



Evolution of Science Fiction from 'Frankenstein' to 'A Voyage to Arcturus'

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Abstract:

The history of science fiction is also the history of humanity's changing attitudes toward space and time. It is the history of our growing understanding of the universe and the position of our species in that universe. Like the history of science itself, the history of this literary form is thin and episodic until about four centuries ago, when the scientific method began to replace more authoritarian and dogmatic modes of thought, and people at last could see that the earth is not the center of the universe with the sun, moon, and stars all spinning round it for the edification of mankind.

We must have some sense of the history of fiction in order to see the role of science fiction in the larger structure of our literary heritage. Perhaps the simplest way to understand the history of fiction is to see it as a movement away from mythology. The history of fiction is the story of humanity's development from a mythic way of seeing the world to a rational or empirical way of seeing it. As human science developed, human fictions changed with it.

INTRODUCTION:

What makes the vision of science fiction unique is the way it is embodied in specific narrative texts. All of its philosophical concept and its scientific or pseudoscientific notions may be discussed as pure abstractions, Wittgensteinian word games or Einsteinian thought experiments. What is essential to science fiction is the enactment of these games or experiments in fictional form. In this study a few select works of "literary merit," such as might be studied in a historical survey of science fiction. Every work to be taken here shows the marks of its own time, the values and concerns of its particular era. And taken as a whole, these works illustrate a great search for values.

When a human being in Frankenstein assumes the god-like power of creation, the question of values and their source arises. Science fiction has used its special vision and its unique knowledge to trace the history of human power over nature and to ask how that power should function. For two centuries science fiction has been making a serious and dedicated effort to create a modern conscience for the human race. When Mary Wollstonecraft Godwin Shelley (1797-1851) published Frankenstein in 1818, she was presenting the world with a story she hoped "would speak to the mysterious fear of our nature, and awaken thrilling horror-one to make the reader dread to look round, to curdle the blood, and quicken the beatings of the heart".[1]

Lacking somewhat in literary polish, she succeeded completely. The image of the monster, patched together out of charnel waste and wrecking his vengeance on mankind, has haunted readers and moviegoers ever since. Indeed, the Edison company's 1910 version of Frankenstein was among the first narrative films ever made. Unfortunately, that image of monstrous terror with which cinema has made us so familiar is only the smallest part of a powerful and complex work, a literary work which receives too little attention because of our familiarity with its often-crude movie adaptations.

Frankenstein begins with an author's Preface which itself begins with this paragraph:

The event on which this fiction is founded has been supposed, by Dr [Erasmus] Darwin, and some of the physiological writers of Germany, as not of impossible occurrence....in assuming it as the basis of a work of fancy, I have not considered myself as merely weaving a series of supernatural terrors. The event on which the interest of the story depends is exempt from the disadvantages of a mere tale of spectres or enchantment. It was recommended by the novelty of the situations which it develops; and, however impossible as a physical fact, affords a point of view to the imagination for the delineating of human passions more comprehensive and commanding than any which the ordinary relations of existing events can yield.[2]

The Shelleys are claiming here that the fantastic is made plausible by science; and further, even if that claim is rejected, the fiction has value by providing thrills (high adventure) and insight into human behaviour (intellectual excitement) illuminated by a uniquely potent "new light". Thus, we have science fiction.

The story of this is comparatively complex. Victor Frankenstein, young science student, goes off from his home in Geneva to study at the University of Ingolstadt. There he undergoes a rebirth, realizing that the learning he had acquired from ancient books is false and that modern science offers truer and more efficacious insights. He soon surpasses his teachers and concocts Pygmalion's classic project of creating life. His motivation is twofold: he wishes to pursue science passionately for its own sake, and he desires, by his experimenting, to acquire knowledge that will improve the human stock. His creation, of course, is hideously ugly. He sees it move and runs from the laboratory in horror. When he returns, the monster is already gone. The monster, "born" innocent but with superhuman potentiality of both mind and body, leaves the laboratory and undergoes his own development.

The monster's biography is a dramatization of Rousseau's notion of the Noble Savage uncorrupted by civilized man. The monster's own recollections are a literary tour de force:

"It was dark when I [first] awoke; I felt cold also, and half frightened, as it were instinctively, finding myself so desolate." [3]

We see him as intelligent but unprejudiced by civilization:

"I heard of the discovery of the American hemisphere, and wept.... over the hapless fate of its original inhabitants," [4]

Untaught by educated man, the monster feels a general good will.

