"It Might be Dangerous…You Go First": The Ethics of Research in Mary Shelley's *Frankenstein* and Mel Brooks's *Young Frankenstein*

Stephen S. Hanson

Tulane University

Abstract

Mary Shelley's *Frankenstein* is described as an example of the dangers of science, especially of science taken into areas where "one ought not to go." We are warned to avoid exploring areas better left unexplored, to avoid research we shouldn't be doing, or to ask, "How much is too much?" Even if this was the original intent, there is a better, and more helpful, interpretation of the work for modern scientists to take: *Frankenstein* as a condemnation of unethical research and as an argument for modern ethical review of research, such as that which is conducted by an Institutional Review Board. Perhaps surprisingly, this can be shown by comparing it to the 1974 spoof, *Young Frankenstein*.

Mary Shelley's *Frankenstein; or, The Modern Prometheus* (first published in 1818 – citations will be referenced by chapters) is often seen as an example of the dangers of science, especially of science taken into areas where "one ought not to go." Given its subtitle, this is perhaps not surprising. In Greek mythology, Prometheus suffered greatly for giving humans the secret of fire; so, a modern Prometheus would presumably attain great suffering for giving humanity a modern equivalent of the life-changing tool of fire. In various analyses of the book, we are warned not to explore areas better left unexplored, to avoid research we should not be doing, or to ask, "How much is too much?" The book's name has even created a scary prefix – we see words like "Frankenfood" and "Frankenscience" used to critique foods and research (Cambra-Badii 2020). ("Frankenfood" is so prevalent that MS Word's spellcheck recognizes it as a word.)

Arguably that was what Shelley herself meant to do with the story, although as shown below there is some textual basis to question this. Nevertheless, even if this was the original intent, there is a better, and more helpful, interpretation of the work for modern scientists to take: *Frankenstein* can be understood as a condemnation of unethical research and an argument for modern ethical review of research, such as that which is conducted by an Institutional Review Board (IRB). Perhaps surprisingly, and definitely amusingly, this can be shown by comparing the original novel to the 1974 parody film, *Young Frankenstein*.

Journal of Science Fiction and Philosophy vol. 6 (2023)
 ISSN 2573-881X
 Published 2023 August 10.

Mary Shelley's *Frankenstein; or, The Modern Prometheus*

The story of Frankenstein has been retold many times, to the point where many people may be more familiar with a movie version of the story than with the original novel. It is worth a brief analysis of the original tale. In Mary Shelley's original work, she tells the story of Victor Frankenstein, a brilliant young scientist who, while studying medicine, becomes obsessed with creating life. He discovers the secret of reanimating dead flesh, creates a human being out of parts taken from human and animal corpses, and successfully brings it to life. When he does so, and only at that point, he is struck by the horrifying appearance of the being he has created, and he explicitly rejects his creation and flees from it.

The unnamed creation escapes to the countryside, learning spoken and written language and some ideas of social interaction by watching a family from hiding. When, craving human contact, he finally decides to directly interact with the family, they too are horrified by his appearance and reject him. This understandably angers him, and he aims that anger at his creator. After a chance encounter with a young relative of Frankenstein's ends poorly for the child and for the beloved ward of the Frankenstein family (who is unjustly executed for the child's murder), the creation returns to Frankenstein to demand that Frankenstein create a female partner for him. He hopes that the two creations could live out their new lives in at least the company of each other, as no one else would have them. Frankenstein begins to create the requested partner but cannot bring himself to finish, instead destroying the female creation before bringing her to life. This causes his first creation to become enraged, and in retaliation he kills most of Frankenstein's remaining loved ones. Frankenstein pursues him around Eurasia and even to the Arctic, where Frankenstein dies before catching up with his creation. Soon after, the creature arrives to observe his dead creator before leaving, presumably to die alone.

