal benefit, not personal gain, be it social or economic or most likely both. Such steps at least could pave the way for humanitarian technology and materialism, and move us beyond relentless social/economic competition for success, glory or wealth and its often ensuing anti-social ambition, isolation, alienation and social and (now forefronted) environmental hazards and injustices.

Unnatural 'beings' and unhallowed arts?

In the context of the opposition of natural/unnatural, Frankenstein is now predominantly figured as a tale of mixing and messing with nature, of playing God, but these *are not the cause* of the disastrous consequences of Victor's science. The 'being' is *produced under particular socio-natural relations*, relations that are consequential in the disasters that follow. He is not a monster because he is somehow 'unnatural'; rather he becomes monstrous first because when he emerges (innocently, neither good nor bad) from the laboratory Victor views him as such: 'I beheld the wretch – the miserable monster whom I had created';⁸³ and second, because he is abandoned by Victor. And it is not Victor's 'unhallowed arts'⁸⁴ that are at fault, but rather his thoughtlessness in creating the 'being' and his unwillingness to take due responsibility for his work.⁸⁵ As the 'being' tells Victor:

Yet you, my creator, detest and spurn me, thy creature, to whom thou art bound by ties only dissoluble by the annihilation of one of us. You purpose to kill me. How dare you sport thus with life? Do your duty towards me, and I will do mine towards the rest of mankind.⁸⁶

Indeed, as we have seen, Shelley ensures that we appreciate the 'being' as a rational and sensitive creature; that his viciousness is learnt when he is denied the humanity that Victor owes to him. It seems that Frankenstein is better read as an exploration of the inextricable ties between ourselves and our artefacts than a tale of somehow crossing lines of purity. As Shelley shows us, Victor and his 'being' *are* inextricably bound together:

Remember, thou hast made me more powerful than thyself; my height is superior to thine; my joints more supple. But I will not be tempted to set myself in opposition to thee. I am thy creature, and I will be even mild and docile to my natural lord and king, if thou wilt also perform thy part, the which thou owest me. Oh, Frankenstein, be not equitable to every other, and trample upon me alone, to whom thy justice, and

even thy clemency and affection, is most due. Remember, that I am your creature; I ought to be thy Adam; but I am rather the fallen angel, I whom thou drivest from joy for no misdeed. Everywhere I see bliss, from which I alone am irrevocably excluded. I was benevolent and good; misery made me a fiend. Make me happy, and I shall again be virtuous.⁸⁷

And for Victor:

I had been the author of unalterable evils; and I lived in daily fear, lest the monster whom I had created should perpetrate some new wickedness.⁸⁸

I, not in deed, but in effect, was the true murderer.⁸⁹

Victor cannot easily avoid, escape, or abandon his creation. He is forced to confront the 'being', and in doing so, to confront himself:

For the first time, also, I felt what the duties of a creator towards his creature were, and that I ought to render him happy before I complained of his wickedness.⁹⁰

He is 'torn by remorse, horror, and despair' yet, unable to forgive the murderous 'being', he wishes to 'extinguish the spark' that he 'so negligently bestowed':⁹¹ 'When I reflected on his crimes and malice, my hatred and revenge burst all bounds of moderation.'⁹² Thus, he chooses to destroy, rather than embrace, or at least take responsibility for, his creation, and in his quest for revenge and destruction of the 'being', he is himself destroyed.

Monsters of modernity

Marina Warner perceives that we can take away from Mary Shelley's work 'the crucial knowledge that monsters are made, not given. And if monsters are made, not given, they can be unmade, too'.⁹³ Indeed, neither Victor nor his 'being' are characterized as *innately* bad or evil: though both are guilty of inhumane crimes, they are driven by social circumstance. Victor is driven by a desire for social gain and glory; he *becomes* a monster in his obsessive alienated drive for success – and he can hardly be blamed for seeking to attain goals valued by his society – and in his abandonment and subsequent treatment of the 'being'. The 'being' is driven to wretchedness; he *becomes* a murderous monster.

From Haraway's amodern perspective we can read the 'being' as a cyborg symbol of technoscience, like a transgenic creature emerging from 'Impurity Hall' that presents us with a *new* rather than non or anti-, pure or impure nature.⁹⁴ That new nature, like science, is not in itself 'good' or 'bad', 'right' or 'wrong', but rather ambiguous; full of potential for liberation as well as potential for exploitation, corruption, inequality, pollution and the like. For Haraway, if anything is wrong, it is certainly not the mixed nature of the new transgenics, a view that we might do well to extend to Victor Frankenstein's 'being'.