If any being felt emotions of benevolence towards me, I should return them a hundred and ahundred fold; for that one creature's sake, I would make peace with the whole kind! [5]

But mankind never does show the monster benevolence because it cannot see the nobility beneath the horrid exterior. People mindlessly attack the creature, once shooting and wounding him at the very moment he saves a child from drowning. Victor's creation is the first of all those science fiction aliens upon whom Earthmen fire weapons without giving them a chance to talk and he is also the first of all those mutants who are really superior to the people of the dominant culture, but are rejected by them merely for being different. Such an archetype of the maligned outside clearly has a continuing appeal to adolescents who may be struggling to reconcile their own sense of worth with the strictures of society. Today this archetype is especially significant for a world that seems to mindlessly so many of us. The monster responds to this rejection not by postulating his own corruption through Original Sin but placing the blame steamroller squarely on factors outside himself:

"Accursed creator!" [he yells at Victor] "Why did you form a monster so hideous that even you turned from me in disgust?" [6]

The monster tries to get Frankenstein to create a bride to end his isolation and promises that he will take his bride away from human habitation. But Victor refuses for numerous reasons. In the course of trying to force Victor's cooperation, the monster finally begins to prey upon his creator's family and friends. Ultimately Victor pledges to destroy his creation who then intentionally leads him on an ever more desolate chase. Eventually, forced to cross the frozen Arctic, Victor is mortally exhausted, but by luck encounters the ice-bound ship of would-be explorer Robert Walton. It is on this ship that the story is told and to this ship the monster comes, just in time to see Victor die and to shed his own tears for the only person who gave him a sense of place in the world. The monster then flees to the north. Nothing but death remains.

Shelley, by her manner of narration multiplies the power of the Noble Savage theme to explore the "human passions" of the outcast. The novel, after the Preface, opens with the letters of Robert Walton to his sister in England. Walton is a seeker after knowledge; he wants to reach the North Pole.

I may there discover the wondrous power which attracts the needle; and may regulate a thousand celestial observations.....I shall satiate my ardent curiosity with the sight of a part of the world never before visited, and may tread a land never before imprinted by the foot of man. These are my enticements, and they are sufficient to conquer all fear of danger or death.... you cannot contest the inestimable benefit which I shall confer on all mankind to the last generation, by discovering a passage near the pole... (Letter 1). [7]

This proclamation is designed to arouse an ambivalence in the reader. Science may indeed help man, but the prideful seeking after knowledge is dangerous.

This ambivalence toward knowledge and the beneficial/malignant seeker is, of course, the Faustian theme. Stories which attached themselves to the name of Johann Faust (1488-1541), a wandering German conjurer, eventually came to

express this ambivalence, a problematic attitude found so often in science fiction. Both Victor and Robert are Faust figures. The former, just like Marlowe's Doctor Faustus, exclaims that "so much has been done.....more, far more, will I achieve." And just as Faustus conjured his Mephistopheles and yet was damned by him, so the monster can say to Victor, "You are my creator, but I am your master; -obey!" Victor, like Robert, will seek knowledge at any cost. When he first tries to justify his behaviour, Victor says, "One man's life or death were but a small price to pay for the acquirement of the knowledge which I sought."

Once Victor is on the ship, the book presents Robert's transcript of his conversations with his patient and guest. Victor's narrative has embedded within it the monster's own history, a tale told Victor by his monster on the glacier at Chamonix by way of pleading for a bride. And within the monster's narrative there is the story of the occurrences at the DeLacey cottage, in the shed of which the monster secretly lived. There the demon observed a family and overheard their history, how the boy Felix had risked all to save his Arab love Safie and her family and how her father betrayed him. So, at the heart of this science fiction, we find an exemplum of human duplicity, of the falseness of the civilized spirit.

After the tale of the DeLaceys the novel unfolds, first finishing the monster's tale of his own mistreatment by mankind in general and his creator in particular, then finishing Victor's tale of scientific excess and moral irresponsibility, and finally returning us, through Robert's last letters, to the ship for the final confrontation between the two Faustians and the monster. To the last, Shelley writes so as to keep before us not the simple good or bad of science, but the morally paralyzing ambivalence it creates. Victor's last words before he dies begin as advice to Robert, but end quite differently:

"Farewell, Walton! Seek happiness in tranquillity and avoid ambition, even if it be only the apparently innocent one of distinguishing yourself in science and discoveries. Yet why do I say this? I have myself been blasted in these hopes, yet another may succeed. "[8]

The monster is then accused of heartlessness by Walton, but answers that he had no one else but Victor to get help from, and he had been created to need love. For that very reason, even as a murderer, he mourned deeply each of his victims, especially Victor. The monster flees, perhaps to die, and Robert turns his ship back. However, he retreats from exploration not as a matter of principle, but because his crew, oppressed by the Arctic conditions, resorts to mutiny. Thus, by encountering the book's events through its many narrators, we find not the simple notion of a rampant evil monster created by science, but rather the disturbing presentation of two continuing human problems: Shall one seek knowledge that will change one's world? Does civilization corrupt the human animal which otherwise would be good? The image that stays in our minds is of the monster, the product of excessive science, but the book is fundamentally about its title character, Frankenstein, a man who, through the more timid Walton, shares a humanity with us.

With the multiplication of technology in the nineteenth century, the problem of knowledge became the problem of science. With the growth of colonialism in the nineteenth century, the problem of the Noble Savage became the problem of the outsider and the outcast. Mary Shelley in Frankenstein spoke movingly to those issues and simultaneously created the seminal work of the new literary genre of science fiction.

Jules Verne (1828-1905) is one of the acknowledged fathers of science fiction, and there is much merit in the work of this widely read author. Unfortunately, a too serious reading of his works also serves as a key in claiming qualities for science fiction which it rarely possesses one should first dispose of these misconceptions in order better to be able to see the contributions Verne made to the genre.