"The Perils of Promethean Science"

If one reads *Frankenstein* as a parable of warning about researching forbidden topics, then the job of ethics is to put the brakes on scientific development. Anecdotally, this is indeed how some researchers have seen IRBs and other forms of ethical review. But this is not the most useful lesson for modern researchers to take from Shelley's work. *Frankenstein* is an indictment of Victor Frankenstein, but not for research into the forbidden zone. His research led to tragic results, not because of its topic, but because of its failure to be properly ethical research. To put it another way, most of the failures of Victor Frankenstein that led to the tragic results would be caught and prevented by appropriate IRB/research ethics review; and if his research were to have been done ethically, it would have achieved its goals and prevented the tragedy that is the major content of the novel.[1]

[1] An argument along these lines has been made by Hugh Davies (2004), but he does not go far enough in pointing out that the flaws in the experiment could be addressed by ethical review. Davies rightly notes that Shelley herself places a strong focus on the character of the physician, and he argues that physicians of good moral integrity are perhaps the best protectors of their subjects. Though one would hope that this were true, prior to the advent of research ethics boards this was shown to be not nearly as successful as regulation and review (Beecher 1966, and Pappworth

It is possible that Shelley herself saw this as all or part of the meaning of the text. The story is told in the novel through a series of letters from Walton, captain of a vessel on an Arctic exploration, who has picked up a castaway that turns out to be Victor Frankenstein. While it is true that, early on, Frankenstein tells the captain that he will not reveal the secret of creating life, asking him instead to "[l]earn from me, if not by my precepts, at least by my example, how dangerous is the acquirement of knowledge and how much happier that man is who believes his native town to be the world, than he who aspires to become greater than his nature will allow" (Chap. 4), this does not seem to be his last word on the topic. In a scene from late in the book, after Frankenstein has already told his tale to Walton, Frankenstein gives an impromptu speech to the crew of the ship. The content of this speech must be important to him, as it is practically the only thing he says to anyone while on the ship (except, obviously, relating his tale to the captain). He has already seen the destruction of his life and the deaths of those he loves at the hands of his creation, and his sole goal now is to find his creation and stop him from ever being able to harm anyone again. The speech is given while the ship is trapped in the ice, in danger of being crushed or of being held until a thaw comes much too late to save the ship's occupants. The crew engages the captain, under likely threat of mutiny, to swear to return home if it becomes possible to escape. Frankenstein rouses himself out of an effective stupor to give this speech, in a manner Shelley describes as "with an eye … full of lofty design and heroism":

> "… Did you not call this a glorious expedition? And wherefore was it glorious? Not because the way was smooth and placid as a southern sea, but because it was full of dangers and terror; because at every new incident your fortitude was to be called forth and your courage exhibited; because danger and death surrounded it, and these you were to brave and overcome. For this was it a glorious, for this was it an honourable undertaking. You were hereafter to be hailed as the benefactors of your species; your names adored as belonging to brave men who encountered death for honour and the benefit of mankind. ... Do not return to your families with the stigma of disgrace marked on your brows. Return as heroes who have fought and conquered, and who know not what it is to turn their backs on the foe." (Chap. 24)

This speech's existence in the novel only makes sense if Frankenstein is really speaking about himself, drawing an allegory between the tragic condition of the ship and its crew and his own life's mission. As this is the only thing that has animated him out of near torpor at all in the days since he boarded the craft, he seems to find it significantly important. The ship's mission (polar exploration) is one of discovery that has, much like Frankenstein's

1967). Davies also notes briefly that an IRB continuing review would have caught a protocol change that Victor Frankenstein made – making his creature gigantic – and evaluated it; however, he doesn't make clear that this change would have then caused an IRB to deny the research. Nor does he clarify how preventing this change would actually prevent the tragic results. The monster perhaps would be less frightening, but could still be quite dangerous, at an average human size. A stronger argument than his can be made for the claim that *Frankenstein* is a tale about avoiding research done unethically.

own life's mission, encountered not entirely unpredictable and dangerous consequences of the journey. This is a perfect time for Shelley to have Frankenstein deliver the moral of the story as "Avoid research into areas where man ought not to tread," but she refuses to do so. Instead, Frankenstein gives an uplifting speech about heroic men bravely seeking an "honourable undertaking." Even at almost the end of his life, which has been reduced to ruin by his scientific endeavors, he doesn't forswear the use of science for the benefit of mankind, even into unknown and unexplored territory. Instead, he argues strongly for exploration and research, even if it may yield death or terror. If the moral of the story is being delivered here, it surely is not one about the importance of avoiding certain kinds of scientific exploration.

