Mary Shelley's *Frankenstein* and Ecological Responsibility

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Summary

This article addresses the following question: what light might Mary Shelley's celebrated 1818 novel, *Frankenstein*, cast on the pressing ecological crisis faced by humanity in the present era? After providing a brief outline of the narrative plot, the focus shifts to those aspects of the novel that are germane to the ecological issue, namely the conception of science and technology that underpins Victor Frankenstein's narrative (and to a lesser extent Captain Walton's) as well as the creature's narrative, in which he entreats Frankenstein to create a female companion to assuage the misery he has suffered at the hands of humans, and simultaneously upbraids him for not accepting responsibility towards him, "his" creature (who does not even have a name). The contrast between Frankenstein's adherence to instrumental rationality, on the one hand, and his inability to empathise with the creature and adopt a caring attitude towards it (Gilligan), on the other, is explored. A parallel is then drawn between Frankenstein's notion of scientific and technical rationality (which draws on the prevailing one at the time, namely that of the historical Enlightenment) and the one which prevails today, which, it is argued, is still essentially the same as when Mary Shelley wrote the novel. Contemporary human beings, therefore, could be understood as representatives of Frankenstein insofar as they have shown a comparable inability and unwillingness to accept responsibility for the deleterious effects of their science-based, technical creations on natural eco-logies (of which they are an integral part). Attention is given to evidence of the effects of techno-scientific practices on these ecosystems, in particular the case of bio-technological industries. The article concludes with a consideration of what is known as "transhumanism", where the direction and probable consequences of the "Frankensteinian" modern scientific and technological programme can be discerned, confirming the prescience of Mary Shelley's novel.

Opsomming

Die huidige artikel is 'n poging om die volgende vraag te beantwoord: watter lig sou Mary Shelley se gevierde roman van 200 jaar gelede (1818), *Frankenstein,* werp op die dringende ekologiese krisis wat die mensdom vandag in die gesig staar? Na 'n kort oorsig van die narratief verskuif die aandag na daardie aspekte van die roman wat relevant is vir die ekologiese kwessie, naamlik die opvatting van wetenskap en tegnologie wat onderliggend is aan Victor Frankenstein se verhaal (en in 'n mindere mate Kaptein Walton s'n), sowel as die kreatuur se verhaal, waarin hy Frankenstein smeek om vir hom 'n vroulike wese te skep ten einde die ellende wat hy as gevolg van

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mense verduur het, te versag. Terselfdertyd betig hy dr. Frankenstein vir sy weiering om verantwoordelikheid vir "sy" skepsel (wat nie eens 'n naam het nie) te aanvaar. Die teenstelling tussen Frankenstein se verknogtheid aan instrumentele rasionaliteit, enersyds, en sy gebrek aan empatie met en besorgdheid oor (Gilligan) die kreatuur, andersyds, word beklemtoon. Vervolgens word daarop gewys dat Frankenstein se opvatting van wetenskaplike en tegniese rasionaliteit (wat die heersende Verligtings-model van die tyd waarin Shelley die roman geskryf het verteenwoordig) wesenlik met die huidige opvatting in die verband ooreenstem. Tydgenootlike mense kan dus grootliks verstaan word as verteenwoordigers van Frankenstein, vir sover hulle 'n vergelykbare onbekwaamheid en onwilligheid vertoon om verantwoordelikheid te aanvaar ten opsigte van die nadelige ekologiese gevolge van hul wetenskaps-gebaseerde tegniese praktyke, spesifiek in die geval van bio-tegnologiese industrieë. Die artikel word afgesluit met 'n oorweging van wat as "transhumanisme" bekend-staan, waar die rigting en waarskynlike gevolge van die "Frankensteiniaanse" moderne wetenskaplike en tegnologiese program waargeneem kan word, en waar-deur Mary Shelley se voorkennis bevestig word.

> I may die, but first you, my tyrant and tormentor, shall curse the sun that gazes on your misery. Beware, for I am fearless and therefore powerful. I will watch with the wiliness of a snake, that I may sting with its venom. Man, you shall repent of the injuries you inflict.
>
> (The creature addressing Victor Frankenstein, in Mary Shelley's *Frankenstein*, p. 206)

In her biography of Mary Shelley, *Mrs. Shelley* (1890; reprinted in Shelley 2014), Lucy Madox Rossetti remarks that:

> A more fantastically horrible story could scarcely be conceived; in fact, the vivid imagination, piling impossible horror upon horror, seems to claim for the book a place in the company of a Poe or a Hoffman. Its weakness appears to be that of placing such an idea in the annals of modern life; such a process invariably weakens these powerful imaginative ideas, and takes away from, instead of adding to, the apparent truth, and cannot fail to give an affectation to the work.
>
> (2014: location 44458)

It is probably because of the gravity of the events separating Rossetti's era (the late 19th century, pre-WWI and II) from that in which we live in the early 21st century that one *has* to disagree with her. Far from being a weakness, this "idea" bears so much more strength precisely *because* it is articulated in the context of "modern life". After all, it is the narrative of a "modern" scientist creating a "monster" that turns out to be unbearably hideous to behold, and carries out horrifying acts of murder when his creator – the "modern Prometheus" – refuses to take responsibility for his creature's possible happiness, and finally refuses, too, the creature's (arguably reasonable) request, to be granted a female like himself, in exchange for the promise, never to trouble humanity again. In this paper I would like to explain my claim, above, that reading Shelley's *Frankenstein* as a quintessentially modern story is what imparts to it its singular, if not prophetic power.

A Critique of the "Promethean"

2018 marks the 200th anniversary of Mary Shelley's "Gothic" proto-science fiction novel, *Frankenstein*; *or, The Modern Prometheus*, which was published when the author was only twenty years old. Evidently it was the fruit of a contest among herself and two other literary figures – her future husband, the poet Percy Shelley, and another poet, Lord Byron – when they were travelling in Switzerland, to write the best ghost (or horror) story (Sanders 1994: 345; Seymour 2002: 110-111). The novel is also a true proto-science fiction novel, which characteristically treats science and technology as a *pharmakon*, that is, something which can create novel realities, but can equally destroy existing ones. Since its publication it has inspired many other, similar stories in literature as well as, later, in film, so that virtually every literate person knows about "Frankenstein", often erroneously attributing the name to Dr Frankenstein's monstrous creature. What interests me here – 200 years since its appearance – is the fact that the critique it renders of scientific ("Promethean") reason, specifically the implicit belief in science's capacity to "control", if not reconstruct, nature through its offspring, technology, has evidently not been taken seriously by contemporary science and technology, given their ongoing quest to fulfil precisely what the novel explicitly (and almost prophetically) warns against.

