

MAKING NATURE AND DREAMING NATURE

for the Honors Program's Human Situation course on NAMING NATURE AND HUMAN NATURE

A Dialogue between
John Lienhard (Mechanical Engineering and History)
And James Pipkin (English)

CONTENTS

PART I, Tuesday, February 20, 1990

PART II, Thursday, February 22, 1990

A Time Line for the dialogues

A Bibliography

Part 1, February 20th:

John: Well James, John Bernard said his class was studying the late 1700's and early 1800's. He said they were working on the period after the peak of the Industrial Revolution. He asked me to talk about technology, and about the response to nature, during those years. That assignment brings up matters you know far better than I do. That's why I asked you to come and talk with me. To get the ball rolling, I'll tell you something I believe about human nature. I believe that: We are what we *make*.

Jim: "We are what we make." Perhaps we are. But before we come to quick agreement, consider this proposition: We are what we *dream*.

John: What we make or what we dream! Do you suppose those could be two ways of looking at the same thing? After all, you can't make a new thing until you've made a mental picture of it. If that's what you mean by a dream -- then we mean the same thing.

Jim: Not if what you have in mind is only a kind of blueprint. What bothers me about your mental picture is that it sounds too mechanical. To dream means to relax or to suspend whatever is mechanical, or logical or prudent. The world the Romantic poets inhabited is a state of mind they often called *reverie* -- twilight zone or border region between waking and sleeping. William Blake called the products of this world of reverie, "sublime allegories." Are your mental pictures ever "sublime allegories" -- symbols of things that might be?

John: I haven't been in the habit of calling them that. But I'm easy, why not! An invention -- even a mechanical one -- is a *synthetic reality*. Can't I call *that* an allegory?

Jim: I now begin to see the whole in your argument.

John: What!

Jim: No, John, that's W-H-O-L-E. Dreaming does create a synthetic reality. By that I mean, when we dream, things come together. More to the point, we as human beings come together in the act of dreaming. To dream is to see and to become. Take, for example, those dreamlike experiences William Wordsworth recalls in *Tintern Abbey*. He describes them this way:

*... that blessed mood,
In which the burthen of the mystery,
In which the heavy and the weary weight
Of all this unintelligible world,
Is lightened -- that serene and blessed mood,
In which the affections gently lead us on --
Until, the breath of this corporeal frame
And even the motion of our human blood
Almost suspended, we are laid asleep
In body, and become a living soul;
While with an eye made quiet by the power
Of harmony, and the deep power of joy,
We see into the life of things.*

It's clear Wordsworth is dreaming, and that he's dreaming nature. He dreams and an unintelligible world -- a nature filled with dead, lifeless objects -- becomes alive -- a nature animated by the life of things. It may be less obvious, but he's also dreaming himself. These dreamlike visions are the dawning recognition of his imaginative power, and they foster what he calls "the growth of a poet's mind." He dreams and then becomes what he dreams. He dreams himself a poet.

Yes, John. The more I think of it, "synthetic reality" is an interesting notion. The world the Romantic poet dreams is synthetic. It's something other than, or more than, the natural. William Blake "Where man is not, nature is barren." The Romantic poets set out to humanize nature, to dream and make it in ways that "wedded" it to us and gave it significance to our lives. John, is this romantic version of a synthetic reality similar to the engineer's version of a synthetic reality? Are the engineer's pictures of the mind primarily a response to nature, a Lockean ratio of what his senses bring in? Or are they images fired in the forge of desire, efforts of transcending nature, or of seeing the infinite in all things?

John: Let me answer that with a personal story. When I took my first teaching job, I knew that part of what young professors are supposed to do, is research. But I didn't begin by writing proposals. I began by going down to the park, late at night. I'd lie on a picnic table, and I'd gaze at the stars. There, "While with an eye made quiet by the power of harmony, and the deep power of joy," I really did see into the life of things.

I could hardly have chosen a better way to start working things out. I suppose that really *was* a way of seeing the infinite in things. The things we *make* may be finite. Railroad tracks only *seem* to run off to infinity. But you're right, we *conceive* the things we make. And we *conceive* them in perfection, even if they're invariably flawed when they come out of our imaginations, and enter the world. In *execution*, all art and skill is bounded.

On the other hand: What impetus hurled Chartres Cathedral into the French sky? The dream may have been built from mere ratios of sense-data. But the cathedral *builders* saw themselves as cast in the image of their infinite God. They even called Him, *the Master Craftsman*.

Jim: God may be a master craftsman, but the Romantic poets ask that we free ourselves from habit and custom, and re-examine the "nature" of what he has crafted. For example, if we want to use the "argument from design" -- that is, if we want to infer what God is like by studying what He has made, his creation -- we often find that he has crafted what William Blake calls a "fearful symmetry."

People may imagine God as a clockmaker or as the unseen author of the "book" of nature. But Blake wrote, "The roaring of lions, the howling of wolves, the raging of the stormy sea, and the destructive sword are portions of eternity too great for the eye of man." This is the God that the romantic poets sometimes dreamed of. He is a *sublime God* who inspires the mental pictures you referred to, but, to be sure, they are *sublime* pictures. This is a God we know *when* we beat against the bounds and barriers of reason and habit and custom. What I'm arguing, then, is that if God *is* a craftsman, his craft is sometimes to speak to us in dreams.

John: The Blake in your quotation *observes* a wild and harsh nature. The God it *reveals* to him seems pretty distant and unknowable. He celebrates, as I think you suggested, not a learned truth but the *numen*. He celebrates what is unknowable. He celebrates that face of God which stirs awe -- which stands apart from us.

Medieval engineers saw a simpler meeting between man and God. The Virgin -- the female principle -- mediated between them and their God. She made Him understandable in human terms. The idea that we're cast in God's image was clear and accessible to them. Maybe you can help me with this: Maybe Blake reflects the changed animus of the changed technology that came *out* of the 18th century. What happened to us and to our dream-turned-machine, to produce Blake, or Scott or Wordsworth? What happened to set us at such arm's length from God?

Jim: We do sometimes feel at arm's length from God, and if we do, it's because we're sometimes arm's length from nature. The Romantics believed the world was once *animated* by a kind of religious imagination, but when they look at the landscape, that religious imagination isn't there anymore.

Wordsworth laments, "Whither is fled the visionary gleam? Where is it now, the glory and the dream?" That animating imagination we call religion can return, but the poet must supply it. Coleridge writes,

*... we receive but what we give,
And in our life alone does Nature live;
Ours is her wedding garment, ours her shroud!
And would we aught behold, of higher worth,
Than that inanimate cold world allowed
To the poor loveless ever-anxious crowd,
Ah! from the soul itself must issue forth
A light, a glory, a fair luminous cloud
Enveloping the earth --
And from the soul itself must there be sent
A sweet and potent voice, of its own birth,
Of all sweet sounds the life and element!*

William Wordsworth also understood that this was the task of the artist: to add "the light that never was, on land or sea, the consecration and the poet's dream." If the world is to have a sense of wonder or magic, we must project it. We must make nature; we must dream nature.

