



Frankenstein

FRANKENSTEIN
MARY SHELLEY

**ANNOTATED FOR SCIENTISTS,
ENGINEERS, AND CREATORS
OF ALL KINDS**

EDITED BY
DAVID H. GUSTON, ED FINN, AND
JASON SCOTT ROBERT

John
Ferry
Stein

**FRANKENSTEIN
OR, THE MODERN PROMETHEUS**

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CHANGING CONCEPTIONS OF HUMAN NATURE

JANE MAIENSCHIN AND KATE MACCORD

Aristotle

Frankenstein is a bit like the proverbial elephant, with all those blind men seeing different things as they touch the trunk or tail or skin. Viewers read Mary Shelley's novel and see many wildly different things. The nearly fifty million Google hits for the word *Frankenstein* exceed the number of hits for the word *Macbeth*, suggesting the popularity and staying power of this text. Here we ask what the story tells us about conceptions of human nature and how those conceptions have changed over time.

While we are looking back two hundred years, let us look back a couple of millennia more. In the fourth century BCE, the Greek philosopher Aristotle set the stage for thinking in terms of "monsters" as deviations from the normal essence of a species. As a keen observer of nature, Aristotle also recognized that individuals go through a development process that unfolds over time. Both of these themes are important for Mary Shelley.

First, about the idea of an essence for a species, or essentialism: Aristotle was convinced based on what he could observe that the world consists of different types of organisms. Each organism falls into a particular species type, in our case the human type. For Aristotle, each type has four causes that make an individual: the material cause provides the substance; the formal cause provides a plan that determines the shape; the efficient cause involves the construction process that make the material the right shape over time; and the final cause makes an organism come alive as it actualizes the potential for life (Lawrence 2010). These causes require time to interact, meaning that an organism can become recognized as a member of its natural type only at the end of the *process* of generation.

In addition, all living organisms also have what Aristotle called a vegetative soul (which makes it alive); animals have locomotory souls (which allow them to move around); and humans have rational souls (which give us reason and emotions). Aristotle's idea of soul was not religious, but it was part of his attempt to explain how something could look exactly the same one minute when a person was alive and different the next minute when the person is dead. Aristotle explained the difference in terms of the action of the final cause and the soul (see Aristotle 1943).

Second is Aristotle's recognition that making something alive requires time. It involves a developmental process to bring all these causes and factors together. Much later the Catholic Church added the idea of "hominization" to indicate the moment when a person becomes alive as a human being. Aristotle would have insisted that becoming alive does not happen at one moment but rather only as a process over time. Several millennia of thinkers have agreed with Aristotle on this point, which remains, at its heart, the best understanding of development.

Victor Frankenstein and His Creature

Like other intellectuals at the beginning of the nineteenth century, Mary Wollstonecraft Shelley lived in the shadow of Aristotle. The period later named the Scientific Revolution (approximately the sixteenth through the eighteenth centuries) sought to replace parts of Aristotelian natural philosophy with materialism, empiricism, and experimentation. Materialism emphasized the importance of thinking in terms of material and the roles of matter in motion as causing what happens in the world, including life. Materialists rejected, for example, the idea that there is some special life force and maintained that living organisms are made of matter that changes over time. In contrast, vitalists believed that there is some kind of vital or life force that makes things come alive—that it takes a life force to make something a living organism rather than a hunk of clay or other material. Through these new explanatory frameworks, people began to explore the living world and ask what causes life to appear in the first place and then continues to make something alive rather than dead.

Those various attempts to understand life obviously influenced Mary's thinking. Empiricism and experimentation called for people to try things out—that is, not just to rely on past knowledge or what can be learned from books but to look for ourselves. Victor Frankenstein embraces the call for experimentation.

Yet Victor seems not to have had a clear view of what makes life happen or about human nature. For some thinkers, such as Paracelsus, among those who were called the iatrochemists of the seventeenth century, life requires a particular chemical interaction. For others, electricity imparts life. Still others thought that heat is the driving factor. Some believed that life arises through some form of unexplained spontaneous generation. Or perhaps there is some other life force that drives material to become animated or alive. Although Victor seems not to have a clear view about what it is that causes life, he is driven by a conviction that he can make a

creature and cause that creature to acquire whatever it takes and thereby to become alive. He wants to create life, and Mary uses the term *create* quite consciously (Westfall 1977, 82–104).