Why a critique of "Promethean" science or rationality? It will be recalled that the figure of Prometheus (Greek for "forethought") in ancient Greek mythology is usually depicted as a Titan who stole fire from the gods and gave it to humans because he pitied them (Brewers 1952: 732). The fire in question symbolises reason, and has been associated with progress in culture. Another, more radical mythological strand in the myth has it that Prometheus – who was employed for this task by Zeus – not only bestowed the gift of fire (reason) on humanity, but actually fashioned them out of mud and water (Brewers 1952: 732). It is ironic that the etymological meaning of "Prometheus" is "forethought", given that Victor Frankenstein, the modern Prometheus of Shelley's tale, by his own admission showed no forethought when he was feverishly engaged in the construction of his creature. (Given the fact that he had reason to regret its creation afterwards, he might rather have been called Epimetheus, meaning "afterthought", after Prometheus's mythical brother.) That this meaning of the name has been regarded as being important, is evident from the fact that, as Franklin Baumer (1977: 94) reminds one, seventeenth-century philosopher Francis Bacon, giving a Christian twist to the myth, "... explained that Prometheus signified Providence and that when Prometheus created man he bequeathed to him his own providential powers. In other words, man, like God, could act providentially in nature". The irony in relation to Frankenstein should be obvious, and even more so when one reads Baumer's next sentence regarding Bacon's understanding of Prometheus (94): "With the additional gift of fire

man could effect new operations and further immensely the mechanical arts and the sciences". It is my argument here that the lack of forethought (or providence) in question does not merely pertain to the fictional Victor Frankenstein, but equally to humankind, collectively considered as a Frankenstein "figure" in respect of the scientific and technological developments since the 18th-century Enlightenment, anti-cipated by Bacon in the 17th century, and coming to dubious fruition in the late 20th and early 21st century.

A brief elaboration on the Promethean is called for here to be able to grasp its full implications in relation to nature, in a manner that is analogous to Shelley's conception of it, which underpins her narrative. In *The Veil of Isis*, Pierre Hadot (2006: 91-98) contrasts what he calls the "Orphic" with the "Promethean" as possible approaches (or what he terms "attitudes") to nature. According to Hadot, Orpheus (2006: 96):

> … penetrates the secrets of nature not through violence but through melody, rhythm, and harmony. Whereas the Promethean attitude is inspired by audacity, boundless curiosity, the will to power, and the search for utility, the Orphic attitude, by contrast, is inspired by respect in the face of mystery and disinterestedness.

It is highly relevant to the theme of this article that, while Hadot highlights the Promethean correlation with the need to defend oneself against that which is inimical in nature, as well as with the necessity to use nature's resources for survival, he simultaneously reminds one that the "blind development of technology and industrialization, however, spurred on by the appetite for profit, places our relation to nature, and nature itself, in danger" (Hadot 2006: 98). Clearly, Shelley's Victor Frankenstein embodies the Promethean, rather than the Orphic, attitude towards nature. Precisely what the Orphic would amount to in the context of an industrialised and technologically developed society may be difficult to imagine, but David Pittaway (2017) has elaborated on one such possibility. Following Hadot's seminal distinction, he contrasts the "Promethean" legacy with the "Orphic" in his sustained investigation of the historical relationship between the former, as a formative force with multifarious manifestations in western culture, and the looming ecological crisis of the early 21st century, where both capitalist and technological exploitation of natural resources are placed under his critical lens (see particularly Pittaway 2017, Chapters 2 and 3). The Orphic impulse, on the other hand, is detected in the promising practice of permaculture, which manifests a deep respect for nature's intrinsic value and creativity insofar as it works *with* nature instead of against it (see particularly Pittaway 2017, Chapters 5 and 6). It is not my objective to elaborate here on practices with promising Orphic prospects, however; rather, those aspects of Shelley's novel which may be read as a far-reaching critique of the Promethean are my main concern.

The Narrative

A brief reconstruction of the narrative will facilitate the interpretation of Shelley's novel. The plot is quite well known, even if it is sometimes in caricature form, because not all film versions adhere to the original plot-structure. In a nutshell, and omitting (too) many details, it is the story of Victor Frankenstein, from a wealthy Genevan family, who goes to Ingolstadt to study "natural philosophy" (i.e. science, particularly chemistry), after becoming infatuated with the work of alchemists like Paracelsus, who believed, like the fictional Dr Faustus, that they could find the "philosopher's stone" and the "elixir of life", which could impart immortality. He is soon cured of this infatuation in favour of Newtonian science – by his teacher, Waldman, who describes modern science as endowing people with the capacity to "command" nature – which he pursues relentlessly. His belief, that he could indeed discover the secret of life – to the point of creating it – does not perish, however. Having figured out how life can be imparted to lifeless objects after discovering a primordial life-principle (which is commonly understood as being connected to electricity, or "galvanism", in derivative works, although this is left vague in the novel), Victor becomes fanatically involved with his project of doing exactly that, working alone in his laboratory and visiting morgues and charnel houses to find the body-parts he needs to construct a colossal "human" figure. Despite his health suffering egregiously because of his singular obsession with his Promethean project of creating a living being through scientific knowledge, Victor perseveres, but when the "creature" comes to life he is so appalled by its hideous eight feet frame and features that he flees.

When Victor's friend, Henry Clerval, arrives in Ingolstadt, he nurses Victor back to health, only for the latter to receive word, four months later, that his youngest brother has been murdered. Returning to Geneva, he sees the creature near the murder scene, and realises that it is the culprit, although the child's nanny has been charged with the murder. Helpless to prevent her from being falsely convicted and executed – after all, who would believe his story? – Victor is stricken with guilt and remorse. He seeks solace in the high Swiss mountains, where he is confronted by the creature, who persuades Victor to listen to his account of acquiring the ability to speak and read intelligently, and of the events that led to him murdering Victor's brother and framing the nanny by putting the child's locket in her pocket.