John: Something about this God of the Romantic Poets is very far from the God of the dream-driven medieval engineer. He still saw himself as the image of a personal, often female, God. His God sustained him and spoke to him. Now you speak of a vision of the poet-made-God, or the technologist-made-God, that veers awfully close to Nietzsche or Ayn Rand. Maybe the best way I can ask you to explain this idea is to ask where you think it came from.

Jim: It comes from a crisis in culture. The revolutions at the end of the 18th century -- political revolutions, industrial revolutions, social revolutions -- have their origin in the collapse of reason and rational explanation that occurs at the end of the era that we call the Enlightenment. As the old certainties of Rationalism fall, the philosophical and metaphysical implications are profound. Poets and thinkers can no longer be certain of Divine laws or natural truths. As a result, they live in a world where fact and value have been sundered. They can no longer accept that reality is fixed, universal, and absolute. Poets such as Wordsworth conclude that reality is both "what [the senses] half create and what [they] perceive."

Internalization becomes a key concept as the writer increasingly suggests that the ultimate source within. We can see this if we just look at the images the poets use. The poet's imagery suggests that reality (or God) is not so much "out there and up there" as it is "in here and down here." The poet's response to nature (what he dreams and makes) is driven by these realizations.

John: You know, your collapsing "world of reason" was in many ways the world of the clock. When that ultimate rationalist, Thomas Jefferson, said, "We hold these truths to be self evident..," he mirrored the 18th-century notion that you could set down a mechanism -- a scheme of things -- and all truth would flow from it. Euclid with his self-evident axioms was the God of the rationalists. The clockwork world of reason certainly was caving in the late days of the 18th century.

Let me mention another way the clockwork world was dying. It's not widely understood that another force rose up in the mid-18th century. That force was feedback control -- the idea that the universe is self-correcting. Feedback turned up in machines like Watt's flyball governor. It turned up in the fantail device that kept windmills pointed into the wind. Those machines all had an entirely new ability. They could read nature and correct themselves. That was one of the most significant late 18th-century changes in the way we saw our machines.

In fact, that very same concept emerged from another quarter at the same time. It turned up in David Hume's and Adam Smith's economic theories. Those theories were the revolutionary answer to the clockwork regulation of mercantile economics. More than that, Watt and Smith, Smith and Hume, were friends.

The feedback concept gave nature a kind of freedom to act in the affairs of men. The Rationalists hovered on the edge of replacing God with their own intellect. Now economists and technologists seemed to be saying that we can replace God with the forces of Nature!

Jim: The Romantics didn't think they were *replacing* God. They felt they were *discovering* God -- sometimes in nature, but more often in the human imagination. Certainly, they were skeptical about the existence of the natural or divine laws associated with Newton's clockwork world. They also rethought traditional religious ideas in light of the changing world in which they lived. The orthodox Christian view is that we can be redeemed by Christ.

But the Romantic view is that we can redeem life by *being there*. That is, by making nature, or dreaming nature, we project meaning and significance onto the world around us. The mind is no longer conceived as a mirrorlike recipient of an already created universe. The mind has the power to create the universe. Thus Coleridge can refer to the poet as "a dim analogue of God."

John: James, you've pulled a trigger in my mind. I find that as you've spoken, I've continually been referencing back to the medieval engineer. Now I think I see why. A moment ago you quoted Coleridge:

... from the soul itself must issue forth a light,
a glory, a fair luminous cloud enveloping the earth --

That's eerie stuff -- a belief that God, that the *light*, issues from the human soul. But the poet seeing himself as a "dim analogue of God" is such a powerfully *Platonic* idea.

Six hundred years before the rise of medieval technology, the African Saint, Augustine, converted from Neoplatonism to the competing religion of his 5th century Hellenistic world. He went over to *Christianity*, but he brought his Platonism along with him. He used Platonic thinking to write the language of medieval theology. For Christians in the year 1000, God and His Heaven were the one Platonic reality. The surrounding world was an illusion. For them to say that we're made in the image of God was to say that we're a crude imagining of reality.

I believe you quoted Coleridge as saying: "from the soul itself [rise] life and element!" It seems to me he's saying that the human craftsman is a dim analogue of God the Master Craftsman. The act of invention fulfills the Platonic ideal. It is the manufacture of a synthetic reality -- a perfect machine that lives in the mind before it's manifest in the world. Of course, invention isn't complete until that perfect machine casts its shadow onto the unreality of the world around us. The machine is, in that sense, born in the dream you speak of.

All that began changing as people rediscovered Aristotle in the 13th century. Now, once again, they began dealing empirically with nature. Now understanding began, not in our minds, not in our dreams, but in our direct response to nature. By the 16th century, the NeoAristotelians were firmly in the driver's seat. Over the next 200 years, it was they who built the Industrial Revolution. Galileo and Newton surely represented the mind-driven science of the Neo-Platonist, but they were also ambivalent. They'd both lash out at the rising empiricism and Aristotelian ideas in the world around them. Yet they both made powerful use of it.

You're describing what sounds to me like a return to Augustine's Neo-Platonism. Maybe you're describing a reaction to a world that's responded too simply to nature. Perhaps you're describing, a counter-revolution.

Jim: Yes. The Romantic revolution was a counter-revolution, but it was more complex than the thesis-antithesis of Platonism and empiricism suggest. Certainly, the Platonic is a strong impulse in Romanticism. It was imported to England from Germany in the form of Kant and Continental idealism. We recognize it in Percy Shelley's concept of Intellectual Beauty. "The awful shadow of some unseen power," he tells us, "floats though unseen among us." Or he mourns our distance from the perfect Platonic ideal. "The One remains, the many change and pass; ... Life, like a dome of many-colored glass stains the white radiance of Eternity."

Of course you're right, John, to see Romanticism as a revolt against empiricism. Blake, for example, mocks Locke when he claims, "I question not my corporeal or vegetative eye anymore than I would question a window concerning a sight; I look through it and not with it." To limit reality to the merely empirical was to enslave ourselves with "mind-forged manacles." "How do you know," Blake asked, "but that every bird that cuts the airy way is an immense world of delight closed by your senses five?"

But the Romantics could not completely deny or escape the native British tradition of empiricism that stretched from Bacon to Locke. *Tintern Abbey*, for example, is structured around Locke's theory of the association of ideas. Wordsworth's vision in the poem is also grounded in the empirical: the divine spirit he discovers is a spirit of place. He takes great care to locate the divine spirit "these waters," "these steep and lofty cliffs," "here, under this dark sycamore." Pantheism or divine immanence -- take your choice. But the spirit Wordsworth celebrates is ... something far more deeply interfused,

*Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man.*

The Romantic vision is neither the thesis, the antithesis, nor some synthesis between Platonism and empiricism. Rather, it's an unresolved tension between the two.

John: That Blake bit about the vegetative eye and the corporeal eye has a remarkable parallel. Did you know that Galileo unfurled his Platonic colors with a very similar remark, 200 years before? He spoke of gazing at nature with "the eye of the forehead," and gazing at the Platonic ideal of nature with "the eye of the mind."

