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TECHNOLOGY

AND THE MODERN NOVEL:

A HISTORICAL PERSPECTIVE*

For purposes of initial discussion, technology may be taken to mean applied science, thereby drawing attention to the practical applications of researches and discoveries made by science. This gives technology an importance which is not always fully recognised. Technology entails an enlargement of the apparatus with which man shapes, and is shaped by, his environment. This in turn leads to a modification of the behaviour-pattern defined by an earlier, if cruder, technology.[1]

The interaction between life and science via technology has always been basic, though at certain stages of man's history this

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[1] Discussions of the manner in which technology affects human behaviour abound in most books that deal with culture past and present. H. J. Muller's *The Children of Frankenstein*, Indiana University Press, 1970 and René Dubos's *So Human An Animal*, London, Rupert Hart-Davies, 1970 are particularly useful.

interaction has made itself more effectively felt. The wheel and axle may be cited as ushering in the agrarian revolution which completely changed man's living habits. However, the conversion of science into technology is, most usually, a gradual one for, between the scientific knowledge and its application, man's culture intervenes, causing a time lag checking immediate implementation of a scientific discovery or invention until there is adequate forecast of its consequences.[2] In the continuum of man's development science and technology occupy crucial positions in relation to man's culture. In a sense culture consists of man's attitudes and orientation towards a given situation affecting his life. So long as science remains a theoretical discipline where its speculations are felt only on paper it does not attract larger considerations. But once it invents instruments and machines, its function is questioned.

While the shape of a culture and its directions are usually in the hands of moralists, politicians and others directly engaged in the business of everyday affairs, literary history shows a marked concern with this science-life nexus among writers. This is only to be expected. Literature offers a keen, sensitive, individual response to the environment in which it finds itself. It imaginatively explores, among other things, the effects upon man's behaviour of any change in his environment. Technology's characteristic feature is the manner in which it modifies or changes the environment into which it is introduced. Literature, as an essential variable of culture, inevitably focuses on these modifications to examine the relationship established between man and his changing environment. The impact of technology is so total as to be subjected to constant critical scrutiny because of the extent to which it permeates life in society. A changed or modified environment induces a corresponding change or modification in peoples' outlook, which revises in turn accepted modes of behaviour. The new patterns of behaviour are invariably

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[2] The atomic bomb is a modern example. The scientific knowledge of the possibility of atomic power did not automatically lead to its utilization as it involved several moral and political questions. For a popular account of the issue, see Robert Jungk's *Brighter Than A Thousand Suns*, London, Gollancz & Hart-Davies, 1958.

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reflected in the literature which informs the ethos of the given socio-cultural context.[3]

Before technology grew sizeable and significant, man's environment was, to all intents and purposes, fashioned by natural forces. The elements and supernatural beings were invoked as the determinants of man's environment. The literature of these ages tended to be preoccupied to supplicate and explicate these natural and supernatural forces. This was the case for a very long span of man's history. While it is true that science was already a flourishing discipline in ancient centres of civilisation, it was, nevertheless, often a theoretical exercise of the fertile imagination. Its findings were not always taken too seriously as they did not obviously affect man at large. Scientists were called natural philosophers and their endeavours to discover the mysteries of nature were often kept secret.

About the seventeenth century, however, a revolution in scientific thinking occurred.[4] To a greater or lesser extent men like Tycho de Brahe, Francis Bacon, Johannes Kepler and Galileo modified the role of the scientist by a more rigorous thinking directly venturing into experimentation. The history of scientific thought shows that experiment was a key development because it converted science into technology.[5] Once men like Kepler and Galileo started to test their theories, what had previously been at most precise and mathematical imaginative exercises and arguments now became observable scientific facts. The great age of technology was being inaugurated. Dreams could now be gradually realized by the new corridors of power that practical science opened. All previous speculative matter could now be tested to separate the fictional from the factual. In science, now,

[3] "Good literature re-creates the immediacy of life—that life was and is all these things, all these different orders of things *all* at once. It embodies the sense of human life developing in a historical and moral context. It re-creates the pressure of value-laden life so that—to the extent of the writer's gifts and art—we know better what it must have meant to live and make decisions in that time and place..." Richard Hoggart, *Speaking to Each Other*, Vol. 2 Harmondsworth, Penguin, 1973, pp. 20-21.
[4] Cf. A. N. Whitehead, *Science and the Modern World*, London, Macmillan, 1925; and D.S.L. Cardwell, *Technology, Science and History*, London, Heinemann, 1972.
[5] It is interesting to note that the first English use of the word "technology" in its present sense took place in 1615—*Oxford English Dictionary*.