Sessions views Haraway's cyborg imagery as 'an abhorrent and dehumanizing vision',⁹⁵ but this human-machine nature-culture hybrid image symbolizes our inextricable entanglement with our own creations, such that it is not so easy to separate the two, to cling to an identity categorized as distinct from 'nature', technology, artefacts.

Polarized discourses such as the GM debate are in many ways focused on removing ambiguity; we are bombarded with 'evidence' and 'facts' aimed to convince us either to embrace or reject the new technology, rather than to see uncertainty in the mixture of possibility and limitation, liberation and exploitation. Within these discourses our attention is drawn, for example, either to the 'unnaturalness' of GM crops and their production process or to see that these are as natural as traditional cheese-making processes. On the basis of such arguments, we are asked to make decisions about whether these are good or bad, right or wrong, Frankenstein food of disaster or the future food that will feed the world. Frankenstein has been mobilized in such polarized discourses and these have had a polarizing effect on the myth.

In contrast, Winner interpreted Frankenstein as a parable of our *ambiguity* towards science and technological creation.⁹⁶ Taking this perspective, the myth can resonate more with contemporary expressions of uncertainty and confusion about the science–progress equation where, as Rabinow notes, 'one finds an urgent and uneasy sense of hesitancy and caution over the consequences of a felt imperative to know and to put that knowledge into action'.⁹⁷ In the biosciences debates, alongside the counter-modern reaction, strong currents of ambiguity and ambivalence prevail such that, as Rabinow observes, 'the rest marks a more perplexed re-evaluation not so much of modernity *per se* but what is taken to be modernity's trajectory and especially the relationship of scientific knowledge and society'.⁹⁸ Thus alongside the 'yes' and the 'no' there is also a space of ambiguity – a contemporary 'practised' purgatorial site of re-evaluation (as Rabinow calls it) – and a space where Frankenstein's presence might be strongly felt.

In foregrounding issues surrounding the production of new natures, Frankenstein can help to focus our attention on questions that are pertinent to contemporary debates. In the multi-billion dollar market arena of the new biotechnology experiments⁹⁹ private interests displace social responsibility.¹⁰⁰ Corporate secrecy and intellectual property laws displace public knowledge and thus contribute to the displacement of informed collective participatory decision-making; and contested scientific certainty displaces trust in the authority of science as the arbitrator of safety and predictability, the supplier of control and 'progress'. In many ways, Frankenstein explores the very questions Castree and Swyngedouw ask of this contemporary production of nature(s):

... namely, what forces are driving this production? What effects are new productions of nature likely to have? And [even] is it right, morally and politically, for humans to reconstruct nature at the deepest level for their own purposes?¹⁰¹

This ['production of nature'] perspective 'asks serious questions about who controls, who acts, and who has the power to produce what kind of socionature'.¹⁰²

In contemporary debates, Frankenstein has been primarily enrolled to fortify arguments that demonize technology, that are counter-modern, or that see dangers in 'messing with nature' or 'playing God'. I would argue that Frankenstein can more usefully be read as a tale of uncertainty and ambiguity in relation to science and technological creation, somewhere beyond the 'story of progress and the parable of disaster'.¹⁰³ Frankenstein resonates more with Beck's notions of responsibility and

accountability, and with Haraway's project to take us beyond the dualisms of modernity. Frankenstein's 'being' is produced under and into particular socio-natural relations. Surely it is those relations, mixed, weaved, messy, that should catch our attention in Frankenstein, and prompt us to ask questions about what kind of socio-nature we want produced by whom, for what purposes and under what conditions.