Today's Historians are locked in a passionate debate over Galileo. Was he Platonist or was he Aristotelian? The tension, if it wasn't there in 1600, is certainly present in our attempts to look at early 17th century science today. The myth of technological and scientific detachment is a lingering aura of Aristotelian empiricism. That myth lies so heavy upon us today. But your Romantic poets remind us that the human mind doesn't just linger as a step in technology. It's more than that. It's the primary determinant in the technology. It precedes technology.

The 18th-century Industrial Revolution was the culmination of at least 200 years of tension between Aristotelian empiricism and the inner Platonic vision. Down through the 17th century those two ideas warred with each other. Newton was a Platonic thinker who scorned Aristotelian experimenters. Yet they were the people who fed him fat with new and highly-honed observations. The giants on whose shoulders he stood to see further were the same experimentalists that he systematically set out to destroy -- people like Robert Hooke.

The English still celebrated Newton in 1800, but the Industrial revolution had been made by people who believed truth to be a gift of nature. They wouldn't have been caught dead saying that life and element arise in the soul itself. By 1800 I see a pendulum poised to return. Surely the need to reclaim the inner self had become great. Surely thinkers must've been asking, "Are *making* and *understanding* the fruit of the mind or a gift of nature?"

Jim: You've framed the question very well, John. The Romantics were asking and answering this question -- but in a variety of ways. We've already heard Blake's answer: "Where man is not, nature is barren." No gifts of nature here. But consider Wordsworth's famous dictum.

*One impulse from a vernal wood
May teach you more of man,
Of moral evil and of good,
Than all the sages can.*

There's no doubt here of Wordsworth's faith in nature's gifts. Let me suggest that the Romantics often posed a corollary to the question you've asked. They asked and explored: "What is the *relationship* between the mind and nature?" This question was also a response to the cultural crisis we've mentioned.

When the old world and its certainties collapsed at the end of the Enlightenment, there was no longer a system that explained the relationship between man and his world. The disappearance of God, at least in his traditional form, and the guillotining of the French King, the Viceroy of God, were unmistakable signs that truth or reality was no longer fixed, universal, or absolute. Humankind's comforting knowledge of its place in "the great chain of being" was lost. The links in the chain were broken. The result was a split between subject and object, self and world, mind and nature, and consciousness and unconsciousness.

The Romantics tried to overcome this split. Wordsworth's great theme is what he calls "the wedding of man and nature." Coleridge speaks of "the One life within us and abroad." Reality or truth was not to be found completely in either the self or nature. Let's come back to your question: "Are making and understanding the fruit of the mind or a gift of nature?"

The most common Romantic answer is roughly this: "The source of art is found in the moment of experience -- the moment of vision." In such moments, there is a dynamic reciprocity between the mind and nature, and inner and outer are indissolubly blended. It becomes difficult, I would argue, to talk about the self except in terms of nature, or to talk about nature except in terms of self.

But this balance belies the strongest impulse of Romanticism. You're right, John, about the pendulum swinging to the inner life. In the greatest of the Romantic dreams, the poet celebrates the transcendent power of the mind. He sees the self as the source of order and meaning. Nature's role becomes to provide some external validation of the dreams of the mind.

Blake claims, "All Deities reside in the human breast." Byron describes the mind as an, "Aurora Borealis which flashes o'er the waste and icy clime" of the world of mere sensory impressions. And Keats says, "the imagination may be compared to Adam's dream - he awoke and found it truth."

John, let me pose one more proposition and suggest some questions it raises. The revolutionary age we're discussing created the beginnings of our modern world. It was -- and is -- an increasingly secular world. One result is that the traditional dialogue between man and God is replaced by a dialogue between man and nature. We've talked about epistemological questions -- that is, question of knowledge and knowing -- but this new script brings with it moral questions as well. For example, should man obey nature or penetrate to what Victor Frankenstein calls the citidel of her inmost secrets?

John: Oh, Oh! I heard something just like that in a rerun of Mel Brooks' movie *Young Frankenstein*, last week. Just before he animated the monster, Victor Frankenstein -- Gene Wilder -- threw his arms heavenward and shouted: "We shall penetrate into the very womb of impervious nature itself!"

James: It's a great line and it echoes the original text wonderfully. But Mary Shelley's *Frankenstein* is as outrageous in its own way as Mel Brooks' parody. Do you think Mel Brooks realized that Mary Shelley's Frankenstein wants to create life, but without either a penis or a womb. Now *there's* a Promethean feat! But more about that later.

Let me bring us back from this uncharacteristically humorous digression to the "impervious nature" of my own comments. What I was asking you was, do we strive to be in harmony with nature, or do we conclude as Matthew Arnold did, that "man must begin where nature ends." And, in moral terms, what do we mean by "human nature"? More to the point of *Frankenstein*, in fulfilling one aspect of our human nature, do we sometimes act unnaturally? Does following the impulse of one part of our nature sometimes cause us to violate another part of our nature?

John: Your questions may, as you say, not represent any simple Platonic/Aristotelian thesis/antithesis but they really are the *fruit* of that tension. The early 17th century philosopher, Francis Bacon, set the agenda for the re-emergence of scientific Aristotlianism. And he did it in just the language you've been using. In 1620 he wrote, "The empire of man over things is founded on the ... sciences ... for nature is only to be commanded by obeying her."

That was radical advice in 1620. Scientists and the people who built things lived in different worlds. The 18th century took form after the people who made things formed an alliance with the people who studied natural philosophy.

Let me take just a minute to describe what flowed from Bacon's remark. Just after he told us that "nature is only to be commanded by obeying her" a wedding took place between natural philosophy and technologists. It happened because people wanted to improve the accuracy of clocks.

A mechanical clock depends on something called an escapement -- a mechanism that moves back and forth in a steady rhythm. In 1585 most escapements were masses on the ends of a rod that rhythmically swung back and forth. But in 1585 Galileo showed that the period of oscillation of a gently-swinging pendulum was always the same -- regardless of the amplitude of its swing. The pendulum stood to make an ideal escapement device, because it keeps swinging at the same speed, while it runs down.

It wasn't the Platonic Galileo, but his son, Vincenzo, who built the first clock with a pendulum escapement. That was in 1641 (The year before Newton's birth, by the way.) The Dutch and English physicists, Christian Huyghens and Robert Hooke, followed Vincenzo's work later in the 1600's with improved theories of the pendulum and better clock designs.

The pendulum escapement was the first mechanical invention that resulted directly from the application of a modern scientific principle -- and it was actually carried out by the most important scientists of the day. Right down through the 17th and 18th centuries, thinkers listened to Bacon's assertion that we must bend to nature -- we must understand nature -- if we mean to control her. Seventeenth-century scientists flocked to play the game according to the new rules. Marvelous scientific advances flowed from that wedding.

But something was missing. The makers of the Industrial Revolution saw *primary reality* flowing from nature. They weren't in the least inclined to agree with Blake's notion about all Dieties residing within the human breast. Their God lay *out there*. A tension was running here all right. And that tension seems to have arisen right along with Francis Bacon.

Jim: John, I think it's clear that we've both been talking about the sources and origins of this period. As revolutionary as the age was, it also represented an evolution of ideas, of problems and questions, that had arisen in preceding eras. Perhaps we should now talk more specifically about the origins of *Frankenstein*. As you look at the history of technology, how do you trace what led to the creation of this rather remarkable novel?

