Vital matters: Mary Shelley's *Frankenstein* and Romantic science

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If they were asked to summarise briefly the 'Frankenstein story', many people would probably come up with something like this: a mad scientist creates a living being out of dead human parts; it then becomes uncontrollable and wreaks havoc on the community. Few I think would fail to use the word 'scientist' to describe the monster's creator, whether they had read Mary Shelley's novel or not. Yet if we turn to the text of the book, this word is nowhere to be found. (Just as the title 'Doctor' is never actually used for Frankenstein.) Instead, we find Frankenstein described as an 'artist', or as 'the pale student of unhallowed arts'. The fact is, the word 'scientist' had not even been coined in 1818, when Shelley's novel was first published. Indeed, as late as 1834 the science historian William Whewell was reporting how members of the British Association for the Advancement of Science had felt 'oppressed' by the difficulty of finding a name 'by which we can designate the students of the knowledge of the material world collectively'. Some suggestions had been put forward by the members. '*Philosophers*', he said, 'was felt to be too wide and too lofty a term', while '*savans* was rather assuming'. When 'some ingenious gentleman proposed that, by analogy with *artist*, they might form *scientist* . . . this was not generally palatable'.[1]

This problem over designation arose because the 'men of science', of whom Whewell was one, thought themselves to be as much philosophers as scientific workers, and were concerned to maintain their status as thoughtful interpreters of a world which they nevertheless studied primarily in its material aspects. If this sense of an undivided commitment was still strong in 1834, it was even more evident in the first two decades of the century, when Mary Shelley was growing up. I here approach my theme. I want to argue that early-nineteenth-century science had much more of an impact on the genesis and substance of *Frankenstein* than is normally noticed, or even allowed, by literary critics. There has been little effort by these critics to seriously situate the novel in the context of the science of its time. On the one hand there is the tendency to read today's concerns back into the novel, to take its 'message' about 'obsessive scientific pursuit' for granted as a prefiguring of science's often dangerous

advances in the twentieth century. The other kind of response is to dismiss the book's science as hocus-pocus, summed up in James Rieger's view that: 'Frankenstein's chemistry is switched-on magic, souped-up alchemy, the electrification of Agrippa and Paracelsus'. He goes on to claim that because Mary Shelley 'skips the science' in her account of the creature's animation, the novel cannot even be considered as science *fiction*.[2] But this is to miss entirely just how thrillingly *speculative* and open the state of science was at the historical moment in which Mary Shelley was writing. It was of course her 'prescient' genius in the book to throw the visionary gaze of this moment into a vertiginous reverse by having what she later called the 'speculative eyes' of the created monster gaze expectantly *back* at his shattered and now impotent creator. But this 'moral' of the story, whilst being the guarantor of its lasting interest, is matched in interest by the kind of 'detached' language that Mary Shelley uses to tell it, particularly when read in its 1818 first edition and against the background of ideas, concerns and disputes which were being thrown up by science in the early decades of the century. I shall be returning to the novel text, but first it is important to say something more about the atmosphere surrounding science in the first two decades of the century.

Without doubt this was an exciting period which saw not only a mushroom growth in scientific experimentation and discovery, but at the same time a general desire by an increasingly powerful and commercially minded middle class to hear what the new science, and especially chemistry, had to say to them about their new world. For it must be remembered that the period we are talking of was one of phenomenal transformation in the production and social structures of English society—in short the transformation we call the 'industrial revolution'. As in all times of rapid change, people wanted answers, and they looked to science for them. David Knight has evoked well the heightened sense of expectation which attended the work of chemists in these years:

> Lecturers in London, Glasgow, and Paris attracted enormous audiences to their orations and demonstration experiments. The chemical philosopher was expected to develop and discuss a world-view; his science seemed the key to the nature of matter, and he was in a position to throw light upon such questions as the truth of materialism or the role of mechanistic explanations in psychology and biology. It seemed possible that chemists, using novel methods of analysis such as the electric battery of Alessandro Volta, might pin down the Proteus of matter and discover the one basic stuff which, in different arrangements or electrical states composed all the manifold substances which we find in the world. Coleridge compared the chemist to the poet as one searching through a multiplicity of forms for unity of substance.[3]

Knight here provides a launching pad of 'topics' for our discussion of *Frankenstein* and Romantic science: Coleridge, without whom it is hardly possible to conceive *Frankenstein* ever having come about; the greatest and most spectacular of the Romantic scientists to lecture about and demonstrate their discoveries and throw crowds into awe, Coleridge's friend the 'chemical philosopher' Humphry Davy; the truth or otherwise of materialist explanations for the evidence of our senses; and the use of voltaic piles to investigate the structure of matter.