But even if it was not Shelley's goal, a good line of argument can also show an appropriate modern lesson of *Frankenstein* to be about conducting ethical research rather than avoiding certain areas of science altogether. Since the argument below involves the modern practice of ethical review, completely unknown in 1818, this could not have been Shelley's exact intended meaning. Still, what this shows is that the flaws in Frankenstein's research could be remedied and, if they were, that his ethically complex research would not have led to tragic consequences.

The Basics of IRB Review

What would an IRB review of Frankenstein's research have determined? The process of ethical review by an IRB is fairly well standardized, and so we can be certain about what would be required for the research to have been reviewed. (I will refer herein to ethics review in the United States; however, none of what I say below should be specific to the US and ought to apply to ethics review in most if not all countries that do such review.)

To submit a study for IRB review, researchers must first create a clear and complete protocol, describing the planned research in detail from start to finish. There is a scientific review of this plan, followed by an ethical review. The risks and benefits to subjects are evaluated and compared; ways to mitigate or respond to the risks or likely harms are required to be identified and prepared. If the intended subjects are members of a population at a heightened risk, the research can only be done if it cannot be done without involving that higher-risk population (for example, research on psychological states of incarcerated persons cannot be done on any other group, and so this research on the vulnerable group of incarcerated persons could be justifiable). If so, again means to mitigate and minimize the risks are required. These requirements of mitigation and minimization of risk take on an additional significance with at-risk populations, such that the researcher takes on an even stronger obligation to protect and (if possible) benefit the research subjects by the research (HHS Regulatory Requirements 1991).

In almost all research on human subjects, individual informed consent of the subjects is required. The Belmont Report, The Nuremberg Code, the Declaration of Helsinki, and the published guidelines for research by the National Institutes of Health all agree on several points: first, respect for the autonomy of subjects to freely choose, or not to choose, is essential to ethical research – and when subjects cannot consent, as in the case of

children or infants, or have material interference to their consent, as in the case of prisoners, extra special care must be taken to protect those subjects (see, e.g., *Belmont Report* 1979). For children and others unable to consent, the consent of an appropriate surrogate is required, but the study must also undergo additional scrutiny and meet additional obligations of protection; merely obtaining the consent of parents or guardians is not sufficient protection (HHS Regulatory Requirements 1991).

In very rare cases, research can be authorized in circumstances where neither a subject nor a surrogate is able to consent to the research. For example, research on emergency treatment of severe head trauma, or on emergency use of artificial blood products by ambulance EMS prior to admission to the hospital, cannot follow normal informed consent processes, as the time of the intervention precedes any point where an informed consent could be performed. These studies require significant extra effort to protect subject populations from participating in unwanted research (CFR 50.24, "Exception from Informed Consent for Emergency Research"). Even with this additional effort, a study can fail to adequately protect subjects, and additional analysis and preparations to reduce this risk are also required. All of these additional protections must be described in the research protocol so their effectiveness can be evaluated ahead of time. (This is relevant to Frankenstein's research for reasons that shall be made clear below.)

Informed consent is not morally grounded simply on a respect for subject autonomy and capacity for decision-making, though that is critical. Informed consent is also important at least in part because it is also agreed that researchers have an obligation to be beneficent, not just to society as a whole, but also (to the extent possible) to their subjects (Hanson 2016, 246). This is not an entirely non-contentious claim. Since a primary challenge of research ethics is often stated as the balancing of risk of harm to an individual subject with the hope of benefit to a population, it might be thought hard to claim that there is an obligation of beneficence to subjects, particularly in Phase I and II trials (where subjects should not normally expect to benefit from the trial).[2] But an appropriate understanding of beneficence and the role of respect for subject autonomy clarifies this while also helping to understand the obligations a researcher would have in Frankenstein's experiment.