John: I'd like to begin that trace with our old friend -- that great hobgoblin of the modern world -- the *mad scientist*. The mad scientist image seems to have first been embodied in the person of *Faust*.

The real Faust was a shadowy figure in early 16th century Germany. He was a self-styled magician and hell-raiser. One place he shows up is in the records of the city of Ingolstadt -- the same Mary Shelly used as the home of her Victor Frankenstein.

Story-tellers took up the legend of this character and recast him in the language of the Protestant Reformation. The Faust we know -- the Faust who sold his soul for knowledge -- was given his present form in 1607, in Christopher Marlowe's book, *The Tragical History of Dr. Faustus*. But that's just the same time Francis Bacon began promoting a role for modern science as the companion of technology.

I think that wedding of science and technology was connected to the wedding of the Platonic inner man with external Aristotelian sources of truth. I think it was a marriage as difficult as it was productive. I think the resulting tension was very much with us in 1800, and I think it's still with us today.

Two hundred years after *Marlow's Faust*, *Mary Shelly* took Faust a step further. Knowledge alone wasn't enough for Victor Frankenstein. He had to *create* life as well as *understand* it. The evil force that served Faust was alchemy. Frankenstein rode electrochemistry on his trip to Hell. Later in the 19th century, Faustian mad scientists added hypnotism and then the mysterious new forces of radiation. They added X-rays and radium. The early 20th century gave us Faustian *technologists* -- Captain Nemo, and the huge, soul-eating mechanical city of Metropolis. And, of course, today's mad scientist is wed to his computer.

Each new scientific or technological discovery has called forth new fears -- fears that we'll lose control of it. Each new discovery brings out Faust or Frankenstein or the mad scientist in some new incarnation. Robert Louis Stevenson added another twist. His monster, Mr. Hyde, emerged as the alter-ego of the gentle Dr. Jekyll, when Jekyll lost control of his knowledge. Jekyll and Hyde touched something about our nature that we all understood, instinctively.

The Faustian mad-scientist is fictional shorthand for describing our potential loss of control -- not so much control of our science-based technology, as control of ourselves. And as I reflect on your picture of the Romantic poets, something else occurs to me. It is that if Mary Shelley hadn't invented *Frankenstein*, someone else would have. In fact, other people *did*. The Romantic poet, Goethe, reinvented Faust. E.T.A. Hoffmann started writing science fiction stories about robots in 1817, one year after Shelley wrote *Frankenstein*. Hoffmann still haunts us in the opera based on his works, *The Tales of Hoffmann*.

Jim: John, let me add a qualification. I think Mary Shelley presents *Frankenstein* as both a mad scientist and a mad poet. In fact, in the novel, scientific invention is really a metaphor for poetic creation. In her preface she even speaks of *Frankenstein's* "unhallowed arts." The Romantic madman is a complex character. We might think of him as a Janus figure. The Roman God Janus was a two-headed figure that looked in opposite directions, and some of the most characteristic Romantic figures are Janus-like because they symbolize both one thing and its opposite at the same time.

Take Coleridge's mariner, for example. Is he a madman, a "grey-beard loon," as the wedding guest calls him? Is he the Devil -- the pilot's boy gasps, "Aha! I see the Devil knows how to row." Or is he the heroic ideal Wordsworth had in mind when he described the statue of Newton that stood outside his college dorm: "The marble index of a mind forever voyaging through strange seas of thought alone."

The answer lies in our attitude toward people who penetrate to the source of things. The mariner tells us, "We were the first that ever burst into that silent sea." He journeys into the uncharted waters of experience and the uncharted mysterious recesses of the human psyche. The source, the beginning -- is this not what all myths try to recreate? In the beginning was the Word, but can we reach the sacred source of life without transgressing and violating?

Is Victor *Frankenstein* a heroic dreamer. Does he succeed in dreaming nature? Or does he make, even create, nature but in the process *become* the unnatural monster? The answer to these questions and many others lies not in the stars but in Thursday's session.

John: OK, James. We have a good stopping point. We've looked at a huge change in world-view that followed the Industrial Revolution. It's a change that cut deep into the workings of the human mind. And for that reason, I can't wait to hear about -- dare I say -- your vision of madness, next time.

PART 2, February 22nd:

Jim: Well, good morning John. I believe we ended our last duet with talk of mad scientists, mad poets, and sources and beginnings. We were talking about the background of the novel, *Frankenstein* when we stopped.

John: That's right. You finished with a cluster of questions. They all reflected concern over what Victor Frankenstein was up to. You wondered whether he dreamt nature or remade it into something *unnatural*. Was he dreamer of heroic proportion, or was he simply *technology-gone-mad*. When I talked about the *mad scientist*, on Tuesday, I may've made Frankenstein look like a cartoon of our own mishandling of nature. But you clearly have something more in mind. Maybe we should sort that out today.

To begin with, I have a hunch we should say more about the immediate milieu that produced *Frankenstein*. How did Mary break out of a group of poets with something that looks to us like *science fiction*? And what about her poet friends? We've called them a bunch of hippies, but they had to be more than that.

Jim: *Frankenstein* may resemble science fiction, but it's actually a Gothic novel. The Gothic novel was one of the most popular fictional forms of the late 18th and early 19th centuries. These novels were tales of terror and the supernatural. You know their trappings -- castles at midnight, young women locked in eerie subterranean vaults, and, of course, that ever-popular figure -- the sex-crazed monk.

But don't be alarmed, the sex-crazed monks were usually Italian. If you've heard of the play, *No Sex Please, We're British*, you won't be surprised by the marvelous ability of the British to project their *ids* onto their continental neighbors. But I don't think this fashionable literary genre really explains how and why Mary Shelley wrote this remarkable novel.

Like so many remarkable things, it begins with the common and trivial. It begins in Switzerland with a parlor game as a group of friends sit around telling ghost stories. But, Oh *what* a group of friends! Mary Shelley had run away from England to Switzerland and was keeping company with the poet, Percy Shelley. This was the same Shelley whose college career had lasted only six months before he was booted out for writing an essay on atheism -- the Shelley who wrote poems calling for a proletarian revolution and pamphlets supporting Catholic emancipation in Ireland.

And when Shelley eloped with Mary, he left behind his wife, Harriet. Actually, Harriet had stayed in England because she was somewhat less than thrilled by Shelley's invitation to live with him and Mary as "their sister."

Mary's half-sister, Claire Clairmont, and the poet Byron, were also members of this interesting menagerie. The poet Robert Southey happened to be in the neighborhood, and he reported back to England that the whole crowd was involved in "a league of incest." (Byron, at least, got his revenge. In his poetry, he publicly attacked Southey for his politics, his lousy poetry and -- getting to the heart of the matter -- his inability to come to sexual climax. Thanks to Byron, poor Bob Southey became known in some circles as "quite a dry Bob.")

Whatever we may think about the sleeping arrangements, Mary Shelley was living in a fascinating Bohemian world. These people were not likely to let habit and custom limit their imaginations. And whatever they did when the lights were low, during the day the conversation was pretty heady. It was filled with talk of hypnotism, Galvanism, Erasmus Darwin, and as Mary Shelley tells us in her Preface, "the nature of the principle of life."