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Notes

- ¹ M. Shelley, *Frankenstein or, the modern Prometheus*, with an introduction by R. E. Dowse and D. J. Palmer (London, Dent, 1963), pp. 51–2. This first (1818) unabridged edition is referred to throughout the paper.
- ² *Ibid.*, p. 143.
- ³ L. Winner, 'Frankenstein's problem', in *Autonomous technology: technics-out-of-control as a theme in political thought* (Cambridge, MA, MIT Press, 1977), ch. 8.
- ⁴ D. Smith, 'The Frankenstein syndrome', in D. Smith, ed., *Business and the environment: implications of the new environmentalism*, (London, Paul Chapman, 1993), pp. 172–189.
- ⁵ M. Warner, *Managing monsters: six myths of our time: The Reith Lectures 1994* (London, Vintage, 1994), p. 20.
- ⁶ J. Rifkin, *The biotech century: how genetic commerce will change the world* (London, Phoenix, 1999).
- ⁷ Smith, 'The Frankenstein syndrome', p. 173.
- ⁸ Warner, *Managing monsters*, p. 20.
- ⁹ *Ibid.*, p. 28.
- ¹⁰ J. Turney, *Frankenstein's footsteps: science, genetics and popular culture* (New Haven, CT, Yale University Press, 1998), pp. 220–23.
- ¹¹ N. Bingham, 'In the belly of the monster: Frankenstein, food, factishes and fiction', in R. Kitchin and J. Kneale, eds., *Lost in space: geographies of science fiction* (London, Continuum, 2002), pp. 180–95, p. 191, drawing on C. Baldick, *In Frankenstein's shadow: myth, monstrosity, and nineteenth century writing* (Oxford, Clarendon Press, 1987), p. 4; p. 184; p. 185, drawing on Baldick, p. 58; and pp. 187 and 188.
- ¹² F. James and J. Field, 'Frankenstein and the spark of being', *History today* 449 (1994), p. 48.
- ¹³ Bingham, *In the belly*, p. 184, says the vitality of myths depends upon their 'capacity for change, their adaptability and openness to new combinations of meaning'.
- ¹⁴ *New Scientist* (20 Feb. 1999), pp. 4–5.
- ¹⁵ Shelley, *Frankenstein*, preface. Shelley is referring to Erasmus Darwin (1731–1802), author of *Zoonomia or the laus of organic life* and grandfather of Charles Darwin (1809–1882).
- ¹⁶ The novel appears to be set in the same era, although the year is unclear as Shelley omits the actual year of Captain Walton's letters (she writes: '17-').
- ¹⁷ K. Back, 'Frankenstein and Brave New World: two cautionary myths on the boundaries of science', *History of European ideas* 20 (1995), pp. 327–32.

- ¹⁸ Shelley, *Frankenstein*, p. 44.
- ¹⁹ James and Field, 'Frankenstein', pp. 47–55.
- ²⁰ A tradition established by Giovanni Aldini, Galvani's nephew, in 1804. Galvani (1737–98) was the Italian physiologist whose medical treatment involving the application of electrical currents to tissues was known as 'galvanism'.
- ²¹ Turney, *Frankenstein's footsteps*, p. 22. See also: James and Field, 'Frankenstein'; D. Towers, (dir./prod.), *Nightmare: the birth of horror*, (London, BBC Videos, 1992); Turney, *Frankenstein's footsteps*; S. Vasbinder, *Scientific attitudes in Mary Shelley's 'Frankenstein'* (Ann Arbor, MI, UMI Research Press, 1984).
- ²² Turney, *Frankenstein's footsteps*, p. 225, citing Vasbinder, *Attitudes*.
- ²³ *Ibid.*, p. 22; James and Field, 'Frankenstein', pp. 47–55.
- ²⁴ Towers, *Nightmare*.
- ²⁵ C. Small, *Ariel like a harpy: Shelley, Mary and 'Frankenstein'* (London, Gollancz, 1972), p. 14.
- ²⁶ Turney, *Frankenstein's footsteps*, p. 27; Bingham, *In the belly*, p. 184.
- ²⁷ Turney, *Frankenstein's footsteps*, p. 27–8. For example over 80 stage productions, nearly 600 individual comic items, and over 400 films are based around the Frankenstein script. For examples of early press usages of Frankenstein imagery (since 1832) see S. Forrey, *Hideous progenies: dramatisations of Frankenstein from the nineteenth century to the present* (University of Pennsylvania Press, 1990); G. Levine and U.C. Knoepfelmacher, *The endurance of Frankenstein: essays on Mary Shelley's novel* (Berkeley, CA, University of California Press, 1979). More recently, there were at least 243 references to Frankenstein in *The Guardian* and *The Times* alone in 1999 during the heat of the GM debate, and the BBC ran a *Panorama* documentary 'Frankenstein foods' (BBC2, 17 May 1999). In academic spheres it is in the last decade or so that Frankenstein has drawn immense critical attention. Turney, *Frankenstein's footsteps*, p. 14; A. K. Mellor, *Mary Shelley: her life, her fiction, her monsters* (London, Routledge, 1989); J.M. Smith ed., *Frankenstein: Mary Shelley case studies in contemporary criticism* (New York, Bedford Books, 1992).
- ²⁸ Summarized from: Turney, *Frankenstein's footsteps*, p. 13; Bingham, *In the belly*, p. 184, citing Baldick, *In Frankenstein's shadow*, p. 3.
- ²⁹ Bingham, *In the belly* cites Baldick, *In Frankenstein's shadow*, p. 5 on this point.
- ³⁰ P.A. Hay, *A companion to environmental thought* (Edinburgh, Edinburgh University Press, 2002), p. 5.
- ³¹ B. Tokar, 'Resisting the engineering of life', in B. Tokar, *Redesigning life? The worldwide challenge to genetic engineering* (London, Zed Books, 2001), pp. 320–36.
- ³² For some, nature is ascribed an intrinsic value, a significance and integrity independent of humans; D. Pepper, *Modern environmentalism: an introduction* (London, Routledge, 1996), pp. 190–92.
- ³³ R. Steinbrecher, 'Ecological consequences of genetic engineering', in Tokar, *Redesigning Life?*, pp. 74–102.
- ³⁴ As Hay, *Companion*, p. 11, calls it.
- ³⁵ *Ibid.*
- ³⁶ D. Demeritt, 'Ecology, objectivity and critique in writings on nature and human societies', *Journal of historical geography* 20 (1994), pp. 22–37. Hay, *Companion*, p. 11, acknowledges: 'Romanticism remains important as a first expression of the ecological impulse within the industrial age'; Pepper, *Modern environmentalism*, pp. 188–9, notes how Romanticism has 'nourished' ecocentrism; noting that the tendency in ecocentrism to romanticize nature reflects the 'Romantic idealisation of nature, countryside and folk societies', and that