[2] Clinical trials are slightly different depending on whether you are testing a drug, a surgical procedure, or a medical device, but they all operate with the same general structure. Trials start with testing on animals, where both the good and bad effects of the treatment are assessed. If those are promising, trials on humans begin with Phase I trials, where a small number of healthy subjects are tested to find the highest safe dose, and to see if there are unexpected side effects in humans. Phase II trials test that dose on affected individuals (that is, people with the condition that the treatment is meant to treat) to see whether it is actually effective in treating the condition. Only if the treatment passes a Phase II trial, which shows that it is at least somewhat effective in treating the condition, does it progress to Phase III trials, where the trial tests whether the new treatment is better than current treatments, or, if there are no current treatments, better than treatment with a placebo. So even a Phase III trial may not benefit a subject more than other treatments available. See, generally, https://www.nih.gov/health-information/nih-clinical-research-trials-you/basics.

Respect for autonomy, when one has a subject capable of autonomous decision-making, normally means enabling good informed consent for that person, followed by following the decision made. Beneficence, meaning doing what is good for another, is sometimes seen in opposition to autonomy; this is a mistake. What is good for one person in a given circumstance might not be good for another in similar circumstances. Thus, we allow that (for example) Jehovah's Witnesses can refuse blood transfusions as treatment where another person would agree to a transfusion. In both cases there is a medical benefit to be had, but that medical benefit is overridden by the religious harm in the case of the Witness. This recognizes that, in fact, it is not beneficial to provide a temporary health benefit of extending someone's life (even extending it for decades) if that extension comes at a loss of a crucial religious value – indeed, if the Witness is correct, this comes at the cost of a loss of an opportunity for unending happiness. The overall good for the Witness is determined by that individual's understanding of what is good. Respecting the autonomy of that adult person means allowing them to make the decision that promotes their good as they best understand it.

Therefore, the informed consent of a subject is a necessary part of understanding what is beneficent for that subject. Even subjects in Phase I research (where, again, they should expect no medical benefit from the research, and that research may have significant risk) can recognize their participation as a benefit to them, as when healthy participants in research do so in support of or in memory of a loved one with the condition being researched.

For those who are unable to consent, this is more difficult. For young children of Jehovah's Witnesses that are too young to consent to, or even assent to treatment, medically necessary blood transfusions ought to be required. Though an adult with a full understanding of what is good for her might autonomously argue that a blood transfusion is not beneficial to her, a child cannot. The child's Witness parents might argue that a refusal is best for that child based on their religious beliefs; but since a young child cannot have autonomous religious beliefs, beneficence to the child can only mean a recognized medical good. Respecting that child's autonomy can only mean helping to enable him to survive to develop autonomy (Wheeler 2015, and Gillon 2003).

IRB Review of Frankenstein's Research

Would Victor Frankenstein's research have met these basic requirements for ethical research? The text suggests it would not have.

Lack of Protocol and Prior Research

First, Victor Frankenstein has no previously prepared protocol to review. He is "bor[ne] onwards, like a hurricane, in the first enthusiasm of success" (Chap. 4). When creating the creature's partner, he notes that "During my first experiment a kind of frenzy had blinded me to the horror of my employment; my mind was intently fixed on the consummation of my labour, and my eyes were shut to the horror of my proceedings" (Chap. 19). This indicates that he began the research without a clear appreciation of where it might lead; quite obviously he has no clear research protocol, and no plan in place whatsoever for the

appropriate treatment of his subject once his research is complete. Even the briefest examination of the idea of his research entails that if it were successful, at the end there would be a subject there in need of care. Because he has no protocol for his research, he could not even begin a review process; if he could, it would have identified the need for protection of the subject of that research.

Frankenstein also skipped a common step in modern research that normally precedes IRB review but can inform it: trials on animals. He considers first creating an animal but rejects it: "I doubted at first whether I should attempt the creation of a being like myself, or one of simpler organization; but my imagination was too much exalted by my first success [discovering the cause of generation and life] to permit me to doubt of my ability to give life to an animal as complex and wonderful as man" (Chap. 4). Animal trials are nearly always required before human trials can begin, because what happens in an animal trial will, if all goes as planned, happen, *mutatis mutandis*, in human trials. Had Frankenstein done an animal trial, the results of his potential human trial would have been clear to him. A living animal created through an animal trial of the Frankenstein protocol will need food, shelter, care, and perhaps re-training in the basic practices of its own life. Knowing this, one would know that the same will likely be true of the human subjects of any future research; recognition of the need to protect the rights of the newly created human research subject would require some plan in place to protect that human.