John: Yes, in the Preface to her 1819 edition, Mary Shelley recalled talking with friends about Darwin's experiments. He'd isolated rotting spaghetti until it began to move on its own. Neither she nor Darwin knew then that some wormlike parasite had grown in it. Darwin thought it was the spontaneous generation of life and Mary picked up on the idea when she wrote *Frankenstein*.

Erasmus Darwin was Charles Darwin's grandfather. He came from an earlier breed than Shelley's friends. He was a doctor, scientist, and popular poet to boot. He, and people like him, sang along with the Industrial Revolution like a Greek chorus. Long before anyone saw how far the Revolution would finally reach, the people celebrated the engines that gave it birth. A popular poem John Dalton in the mid-1700's praised an early steam engine maker:

*Man's richest gift thy work will shine:
Rome's aqueducts were poor to thine!*

And John Dyer, wrote about the new water-powered spinning machines. "Art," he said

*... has a spiral engine form'd,
Which, on an hundred spools, an hundred threads,
With one huge wheel, by lapse of water, twines,*

That's the stuff that was popular in 1790, and Erasmus Darwin, was cranking it out.

Jim: That kind of stuff may have been popular, but I think cranking it out is an appropriate term. Surely Erasmus Darwin's real contributions to what we're talking about lie in a different arena.

John: Right. He was really soldier in the Industrial Revolution. He was also a co-founder of the Lunar Society. That was an unlikely cell-group where scientists, industrialists, and writers sat down to talk and to plot the Revolution's course.

By the time the Romantic poets found their voice, they looked back on Darwin and his ilk with unvarnished contempt. Coleridge said outright that he was absolutely nauseated by Erasmus Darwin." But by then, Darwin had touched many people with his outpouring of ideas. Listen to this astonishing piece, written in 1791 -- 13 years before even the first locomotive.

*Soon shall thy arm, UNCONQUER'D STEAM! afar
Drag the slow barge, or drive the rapid car;
Or on wide-waving wings expanded bear
The flying-chariot through the fields of air.
-- Fair crews triumphant, leaning from above,
Shall wave their fluttering kerchiefs as they move;
Or warrior-bands alarm the gaping crowd,
And armies shrink beneath the shadowy cloud.*

Never mind the quality of his poetry, that's an amazing vision. It's a hope-fed vision -- a vision born in the optimism that'd carried people for half a century. It was a vision shared by poets and millwrights alike.

One figure in Darwin's Lunar Society was Joseph Priestly. He was a dissident Protestant clergyman, but he was also the first *scientist* to isolate oxygen -- even before Lavoisier did. He fled Birmingham just ahead of a lynch mob in 1791, and settled in London carrying his wonderful radical ideas with him.

Jim: It's hard for us to imagine what a small world England was at this time. Even Europe! The network of important people who knew each other sometimes boggles the mind. In fact, didn't Priestly belong to a radical group of writers that met over a bookstore in London?

John: Yes, he did. That's where he landed after he was run out of Birmingham. And one person he met there was *Mary Wollstonecraft*. Mary Wollstonecraft had been raised by an abusive father and a put-upon mother. Early in life she set out to support herself -- first as companion to a wealthy lady, then as a teacher, and later as a governess. Finally, in 1787, she settled in London to earn a living by writing.

There she met not only Priestly, but William Blake, and the American, Thomas Paine -- the *same* Thomas Paine whose pamphlet, *Common Sense*, had fueled the American Revolution. The group she fell into included primary theorists of 18th century Revolution.

Mary Wollstonecraft began writing about the role of women, but in fairly guarded terms. She wrote a novel. She wrote a book on educating young women. Then, in 1792, she burst forth with a searing manifesto that became a primary feminist source, right down to this very day. She titled it, *Vindication of the Rights of Woman*. That might have been a play on Thomas Paine's title, *The Rights of Man*.

All the elements of today's women's rights movement were there. Her call to "expand our faculties," was today's idea of "consciousness raising." She hated the way middle class women of her age sold themselves into an idle life. She always returned to the importance of education and self-sufficiency among women. The public met the work with cries of horror. They did then, and some still do, 200 years later. She'd written rapidly and not too carefully. Some of her arguments sidetrack. But the arguments are compelling, and their intent is quite clear enough. In fact, every one has become familiar today.

A few years later, she took up with another member of the group. He was William Godwin, a noted writer on political revolution. When she became pregnant in 1797 they married, even though they'd both railed against marriage. They were both embarrassed by anything as conventional as marriage. In the end, she bore a daughter but she died giving the child birth.

William Godwin passed Mary's legacy on to his daughter. He even *named* her Mary. In his grief he wrote the biography of this lady he'd obviously loved so well. Years later, young Mary took up with Percy Shelly and Lord Byron. For this was *Mary Shelley*. That's a long digression, but I wanted to recite her credentials as a counter-revolutionary. It seems to me that she came about her role as the inventor of Victor Frankenstein, very honestly.

Jim: What you've said, John, helps us understand something of the personal history of Mary Shelley. I suspect that we can trace the genesis of *Frankenstein* to an even more personal layer of her life. In her preface, what Mary Shelley talks about is *reverie*. As you remember, on Tuesday I described reverie as a dreamlike state between sleep and full waking consciousness.

She tells us that her reverie produced the haunting image of what she calls "the pale student of unhallowed arts," as he mocks God's creation of life. But her reveries about the source of life itself are deeper and more personal than this image suggests. Creation and the source of life were the frightening stuff of Mary Shelley's dreams. Mary Shelley's mother, Mary Wollstonecraft, had died giving birth to her. Mary Shelley's own first child, a little girl, had died only a few days after she was born.

This was obviously terrible and traumatic, and she was haunted by recurrent dreams about her first experience of giving birth. She writes that she dreamed, that my little baby came to life again; that it had only been cold; and that we rubbed it before the fire, and it lived.

Isn't this the very situation that the novel *Frankenstein* dramatizes in symbolic form? Frankenstein *is* Mary Shelley's dream. It's about creation, and it's about the fire with which we create. Listen to this from her journals:

*Above all, let me fearlessly descend in the remotest caverns of my mind,
carry the torch of self-knowledge into its deepest recesses.*

Think about this image of caves and torches. Mary Shelley, as an artist, sees herself as Prometheus -- the creator of life and light. Her Platonic dream-fired torch illumines the shadows on the walls of the cave. But these shadows lurk on the walls of the caverns of our minds. Is *Frankenstein* the first great work of science fiction? Perhaps. But this fiction is no stranger than truth of dreams or myth.

John: In this case, the myth of Prometheus! I suppose we owe it to our audience to remind them that Mary Shelley's full title was *Frankenstein, or the Modern Prometheus*. Prometheus does indeed lie squarely in our path.

My own instinct is to talk, not so much about Prometheus who separated himself from the good will of the Gods by claiming control of fire, as it is to talk about the first real-life user of fire. And that was Adam. That was our early forbear who first asserted his own will and knowledge over and against the succoring care of nature.