In foregrounding Coleridge's 'influence' in the formation of *Frankenstein* I can obviously be accused of ignoring the more obvious poetical candidate for the job, Percy Bysshe Shelley. Yet even if Frankenstein is modelled on the atheistic and obsessive character of Shelley, as I believe he is, we must remember that there is another Romantic 'quester' in the novel too. This is the narrator Robert Walton, who, quoting from *The Rime of the Ancient Mariner*, tells his sister that though he is going to unexplored regions, to 'the land of mist and snow', he will 'kill no albatross'. This statement tells us a number of things, firstly in relation to the novel's dating. The fact of his having been inspired by Coleridge's poem (first published in October 1798), taken in conjunction with the dating of his letters and journal (ranging from 11 December 17— to 12 September 17—) means that Walton's encounter with Frankenstein and his story has to have occurred in 1799. (Frankenstein's quoting from Wordsworth's 'Tintern Abbey' whilst lamenting the murder of his friend Clerval by the monster, is another dating indicator, since this poem appeared along with the *Mariner* in the 1798 *Lyrical Ballads*.) Such careful temporal location by Mary Shelley cannot be accidental, and though we can only guess at what she had in mind in setting the book in the last year of the eighteenth century, a cluster of related events and people—all linked to science—are intriguing to look at for this period.

Firstly, we have to bear in mind the very strong influence that William Godwin had both on the character of his daughter, and on her novel, which she dedicated to him. Her upbringing and bookish education were not only carefully overseen by Godwin himself, the man for whom she continued to feel an 'excessive and romantic attachment'. She would also have been left in no doubt by Godwin about the importance of the famous people who had sat at his dinner table from the mid 1790s onward, when he first attained fame both as a radical philosopher and best-selling novelist.[4] A number of these distinguished visitors were natural philosophers, in particular the young Humphry Davy, who had first been brought to Godwin's home in 1799 by S. T. Coleridge. Coleridge had earlier formed a brief attachment for Godwin's anarchist theories, then attacked them, and finally, as the complex post-French Revolutionary period of agonised reappraisal deepened for its erstwhile English supporters, he persuaded Godwin away from atheism into what the latter called his 'theism', which consisted 'in a reverent and soothing contemplation of all that is beautiful, grand, or mysterious in the system of the universe'.[5] Coleridge and Davy had met through Southey, who had been encouraging the ex-apothecary's assistant to write poetry, some of which was later published. They became firm friends, impressed by each other's enthusiasms for science and poetry. It was through Davy that Coleridge became absorbed in the possibilities of chemistry. During the winter of 1799–1800, Coleridge saw a good deal of Godwin and wrote to Thomas Wedgwood: 'I like him for thinking so well of Davy. He talks of him everywhere as the most extraordinary human being he has ever met with. I cannot say that: for I know one whom I feel to be the superior—but I never met so extraordinary a young man.'[6]

Davy at this time was a rising star in the scientific community, having just written on the anaesthetic and exhilarating effects (shared with Coleridge and Thomas Beddoes at Bristol) of nitrous oxide—laughing gas. As well as supplying detailed accounts of

these effects (Coleridge reported that his own 'sensations were highly pleasurable'), the book he wrote contained competent volumetric analyses of the various oxides of oxygen, enough to secure him an assistant lectureship at the Royal Institution, where in 1802 at the astonishingly young age of 23 he was made professor. Described by Knight as 'perhaps the greatest of Romantic scientists', Davy went on to become famous for discovering the alkali metals sodium and potassium, for proving that chlorine was a chemical element and not an oxide, and for inventing a safety-lamp for coal-miners. Davy had not only used the newly invented battery of Galvani to isolate sodium and potassium—metals whose light and reactive nature lent themselves to spectacular effects in the crowded demonstrations he performed for the public—but he came to believe 'that chemical affinity and electricity were manifestations of one power'.[7] Underlying chemical properties was the magic of electrical forces.

Did Mary Shelley go to any of Davy's spectacular demonstrations as part of her Godwinian education? The 1818 edition of her novel has a passage (subsequently deleted) strongly suggesting that she did. Frankenstein tells Walton how in his childhood:

> My father expressed a wish that I should attend a course of lectures upon natural philosophy, to which I cheerfully consented . . . The professor discoursed with the greatest fluency of potassium and boron, of sulphates and oxyds, terms to which I could affix no idea; and I became disgusted with the science of natural philosophy, although I still read Pliny and Buffon with delight . . .[8]

Though this is no proof, one can quite imagine Mary wanting to exchange the tetchiness of her stepmother Mrs Clairmont for the dazzling displays put on by Davy. Certainly, when she was writing the 'animation' scene of *Frankenstein* in the autumn of 1816 in Bath, she read with thoroughness the lectures Davy had published in 1812 as *Elements of Chemical Philosophy*. Another certainty is that among the frequent visitors to the Godwin household throughout Mary's childhood was an intimate friend of her father's who reached back to the days of *Political Justice*, the scientific investigator and populariser of science, William Nicholson.[9] In 1800, Nicholson and Anthony Carlisle had used the Galvanic electric current to demonstrate how water could be decomposed into hydrogen and oxygen. Their paper appeared in Nicholson's *Journal of Natural Philosophy, Chemistry and the Arts*, a title once again demonstrating the connectedness that obtained between the arts and the sciences at this period.