As well, prior animal research provides for an analysis of the potential risks and benefits of the research. If it is indeed so monstrous to look upon the results of the experiment that the experimenter cannot even bear to see it, then that would be seen from the animal studies; the protocol could thus have been appropriately altered or rejected outright.

The protocol must not only be created from start to finish for review, but it must also be followed. It is not permissible to alter the protocol on the fly during the research or to do something different than what has been planned. If it turns out that the researchers need to do something different than what the protocol guides them to do, they must first submit a revision to the IRB that must be approved in the same way as the original protocol. So, when Frankenstein realizes that working with human-sized body parts is difficult because of the small size, and decides to make the creation larger, he is changing the protocol and would have to have further review:

> It was with these feelings that I began the creation of a human being. As the minuteness of the parts formed a great hindrance to my speed, I resolved, contrary to my first intention, to make the being of a gigantic stature, that is to say, about eight feet in height, and proportionably large. (Chap. 4)

It also appears that, because of this, he must use both human and animal parts for the creation, rather than only human parts as it seems he originally planned: "The dissecting room and the slaughter-house furnished many of my materials…" (Chap. 4). Of course, since he has no protocol and is urged forward with "a resistless and almost frantic impulse" as he pursues his goal, perhaps these should not be called changes to a protocol that barely existed; but if he had had a clear protocol at the beginning of his work these would be changes to it.

Further, if he were indeed using animal parts his research would also fall under the purview of an Institutional Animal Care and Use Committee [IACUC]. IACUCs normally review research using living animals to ensure adequate care is taken with the animals to "avoid or minimize discomfort, distress, and pain to the animals, consistent with sound research design" (PHS 2015). Of course, IACUCs assess research for animal welfare, rather than human welfare, and it is accepted by common scientific practice that the use and sacrifice of animals in research not intended to benefit them or beings like them can be morally permissible. As such, they assess research with an eye for different concerns than IRBs. Human subjects of research are protected in ways that reflect a higher moral value granted to humans, but IACUCs remain an important, if more limited, part in enabling the ethical conduct of research (PHS 2015).

IACUCs normally evaluate the use of living animals in research, rather than use of parts from animals already deceased, but they would still have a role in the evaluation of Frankenstein's use of animals. There would be no need to evaluate the care and welfare of the animals in life, as they died prior to their being included in the research; however, since this research would count as a xenograft of animal tissue into a human body, Frankenstein would need to confirm, as much as possible, that the "candidate animals are free of zoonotic and pathogenic agents, even if these agents are usually considered harmless" (McCarthy 1995). Of course, this is to be done "[t]o the extent possible within the state of the art," which in Frankenstein's time was virtually nonexistent, but care would now be taken to ensure the minimum of potential cross-species contamination (McCarthy 1995).

Protection of (Created) Human Subjects

It is not the existence of the created human but Frankenstein's rejection of him, and his denial of a request to create him a companion, that causes the creation to become a monster truly worthy of the title.[3] Good review of a protocol to ensure appropriate protection of the subjects that would result from such an experiment would have prevented the disaster that befell Victor Frankenstein's creation. The harm is done not by the research but by the rejection; I argue that this possibility would have been noted and avoided by a proper IRB evaluation of the research. The requirements for the protection of vulnerable research subjects give us guidance as to how this would occur.

Frankenstein's rejection of his creation is a failure to properly protect the human subject that, while it does not exist at the beginning of his research, is created by it. There are not currently regulations or clear guidance for IRBs on how to handle subjects created by research, although perhaps we will need to develop such guidelines. Currently, it is technically possible to create a human subject in research by performing research that creates (or creates and modifies) a human embryo. It is only because of restrictions on implanting those embryos that we do not currently have gestated and born created subjects of human research, and it is certainly possible that those restrictions may be changed at some point in the future. (One researcher in China has claimed to have

[3] The creation first learns rejection and anger, really, at the hands of others, but those others encounter him only because he is already rejected by Victor Frankenstein.

implanted two or three gene-edited embryos that were carried to term and born; he was jailed for violating a governmental ban. If true, this shows that it is possible and only being prevented by our decisions to do so [BBC 2019].) Analysis of Frankenstein's research may help educate that future IRB review; still, there is already guidance in current IRB processes to indicate what should be required when such beings are created.