Popularly, a defense of science fiction is often made on two grounds: first, that good science fiction is written in accurate accord with its contemporary science fact; and second, that science fiction has had extraordinary success in predicting the actual development of science. While science fiction is often in accord with science fact, and while many gadgets were described in science fiction before they functioned in fact (incandescent lighting, for instance, illuminates Verne's Nautilus nine years before Edison's patent was granted), it remains truer to say that science fiction tends to recognize the science fact of its time and use or abuse that fact for primarily fictional purposes. In *From the Earth to the Moon* (1865), for example, Verne has his ballistic spaceship fired from a nine-hundred-foot-deep hole in the environs of the fictional Stone Hill, Florida. Verne knew perfectly well that a hole of that depth anywhere in Florida would be under water; his straight-faced show of scientific accuracy ironically masked a satire on American ingenuity. In *Purchase of the North Pole* (1889), some amateur scientists conspire to change the Earth's axis by explosives, thus melting the polar ice cap and making accessible vast mineral wealth. Verne chose to ignore what he knew perfectly well-that the experiment would as likely devastate all coastal cities as it would free the ice-bound land masses-not for the purpose of satire but for the simpler joy of working out the problem of axis-shifting, and the consequences be damned! Verne's work really supports the claim that much science fiction displays a heartily unscientific exuberance for apparently scientific adventure.

The great claim made for *20,000 Leagues Under the Sea* is that Nemo's Nautilus accurately predicts the development of the submarine. Without meaning to detract from such inventive detail as electric lighting, chemical oxygen production, seaweed cigars, and so on, one should note that David Bushnell, who coined the term "submarine," first successfully tested his Turtle in 1775; Robert Fulton demonstrated a functional steam submarine in the *Sei* in 1807 (this ship, incidentally, was named Nautilus); and the Confederate States of America, in 1864, successfully used the nine-man submarine Huntley to sink the United States frigate *Housatonic*. Verne doubtless knew all this. But for Verne, the thought not of a primitive submarine (the Huntley's crew all perished before they could return to port) but of a fully developed machine roaming the deeps of the world called forth every trick of his fictional trade.

20,000 Leagues Under the Sea is the first-person narrative of professor and naturalist Pierre Aronnax. When the book opens, he and his comically faithful servant Conseil have joined the American frigate *Abraham Lincoln* in the pursuit of some "thing" that is endangering the shipping of the world. Its speed and strength make it utterly fantastic and Aronnax gives a lengthy discussion of possible explanations. He discards submarines first, for they would be, technically impossible. He discards certain superstitious imaginings; and finally,

since all other theories must be rejected, one is forced to admit the existence of some marine animal of extraordinary power.[9]

The creature, of course, turns out to be an undersea ship after all. In the light of Aronnax's discussion, many modern readers assume that Verne was predicting the submarine. In fact, Verne was creating the fictional context, fully against the facts of contemporary science, that would give the submarine the thrill of the fantastic. Then he uses much of the rest of the book to make this fantastic plausible. Whereas Mary Shelley created science fiction, urged on by a disturbing ambivalence toward science, Verne made science fiction popular by demonstrating a boundless enthusiasm for science.

Aronnax and Conseil, and a practical-minded Canadian harpooner named Ned Land, are tossed into the water when the "creature" rams the *Abraham Lincoln*. They are rescued by Captain Nemo and introduced to his submarine, the Nautilus. The vast body of the book consists of unconnected episodes, about half of which glory in scientific detail for its own sake. Here are passages describing the fish outside the view port, the shells in Nemo's collection and the workings of an electric harpoon etc. The remainder of the book uses the science fictional situation to present astounding adventures like a passage through a secret undersea river connecting the Red Sea and the Mediterranean, a trip to the inside of a submerged volcano, a fight against giant squids. There is some serious attempt to explore "human passions through the character of the misanthropic Nemo ("It isn't new continents the earth needs, but new men!") and Ned Land's constant desire to escape the captain, but this exploration is lost in the enthusiastic and playful wealth of scientific detail.

In Aronnax's narrative, this enthusiasm leads to a rich multiplication of the sound of science, a frequent gentle humour, and unfortunately an often-tedious longwindedness. The flavour of this combination can only be appreciated by a glance at the following extract. Aronnax has already "proved that the "thing must be a creature rather than a submarine. Now he is explaining to Ned that

"...it must be built in some incredibly powerful way."

"Why?" Ned asked.

"Because incalculable strength is needed to stay at great depths and withstand the pressure there."

"Really?" said Ned, blinking.

"Yes, and I could give you some figures to prove it easily."

"Oh, figures!" answered Ned. "You can make figures do whatever you want."

"Perhaps in business, Ned, but not in mathematics. Now listen. The pressure of one atmosphere is represented by a column of water thirty-two feet high. In actual fact, the column of water would not be that high, because here we're dealing with sea water which has a greater density than fresh water. Well now, Ned, when you dive down into the sea, for every thirty-two feet of water between you and the surface, your body is supporting an additional pressure of one atmosphere, or in other words of 14.7 pounds per square inch of surface. It follows that at 320 feet this pressure is equal to ten atmospheres, a hundred atmospheres at 3200 feet, and a thousand atmospheres at 32,000 feet or about six miles. This is the same as saying that if you could reach such a depth in the ocean, your body would undergo a pressure of 14,700 pounds per square inch. Now, Ned, do you know how many square inches there are on the surface of your body?"