I want now to move forward in time to that famous Genevan summer of 1816 when Mary Shelley, whilst in the company of Shelley, Byron, Polidori (Byron's physician and companion) and Claire Clairmont, began her *Frankenstein* story. What interests me most here is the role Polidori played in the genesis of the tale, something that is little explored in discussions of what Rieger has called the 'Ghost Story Contest'.[10] In her Introduction to the 1831 edition of her novel, Mary Shelley says that among the long conversations she witnessed between Byron and Shelley in mid June of 1816:

various philosophical doctrines were discussed, and among others the nature of the principle of life, and whether there was any probability of its ever being discovered or communicated. They talked of the experiments of Dr Darwin [i.e. Erasmus Darwin, Charles Darwin's grandfather] . . . Perhaps a corpse would be reanimated; galvanism had given token of such things: perhaps the component parts of a creature might be manufactured, brought together, and endued with vital warmth.[11]

As Rieger has suggested, using the only extant diary among the group for the period up to July, that kept by Polidori, it is probable that the discussion of 'the nature of the principle of life' Mary witnessed was more likely to have taken place between Shelley and Polidori rather than between Shelley and Byron. On 15 June, Polidori had recorded in his journal, '. . . Shelley and I had a conversation about principles,—whether man was to be thought merely an instrument'. In other words, whether man was simply the material but animate product of the 'system of the universe', or whether he was a creature created by God with a separate and eternal soul. Now Polidori is often portrayed as a somewhat ineffectual and hysterical character (and so he might have been, particularly in relation to Lord Byron). But where science was concerned, he was an accomplished physician who had gained his medical diploma at the unprecedented age of nineteen at Edinburgh University, writing a dissertation on *The Psychosomatic Effects of Sleepwalking and/or Nightmares*. There is every reason to suppose that he kept abreast of scientific developments and controversies of the time. One such controversy had blown up following the delivery of two lectures in London in March of 1816 by a young lecturer at the Royal College of Surgeons, William Lawrence. If Polidori attended these lectures, as he is likely to have done, being in London at the time and having a deep interest in medical debates concerning the human body, it is almost inconceivable that he did not discuss them in some detail with Mary Shelley while Byron and Shelley were away on their eight-day trip around Lake Geneva at the end of June. His diary shows that he either dined or spent each of these days at her house during that time.

The subject of Lawrence's lectures not only had a central bearing on *Frankenstein*, but initiated the 'science versus religion' debate that would explode again following Darwin's publication of the *Origin of Species* later in the century, and which was destined to continue into the twentieth century. The controversy between 'vitalists' and 'materialists' had begun in earnest in 1814, when John Abernethy, a famous London surgeon at the Royal College of Physicians, had given a series of anatomical lectures in which he claimed that life had its own principle, distinct from the organisation of the body, and depending on a subtle substance, similar to, though not necessarily identical with, electricity. In the lectures, he supported his assertions by referring to the doctrines of the eighteenth-century anatomist John Hunter, and the work of Humphry Davy, who also believed in electricity as a 'vital fluid' animating all living things. By 1816, Lawrence saw fit to launch an attack on Abernethy, his former teacher. Basing his argument on the ideas of the great French zoologist Cuvier, he argued that there was no separate 'principle of life' independent of the body, and ridiculed the notion of a subtle, invisible animating matter by comparing it to the personifications found in ancient and medieval mythology:

Thus we find at least that the philosopher with his archeus, his anima, or his subtle and mobile fluid is about on a level, in respect to the mental process, by which he has arrived at it with the

> Poor Indian, whose untutor'd mind,
> Sees God in clouds, and hears him in the wind.[12]

If these were the beliefs of untutored poverty, then they were also beliefs shared by Rousseau, Wordsworth, Coleridge, Godwin and Mary Shelley. The debate was to rage on, with Lawrence defending his materialistic position by explicitly arguing that the human mind was connected with the functioning of the brain and the external senses. Abernethy replied in a series of lectures he delivered in 1817, alleging that the sceptics were afraid of a substance superadded to structure, since to believe in such a thing could imply belief in a soul. This, he said, would thereby endanger 'the privileges of scepticism', that is, the assurance that 'gratifying their senses, and acting as their reason dictates, for their own advantage, independently of all other considerations' (we should now say, being 'selfish') was true philosophy.[13]