While specific research guidance about creating a new adult human being does not yet exist, there are comparable kinds of research to guide what protection of human subjects might mean in a case like Frankenstein's research. The first is research on children. Since the result of Frankenstein's research is a human person with minimal ability to function in the world, his research would produce what is called a *vulnerable subject*. We may have limited guidance on created subjects, but there is guidance on research on vulnerable populations. Probably the most similar population is that of children, as Frankenstein's creation is adult in body but childlike in mind, including in his ability to learn.

Protection of children in research usually means only engaging in research with children when there is an expectation of benefit for the child subject, or unless the research involves at most a minor incremental increase in risk over the normal amount of risk that a child in similar circumstances, but not involved in research, would undergo (45 CFR 46.406-7). This is due to the requirement for beneficence as it applies to subjects too young to have values and worldviews that can determine what is of value to them, as was discussed in reference to Jehovah's Witnesses above. If they survive and thrive, children will generally develop autonomy as they age and grow up. We generally respect that ability by enabling the child to survive; thus, research on children that involves any significant risk must contain some realistic chance of benefit to the child. This is a guideline, and some low-risk research can be done that is not expected to provide direct benefit to child subjects; but the goal is avoiding harm without corresponding benefit, as much as possible. This is not only a concern of beneficence to the child subject, but also a means of respecting their developing autonomy.[4]

In Frankenstein's research, the research ends (as does much research on children) with a subject not yet capable of exercising autonomy. Under normal circumstances, a researcher does not retain responsibility for supporting subjects after a scientific study (including education and emotional support), but this is not a normal circumstance. As he has created the creature entirely through the study, and the creature would not exist without this research, and there is no one else to whom the creature's future autonomous development can be entrusted (unlike cases where children with parents or guardians exist), then in this rare sort of case, the researcher does have an additional burden of supporting the potentially autonomous being created by the research.

[4] Assent is also an important means of respecting autonomy in research on older children, but as assent must be given before research begins it does not have relevance to this discussion of research subjects that are created during the protocol.

Since, as noted, there is a (very) limited amount of research that creates non-autonomous but potentially autonomous beings, this claim will need argument. Further, analysis of the ethics of a research protocol that creates a being in need of support and protection, as opposed to research that begins and ends with vulnerable subjects, is necessarily going to involve some speculation and assessment of hypotheticals. However, it can be argued that proper ethical analysis of a protocol like Frankenstein's would require long-term follow-up protections.

A similar real-life example exists, wherein the requirement to protect and support the resultant vulnerable subject was recognized by some of the researchers. The example I have in mind is that of Roger Fouts and Washoe the chimpanzee (Fouts 1998). Having experimented on Washoe the chimp in order to teach her language by raising her essentially as a non-vocal human, and thus having created a chimp with capacity for signing but without the real capacity to live in the wild as a chimp, Fouts concluded that he had a responsibility to continue to provide for Washoe's care and development. He could not just use this research to publish and leave her; he argued that he had an obligation to the subject of the research who has, in a very real way, been created by that research. (One might note that Washoe, far from becoming a dangerous adult chimp as was predicted and as has often occurred with chimps raised from infancy by humans, settled into a relatively peaceful and comfortable life interacting with both chimpanzees and humans, until her death at age 42 in 2007 [Friends of Washoe 2023].)

If Frankenstein were doing ethical research, he would have had to plan and provide for the protection of the vulnerable research subject that he was creating. Whatever else would have occurred, the creation could not have been abandoned and left to discover a cruel world on its own. Frankenstein did unethical research; and had he not done so, the results would not have been a horror novel.

"It's Pronounced 'Fronkensteen'": Mel Brooks's *Young Frankenstein*

This may be seen more clearly through an analysis of a comparable "study" that, though still not done in an ideal fashion, is significantly more ethical in its approach to human subjects. The "research" performed in the 1974 movie *Young Frankenstein* manages to right many of the wrongs in the Frankenstein story, which leads to a much better result. (Brooks 1974).