"I have no idea, Monsieur Aronnax."

"About two thousand six hundred."

"That many?" [10]

One is delighted by the calculations offered to prove a point incalculable," the off-hand jibes at "business," and the incredulity of Ned. Underlying this whole speech is the suspicion which Verne could expect in his contemporaries, that the thing would indeed turn out to be a submarine. Thus, we see a humor satirically directed against the scientist himself when the exchange ends:

"So, you can see how strong their bone structure and body would have to be in order to resist such pressure!"

"They must be built," answered Ned Land, "with steel plates eight inches thick, like armored frigates.[11] And indeed, that is just how the Nautilus is built.

In Verne's novel we find science fiction, despite a playful poking fun at the scientist, offering scientific adventure with an enthusiasm that borders on the obsessive. Though humor is perhaps Verne's stylistic strongpoint, one cannot forget the images of the giant cultured pearl worth two million dollars, the valley of lost ships whence Nemo acquires his gold, the underwater coral burying ground, or the visit to dead Atlantis. Nemo is perhaps memorable in his melancholy misanthropy, his secret support of revolutionaries, and his missionary preaching for the protection of the ecology of the sea. But the overall story intended to tie the episodes together is really not memorable at all. The escape of Aronnax, Conseil, and Ned Land occurs, conveniently, when the Professor is unconscious, so Verne is not put upon to invent a means whereby these ordinary men could evade the extraordinary Nemo, nor must Verne explore the necessarily dramatic final meeting of the two men. Instead, he falls back on editorial omission, a literary device which had already been used by his idol Poe in *The Narrative of Arthur Gordon Pym*, and merely wraps up the story. Yet, of all the books of this enormously popular author, *20,000 Leagues Under the Sea* was the most popular all. While Mary Shelley dramatized the ambivalence toward science, Verne had shown that one could embrace it for its own sake. While Mary Shelley had agonized over the problem of the outsider in a colonial century, Verne had created Nemo, made rich by science, to support the oppressed. Where science fiction had come to Verne as a fledgling genre struggling with ambivalence, he left it a widely read art form capable of expressing the enthusiasms of a scientific age.

H.G. Wells's short novel *The Time Machine* is narrated by an unnamed guest at the home of the Time Traveller. The scientific context is established immediately by the after-dinner debate about the physical nature of time. The Time Traveller asserts that

There is no difference between Time and any of the three dimensions of Space except that our consciousness moves along it, [12]

This single fantastic assumption, made plausible by the dinner table argument and the demonstration of a small working model of a time machine, is used to justify the Time Traveller's voyaging to the future. Other authors, like Washington Irving in "Rip Van Winkle," had created characters who slept their way into the future. Some, like Edward Bellamy in *Looking Backward*, had tried to justify this protracted sleep by appealing to scientific sounding notions of extended Mesmerism and chemically preservative gases. But Wells was the first to conceive of the time machine, and this device is the key to the effectiveness of the tale. The Time Traveller enters his own dining hall a bit late for the habitual meal in the week following the demonstration of the model and declares to his reconvened guests that "I was in my laboratory at four o'clock, and since thenI've lived eight days." Because the machine has allowed him to return, Wells has every reason to have the Time Traveller not merely undergo future experiences, but report them to and defend them against the typically Victorian minds of his guests. Except for interjections by those guests, almost the entire remainder of the book is the Time Traveller's tale.

After a vivid description of the gray blur of alternating nights and days, the time Traveller arrives in 802, 701 A.D. and discovers there what at first appears to be an ideal, almost Edenic environment the whole earth had become a garden." The inhabitants of this world turn out to be the Eloi, a race of delicate, slight, fruit-eating people who live in utter tranquility with each other. Gradually, however, it becomes clear that this tranquility arises not from ethical perfection or moral restraint but from enervation. Indeed, the Time Traveller at one point observes one of a party of Eloi drowning and finally performs the rescue himself when it becomes clear that these dull specimens will not even glance toward the impending disaster. The saved character is named Weena, a typically stupid, childlike Eloi with a typically short attention span. Vaguely recognizing the Time Traveller as a personal saviour, she attaches herself to him with the closest thing the future has to offer by way of personal affection, a thoughtless, nearly cannibal, barely sexual fidelity. As a mark of this, just before the Time Traveller leaves her epoch, she gives him two flowers which figure importantly later in the book.

Where did the Eloi come from? They came, or will come, the Time Traveller realizes, from us: they are our children. The evidence of decaying machines and once-imposing architecture leads him to presume that technology had been refined and that that refinement had led to a change in man through the normal process of evolution.