This (the creature's story) is the most moving part of the novel, in my estimation, because it unmasks Dr Frankenstein as someone who is quite willing and able to harness scientific (chemical) and technical rationality effectively in the construction and animation of the nameless creature, but who is almost completely unsympathetic towards the being that he has brought to life. And this despite the very eloquent manner in which this outwardly hideous, but evidently intelligent and sensitive being entreats him

to create a female mate for him so that he will not be alone in a world where people abhor him at first sight. The latter experience evidently evokes in him conflicting feelings of wanting affection, but also revenge against those who reject him. Ironically, Victor Frankenstein is depicted as a very sensitive person where his family members are concerned, but when confronted by the fruits of his own scientific and technical labours, he seems devoid of any sympathy and understanding.

Ostensibly realising that he has a certain duty towards the creature, but more for pragmatic reasons of pacifying the creature so as to preclude future hostility on its part towards humans, Frankenstein reluctantly agrees to construct a female companion for it – a task which he eventually takes up in the Orkney Islands, but abandons again in the belief that two such creatures would pose a threat to humanity. The end result is that the understandably vengeful creature murders his friend, Henry, as well as his wife, Elizabeth, on their wedding night. Victor follows the creature to the North Pole, intent on destroying it, which is how he meets Captain Walton who tells his story.

Walton, whose crew have seen the creature on a sled speeding north, nurses Victor Frankenstein to the point of health where the latter can converse with him, and having learnt that Walton is pursuing fame for his exploratory efforts towards the North Pole, Victor decides to dissuade him from doing so by telling him his story, which Walton relates to his sister by letter. Victor's health deteriorates rapidly, and when Walton hears a cry from the cabin where he lies, he finds the monster there with Frankenstein's corpse, outraged by the fact that, by dying, his maker has escaped his final retribution. After conversing with Walton for a time, the creature declares his intent, to immolate himself on a funeral pyre, never to trouble humanity again, and disappears. Against this backdrop several strands of Shelley's narrative can be subjected to interpretation.

Indirect Truth

Readers have probably wondered why the narrative of Shelley's quasi-epistolary novel functions by means of various "frames": Captain Walton writing to his sister – at the beginning of the narration, and again, as a closing frame of sorts, at the end – to tell the story that Dr Frankenstein tells him, which includes the story that the creature tells Frankenstein. One might say that these are "distancing" devices of sorts, imparting to the narrative a structure of indirectness in relation to the "truth" that Shelley wishes to convey about the possible consequences of scientific knowledge and its technical implementation. What would be the sense of such indirect narration, particularly because most people are familiar with the relatively distorting effects of recounting a tale one has heard to others, even with the best intentions of conveying it with accuracy and veracity? I would contend that

this is precisely why Shelley made use of these different narrative frames. Early in the novel – just before the commencement of Franken-stein's narrative, as recorded by Walton for his sister's benefit – one reads (Shelley 1818: 23): "I have resolved every night, when I am not imperatively occupied by my duties, to record, as nearly as possible in his own words, what he has related during the day". The phrase, "as nearly as possible in his own words", amounts to an implicit admission, on the part of the novelist, that such an indirect account is always subject to a greater or lesser degree of distortion. But why this literary technique, then, and not a straightforward narrative by Victor Frankenstein?

The answer, I believe, lies in the epistemic function of such indirectness, where the different "frames" serve the purpose of emphasising to the reader how far removed he or she is – or perhaps, should remain – from the horrifying, and for all intents and purposes unbearable, truth of Franken-stein's "alchemical" creation of what turned out to be a monstrosity or "monster" (from Latin *monstrum*: portent, and *monēre*: warn; Sykes 1983: 655); his intention to create something beautifully proportioned notwith-standing. After all, when Victor Frankenstein counsels Walton (Shelley 1818: 19-22; 53) to refrain from excessive scientific ambition in his quest to reach the North Pole, his warning explicitly presupposes his own tragic experience of the incalculable consequences of such ambition.

To clarify what I mean by this interpretation of the literary-epistemic sense of the technique of "indirect" narration employed by Mary Shelley, one might recall an analogous literary-epistemic strategy on Plato's part in his *Symposium* (1965), albeit with somewhat different intent. Well-read as she was (with two erudite parents), Shelley was probably familiar with Plato's text, and although it is impossible to know with certainty, might have been influenced by Plato's technique of indirectness in the dialogue, where Apollodorus (Plato 1965: 33) provides an account, at Glaucon's request, of a drinking party or symposium where Socrates gave a memorable account of the nature of love (*Eros*). Importantly, the symposium in question occurred years before, and Apollodorus was not personally present, but received his information from Aristodemus. A number of intermediaries therefore stand between Glaucon and Socrates in the dialogue, so that his understanding of what Socrates said is unavoidably indirect. As I have argued elsewhere (Olivier 2009), there is an isomorphism between this literary indirectness and Plato's metaphysical doctrine of beauty, as conveyed in the *Symposium*, according to which one cannot approach the beautiful directly in the world of becoming, or sensory experience, but has to ascend, gradually and pains-takingly, through various intermediary steps, to the mystical and ecstatic apprehension of the beautiful (Plato 1965: 93-94; Olivier 2009: 70-71).

The point is that, just as Plato makes use of various "frames" to emphasise the distance that separates the listener from Socrates as the object of interest – which is itself analogous to the distance between the human realm of

becoming and that of being (where the beautiful "itself" is located) – in order to bring across the ontological chasm dividing the realms of becoming and being, so, too, Shelley employs framing devices to stress the distance between the different narratives in question and the truth conveyed by these, which is, unlike Plato's archetypal Form of the beautiful (in fact, its complete opposite), an unbearable, horrifying truth. Perhaps one might, following Terry Eagleton (1990: 212) – who points to Marx's conception of money in these terms – think of it as a variety of the "monstrous" sublime, where the sublime is marked by what is sensorily unpresentable, albeit thinkable (Kant 1969: 104-107; Lyotard 1984: 80-81). This does not only apply to the appearance of the creature, which Shelley stresses on several occasions as being unbearable to look at because of its indescribably grotesque ugliness – (Shelley 1818: 58-59, 113; on the latter page his face is described by Shelley by noting "… its unearthly ugliness [which] rendered it almost too horrible for human eyes") – but in the final analysis to what the creature represents, metonymically speaking. The latter is, arguably, the even more unbearable truth of what science and technology are capable of, namely of producing 'monsters' in the sense specified earlier. What these monsters are, ranges from the effects of techno-scientific practices and products on nature to those practices that are in the process of effecting a transition to a bio- and neuro-engineered world (more on these below).