That's what Victor Frankenstein did, and that's what the title suggests that he did. Victor Frankenstein surely ate the apple of knowledge and became God. That's what Prometheus did as well. And yet right there in her preface, Mary Shelley quotes Milton's *Paradise Lost*, "Did I request thee, Maker, from my clay to mold me man?" She tells us, right up front, that the *monster* is Adam.

Mary Shelley portrayed Victor as Prometheus seizing control of something far more monstrous than fire. Shelley's Victor/Prometheus seized control of God's creative right. He created his own hapless Adam. Frankenstein's Adam -- the monster himself -- explains at the end that he had no choice but to become a murdering monster. In my view he was completing the evil Frankenstein had committed in making him. Only at the end do we understand that Frankenstein's greatest mischief was creating Adam in *his own*, already flawed, image.

Jim: Do you see Victor Frankenstein as just a mischief maker -- just somebody who opened Pandora's Box?

John: That's what the *original Faust* seems to have been -- a mischief maker. But the mad scientist is surely mutating by now. There seems to have been a heroic dimension in fallen Adam as Frankenstein, Pandora and, I think, Faust after her, were only gratifying their own obsessive curiosity. But Prometheus stole fire from the Gods so he could present that gift to the human race. Frankenstein also dreamt of serving human good in a way that reached beyond his lust for knowledge.

*Life and death appeared to me ideal bounds which I should break through
and pour a torrent of light into our dark world.*

So Mary Shelley saw that awful broken line that hardly separates Adam's ideals from his base nature. She saw the terrible threat lurking in Adam's best intentions.

Jim: John, I think the novel clearly supports your interpretation. Frankenstein is an over-reacher and Mary Shelley judges him accordingly. But my instinct is not to emphasize the novel as moral tale, but to talk about the heroic and the ambiguous qualities of Victor Frankenstein. I think this will help us better understand what makes *Frankenstein* a distinctly Romantic work of art.

On Tuesday, I referred to the Romantic Janus figure and cited Coleridge's mariner as an example. I also see Victor Frankenstein as a Janus Figure. He is both God and Adam. He is both God and Lucifer. When I say that he is Lucifer, I mean Lucifer the fallen angel who warred with God. But we should remember that the name Lucifer means light-bearer. The passage that you cited about Victor's desire to "pour a torrent of light into our dark world." can be read with this perspective. So can the passage from Mary's journal that I read.

Victor is a Lucifer in challenging the limits or boundaries of knowledge -- remember the passage you quoted begins: "Life and Death appeared to me ideal bounds which I should break." The Romantic hero is often a boundary-breaker -- a revolutionary. He is a rebel who challenges whatever limits the human imagination or spirit. He is a visionary poet-prophet who desires to share the light of the human mind with his fellow humans.

John: I just noticed something: *Young Frankenstein* aside, you really do echo the way early science fiction movies treated scientists: "The members of the Foundation are fools! How can I ever make them understand what this will mean for the human race!"

Jim: Exactly! A kind of *fine madness*. And the mythic figure who best captures this romantic concept is Prometheus. Prometheus is a Lucifer who warred against his gods in stealing fire. He is also a crucified Christ, endlessly suffering, chained to a rock while a vulture picks at his liver through all eternity. On the one hand, he is our benevolent ally stealing fire for us, suffering for us. But he is also responsible for our alienation from heaven.

Victor Frankenstein is the modern Prometheus, a Janus-like figure of moral ambiguity. And the way we choose to view him has much to do with our own ideas about order versus desire, about boundaries versus aspiration. Do we condemn these transgressors of the moral order as outlaws, chain them forever to rocks? Or do we realize that the moral order itself is sometimes unjust and inhuman? Do we chant as William Blake does, What hand dares to sieze the fire?

John: That image contains -- dare I say -- more truth than poetry. I've become absolutely convinced that if we go looking for the true seeds of invention, we usually find an alien. The seminal inventor is by his nature a person standing outside the normal order of things. For example, Morse didn't by any stretch of the mind invent the telegraph -- all he did was make a success of it. The true inventor published an anonymous article 80 years earlier and let the idea fester in other more practical minds.

Jim: Yes, taking a risk and standing outside the normal order of things is fundamental to the romantic stance. But the underlying impulse is complex and ambiguous. That is, it's sometimes an expression of our heroic defiance of evil, and it's sometimes an expression of our darker side and our failings as well. And sometimes it's an expression of both at the same time. We have our Janus-figure again.

Let's look more closely at what Victor does, and its Janus-like nature. Victor tells us that he wants to learn the "hidden laws of nature." But it's clear that he also rebels against nature. He tries to transcend nature by defying mortality. He tries to live forever by giving birth to an immortal monster. Victor also says he wants to be God in his infinite mercy.

John: Modest fellow!

Jim: His aim, he says, is to "banish disease from the human frame." He would make us all Gods!

John: That's better.

Jim: But his motive is not quite so straight forward. He pridefully imagines "A new species would bless me as its creator and source." And the rub goes even deeper. For the artist who creates, the real chafe is to be made in the image of his creator. To be only an imitation, a mere copy. The ultimate ideal then is to create himself. For the poet this means to create a myth and then live it.

We think of Hemmingway running the bulls at Pamplona. We think of Byron dying in the Greek war for independence. We think of Wordsworth "dreaming himself" to existence in *The Prelude*. We think of James Joyce's novel, *A Portrait of the Artist as a Young Man*. In the case of *Frankenstein*, he becomes God by appropriating the right to create himself. Symbolically, he tries to create himself by creating the monster.

John: We think of Isambard Kingdom Brunel, larger than life, smoking cigars and wearing a tall top hat. Do you know Brunel?

Jim: No I don't

John: He's the fellow who built the Great Western Railway system in England. He's the man who was drilling the first tunnel under the Thames River while a somewhat older Mary Shelley was writing scientific biographies. If anyone ever dreamt nature and made himself, it was Brunel. And he finally died producing his last great monster, *The Great Eastern* steamship -- the largest ship of its time by a factor of three.

The *Great Eastern* was a Frankensteinian monster indeed. It failed as a commercial liner because it ate too much coal. It eventually *did* serve to lay the first transatlantic cable. But that was long after the stress of building it had killed Brunel. When art historian, Kenneth Clark, talked about Brunel's work, by the way, he used the words, *Heroic Materialism*.

Jim: Perhaps Oscar Wilde had the Brunels and Frankensteins in mind when he said, "Nothing succeeds like excess." They are larger than life. Victor's act may be sinful, but it's also heroic.

John: Brunel's may have been *obsessive* but it was also heroic.

Jim: Let me talk about the heroic in a slightly different way. A way that links Frankenstein with some of the Romantic poets that the "Human Sit" class has been reading -- poets who aren't so overtly outrageous as Frankenstein. Poets who don't shock us with such Daemonic energy.

Victor Frankenstein, like the Romantic poets and like your friend Brunel, is on a quest for the ideal. He wants to find a concrete embodiment of his vision or dream. This is what underlies his attempt to create the monster. And Frankenstein is so intense in his passion and desire that *real* becomes *illusion* and *illusion* becomes *real*.