What, unless biological science is a mass of errors, is the cause of human intelligence and vigour? Hardship and freedom: conditions under which the active, strong, and subtle survive and the weaker go to the wall.....I thought of the physical slightness of the people, their lack of intelligence, and those big abundant ruins, and it strengthened my belief in a perfect conquest of Nature. For after the battle comes Quiet. Humanity had been strong, energetic, and intelligent, and had used all its abundant vitality to alter the conditions under which it lived. And now came the reaction of the altered conditions.[13]

But the Time Traveller has so far seen only part of man's situation. Were Well's novel merely a fictional prediction of our future degeneration it would not speak to us as it does. What Wells added was his own version of the Socialist vision. As early as Benjamin Disraeli's novel *Sybil, or the Two Nations* (1845), fiction had presented the Rich and Poor as utterly separated. In the world of 802,701 A.D., the degenerate Eloi are not alone at night, creeping from the bowels of underground tunnels where they live. come the Morlocks, pallid, compulsive mechanics who feed on the weak and sleeping Eloi. Well's Time Traveller comes to realize that the separation of classes in his own time had led to a separation of environments as the mechanical class stayed with its underground machines while the leisure class frolicked above. This separation of environments had led in turn to separate evolutions; and by this date "Man ...had differentiated into two distinct animals." To the extent that the Morlocks are mindless, they have been brutalized by the Eloi-or their ancestors in Victorian England, but to the extent that they victimize the Eloi, the workers represent a base threat to what had once been gracious in human existence. The attitude of the book is complex. By virtue of their harmlessness, the Eloi elicit our sympathy, but by virtue of their vestigial aptitudes for solving at least mechanical problems, the Morlocks possess in greater measure that self-reliance on which mankind has prided itself. Clearly neither alternative is acceptable, and the book becomes a potent plea for the whole man, warning against the fragmentation of function and the isolation of class which the progressively mechanizing society of England was supporting,

Somepersists have held the definition of science fiction that calls for the creation of a narrative world. This they do by making a simple alteration of the known world and then logically extrapolating the consequences of that change, projecting that change into the future or into some new society. On the very first page of the novel, Well's narrating guest mentions the inventor's special dining chairs which "embraced and caressed us rather than submitted to be sat upon." With this one technological exception, one might well say that nothing in *The Time Machine* is unjustified-implausible-so long as we accept the science of the day (Social Darwinism, Scientific Socialism) and one scientifically fantastic device (the time machine itself) made fictionally plausible by the arguments within the book. The range of science fiction extends far enough to include such works as Phil Nowlan's comic strip, *Buck Rogers* (1929-67), which constantly concocts new and unjustified devices at the drop of a hat, but in the center of that range are found the so-called scientific romances of H. G. Wells. These are potent in their conception and pure in their execution.

The Time Machine is remembered for the adventures in 802,701 A.D. The Morlocks have taken the machine itself and in his efforts to regain it the Time Traveller has some hair-raising adventures in their lightless mechanical burrows. However, this gloomy warning of the dangers of class differentiation, though comprising the bulk of the book, is actually but half of its thematic substance. Even before he leaves the time of the Eloi, the Time Traveller, in a moment of respite from pursuit by the Morlocks through a nighttime forest, philosophizes:

"Looking at these stars suddenly dwarfed my own troubles and all the gravities of terrestrial life...I thought of the great [20,000 year] processional cycle that the pole of the earth describes. Only forty times had that silent revolution occurred during all the years that I had traversed." [14]

In science fiction, man is made to feel his smallness by contemplation of the disparity between the magnitude of his understanding and the magnitude of the cosmos he inhabits. Even eight hundred thousand years is but an instant to the age of a planet.

So before the Time Traveller returns to Victorian England, he first journeys forward, this time thirty million years into the future when there is no more alternation of day and night because "the work of the tidal drag was done." He comes to rest on "a desolate beach," the first of a legion of such crucial locales in science fiction. The only life visible in the murky air or on the muddy land is "a thing like a huge white butterfly" and "a monstrous crab-like creature." "Abominable desolation.....hung over the world."

At last, more than thirty million years hence, the huge red-hot dome of the [decaying] sun had come to obscure nearly a tenth part of the darkling heavens.[15]

In this final image of the world run down, the differences between Morlock and Eloi seem ancient and unimportant.

The Time Traveller finishes telling of his journey and exhibits Weena's flowers to substantiate his tale. A Botanist guest cannot identify them as belonging to any presently known species. The Time Traveller, sympathetic toward the victimized Eloi, determines to set off again with the equipment and skills to help them. He promises to return, if he lives and thus succeeds, and would, of course, make such a return, from the narrator's point of view, right after he leaves. But he does not return. This time, apparently, the Morlocks were successful. The narrating guest offers an epilogue three years later in which he writes that the Time Traveller

.....thought but cheerlessly of the Advancement of Mankind, and saw in the growing pile of civilization only a foolish heaping that must inevitably fall back upon and destroy its makers in the end..... But.....I have by me, for my comfort, two strange white flowers-shrivelled now, and brown and flat and brittle to witness that even when mind and strength had gone, gratitude and mutual tenderness still lived on in the heart of man. [16]

This strange narrative optimism, standing against the undoubted fact of the Time Traveller's death, leaves the reader with an ambivalence not merely about science and the putative benefits of technology, but about the essential meaning of humanity. In separately dramatizing our lighter and our baser natures, Wells raises this question of meaning with a psychological immediacy. In this short novel, a nearly pure extrapolation, Wells was able to forge the art of science fiction into a sophisticated tool for both social and metaphysical speculation.