Frankenstein and Ethical Responsibility

As intimated earlier, the important insight that Shelley affords one concerns her portrayal of scientific rationality, which underpins Victor's narrative, as being capable of unheard-of discoveries and their implementation by technical means. This is where the significance of Shelley's Gothic science fiction lies for the contemporary world. Just as Victor Frankenstein forged ahead with his intention to create a living being out of dead limbs and tissue, while showing an incongruous (because irrational) unwillingness to accept the ethical consequences of and responsibility for his deed, so, too, the modern world, still committed to the self-same scientific and technical rationality, is equally unwilling to accept the ethical consequences of its techno-scientific creations. The latter may not have a humanoid form, like Victor's creature – except, of course, for many of the artificially intelligent robotic beings that are being produced today (Olivier 2017, 2018) – but they are nevertheless products of technoscience, and they have many deleterious effects in the world that the people who produced them do not take responsibility for. The most obvious examples are motor cars' fossil fuels-based carbon-emissions, which are driving catastrophic global warming (Klein 2014: 2, 6, 14-21; Kovel 2007: 1-2), and also the virtually daily reported disastrous suffocation of the world's oceans by plastic products, which literally kill ocean creatures

(Briggs 2018; Tutton 2018). These – discussed in more detail below – are more monstrous than Frankenstein's creature, who, for all intents and purposes, had a finer sensibility than most humans, as well as an acute sense of right and wrong (which makes him, to say the least, a very ambiguous "monster"), but was edged towards revenge by his maker who would not accept his own ethical responsibility towards his creature. What grounds do I have for making this claim?

There are several passages in the novel where this becomes apparent. So, for example, after finally bringing his Promethean labours of creation to fruition after nearly two years of concentrated, exhausting and enervating work in the construction of a suitable body, in the early hours of the morning Frankenstein performs the life-giving act on the body, and witnesses it coming to life:

> The different accidents of life are not so changeable as the feelings of human nature. 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 and continued a long time traversing my bedchamber, unable to compose my mind to sleep.
>
> (Shelley 1818: 58-59)

Horror in the face of something visually abominable is understandable; perhaps even an initial flight from the scene of first apprehending it, followed by a realisation, possibly, that the abomination is the fruit of one's own intentional endeavours. When the creature appears in his bedroom, where he has fallen asleep exhausted, Victor flees again, this time out of the house, and subsequently into the streets, with no sign of the creature (Shelley 1818: 59-60). But, while one might expect him to show a semblance of accountability, as time passes, Victor's refusal becomes ever more apparent. When he encounters the creature in the high Alpine mountains, the latter entreats him to listen to his tale – of what has occurred to him since his creation by Frankenstein – as follows:

> I entreat you to hear me before you give vent to your hatred on my devoted head. Have I not suffered enough, that you seek to increase my misery? Life, although it may only be an accumulation of anguish, is dear to me, and I will defend it. 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 thy creature; I ought to be thy Adam, but I am rather the fallen angel [A reference to Milton's Satan in *Paradise Lost*, which

> he has read; BO], 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.
> (Shelley 1818: 114)

Despite the accuracy of the monster's evocation of the asymmetry between Frankenstein's treatment of others and that meted out to himself, the doctor's own creation, Victor's response again reflects his own unwilling-ness to acknowledge the nameless creature as his own:

> Begone! I will not hear you. There can be no community between you and me; we are enemies. Begone, or let us try our strength in a fight, in which one must fall.
>
> (114)

Yet, after listening at length to the creature's moving tale of perceiving abundant signs of human happiness and his rejection at human hands when he tried to win their favour through benevolent deeds, leading him to request from Victor the making of a female companion for himself, a moment comes where Victor seems to relent:

> I was moved. I shuddered when I thought of the possible consequences of my consent, but I felt that there was some justice in his argument. His tale and the feelings he now expressed proved him to be a creature of fine sensations, and did I not as his maker owe him all the portion of happiness that it was in my power to bestow?
>
> (Shelley 1818: 176)

After vacillating once again, only to be reminded by the creature of his own inconstancy, Frankenstein (1818: 178) finally consents to its demand, that he produce a female companion, on condition that the creature and its female counterpart disappear from human society forever, which the creature happily accepts, urging Victor to commence his labours as soon as possible, and assuring him that his progress would be closely watched. At this point in the narrative it appears that the good doctor is finally willing and able to accept some ethical responsibility towards something, or rather – given the creature's undeniable sensibility and capacity for reason, no less than any human's – *someone* of his own "making", in the most literal sense. Given his unease about his own consent to do so, Victor procrastinates for some time, but finally, after travelling to Scotland with his friend Clerval, isolates himself on the Orkney Islands to accomplish the dreaded task he has committed himself to executing. Already far advanced in the construction of a female body, Victor (Shelley 1818: 202-203) reflects on the possible consequences of duplicating his earlier creation, this time in female form, and concludes that there is no guarantee that she would not commit murder and mayhem on a scale far exceeding the destruction that his first creature has so far wreaked

(killing his brother and the boy's nanny). This thought impels him to destroy the body-parts he has assembled, in full view of the monster, who is watching through the window. When the creature confronts him about this sometime later, demanding an explanation, Victor replies (1818: 205): "Begone! I do break my promise; never will I create another like yourself, equal in deformity and wickedness." The monster's ironic response (which conspicuously reverses the creator/creature relationship) is chilling, and, one has to admit, justified, given Frankenstein's renunciation of the responsibility he ostensibly, albeit briefly, accepted before rejecting it again:

> Slave, I before reasoned with you, but you have proved yourself unworthy of my condescension. Remember that I have power; you believe yourself miserable, but I can make you so wretched that the light of day will be hateful to you. You are my creator, but I am your master; obey!'
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> (1818: 205)

How should one understand this unwillingness, or perhaps inability, on the part of Victor Frankenstein, to act according to the responsibility that one's own actions undeniably bestow upon the agent? It is my contention that it flows from the kind of scientific rationality that Victor represents, described tellingly by one of his teachers, Waldman (Shelley 1818: 45-46; discussed below), and which – far from being oriented towards morally just relationships with others – is predicated on the capacity of natural-scientific knowledge to yield (technical) power over nature, as I shall argue below. But before scrutinising the character of modern scientific rationality and its offspring, modern technology, a brief look at the work of Carol Gilligan is informative in this regard, given the light it casts on the reasons for Frankenstein's refusal of his responsibility towards his creature.