By this, I mean his illusion, his dream of the monster, becomes real. He actually creates life, brings his illusion into being. And as he does, the real world becomes an illusion. Think of how Victor forgets his parents and loved ones for months and even years on end. Think of how often he lies in some fevered stupor that blots out the social world -- the world of human contacts.

With this perspective in mind, let's look again at the novel's moral fable. What is Victor's sin?

John: If it's a sin at all ...

Jim: It's clearly not a sin against God. In fact, there is no God in Mary Shelley's world. God is in the novel, all right, but he's only a literary allusion. He's only a character in a poem -- Milton's *Paradise Lost*.

Victor doesn't sin against God, but against the monster. The monster is his son, his Adam, and Victor rejects and abandons him. The monster becomes his double. Victor calls him "the fiend that lurked in my heart." He refers to him as "my own Vampire, my own spirit let loose from the grave." And Victor cannot recognize, cannot accept, this image of the evil within himself. The students in the "Human Sit" class read *The Tempest* this semester. Victor's problem is that, unlike Prospero, he can't turn to his Caliban and say, "This thing of darkness, I acknowledge mine."

We can also see Victor's sin in the other things he neglects or abandons as he pursues his quest. He neglects love, his love for Elizabeth and for his parents. He neglects sympathy -- the sympathy that underlies deep friendship. The friendship that the ship's captain, Robert Walton, desires with Frankenstein. I should explain that, for the Romantics, sympathy was not pity. It was something much more important -- the ability to identify imaginatively with another person. It's this that Victor Frankenstein neglects. In short, he rejects the hearth, the home, the community.

John: And that's another feature that science fiction has copied right down through television -- unshaven, unresponsive, megamaniacal. This lady did more than just mirror a poet's vision of Hell-within she invented a genre at the same time. And that genre has warned us of the potential *Hell-within* ever since.

Jim: Yes, the Hell-within is the burden that the questor must bear. As Byron wrote, sorrow is knowledge. Those who know the most must mourn the deepest o'er the fatal truth. Suffering is knowledge, but the tree of knowledge is not that of life. This is often the case with the Romantic solitary or outcast or Bohemian.

The Romantic recognizes the necessity of that part of our humanity represented by love and sympathy and the domestic virtues. But he also realizes that to cultivate them is to lose the quest. Social and political limits may be the necessary boundaries of the Bourgeois world, but they frustrate the noblest elements of the human spirit. Our fullness as a human being often means that we must rebel against and violate the social community. Our heroism is often expressed in defiance.

Remember that, at the end of the novel, Victor tells Robert Walton "learn from me by example." But that's not what he really thinks. His Romantic desire breaks out a final time and he adds, "Yet another may succeed." And Robert Walton becomes the exception that proves the Romantic rule. He too had his Promethean dream. He set out to discover the fabled Northwest Passage and the secrets of the magnet.

But *he* heeds the voice of limits, the voice of community. He turns back and rejects his quest. He chooses a life that is better; but it's a lesser life. And *he knows it*, returning in bitterness and dejection. There will be no novel titled *Robert Walton*.

John: At least not until the 21st century. Robert Walton might provide material for Woody Allen or Albert Brooks. But we live in a different world today -- very different from the one you're describing.

Jim: We're certainly not the keepers of the dream. We've had more than our share of giant dreams gone awry. The inner life for us is often a place of anxiety and neurosis.

John: Byron himself strikes me as terribly self-absorbed but you're right. Anxiety and neurosis doesn't paint his picture. Still, the Romantic dream lingered on for some while after that summer in Geneva. Yet it mutated as it lingered in the 19th century.

Look at the people around Byron. Mary Shelley moved on into a world that was trying to *realize* the dream. By the 1830's she was ghost-writing for a cleric, the Rev. Dionysius Lardner, who wrote encyclopaedias and practical technical handbooks.

Even more remarkable is the story of his daughter, Ada. She became involved in a far more down-to-earth version of Frankenstein's attempt to dream nature and to create himself. Just after Ada, was born in 1815, Byron wrote:

*Is thy face like thy mother's, my fair child!
Ada! Sole daughter of my house and heart?*

Of course that was *after* Byron ran off with Claire the next summer. He never made any claim at all on Ada's custody. She was raised by the tough and manipulative Lady Byron. Ada was timid and sickly as a child, but she had a sharp analytical mind. She wanted to be a *mathematician*. No doubt that came from her mother who *also* loved mathematics.

Jim: In fact, Byron ridiculed Lady Byron for that. He once called her the "Princess of Parallelograms." And in *Don Juan* he satirized her, using perhaps the greatest polysyllabic rhyme in the English language: "But -- Oh! ye lords of ladies intellectual, inform us truly, have they not hen-pecked you all?"

John: And yet, at the same time, the fascination with math stayed with both these women. When Ada was 17, she met Charles Babbage on a visit to London. Babbage was a brilliant British mathematician whose driving interest was the problem of mechanizing calculation.

In 1834 he began work on what he called an *Analytical Engine* -- a machine that could be told how to carry out a *sequence* of related calculations. The Analytical Engine was the world's first programmable computer. Babbage eventually foundered on mechanical problems of making his Engine run. There was too much friction in its gears. Practical computers would have to wait until components could be made electronically. Still, Babbage was a full century ahead of his time in setting up the working principles.

In any event, Babbage put Ada to writing a description of the machine's operation and capabilities. Her work was published as a series of seven notes, in *Taylor's Scientific Memoirs* in 1843. She was just 27 at the time, but the notes display a late 20th-century understanding of what the computer is and what it can do. In the most famous quotation from the notes, she says:

The Analytical Engine has no pretensions whatever to *originate* anything. It can do whatever we *know how to order it to* [do]. It can *follow* analysis; but it has no power of anticipating any ... truths. Its province is to assist us in making *available* what we're already acquainted with.

What I find so eerie about this passage is the almost primary need to assure people that the computer is not Frankenstein -- at least not *quite* -- not yet.

Ada died of uterine cancer only a few years later. But in 1980 -- on what would have been her 165th birthday -- the Defense Department announced a powerful new computer language. They named it Ada. Most computer languages are named with acronyms, but not this one. It was a simple tribute to the lady whom many people regard as having been the first computer programmer.

Jim: Do you know of any other machines that were beginning to creep into the garden of the artistic imagination?

John: Oh yes. Turner celebrated the new machines of the 19th century in his oil paintings. I mentioned last time that Mary Shelley was not the only early 19th-century writer who saw us recreating ourselves. We talked about Goethe's *Faust* and E.T.A. Hoffman's stories about automata and robots. But chiefly, I see the literary vision of Adam-as-God giving way to mechanical expressions of humanism and social reform. Look at Dickens. No more gazing inward at nature here. Dickens calls us in a stentorian voice to undo the social ills that followed industrialization.

Jim: Dickens does look out and attack the ills of the Industrialization. But he still looks inward to celebrate the emotional and imaginative life that make existence human. In that sense he's the heir of the Romantics. But the terms of engagement with the world are different because Victorian society is so different from the world of the Romantics in the late 18th and early 19th centuries. For the Wordsworth of *Tintern Abbey*, nature is still divine.