Yevgeny Zamyatin's *We* is set in a future world-wide United State in which there are no people, only Numbers. The book takes the form of the diary of D-503, an engineer who is also Chief Builder of a new and marvellous device, the space-ship Integral, which the Well-Doer (the dictator) clearly plans to use to extend the grip of this society to the planets. As the Guardians of the United State say of the aliens they expect to meet,

If they will not understand that we are bringing them a mathematically faultless happiness, our duty will be to force them to be happy.[17]

The stylistic conflict between "happiness" and "force" is typical of Zamyatin's continuing effort to keep metaphysical issues before the reader. Beyond the particular warning against technological totalitarianism, we find more general dilemmas. In this case, the nature of happiness is questioned:

Desires are tortures, aren't they? It is clear, therefore, that happiness is when there are no longer any desires, not a single desire anymore.[18]

Similarly, the book questions the nature of freedom:

Why is the dance beautiful? Answer: because it is an unfree movement.[19]

Taking these two examples together, Zamyatin is posing anew, in the logic of a scientific age, a perpetual problem: can freedom and happiness be compatible? The answer for the United State is to try and develop an operation for "the surgical removal of fancy." This is the world our characters inhabit-and perhaps the world toward which we are moving.

The fact that D-503 writes a diary at all shows that he has some desire which is not preemptively channelled by society. There should be no desire in the United State except to serve the state. But D-503 becomes attracted to I-330. Since desires are tortures, and since love is the extreme of desire, and since the extreme of torture is death, D-503, before he submits to his strange yearnings, concludes that, " $L=f(D)$, love is the function of death." We see this to be true when one female Number individualizes herself by screaming at the public execution of her illicit lover. She too meets death.

The State has done everything possible to kill desire, imagination, art. The people live in glass apartments so that privacy and loneliness do not lead them to private, lonely thoughts. Of course, this living arrangement also facilitates surveillance by the ever-helpful Guardians. Mankind's traditional evil, sexual urging, has been conquered by the *Lex Sexualis*: "A Number may obtain a license to use any other number as a sexual product." And, of course, the other Number must submit. All a Number need do is apply to the proper authorities and he or she is given a coupon book with pink slips conferring sexual access. Everyone does everything by the beautifully efficient Tables of hours. By submitting a pink slip to your chosen Number, you may cohabit when next your Sexual Hours coincide. At that point-and that point only-curtains may be drawn in the glass apartments,

As D-503 finds himself wishing for illicit activity, he begins to examine the world he lives in. Through his usually patriotic eyes we simultaneously learn to fear mechanization and sympathize with those urgings which keep people mechanized. He reports to us all the features of his almost totally regularized society as he breaks slowly from it. I-330 turns out to be a member of a secret society, the Mephi (from Mephisto) who live outside the Green Walls which totally imprison every city of the United State. Much of the excitement of the book comes from D-503's growing involvement with the Mephi's desire to sabotage the state, I-330 hopes to use the Integral to breach the Green Walls. When D-503 realizes this, however, he also doubts the sincerity of I-330's love, supposing that she may have taken up with him only to gain

access to the ship. Zamyatin recognizes that the woman too may be calculating, and society does indeed protect its faithful members.

Zamyatin keeps such complexities always before us. He is uniquely successful in doing this by scientizing the very language of his novel. We have already encountered "mathematically faultless happiness" and " $L=f(D)$ "; we have seen people reduced to Numbers and seen these Numbers functioning according to the Tables of Hours. In the following, D-503 is defending the Operation Department, the medical facility to which Guardians bring deviant Numbers in need of a little palliative lobotomy. The very substance of his thought reveals his mechanized mind:

About five centuries ago, when the work of the Operation Department was only beginning, there were yet to be found some fools who compared our Operation Department with the ancient Inquisition. But this is as absurd as to compare a surgeon performing a tracheotomy with a highway cutthroat. Both use a knife, perhaps the same kind of knife, both do the same thing, viz., cut the throat of a living man, yet one is a well-doer, the other is a murderer, one is marked plus, the other minus. All this becomes perfectly clear in one second. In one turn of our wheel of logic, the teeth of which engage that minus, turn it upward, and thus change its aspect.[20]

It is impossible to deny the logic of this passage; but the logic has nothing to do with the moral axioms by which we judge lobotomies. In the conflict between the mathematical language and the humane desire to do well. Zamyatin is warning us against sophistry under the guise of science. An acute reader sees that the real target is the sophistry, not the science. Indeed, the Integral, a mathematical summation and a mechanical device, could well be the instrument of successful rebellion.

In discussing the Operation Department, D-503 necessarily uses Zamyatin's key image, the knife.