In her study, *In a Different Voice* (1982), she makes out a case for an approach to ethics which is fundamentally different from a "rule-based approach", or what she calls an "ethics of justice", where Gilligan associates the latter with a typical masculine approach. This contrasts with what she proposes as being a characteristically feminine approach, namely "an ethics of care". Gilligan arrives at this distinction on the basis of considering, first, Freud's valorisation of masculine moral development and a concomitant inability to discern a comparable development of the sense of relationships, morality and the self on the part of women (Gilligan 1982: 24). Secondly, and in a more sustained manner, she considers one of a series of "measuring experiments" – the "rights and responsibilities study" – devised by the psychologist Kohlberg and conducted in a sixth-grade class at a school, involving boys and girls. In the course of her lengthy discussion (Gilligan 1982: 24-39) of Kohlberg's study, she painstakingly unravels the implications of the divergent responses by the boy and the girl to an imaginary moral dilemma posed to them by the interviewer, arriving in the end at a far-reaching conclusion. According to Gilligan, while Kohlberg arrived at a

similar conclusion to that of Freud regarding women's, or girls' moral development (that it is deficient compared with that of men or boys) he had overlooked the complexity of the girl's position, which fundamentally differed from that of the boy in one crucial respect: while the boy, Jake, used logic and *conventional* "*rules*" to arrive at his considered judgment, the girl, appropriately named Amy, made her judgments on the basis of what was to her the primacy of human *relationships*. This leads to Gilligan's characterisation of an approach to moral action, as exemplified by the girl's stress on human relationships, as "an ethic of care", which she further claims is characteristically feminine.

This does not mean, of course, that men are not capable of acting in accordance with the primacy of human relationships, instead of conventional rules. But if one looks for an affirmative correlation between scientific rationality (espoused by Victor Frankenstein), intent on uncovering the calculable ontological structures of nature (discussed below) with a view to manipulating these for human ends, on the one hand, and an "ethic of care", on the other, one would look in vain. However, it is not difficult to discern a correlation between "convention" and Victor's scientific aspirations to control natural forces. Is this not one of the conventions that modern society is founded upon – the control of nature through science and technology (Germain 2017)? Moreover, when one examines Victor's reasons for eventually breaking his promise to the creature, to produce for him a female mate, the same impression prevails; certainly not one of "an ethic of care". Here he is, reflecting on the consequences of seeing his promise through by completing his construction of the creature's mate:

> Even if they were to leave Europe and inhabit the deserts of the new world, yet one of the first results of those sympathies for which the daemon thirsted would be children, and a race of devils would be propagated upon the earth who might make the very existence of the species of man a condition precarious and full of terror. Had I right, for my own benefit, to inflict this curse upon everlasting generations? I had before been moved by the sophisms of the being I had created; I had been struck senseless by his fiendish threats; but now, for the first time, the wickedness of my promise burst upon me; I shuddered to think that future ages might curse me as their pest, whose selfishness had not hesitated to buy its own peace at the price, perhaps, of the existence of the whole human race.
>
> (Shelley 1818: 203)

Victor's emphasis on not having the "right" to decide on behalf of sub-sequent generations suggests the absence of agreement, that is, "convention". But nowhere does he invoke the primacy of his *relationships* with people, not even his family, or Elizabeth, whom he loves, as a factor that impels him to accept that he owes the creature a debt of responsibility. By acting according to this ethical responsibility he could safeguard their lives, let alone acknowledge the

status of his creature, if not as a fully fledged human being, then at least as someone with the status of a sensitive, rational and morally susceptible "person" – which the creature has amply demon-strated in the course of the narrative he relates to Frankenstein, and which the latter briefly recognised (Shelley 1818: 176). All of this is intimately related to the character of modern science and rationality.

Frankenstein, Modern Science and Technology

But what exactly does this "scientific rationality", so characteristic of western culture, which has paved the way for an unprecedented planetary eco-crisis, amount to? Shelley may have been a Romantic, but she understood its manifestation in the context of the Enlightenment very well; take this characterisation, where Professor Waldman – soon to be one of Victor's teachers at Ingolstadt university – disabuses the young man of his infatuation with alchemy:

> The ancient teachers of this science, said he, promised impossibilities and performed nothing. The modern masters promise very little; they know that metals cannot be transmuted and that the elixir of life is a chimera but these philosophers, whose hands seem only made to dabble in dirt, and their eyes to pore over the microscope or crucible, have indeed performed miracles. They penetrate into the recesses of nature and show how she works in her hiding-places. They ascend into the heavens; they have discovered how the blood circulates, and the nature of the air we breathe. They have acquired new and almost unlimited powers; they can command the thunders of heaven, mimic the earthquake, and even mock the invisible world with its own shadows.
>
> (Shelley 1818: 45-46)

That Frankenstein deserves the nickname of "modern Prometheus" is evident from his description of Waldman's account of modern science:

> Such were the professor's words − rather let me say such the words of the fate − enounced to destroy me. As he went on I felt as if my soul were grappling with a palpable enemy; one by one the various keys were touched which formed the mechanism of my being; chord after chord was sounded, 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.
>
> (1818: 46)