modern ecocentrism is historically linked to the late eighteenth- and early nineteenth-century Romantic movement, often through the inspiration and impact of certain influential individuals such as William Blake (1757–1827), whose bio-ethical sentiments influenced much twentieth-century green thought. Similarly, Hay, *Companion*, p. 11, states that ‘individual romantic thinkers, particularly Thoreau, continue to speak movingly to the environmentalists of today’.

- ³⁷ A. Ross, *The Chicago gangster theory of life: nature's debt to society* (London, Verso, 1994), p. 9.
- ³⁸ Pepper, *Modern environmentalism*, p. 191.
- ³⁹ D. Haraway, *Simians, cyborgs and women: the reinvention of nature* (London, Free Association Books, 1991), p. 181. Haraway argues that ‘taking responsibility for the social relations of science means *refusing* an anti-science metaphysics, a demonology of technology’.
- ⁴⁰ Shelley, *Frankenstein*, Victor Frankenstein [VF], p. 28 (emphasis added).
- ⁴¹ Dowse and Palmer, Introduction to Shelley, *Frankenstein*, p. vi.
- ⁴² *Ibid.* VF, pp. 229, 30 (emphasis added), and 27.
- ⁴³ *Ibid.* VF, pp. 29, 27, and 29 (emphasis added).
- ⁴⁴ *Ibid.* VF, pp. 48–9 (emphasis added).
- ⁴⁵ *Ibid.* VF, p. 49.
- ⁴⁶ *Ibid.* VF, p. 66; Captain Walton [CW], p. 17 (emphasis added); VF, pp. 236 and 78 (emphasis added).
- ⁴⁷ *Ibid.* VF, p. 31.
- ⁴⁸ *Ibid.* VF, p. 92.
- ⁴⁹ Turney, *Frankenstein's footsteps*, p. 202.
- ⁵⁰ Shelley, *Frankenstein*, CW: pp.8, 10, 10, 11, and 17.
- ⁵¹ *Ibid.* CW, p. 17.
- ⁵² *Ibid.* CW, pp. 11, 231, and 232.
- ⁵³ *Ibid.* VF, p. 233.
- ⁵⁴ Pepper, *Modern environmentalism*, p. 190; B. Russell, *History of western philosophy* (London, Unwin, 1980 edn, 1946), p. 656. It is worth noting that Russell was very much influenced by the Second World War and German fascism; however, as a champion of scientific rationalism he was clearly opposed to the individualism championed by the Romantics, opposed as they were to the scientific search for generalizations.
- ⁵⁵ Shelley, *Frankenstein*, VF, p. 28.
- ⁵⁶ The ‘being’ finds and reads these texts. Shelley, *Frankenstein*, p. 133.
- ⁵⁷ *Ibid.*, the ‘being’, p. 101.
- ⁵⁸ *Ibid.*, the ‘being’, p. 125.
- ⁵⁹ D. Pepper, *The roots of modern environmentalism* (Beckenham, UK, Croom Helm, 1984), p. 78.
- ⁶⁰ Shelley, *Frankenstein*, the ‘being’, p. 240.
- ⁶¹ *Ibid.* VF, p. 40.
- ⁶² James and Field, ‘Frankenstein’, p. 49.
- ⁶³ Shelley, *Frankenstein*, Professor Waldman [PW], p. 40.
- ⁶⁴ *Ibid.* PW, p. 40.
- ⁶⁵ *Ibid.* PW, p. 42; VF, pp. 44, 48, 44, and 47.
- ⁶⁶ *Ibid.* VF, p. 47 (emphasis added).
- ⁶⁷ *Ibid.* VF, p. 229.
- ⁶⁸ Bingham, *In the belly*, p. 186 (emphasis added).