A knife is the most solid, the most immortal, the most inspired invention of man. The knife served on the guillotine. The knife is the universal tool for cutting knots. The way of paradoxes follows its sharp edge, the only way becoming to a fearless mind...[21]

Through the knife, Zamyatin extends the ambiguities of freedom versus happiness to basic human physiology. Just as knives may solve a problem or kill a saint, so mouths can be used for suckling or snarling, and teeth for sustenance or savagery. Time and again Numbers are characterized by their mouths, with teeth like knives, smiles like scissors, lips a deep blood red. We begin to see that the knife/technology constellation of symbols has an implicitly sexual side, we begin to sense its phallic nature, and we realize that sex too can lead ambiguously to tenderness or to dehumanization: love or the *Lex Sexualis*.

Through the central image of the knife, extending to all technology on the one hand and to human sexuality on the other, Zamyatin takes Shelley's ambivalence toward science and shows us that it is part and parcel of man's universal existential ambiguity. The state perfects the operation for the surgical removal of fancy and D-503, having failed in treated by a benevolent government. Writing a last chapter for the sake (210) using the Integral to fight the Well-Doer, need not be executed. He can be of completeness, he claims to feel as if "a splinter has been taken out of my head." Horribly, he is pleased to note that now he smiles all the time and "Smiling is the normal state for a human being." Like the knife, so simple and apparently good a thing as a smile is revealed ultimately to be deeply ambiguous. As D-503 says, in his last words, "Reason must prevail."

We are a thoroughly scientific fiction, using science to justify its social extrapolation, its plot, even its language. The emphasis is against over reliance on science, for in that direction lies totalitarianism. But the book does not offer a surer path. Rather, in its more general address to human problems, it seems to suggest that our world is indeed an uncertain one, and we must learn to recognize and live with uncertainty. Zamyatin extended the range of science fiction by making dystopian literature a vehicle for the most searching kind of human self-reflection.

All science fiction is to some degree fantastic. Even the purely extrapolative function of Wells gains its excitement and special perspective by positing a time machine. A work like *We*, with its full array of social and technological innovations may seem somewhat fantastic. If one continues in this progression, one senses the range of science fiction extending perhaps to pure fantasy itself. David Lindsay has created in *A Voyage to Arcturus* a work of troubling power which takes its roots in science fiction and flowers into metaphysical fantasy. Zamyatin relentlessly applied science in his fiction to make us feel the frightening importance of existential ambiguity. Lindsay, countryman of Shelley and Wells, cavalierly overcomes science to arrive at the consequence of that ambiguity: moral paralysis.

The story begins when two Englishmen, Maskull and Nightspore, come to a seance intended to thrill jaded Edwardian sensibilities. An apparition indeed appears. As the guests watch, a man rushes into the room and strangles the

apparition, who dies with a hideous grin. The man, Krag, turns out to know Nightspore and offers to take him and his friend to Arcturus in search of Surture, apparently some type of demigod. The hocus-pocus of the seance is balanced against the inverted science Maskull soon encounters at Starkness, the abandoned Scottish observatory from which Krag proposes to leave. There Maskull finds a tower which he hasn't the strength to climb, for as he goes up, its gravity increases geometrically: gravity as inverse electromagnetic phenomenon. Of course, there is no justification for this kind of gravity, but once introduced, it functions "scientifically," with mathematical precision. But when Krag arrives and needs to climb to the roof, he administers a ritual arm wound to Maskull, and suddenly the man can walk up the stairs with ease. The narrative attitude toward science here is ambiguous, as in *We*. However, where *We* questions the utility of science, *A Voyage to Arcturus* questions the very nature of science. What after all should we make our science if it functions in the same realm as magic? By writing science fiction as fantasy, Lindsay makes science fiction a tool for questioning science itself.

In this vein, the trio travels to Arcturus, or more accurately to the planet Tormance in orbit around the star Arcturus, in a spaceship powered by a bottle of backrays, light which is just like ordinary light except instead of inevitably radiating out from its source, it tries unceasingly to radiate back to its source. The ship goes incredibly fast—one can calculate that speed as an incredible 15,225 times the speed of light—and Maskull loses consciousness. What he experiences on awakening forms the bulk of the book.

One of the most striking sights is the illumination itself. Arcturus turns out to be a double star, one globe of which, in the eyes of Maskull on Tormance, transmits red-yellow-blue light and the other of which transmits blue-ulfire-jale light. When both cast their light, there appear to be five primary colours. Lindsay makes his invented colours seem quite real:

Just as blue is delicate and mysterious, yellow clear and unsubtle, and red sanguine and passionate, so [Maskull] felt ulfire to be wild and painful, and jale dreamlike, feverish, and voluptuous. [22]

This is all very logical, and Lindsay uses the colours jale and ulfire in describing the wildly diverse Tormantic sights. But the human eye, logic notwithstanding, shouldn't be able to see any colours but those within what we so that we may see what we do not see on earth that it is precisely Lindsay has used science fiction to create his philosophical landscape. Quite literally, one of the "oddities" of this "alien world" is its "new light."

"I am on a strange planet," said Maskull slowly, "where all sorts of unheard of things may happen, and where the very laws of morality may be different." [23]

Not only a strange planet, but quite particularly "a new planet" where life

is necessarily energetic and lawless, and not sedate and imitative. Nature is still fluid—not yet rigid—and matter is plastic. The will forks and sports incessantly, and thus no two creatures are alike. [24]

When Maskull first regains consciousness after his space journey, he finds himself on a plain.