We are just as fascinated today as Mary’s contemporary readers would have been about what it takes to make material come to life and what makes up what we think of as human nature. Today scientists often point to something about the way cells in embryos divide to produce more and more cells out of an initially fertilized egg. Those cells contain nucleic acids, which seem to be essential for life. Strands of deoxyribonucleic acids (DNA) replicate themselves in ways that allow cells to divide and multicellular organisms to grow and develop over time. We continue to think of life as having a material basis. Perhaps unlike Mary’s Victor, we know much more about what makes something alive, and we also realize how much more we do not yet know.

What Makes the Unnamed Creature a “Monster”?

In Victor’s creature, we are introduced to a conundrum about human nature—What makes a monster? Is it physical appearance? This is a strong possibility; after all, the creature is bigger and stronger than the people it encounters and “endowed with a figure hideously deformed and loathsome” (p. 98). In Aristotle’s parlance of causes, we could read within the creature an interrupted set of formal and efficient causes—that is, an interruption in the plan and the construction of the material that makes a shape.

Maybe it behooves us, however, to look a little deeper at the nature of this creature’s putative monstrosity. Although physically aberrant, he is constructed from human parts and so is endowed with some level of humanness, at least in the material sense. And although the people whom the creature encounters recoil from his physical appearance, his form is recognizable as that of a man rather than that of some other type. In this sense, he has the essence or “nature” of a human.

What about the creature’s rational “soul” or his intellectual faculties, which also include emotion and sensations? Are his deficits here what makes him a monster? This is another strong possibility. He displays behaviors that challenge his contemporaries’ moral sensibilities—violence, vengeance, and murder. But these acts are also committed by many people to whom the label *monster* might not apply.

To delve a bit deeper into the monstrous nature of Victor’s creation, let’s return for a moment to Aristotle. Recall that as generation unfolds, the four causes interact to give rise to a fully realized organism of a particular

type. That is, a person is a person and has the nature of a human in particular only because of the *process* of development.

Why Development Matters

Let's take a moment to consider the importance of there being a process of development and why this matters for the creation of a monster and whether he can become a human person without appropriate development. Throughout his monologues to his creator, the creature explains that he had no parents to raise him and that he had to pick up his morals through stolen conversations and observations. Victor carried out his experiment and then ran away from it, leaving the mind and behavior of a newborn bound within an adult body. Victor made the fatal mistake of failing to understand that producing a life, in the sense of a fully and properly functioning living human, requires development. Babies do not know what is right and wrong; they have to learn about morals as well as about how to walk and talk and ride a bicycle and read a book and such things. Aristotle knew this. Yet some of the enthusiastic materialists of the Scientific Revolution thought that material and material forces might be enough. It is not clear whether Victor or Mary learned the lesson that development matters or fell for the illusion that matter is enough.

Mary surely wants us to see that Victor oversteps the bounds of proper science and medicine with his experiments. The morality tale suggests that we humans should not try to overreach and create novel beings. We are, it seems, likely to get it wrong and create a monster.

Yet perhaps this is not the right conclusion. Perhaps instead we should note that Victor himself also lacks a proper education that has developed over time. He does not develop his understanding of the world in a systematic way. He seems to jump from one passion to another. At first, he enthuses about some texts that appeal to him, only to discard them and embrace others. Then he seeks teachers and learns from them but also pursues his own secret agenda. We do not get a clear sense of why but might interpret that, like the creature he produces, Victor also fails to develop appropriate feelings and rationality about the world, including a feeling for proper scientific experimentation and what it can or cannot tell us.

The point here is that the moral of Mary's tale is not simply restrictive—that is, “do not mess with creating life”—but also instructive—that is, be aware that organisms, especially humans, require time and particular stimuli to realize fully the norms of their species.

Normal and Aberrant Development

For Aristotle, the four causes interact throughout the generative process, giving rise to an adult of a particular type. Type (in our case, being human) is thus the outcome of a regular process of generation. What, then, is the outcome of an interrupted generative process? And how have people understood this interrupted generative process through time?

There are two points to consider here: type and deviation from the regular process of development (i.e., the normal way in which something achieves a type). Within the Aristotelian worldview, a type is a natural unit, and its members are endowed with particular features that make them recognizable as belonging to that unit (so long as they go through the regular course of development). In Aristotle's estimation, types are essential—that is, they are constituted by sets of attributes that make their members fundamentally what they are. Essence defines the type but also defines and gives rise to the organisms within a type.

Let's look at the idea of type a little bit more closely. The type concept persisted long beyond Aristotle. Just as Aristotle had done, natural historians of the seventeenth through the nineteenth centuries sought to make sense of and to order the natural world. This ordering often required recognizing distinctions between organisms and grouping them into neat, tidy types.