- ⁶⁹ Turney, *Frankenstein's footsteps*, p. 203. Turney cites Kenneth Branagh's director's notes from his 1994 film *Mary Shelley's Frankenstein*.
- ⁷⁰ Turney, *Frankenstein's footsteps*, p. 203 (emphasis added), Turney citing VF (p. 47 in Shelley, *Frankenstein*).
- ⁷¹ Shelley, *Frankenstein*, VF, pp. 228 and 46.
- ⁷² *Ibid.* VF, p. 48.
- ⁷³ Bingham, *In the belly*, p. 184 (citing Baldick, *In Frankenstein's shadow*, p. 3).
- ⁷⁴ Shelley, *Frankenstein*, VF, pp. 51, 53, and 52.
- ⁷⁵ *Ibid.* VF, p. 52.
- ⁷⁶ *Ibid.* VF, p. 53.
- ⁷⁷ *Ibid.* VF, p. 55.
- ⁷⁸ *Ibid.*, the 'being': pp. 240–41.
- ⁷⁹ *Ibid.*
- ⁸⁰ U. Beck, *Risk society: towards a new modernity* (London, Sage, 1992); U. Beck, *Ecological politics in an age of risk* (Cambridge, Polity Press, 1995); U. Beck, 'Politics of risk society', in J. Franklin, ed., *The politics of risk society*, (Cambridge, Polity Press, 1998) pp. 9–22; U. Beck, *World risk society* (Cambridge, Polity Press, 1999).
- ⁸¹ Beck, 'Politics', p. 14 (emphasis original)
- ⁸² J. Barry, *Environment and social theory* (London, Routledge, 1999), p. 164.
- ⁸³ Shelley, *Frankenstein*, VF, p. 52.
- ⁸⁴ *Ibid.* VF, p. 89.
- ⁸⁵ Bingham, *In the belly*, pp. 190–1, cites B. Latour, *Aramis or the love of technology* (Cambridge, MA, Harvard University Press, 1996), pp. 248–9, on this point: 'You're deceiving us Victor and have been deceiving us for a long time . . . Your crime is that you abandoned your creation.'
- ⁸⁶ Shelley, *Frankenstein*, the 'being', p. 100.
- ⁸⁷ *Ibid.*, p. 101.
- ⁸⁸ *Ibid.* VF, p. 92.
- ⁸⁹ *Ibid.* VF, p. 93.
- ⁹⁰ *Ibid.* VF, p. 103.
- ⁹¹ *Ibid.* VF, p. 89, and 101.
- ⁹² *Ibid.* VF, p. 92.
- ⁹³ Warner, *Managing monsters*, p. 31.
- ⁹⁴ G. Myerson, *Postmodern encounters: Donna Haraway and GM foods* (Cambridge, Icon Books, 2000), p. 27.
- ⁹⁵ G. Sessions, 'Postmodernism and environmental justice', in *The trumpeter: journal of ecosophy* 12 (1995), pp. 150–154, cited in Hay, *Companion*, p. 338.
- ⁹⁶ Winner, *Autonomous technology*.
- ⁹⁷ P. Rabinow, *French DNA: trouble in purgatory* (Chicago, University of Chicago Press, 1999), p. 18.
- ⁹⁸ *Ibid.*
- ⁹⁹ N. Castree, 'Marxism, capitalism and the production of nature', in N. Castree and B. Braun, eds, *Social nature: theory, practice and politics*, (Oxford, Blackwell, 2001), pp. 189–207.
- ¹⁰⁰ F. Bowring, *Science, seeds and cyborgs: biotechnology and the appropriation of life* (London, Verso, 2003), p. 65.
- ¹⁰¹ Castree, 'Marxism', p. 190.
- ¹⁰² E. Swyngedouw, 'Modernity and hybridity: nature, *regeneracionismo*, and the production of the Spanish waterscape, 1890–1930', *Annals of the Association of American Geographers* 89 (1999), pp. 443–65.
- ¹⁰³ Myerson, *Postmodern encounters*, p. 46.