Which in more ways than one bring us back to Mary Shelley's *Frankenstein*. For as we all know, although ambitious Frankenstein wishes to 'pour a torrent of light into our dark world' by 'bestowing animation upon lifeless matter', his motive for doing so is highly suspect:

> 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.[14]

Does such power-seeking selfishness mean that he is an unbeliever in the soul, a 'soulless' person? But then, surely it is Frankenstein's creature who has by tradition been seen as having to bear this deficiency. At a crucial turning point in the moral life of her novel *Mary Barton*, Elizabeth Gaskell seems to have wanted it both ways, deploying the image of 'Frankenstein' thus:

> The actions of the uneducated seem to me typified in those of Frankenstein, that monster of many human qualities, ungifted with a soul, a knowledge of the difference between good and evil.

Chris Baldick says this conflation of creature and creator indicates a 'creative misreading' caused by Gaskell's confusion of the novel with Richard Brinsley Peake's popular stage adaptation, in which the monster was redefined 'as a soulless being and as an inarticulate child'. I think the harsher conclusion more likely: she was responding solely to the 'Frankenstein myth' which the theatre had produced, and just had not read the book. But Baldick's comment that 'in the novel the problem of the monster's soul simply does not arise' is both true and untrue, depending upon the way one interprets the capacity of the novel's characters to negotiate 'sense' and 'nonsense'. The 1818 edition of *Frankenstein* has a passage explicitly referring to electricity as a 'fluid'.[15] This suggests that Frankenstein's cosmology does originally contain the notion of an immaterial, but a 'sensing' human soul, one that shares its life-nature with electricity.

Let us now finally turn once more to the novel as it stands, its conclusion, and ours. The monster, feeling he has nothing left to live for now that his creator is dead, anticipates the feelings he will have in going out of the world on his suicidal funeral pyre. For the language he uses, words which describe sense-perceptions of the kind he had used to Frankenstein to evoke his entry into the world, shows us that his real creator, Mary Shelley, is using a 'sensationalist' theory of learning and experience that is at one with the kind of 'materialistic' and 'atheistic' theory that William Lawrence had been propounding:

'But soon' he cried with sad and solemn enthusiasm, 'I shall die, and what I now feel be no longer felt . . . I shall no longer see the sun or stars or feel the winds play on my cheek. Light, feeling and sense will pass away . . . I shall ascend my funeral pyre triumphantly and exult in the agony of the torturing flames. The light of that conflagration will fade away; my ashes will be swept into the sea by the winds. My spirit will sleep in peace, or if it thinks, it will not surely think thus. Farewell.'

It is perhaps no wonder that the magnificent but cheated monster has no name.

[1] William Whewell, *Quarterly Review* of 1834, cited in the *Oxford English Dictionary*.

[2] James Rieger, Introduction to *Frankenstein or, The Modern Prometheus. The 1818 Text* (Chicago and London: University of Chicago Press, 1982), p. xxvii.

[3] David M. Knight, *Natural Science Books in English 1600–1900* (London, 1972), p. 128.

[4] The two books which established his fame were the *Enquiry Concerning Political Justice* (1793), and *Caleb Williams* (1794).

[5] Quoted in Peter Marshall, *William Godwin* (New Haven and London: Yale University Press, 1984), pp. 238–239.

[6] Quoted in Trevor H. Levere, *Poetry realised in Nature: Samuel Taylor Coleridge and Early Nineteenth Century Science* (Cambridge University Press, 1981), p. 21. The one whom Coleridge felt to be superior to Davy was William Wordsworth.

[7] Knight, p. 136.

[8] *Frankenstein*, Rieger edition, p. 36.

[9] William Nicholson it was who wrote a detailed analysis of the three-week old Mary from a Lavaterian (physiognomic) study of her face in 1797. He considered that she was destined to enjoy 'considerable memory and intelligence'. See Jane Dunn, *Moon in Eclipse: A Life of Mary Shelley* (London, 1978), p. 17.

[10] See Rieger's edition of *Frankenstein*, p. xvi–xvii and p. 260. Easy access to Mary Shelley's 1831 account of the novel's genesis may be had in the Penguin Classic edition of the novel, edited with an introduction to the text by myself.

[11] *Frankenstein*, Penguin edition, p. 54.

[12] Quoted by Owsei Temkin, 'Basic Science, Medicine and the Romantic Era', *Bulletin of the History of Medicine*, vol. XXXVII, March–April 1963, no. 2.

[13] Temkin, p. 101.

[14] *Frankenstein*, Penguin edition, pp. 97–98.

[15] Rieger, p. 35.