In Aristotle's estimation, types are unchanging entities, but by the time Mary wrote *Frankenstein*, the concept that species are fixed had begun to be challenged. Part of this challenge came from recognizing that the environment can affect an organism throughout the process of development; the other part involved understanding that these changes can be passed from one generation to the next. These two pieces of the puzzle became the basis for evolutionary theory: Darwin understood them but had no way of knowing how changes during development could be passed on; this understanding would not come until the twentieth century once the process and material nature of inheritance were understood.

In Mary's time, deviation from the regular process of development was understood to create monsters. In the early nineteenth century, for instance, Johann Friedrich Meckel (1781–1833) spent the majority of his career looking for and describing embryological aberrations (O'Connell 2013a). To Meckel, these monstrosities could be explained on the basis of interrupted development. They were recognized by their deviations from the norms of development (i.e., their nonadherence to the norms of the human type). What's more, these monsters, according to Meckel,

represented arrests of development in which the embryo or fetus was stuck at a stage representing a lower organism in the animal kingdom (Meckel was a proponent of the idea that development is a readout of evolutionary history long before Ernst Haeckel [1834–1919] offered his famous recapitulation theory) (Barnes 2014b; O’Connell 2013b). In this system, an interrupted generative process creates a transgression of types.

Theories of deviation from the normal type and altered developmental processes were co-opted in the later nineteenth century by some scientists seeking to explain both development and evolution. For instance, Edward Drinker Cope (1840–1897) and Henry Fairfield Osborn (1857–1935) understood there to be tooth types that organisms could move between throughout evolution. This move, according to Cope and Osborn, was brought about by changes in the organism’s developmental trajectory (Barnes 2014a). In this later context, types and movement between them became not so much about monsters but about evolution.

And in Conclusion, Was the Creature Human?

A human, according to Aristotle, is a being of the human type. It is a creature that has gained the proper form and has followed the proper course of development (both physically and rationally/emotionally) for the human type. According to Aristotle’s estimation, then, Victor Frankenstein’s creature cannot be considered a human. We agree.

Victor wants to see the creature as human; after all, he went through the arduous process of gathering human materials and conducting the experiments necessary to (re)create life. But in the end Victor doesn’t want to do the proper developmental work—he abandons his creation, leaving him in an incomplete state of development. In Aristotelian language, Victor disturbs the formal, efficient, and final causes, leaving the creature with an ill-formed body and mind of material cause alone.

What if we abandon the Aristotelian framework of the four causes and focus on the ways in which others among Mary Shelley’s contemporaries explained life? Let’s return for a moment to the materialists. For a strict materialist, the only thing necessary to designate something as human is that it be constructed of the proper matter. Because process isn’t an issue here, a pure materialist may well deem the creature to be human. However, very few people have ever been strict materialists in this sense. Material alone is not enough. A much more common view was that of the mechanist materialist, who required both that the proper material be present and that this material be in motion in the correct way. Such a thinker would

not see the creature as human. The mechanistic aspect requires process, and the motions of material must be started and continued in the right way.

In closing, let's consider a modern implication of one question *Frankenstein* raises for our views of human nature. Being a human means being of the human type, which requires both the form of the matter and also the process of its development. Only when the matter and process are achieved together in the proper way can an individual's humanity be achieved. The concept of personhood carries additional social interpretations and is ultimately defined through social convention, yet in our view personhood requires at the very least being fully human in the sense of form and development.

We recognize that there are many different opinions about what can and should be counted as a person. Yet development is crucial, and material alone is not enough. Genes and inherited material are not enough. In this light, personhood, or the designation of a being as a person, can be conferred only once the process of development is sufficiently complete. Determining what counts as sufficient to count as a person is a social issue. Biologically, what counts as a human being is the ability to live independently, with "living" defined according to the best scientific and medical standards of the day.

To look more concretely at a topic of current interest, some people claim that embryos have personhood and should be given the legal rights of a human being. In the sense of humanity or personhood explained here, this definition would be an inaccurate assessment of embryos. Embryos are materially of the human type, but they have not yet gone through the process of development and are not yet persons in this sense. Some people like to suggest that embryos are potential persons in that they might, under the right circumstances, become persons. Or to put it biologically, perhaps an embryo or a "monster" that is not a fully formed human might be taken as having the potential to become a human being. But potential is not actual. Most of us have many potentials that we never put into action. It does not make sense to act as if every one of us is already an Olympic star or concert pianist or math genius just because we may each have the potential to become these things. It is the actual that matters. The creature is not an actual human in that he has not developed fully. Even after two centuries, Victor and his not-human creature help inform our understanding of human nature.