A cursory discourse-analysis of these two passages from the novel shows that neither Waldman's characterisation of "humble" modern science, nor Victor's account of the fervour it evoked in him is innocent; on the contrary. Modern

science may have relinquished the Faustian ambitions of alchemy, but in their place they have "performed miracles", "acquired … almost unlimited powers", and "can command the thunders of heaven" – anything but a disinterested stance towards knowledge, or "knowledge for its own sake", but instead an explicit statement of the *technical*, world-transforming aims of scientific knowledge-acquisition. Similarly, Frankenstein was moved by Waldman's words to the exploration of "new powers" – not new insights, knowledge or understanding, but "powers" aimed at uncovering "mysteries of creation"; the last word evoking the hubristic imitation of divine creation, as well as adumbrating the disastrous act of "creation" that Victor will perform. Compare Shelley's evocation of modern science with that of one of its founders, René Descartes. In his *Discourse on Method* of 1637 Descartes says:

> … it is possible to attain knowledge which is very useful in life…instead of that speculative philosophy which is taught in the Schools, we may find a practical philosophy by means of which, knowing the force and the action of fire, water, air, the stars, heavens and all the other bodies that environ us, as distinctly as we know the different crafts of our artisans, we can in the same way employ them in all those uses to which they are adapted, and thus render ourselves the masters and possessors of nature.
>
> (1972: 119)

As I shall demonstrate below, his expectation of (an attempted) mastery over nature through "practical philosophy" (so-called at a time when modern science was in its infancy) has been accompanied, ironically, by unexpected consequences in the shape of the destruction of the integrity of natural ecosystems (with severely negative implications for human health), which is all the more ironic in light of Descartes's next statement:

> This is not merely to be desired with a view to the invention of an infinity of arts and crafts which enable us to enjoy without any trouble the fruits of the earth and all the good things which are to be found there, but also principally because it brings about the preservation of health, which is without doubt the chief blessing and the foundation of all other blessings in this life.
>
> (1972: 119-120)

It is by now a commonplace that modern science has developed in such a way that it has formed the basis of modern technology – its offspring – by means of which the attempted subordination of nature to human ends has proceeded. Pierre Hadot reminds one that one of Descartes's contempo-raries, Francis Bacon, played an equally foundational role in this process (2006: 121-122): "… Francis Bacon's program is a program for the manipulation of the environment and of nature itself, precisely the one that our current period is trying to realise, in a way that risks bringing about … disastrous consequences not just for nature but for mankind". He sums up the role of the pioneers of

modern science in laying the foundation for this to be possible in terms that resonate with the words that Shelley (1818: 45-46) put on the lips of Professor Waldman:

> What we must say, I think, is that with Francis Bacon, Descartes, Galileo, and Newton, a definitive break ... may have taken place, and these scholars discovered the means of progressing in a decisive and definitive way in this project of dominating nature, limiting themselves to the rigorous analysis of what is measurable and quantifiable in sensible phenomena.
>
> (Hadot 2006: 123)

I mentioned earlier in passing that modern technology is the "offspring" of modern science. Nowhere is this better explained than in the work of Martin Heidegger. Heidegger conceives of the modern age as one where the way was prepared for technological "control" of nature by modern science, in so far as science interprets nature in a series of "representations" where nature is re-presented "objectively" and mathematically in terms of "calculability". Such calculability paves the way for technological control (through machine technology), which would be unthinkable without it. This means that representation – which, for Heidegger, is a way of conceiving of the world as a *picture* – is a prerequisite for the advent of technology (Heidegger 2009b: 208), because without the reduction of the world to a "picture" – that is, a representation – the mathematical calculation that prepares the world, or nature, for technological manipulation, is impossible. Heidegger reminds one that people nevertheless persist in erroneously understanding technology instrumentally, that is, as a series of "tools" by means of which nature (and people) may be controlled. In truth, however, the essence of technology, or what Heidegger calls *Ge-stell* ("Enframing") is itself nothing technological (machine technology is merely the concrete manifestation of technology as "Enframing"). Instead, it is a fundamental and, as history has shown, exclusive way of understanding the world, nature and even humanity as material to be used and organised for human use – one that is already perceptible in Shelley's (as well as Descartes's) account of modern science intent on mastery, as articulated by Waldman to Frankenstein. For Heidegger (1977: 4; 19-20; 2009a: 326) it is "a power" by which humans are "be-set", which reduces nature to a "standing-reserve", which is nothing that can be controlled (because it is what makes such vaunted "control" through technical means possible in the first place), and has long since ceased being a "tool" (Heidegger 2009a: 325).

What instances of modern technology can be listed that have had (and still have) a severely deleterious, destructive effect on nature, in the same way that Frankenstein's creature has on his creator's family, friends and himself, and for which Dr Frankenstein refuses to take ethical responsibility? This question can only be answered in the context of the prevailing ecological crisis.

The Ecological Crisis and Technology

Against this backdrop the question that arises is what demonstrable effect modern science and its offspring, modern technology – considered by analogy with the means by which the fictional Dr Frankenstein created his (rather ambiguous) "monster" – have had on natural ecosystems, possibly contributing to what is, by all accounts, an unprecedented global eco-crisis whose manifestations have been increasing in number and severity (see, for example: Watts 2018; Siegle 2018; RT News 2018; Dewan 2018). Should there be any doubt about the question, whether there is an ecological crisis – given the success of the denialist discourse, sponsored by powerful agencies in whose interest it is not to undermine the existing economic system of neoliberal capitalism (Klein 2014: 30; 39-40) – the following list of manifestations, globally, of such an eco-crisis should give reason for pause. (See also Lovelock 2010; and Klein 2014: 29, 40, regarding the fact that 97% of the world's climate scientists agree that anthropogenic climate change, including global warming, is indeed the case.) This list dates back to 2007, when the book was published; indications are that it has worsened considerably since then (as the articles by Watts, Siegle, RT News and Dewan, referred to above, testify):