He felt something hard on his forehead. Putting his hand up, he discovered there a fleshy protuberance the size of a small plum, having a cavity in the middle, of which he could not feel the bottom. Then he also became aware of a large knob on each side of his neck, an inch below the ear.

From the region of his heart, a tentacle had budded. It was as long as his arm, but thin, like whipcord, and soft and flexible. As soon as he thoroughly realized the significance of these new organs, his heart began to pump. Whatever might, or might not, be their use, they proved one thing that he was in a new world. [25]

At the level of the plot, Maskull's conclusion is literally true. But more importantly, he is in a new world because he sees it with new eyes—among other things. The bulb on his forehead is called a breve.

Maskull became interested in a new phenomenon. The blossoms of a crystal bush were emitting mental waves, which with his breve he could clearly distinguish. They cried out silently, "To me To me!" While he looked, a flying worm guided itself through the air to one of these blossoms and began to suck its nectar. The floral cry immediately ceased. [26]

There is a disquieting realism to this description, illuminated by unearthly colours, displaying fantastic creatures and things, and employing direct access to "mental waves." However, one fails to realize if that worm killed the flower or made love to it. Equally disquieting is whether either of those acts have been good or bad.

When Maskull awakens with his breve, it is as if he had died in the spaceship landing and been reborn on Tormance. He is without friends, history, or orientation. Immediately he awakes and a "woman" named Joiwind gives him help. He cannot lift himself against Tormance's potent gravity. She wounds her own arm, wounds his arm (not the one Krag had already used) and they mix bloods, she feeling weakened, he strengthened. Again, ritual and science seem to intertwine and elude us.

The bulk of the novel is Maskull's journey across Tormance, each episode employing a new locale, new characters, and new modes of perception. Within each environment, we find an inner logic such as we would expect in more extrapolative science fiction. In Lichstorm, for example, the inhabitants are pure men and women, not men with some estrogen and women with some androgen. These people exhibit sexual passions and characteristics in much more dramatic-frightening-ways than do normal earth people. Yet in addition, they transport themselves by the power of "male stones," the rays of which repel matter and can maneuver a flying boat by being alternately exposed and shaded. Such complementary details not only deepen the "scientific" aspect of the fiction but question the assumption by which we attempt scientific thought.

In addition to the bewildering logic within each episode, we find the fiction pushed far toward fantasy by the profound perceptual changes that accompany each of the frequent and unexpected changes of locale. Just as Alice enters a new world each time she jumps over a brook in *Through the Looking Glass* (1872), so Maskull enters a new, albeit science fictional world each time he continues on his journey. For each new locale, Maskull changes perceptions. In an important sense, each change is a dying out of one world and a birth into another. This dying, as postulated by Saint Jerome, makes Maskull better able to see the moral imperatives of the world, but each death also brings him to a new world and one cannot know that in the newer world he is any better prepared.

This book does more than dabble with Christian theology. In an echo of the mysticism of St. John of Patmos, the isolated Maskull hears a whisper that tells him,

Nightspore is asleep now, but when he wakes you must die.

You will go, but he will return.[27]

Lindsay was well aware of his science fiction forebears. The male stones, for example, are certainly modelled on the Cavorite that propelled Wells's *The First Men in the Moon* (1901). Similarly, his reasoning behind some biological and physical details is extraordinary, for instance, when he notes the branches of a tree tossing around a squirrel, and then questions our whole sense of taxonomy by noting that the sight would not seem strange if we merely thought of the tree as animal and the squirrel as vegetable. Indeed, in the purest sense of extrapolation, each episode is intriguing science fiction. But in the mad rush from episode to episode, and in the utterly unjustified leaps from physiology to physiology, sense to sense, Lindsay has also created a Fantasy. Lindsay has exploited fantasy to extend the range of science fiction into ultimately serious myth.

CONCLUSION:

Interested as we are in all branches of natural science, our interest in nature does not seem to be strictly a scientific one. In a natural history lie the birds and animals stark and stiff or stand up in ghastly museum mockery of life. The fish in the water, the bird in the tree, the animal in the fields or woods, what a different impression they make upon us! To the great body of mankind, the view of nature presented through the natural sciences has a good deal of this lifeless funeral character of the specimens in the museum.

Yevgeny Zamyatin's 'We' is set in a future world-wide United State in which there are no people, only Numbers. We are a thoroughly scientific fiction, using science to justify its social extrapolation, its plot, even its Language. The emphasis is against over-reliance on science, for in that direction lies totalitarianism. It seems to suggest that our world is indeed an uncertain one, and we must learn to recognize and live with uncertainty.

It is manifest from the present study that the sumptuous feast of great writing in science fiction has something to say about science in a Berary way and say it forcibly as well. Every work shows the marks of its own time, the values and concerns of its particular era. Taken as a whole, these works illustrate a great search for values as these are all works of practical and speculating philosophy, using the unique potential of fiction as a way of searching for ethical principles in concrete situations. can thus be inferred that for the last two centuries, science fiction has been making literature. a serious and dedicated effort to create a modern form.

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