Young Frankenstein is a parody of the 1931 Boris Karloff *Frankenstein* movie and other horror films of that era. Thus, though it is well-grounded in American cinema, it at best plays fast and loose with Shelley's story. But interestingly enough, it is a movie that works well as a spoof and also works tolerably well, a few necessary nonsense bits aside, as a decent telling of the *Frankenstein* tale. The story goes as follows: Frederick Frankenstein, the grandson of Victor Frankenstein, is attempting to live down the heritage of his grandfather and his research while also being a skilled surgeon. He receives an invitation to his grandfather's old castle, where, after some missteps with a candle and a rotating bookshelf, he discovers a copy of his grandfather's notes in book form (titled "How I Did It") and things go more or less as one would expect a parody to after that. He reads the notes, concludes it would be possible to create life, and conducts the experiment following

his grandfather's plan. In a set containing many of the same items as the 1931 film, he puts together a body out of cadavers, inserts a brain, sends it to the roof in a lightning storm and successfully ends up creating a living human out of dead tissue. Since he unintentionally implanted the wrong brain into his creation (instead of the brain of "Hans Delbruck: Scientist and Saint" he ends up with the brain of "Abby someone…. Abby Normal!"), things go wrong and hijinks, as they say, ensue. Unlike Victor Frankenstein, though, Frederick never stops trying to help his creation to become healthy and blended into society. At the climactic point of the movie, he performs another procedure, at some risk to himself, to fix the brain and make the creature, in his words, "right as rain." It works, the riot that ends the 1931 *Frankenstein* is averted, and everyone lives happily ever after.

What is interesting is how some of the differences between this movie and the novel result in Frederick Frankenstein performing more ethical research. The first is indicated by his discovery of the book. Frederick is following a research design wherein he knows what is likely to result. It is not created like a good research protocol, and studies with only one subject do not tend to pass scientific evaluation, but at least he begins with a relatively complete understanding of the process from beginning to end in this book. He begins the research with a clear understanding of what is supposed to happen and what, if it succeeds, will result. This is not quite the same as submitting a protocol for IRB review; but in comparison, this approach allows him to have a clear plan from the start and to avoid (some) surprises later in the research.

By using his protocol, Frederick can also plan for the results of his research, a living being with limited initial mental and physical ability. He expects a person with a genius-level and altruistic brain, but also expects that there will be developmental issues. From the beginning, he is prepared for the results of his research and is able to plan for possible setbacks. Thus, he does not react poorly on seeing his creation. Frederick greets his creation with affection and guidance, assisting him in taking his first steps. Though Frederick hopes that his creation will have a largely positive reaction to him, he is prepared with sedatives and is able to restrain the creature after he reacts badly to a flame. The creation's fear of flame is a silly plot device (admittedly borrowed wholesale from the 1931 film) repeated several times, and yet Frederick is prepared for that and other setbacks.

When the creation functions more poorly than expected (due to a protocol violation[5], also borrowed from the 1931 film, wherein an abnormal brain is substituted for the healthy one the protocol planned for) Frederick still holds to a strong responsibility to his created subject, assisting him in the development of his motor skills and other necessary skills for survival in society. Perhaps most importantly, he shows exactly what Victor Frankenstein failed to show at a similar point in his research. Frederick is terrified of his own creation, and yet he goes to great lengths to accept him. After the creation returns from being frightened by and frightening the general public, Frederick holds him close and tells him, "You are loved…" and "You are not evil; you are good." The fatherly concern that Victor refused his creation is given explicitly to Frederick's.

[5] "Protocol violation" is the term used to describe any time a researcher does something to a subject (intentionally or otherwise) that is not described by the protocol submitted for review.

In Shelley's *Frankenstein,* even at the end the creation knows that he had a "heart fashioned to be susceptible of love and sympathy…" (Chap. 24). It was not in the creation where the error lay but in the ethics of the creator's behavior towards his creation. The creature believes that, had his incipient goodness been nurtured, he could have been a good person. It was only after rejection that he made the active choice to inspire fear. Victor Frankenstein failed to properly treat the subject of his experiment, and from that came disaster. Frederick Frankenstein, by caring about the subject that resulted from his experiment, avoids disaster.