> - As for this [global] warming, average temperature increased by 1°F – a disarmingly small number that, being unevenly distributed, translates into chaotic weather events (seven of the ten most destructive storms in recorded history having occurred in the last decade), and an unpredictable and uncontrollable cascade of ecological trauma – including now the melting of the North Pole during the summer of 2000, for the first time in 50 million years, and signs of the disappearance of the "snows of Kilimanjaro" the year following; since then this melting has become a fixture.
> - Species were vanishing at a rate that has not occurred in 65 million years …
> - Forty percent of agricultural soils had been degraded.
> - Half of the forests had disappeared.
> - Half of the wetlands had been filled or drained.
> - One-half of US coastal waters were unfit for fishing or swimming.
> - Despite concerted effort to bring to bay the emissions of ozone-depleting substances, the Antarctic ozone hole was the largest ever in 2000, some three times the size of the continental United States; meanwhile, 2,000 tons of such substances as cause it continue to be emitted every day.
> - 7.3 billion tons of pollutants were released in the United States during 1999.
>
> (Kovel 2007: 2)

That there is a correlation between the conditions described above by Kovel, and the comparative figures pertaining to world population and the use of

resources before the year 2000 and the new millennium, below, is not difficult to grasp:

> - The human population had increased from 3.7 billion to 6 billion (62 percent).
> - Oil consumption had increased from 46 million barrels a day to 73 million.
> - Natural gas extraction had increased from 34 trillion cubic feet per year to 95 trillion.
> - Coal extraction had gone from 2.2 billion metric tonnes to 3.8 billion.
> - The global motor vehicle population had almost tripled, from 246 million to 730 million.
> - Air traffic had increased by a factor of six.
> - The rate at which trees are consumed to make paper had doubled, to 200 million metric tons per year.
> - Human carbon emissions had increased from 3.9 million metric tons annually to an estimated 6.4 million – this despite the additional impetus to cut back caused by an awareness of global warming, which was not perceived to be a factor in 1970.
>
> (Kovel 2007: 1-2; this was before 2007)

The theme of Kovel's book (2007) is evident from its title: *The Enemy of Nature*: *The End of Capitalism or the End of the World*? This means that technology is not his primary focus, although it is clearly implicated in virtually everything he lists. Anthropogenic global warming is the consequence of emitting too much carbon into the atmosphere, which occurs mainly through factory and motor vehicle emissions during the combustion of fossil fuels such as oil, petrol, diesel and natural gas, to which may be added emissions from burning coal. For all these processes advanced technology is required. The second list, particularly, signals the unavoidable, and increasing, use of technological equipment, when seen in conjunction with the increased human population, which has by now surpassed 7 billion. David Pittaway (2017: Chapter 2), referred to earlier, lists the following seven "direct physical causes" of the ecological crisis, all of which directly involve technology: the fossil-fuel industry, the petrochemical industry, the agricultural industry, the construction industry, the mining industry, the meat and fish industries, and the "bio-tech" industry. Pittaway's research has produced extensive evidence of the causes – direct as well as what he calls "attitudinal" (2017: Chapter 3) – of the eco-crisis, but what has to be singled out, given its potential to destroy many, if not most of the agricultural crops that humans depend on for food, is the "bio-tech" industry, which is inseparable from genetic and chemical technology or engineering. To be clear about this: the bio-technological industries employ sophisticated chemical and biological (including genetic) engineering techniques to alter natural entities – mainly plants or crops used for human consumption – under the subterfuge that modifying these organisms genetically is a way to produce far larger quantities of them than is usually the case (by making them resistant to pests, for example), preventing

starvation globally. But this claim hides the negative aspects of the bio-tech industries' genetic engineering programme. Pittaway lists the following problems associated with bio-technology, for example:

- The pesticides used alongside a given GMO [genetically modified organisms; BO] crop, typically glyphosate by Monsanto, is associated with high occurrences of a variety of adverse human conditions.
- "Bt" (Bacillus thuringiensis) crops adversely affect "non-target" and "beneficial organisms that partly constitute what is commonly referred to as 'the web of life'".
- GM crops and their associated herbicides can harm birds, insects, amphibians, marine ecosystems, and soil organisms.
- GMOs reduce biodiversity, pollute water resources, and are unsustainable.
- Roundup herbicide has been shown to cause birth defects in amphibians, embryonic deaths and endocrine disruptions, and organ damage in animals even at very low doses.
- GM canola has been found growing wild in various areas, threatening to pass on its herbicide tolerant genes on [sic] to weeds.
- Massive monocrops are genetically modified – for example, 94% corn and 88% soy in the US – and such massive crops go hand-in-hand with de-forestation, loss of biodiversity, defilement of water sources, and loss of topsoil.

(2017: 76)

For lack of space I shall refrain from elaborating on all the harmful effects of these products of bio-technology; suffice it to say that Pittaway (2017: 76) provides ample evidence of scientific agencies' severely critical responses to the eco-destructive consequences of the widespread use of genetically modified organisms, for instance the effect that GMO's have on natural organisms' "fitness" through hybridisation. This kind of technology can truly be called "Frankenstein-technology" (or "Frankenfood", as it is referred to; see CBS News) – it consists in the technical creation of organisms which then "turn on their creators" (humanity) by undermining the very conditions that existed for life to appear in the first place. Moreover, there is no indication that those who have produced these "GMO's" are willing to take responsibility for the deleterious effects of what they have technologically produced. To be sure, one cannot talk about sensitivity and rationality on the part of organisms, by analogy with Frankenstein's creature, but if one considers that the genetic architecture of all forms of life is fundamentally the same (Kovel 2007: 98-105), human beings arguably have a responsibility towards all life-forms. Vandana Shiva, the well-known Indian environmental activist, who has frequently confronted mega-corporations like Monsanto (the largest producer of GMO's in the world) has the following to say in an interview on her work:

> In 2000 we started a very beautiful movement which then led to my writing my book *Earth Democracy* − it was the living democracy movement against the

> chemicals and all the pushing of GMOs. It became big and communities began to come together discussing how to protect their biodiversity. They wrote this most beautiful declaration, just drafted it at the local level. About 200 villages were the first to do it, and it spread to about 6,000 villages. The text basically said, "We are part of the earth family. The tigers and the wolves in the forest and the trees in the forest and the seeds in our farms are all part of our earth community; therefore we do not accept the destruction, the privatization through patenting, the pollution through chemicals, and we will protect our family, the earth family, as we protect our own family."
>
> (Walters 2016: 64)

Contrary to "Franken-companies" like Monsanto, that produce and spread GMO's across the world, "Earth Democracy" is evidently capable and willing to accept responsibility for "the earth family". Through their bio-technological industries such companies still act firmly in accordance with the "Promethean" ethos of modern science, intent on using scientific knowledge to "command" the earth technically (even to its and its inhabitants' detriment), as it was formulated by Mary Shelley in *Frankenstein*, but they refuse the concomitant ethical responsibility for their practices. This testifies to the prescience of Shelley's vision as articulated in this novel.