But the Victorian poet, Tennyson, had read early theories of evolution and, for him, nature is "red in tooth and claw." The change in the world is roughly this. When nature ceases to be divine, it also ceases to be human. It ceases to mean anything to us except as a symbol of peace and esthetic beauty.

John: And so, it seems, the 18th-century spiritual force that'd created revolution, had also sown the seeds of its own destruction. By 1850, the enormous changes promised by 18th-century revolution, had been delivered. The great flowering of technology had been accompanied by an equally great flowering of science. Now, as you point out, the Romantic ebbs. It still lingers, but it ebbs.

Jim: Before we leave the romantic vision, let's return one last time to the Romantic dream in *Frankenstein*. Your idea about creation containing the seeds of its own destruction is interesting. The *Frankenstein* begins with creation, but ends with destruction as the monster casts himself into a funeral pyre.

It is perhaps fitting that the monster has the last word. After all, before the injustice of Victor and of society turn him into a monster, he's really the most human character in the whole work. He speaks lovingly and reverentially about Victor Frankenstein in the last scene. He reminds us of the heroic glory of Victor's dream. And then he dives into the pyre. What are we to make of this stark final statement? Is it an expression of nihilism? Is self-destruction, non-being, the final dead end of the Romantic dream?

Or is it an attempt to find peace -- the peace that comes with catharsis at the conclusion of Victor Frankenstein's tragedy?

Or is his plunge the dive of the Phoenix, that rare mythic bird whose flight into the fire results in rebirth, resurrection? Is there a hint of Christ-like martyrdom and regeneration?

Perhaps it's some or all of these. Certainly its dramatic quality makes it one final triumphant assertion of the self. This same triumphant assertion of the self and its dreams lies at the heart of much Romantic art. Lord Byron writes in *Childe Harold's Pilgrimage*:

*Tis to create, and in creating live
A being more intense that we endow
With form our fancy, gaining as we give
The life we image.*

And in *The Prelude*, Wordsworth might have been describing Mary Shelley's reveries when he wrote:

*Huge and mighty forms that do not live
Like living men, moved slowly through the mind
By day, and were a trouble to my dreams.*

A character in Emily Bronte's Romantic novel *Wuthering Heights* sustains the theme: "There is, or should be, an existence of yours beyond you."

Frankenstein's monster is his existence beyond himself. The desire to create that "dream child" is at bottom a religious quest, a quest to merge ourselves with some larger transcendent power that is both within and without. But today this quest is no longer for the everyman. It probably wasn't even in Mary Shelley's time. It is only for the Victor Frankensteins, the Ahab's and the Kubla Khans. The quest takes these Janus-like characters to the source of things, to dreams.

But this place of dream is at once, holy, enchanted, and savage. And when we see them on their quest, we are apt to say, as Coleridge does in his poem, *Kubla Khan*: "Beware! Beware! His flashing eyes, his floating hair."

But if we can get beyond our initial discomfort, if we see the heroic ideal that drives this dreamer -- John's mad scientist -- who lives in the enchanted world of desire, perhaps we will have the grace to add, as Coleridge does:

*Weave a circle round him thrice,
And close your eyes with holy dread,
For he on honeydew hath fed,
And drunk the milk of Paradise.*

John: I certainly hope our technology and our intellectual enterprise can keep its hold on some vestige of that heroic ideal through all the public forces that control it today. We need to provide a home for some trace of the monster -- for just a breath of the fine madness. I doubt we'll ever build a world fit for habitation without some feeding on honeydew -- without drinking the milk of Paradise.

But you said the monster himself should have the last word. Let's take that last word from the *Young Frankenstein* version. Perhaps the monster speaks to these students of his tragic story when he says, "I decided that if I could not inspire love, which was my greatest hope, then at least I could inspire fear."

Jim: Perhaps he speaks for us as well, John. If we could not inspire love, then we'll settle for fear -- fear that we've lost touch with the buried life that the monster symbolizes.

A TIMETABLE

Date	Period	Person
437-347 BC		Plato
384-322 BC		Aristotle
	Platonism (also called Neoplatonism) dominated the later days of this period	
354-430 AD		St. Augustine
	Post-Classical & Early Medieval Period	
1000-1300 AD	High Medieval Technology	
mid 1200's	Aristotelian Revival	
1564-1642		Galileo Galilei
1620 on	Rise of modern ideas about science	
1642-1727		Isaac Newton
ca. 1660-1670	Rationalism, Enlightenment, Age of Reason	
1740-1780	Gatherings of Industrial Revolution	
1780's	High tide of the Industrial Revolution	
1776-1783	American Revolution	
1787-1799	French Revolution	
1780-1791	Major Activity of the Lunar Society	
1798-1832	English Romanticism	
1816	Summer in Switzerland, Composition of <u>Frankenstein</u>	
1759-1797		Mary Wollstoncraft
1757-1827		William Blake
1770-1850		William Wordsworth
1772-1834		S. T. Coleridge
1788-1824		Lord Byron
1792-1822		Percy Shelley
1797-1851		Mary Wollstonecraft Godwin Shelley
1795-1821		John Keats
1850	Beginning of the rise of Victorian Science, most of which is still intact today	

SOME BIBLIOGRAPHY

This is not a full listing of sources by any shot. It is simply a limited account of related materials that we think might be helpful.

White, L. Jr., *Medieval Technology and Social Change*, (New York: Oxford University Press, 1966).

White, L. Jr., *Medieval Religion and Technology*, Berkeley, California: University of California Press., 1978.

Roller, D. H. D., "Science and the Fine Arts: Reflections of Platonic Idealism and of Aristotelian Naturalism," *Leonardo*, Vol. 13, pp. 192-198, 1980.

Gimpel, J., *The Medieval Machine*, New York: Penguin Books, 1976.

Maurice, K. and Mayr, O., *The Clockwork Universe: German Clocks and Automata*, Washington, D.C.: The Smithsonian Inst. and New York: Neal Watson Academic Pubs, 1980.

Klingender, F. D., *ART, and the Industrial Revolution*. New York: Augustus M. Kelley Publishers, 1968.

Shelley, M. *Frankenstein, or the Modern Prometheus*. Chicago: Donohue, Henneberry & Co., (many editions exist -- take your pick.)

Stein. D., *Ada*, Cambridge, Mass., MIT Press, 1987.

Hyman, A., *Charles Babbage, Pioneer of the Computer*, Princeton, NJ: Princeton University Press, 1982.

Wollenstonecraft, M. *Vindication of the Rights of Woman*. (M. Brody, ed.) London: Penguin Books, 1975.

Edgerton, S.Y., Jr., "Galileo, Florentine 'Disegno,' and the 'Strange Spottedness' of the Moon." *Art Journal*, Vol. 44, No. 1, 1984, pp. 225-232.

Wilford, J. N., *The Mapmakers*, New York: Vintage Books, 1982, Chapter 23.

Settle, T. B., "Galileo and Early Experimentation," *Springs of Scientific Creativity*, (F. Aris, H.T. Davis, and R.H. Stuewer, eds.) Minneapolis: Univ. of Minnesota Press, 1983, pp. 3-20.