Conclusion

One can read a meaning into a novel, and a novel read in as many times and places as *Frankenstein* may well have as many different meanings. So rather than conclude that this is the meaning for all times of the story of Frankenstein, let me rather suggest that this is a good lesson for our time from the failures of Victor Frankenstein. We have, in some ways, been "reanimating inanimate human tissue" for as long as we have had cardiopulmonary resuscitation, organ transplants, and open-heart surgery; though this is not Shelley's creation of life, it is the preservation of it when previously death was unavoidable. The creation of human/animal chimeras for the creation of human organs for transplant, or other reasons, closely resembles Shelley's charnel- and slaughter-house creation, especially if the creatures' brains are intentionally or unintentionally 'humanized' by combining human and animal brain cells. Similarly, the creation of "human brain organoids"(three-dimensional cellular structures that can resemble a developmental human brain) may require that we consider caring for the conscious creations of our research sooner than we think (Koplin and Massie 2021). As we research (and perform regularly as standard of care) things that would truly have shocked, amazed, and probably terrified Shelley herself, we may gain less from worrying about the places scientific research ought to avoid, and learn more from considerations of how to do it well.

References

BBC News. 2019. "China jails 'gene-edited babies' scientist for three years." Dec 20, 2019. https://www.bbc.com/news/world-asia-china-50944461. Last accessed May 4, 2023.

Beecher, Henry K. 1966. "Ethics and clinical research." *New England Journal of Medicine* 1966, 274: 1354.

Cambra-Badii, Irene, Elena Guardiola and Josep-E. Baños. 2020. "The Ethical Interest of *Frankenstein; or, The Modern Prometheus*: A Literature Review 200 Years after Its Publication." *Science and Engineering Ethics* 26: 2791–2808.

Davies, Hugh. 2004. "Can Mary Shelley's Frankenstein be read as an early research ethics text?" *Medical Humanities* 2004, 30: 32–35.

"Exception from Informed Consent for Emergency Research," n.d., *21 Code of Federal Regulations* 50.24.

Fouts, Roger, with Stephen Tukel Mills. 1998. *Next of Kin: My Conversations with Chimpanzees.* William Morrow.

Friends of Washoe. "Washoe." 2023. http://www.friendsofwashoe.org/meet/washoe.html. Last accessed May 1, 2023.

Gillon, Ranaan. 2003. "Four scenarios." *Journal of Medical Ethics* 2003, 29: 267-268.

Hanson, Stephen S. 2016. "Consent." *Macmillan Interdisciplinary Handbooks Philosophy: Medical Ethics.* MacMillan Publishers: 244-260.

HHS Regulatory Requirements for Research Involving Children Described in Subpart D. 1991. https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/common-rule-subpart-d/index.html. Last reviewed, March 12, 2021. Last accessed May 4, 2023.

Koplin, Julian, and John Massie. 2021. *Journal of Medical Ethics.* 2021, 47: 567-571.

McCarthy, Charles R. 1995. Ethical Aspects of Animal-to-Human Xenografts. *ILAR Journal*, 37(1): 3–9. https://doi.org/10.1093/ilar.37.1.3

National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. 1979. *Belmont Report*: *Ethical Principles and Guidelines for the Protection of Human Subjects of Research.* https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/read-the-belmont-report/index.html. Last accessed May 4, 2023.

Pappworth, Maurice H. 1967. "Human guinea pigs: *Experimentation in man*." Routledge and Kegan Paul, 1967: 242.

Shelley, Mary. 1818. *Frankenstein; or, The Modern Prometheus.* https://www.gutenberg.org/ebooks/84. Last accessed May 10, 2023.

United States Department of Health and Human Services. 2022. "NIH Clinical Research Trials and You." https://www.nih.gov/health-information/nih-clinical-research-trials-you/basics. Last accessed May 26, 2023.

United States Public Health Service [PHS]. 2015. PHS Policy on Humane Care and Use of Laboratory Animals. https://olaw.nih.gov/policies-laws/phs-policy.htm. Last accessed May 26, 2023.

Wheeler, Robert. 2015. "Why do we treat the children of Jehovah's Witnesses differently from their adult parents?" *Archives of Disease in Childhood* 100: 606-607.

Young Frankenstein. 1974. Dir. Mel Brooks. Perf. Gene Wilder, Terri Garr, Marti Feldman. 20th Century Fox. Film.