Conclusion: Bio-technological Transhumanism

It is fitting to note, in conclusion, that the attempt to transform nature by bio-technological means is not restricted to what has been referred to. The movement known as "transhumanism", sometimes associated with Raymond Kurzweil's (2006) claims about the imminent "singularity" – when computer intelligence will putatively so far surpass human intelligence (as if that is all that makes us human; see Germain 2017) that a qualitative change in human-machine relations will take place – aims to promote the merging of human beings with machines, to become "cyborgs" (cybernetic organisms). Needless to stress, such a qualitative change may occur, but if it should entail a fundamental change in human beings as "caring" (and not merely "intelligent") beings (in the Heideggerian sense; see Olivier 2017), it is doubtful whether one would still be able to refer to such "cyborgs" as humans. (Here I understand something very different by this word – "cyborg" – from that intended by Donna Haraway [1991] in her well-known work in this regard, with which I am largely in agreement. It is telling that Haraway [1991: 151] explicitly distances her notion of "cyborg" from "Frankenstein's monster". This falls outside of the scope of the present paper.) If anyone should think I am exaggerating, here is Kurzweil (2006: 39-40) on the "singularity":

> What is the Singularity? From my perspective, the Singularity is a future period during which the pace of technological change will be so fast and far-reaching that human existence on this planet will be irreversibly altered. We will combine our brain power − the knowledge, skills, and personality quirks that make us Human −with our computer power in order to think, reason, communicate, and create in ways we can scarcely even contemplate today. This merger of man and machine, coupled with the sudden explosion in machine intelligence and rapid innovation in gene research and nano-technology, will result in a world where there is no distinction between the biological and the mechanical, or between physical and virtual reality. These technological revolutions will allow us to transcend our frail bodies with all their limitations. Illness, as we know it, will be eradicated. Through the use of nanotechnology, we will be able to manufacture almost any physical product upon demand, world hunger and poverty will be solved, and pollution will vanish. Human existence will undergo a quantum leap in evolution. We will be able to live as long as we choose. The coming into being of such a world is, in essence, the Singularity.

It is not difficult to recognise in Kurzweil's somewhat elliptical vision a counterpart to Victor Frankenstein's, at that point when he believed himself capable of unheard-of achievements by means of the technical application of modern science, particularly regarding his anticipation of being able to defeat death:

> No one can conceive the variety of feelings which bore me onwards, like a hurricane, in the first enthusiasm of success. 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. Pursuing these reflections, I thought that if I could bestow animation upon lifeless matter, I might in process of time … renew life where death had apparently devoted the body to corruption.
>
> (Shelley 1818: 54)

Can anyone doubt the prescience of Mary Shelley when one compares these passages – those from Kurzweil and from her novel, respectively – with regard to the capacity of modern science, then and now, to "command" nature in such a way that it is definitively surpassed? In the light of what has been argued here, I believe that one cannot. This is further confirmed by the Estonian exhibition at the 2017 Venice Biennale (see Russeth 2017 and Janke 2017), by the internationally recognised Estonian artist Katja Novitskova, which is appropriately titled "If Only You Could See What I've Seen with Your Eyes" – a telling quotation from Ridley Scott's classic sci-fi neo-noir *Blade Runner* (1982). It is addressed to the bio-technologist who created the eyes of one of the bio-technologically created "replicants", Roy, for the Tyrrell company, when Roy confronts his "maker". The exhibition title

captures the desired results of the present, burgeoning bio-technologies aptly: their implicit goal is nothing less than the replication (recall the "replicants" of Scott's film) and enhancement of nature in all her diversity – the "replicants" were constructed to be able to perform tasks in outer space that the "natural" human body is not equipped to carry out. Novitskova's exhibition exposes this kind of bio- and neuro-technological transformation critically in a series of disturbing images, ranging from what appears to be a variety of embryonic beings, through laboratory "worms" to what is arguably the paradigmatic image on display: a leopard whose eyes glow with an unworldly red electronic light. Novitskova therefore exposes the global programme of fusing the natural and the artificial bio-technologically, and her imagery suggests that this is tied to military and financial interests. The pamphlet (e-flux 2017) for Novitskova's exhibition puts this in perspective:

> If Only You Could See What I've Seen with Your Eyes addresses the relationship between the domain of seeing, big data-driven industries, and ecology in times of biotic crisis.
>
> Currently, vast aspects of human and nonhuman lives are being registered and modeled on an environmental scale. Collection and processing of data has become a tool used to map all possible surfaces, moments and spectra on Earth and beyond – from faces to biological cell walls to dust on Mars.
>
> This is performed by human, and increasingly, robotic agents, and is directed at people, both wild and captured creatures, and nonliving processes. Seeing has become an expanding extractive industry. In the process new visual languages, commodities and life forms are being generated reflecting back to us our often violent entanglement with the world: patterns of embryonic development in mutated lab-test worms, live-streamed flows of CO2 gas across the planet, or a group of near-extinct animals passing by a tree and noticing the tracking camera.
>
> Katja Novitskova works from new forms of imagery taken from the realm of present day visual representation. This exhibition explores this radical new articulation of the role of the image, and how constant planetary scale mediation gains an ecological dimension.

From the above it is apparent that, like a latter-day Mary Shelley, Novitskova has uncovered the usually hidden bio- and neuro-technological processes that depend on information-gathering, and that are increasingly transforming the human life-world by mapping and potentially altering their neural composition through various forms of mapping and interference, concomitantly carrying out the same task with regard to other living beings. This, too, is part of contemporary "transhumanism" (see Olivier 2018), which amounts to systematic attempts to transcend human embodiment technologically. If this is the direction in which the contemporary extension of a "Frankensteinian" scientific and technological programme is going, it raises serious questions of ethical accountability on the part of those who are driving it in its diverse manifestations, as characterised above.

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