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lay the key to the understanding of the universe and of the various hitherto astonishing phenomena of nature. Reason and observation combined to give science its solid bedrock of permanence. Man's knowledge of his surroundings grew enormously and rapidly and this extended his power to dominate and exploit his environment. Now man could shape his own material destiny. This revolution in man's thinking and aspirations, leading to the formulations of new hopes for a better age, found, perhaps, its most articulate advocate in the writings of Bacon,[6] especially his *The New Atlantis*, published posthumously in 1627.

The chief feature of *The New Atlantis* is its portrayal of a gigantic research institute devoted to exploiting the practical side of scientific theories. In Solomon's House (as this institute is called) is vested the glory, splendour and power of the new Atlantis. Significantly Bacon's ideal society is governed, not by politicians, but by a select group of men, each of whom is a specialist of the various sciences. The extent of specialization so familiar in our time is anticipated by Bacon who postulates the necessity of having specialists of all kinds. Though the literary merits of *The New Atlantis* are doubtful[7]—there is too much descriptive detail which destroys the story element—it gave much impetus to the idea of progress based on ever-increasing knowledge and emphasized the role of scientists as shapers of patterns of living. Bacon's very careful and detailed description of Solomon's House inspired the establishment of the Royal Society and its early researches.[8] A radical change occured in man's outlook on life, and subsequent history up till our own time was to bear testimony and pay homage to the genius of Bacon. It has

[6] "The core of Bacon's work was not science, but the social relations of science. He was virtually the first, and a very great, writer on this subject". J. G. Crowther, *The Social Relations of Science*, London, Cresset Press, 1967, p. 260.

[7] Cf. "Although full of Utopian science, *The New Atlantis* is not an imaginative effort to see how science might affect and change society." Richard Gerber, *Utopian Fantasy*, London, McGraw-Hill, 1973, p. 51.

[8] "The founders of that Academy, such as John Wallis, the mathematician, and Robert Boyle, the chemist and physicist, acknowledged Bacon as the originator of their plan, and Bishop Sprat, its historian, wrote, 'This foundation of the Royal Society... was a work well becoming the largeness of his wit to devise.' Joseph Glanvill says in the Dedication to his *Scepsis Scientifica*, 1665, 'Solomon's House in *The New Atlantis* was a prophetic scheme of the Royal Society'." A. B. Gough, "Introduction" to *The New Atlantis*, London, Oxford University Press, 1924, p. xlii.

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to be admitted, of course, that Bacon had his detractors and that the arrogance he unintentionally accorded to the new man was to be meted out at considerable price. The new philosophy of science was mercilessly satirized by a man like Swift, particularly in Book 3 of *Gulliver's Travels*. Despite such attacks, Bacon's ideas remained deeply entrenched in the growing realization that man could largely become the maker of his own life.

Scientific humanism, which was challenging religion's role in human affairs, had found a fruitful literary voice in *The New Atlantis*. For Bacon, science and technology were Promethean[9]— knowledge made available by science ought to be utilized to better man's living condition. As the Master of Solomon's House put it, "The end of our foundation is the knowledge of Causes, and secret motions of things; and the enlarging of the bounds of human empire to the effecting of all things possible."[10] While *The New Atlantis* purports by its style to be a literary work, its continuing impact was essentially non-literary. In spite of its literary shortcomings, *The New Atlantis* remains an important document embodying the "knowledge is power" philosophy which optimistically looked towards the future as unfolding greater reign for man through the agency of applied science.

From a literary point of view Swift's parody on the work carried out by the Royal Society in *Gulliver's Travels* is certainly more appealing than *The New Atlantis*.[11] Basically, Swift's on-slaught was directed against those scientific projects which were an end in themselves and not a means to improving mankind.[12] In Book 2, for example, when satirizing politicians, Swift seems to give assent to agricultural technology through the King of Brobdingnag who says, "whoever could make two ears of corn, or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians

[9] The term is Basil Willey's. Cf. *The Seventeenth Century Background*, Harmondsworth, Penguin, 1962, p. 37.

[10] *Op. cit.* p. 35.

[11] C. Milton Millhauser, " 'Dr. Newton & Mr. Hyde'; Scientists in Fiction From Swift to Stevenson," *Nineteenth Century Fiction*, Vol. 28, No. 3, December 1973, pp. 287-304.

[12] But see George Orwell's "Policies as Literature: An Examination of *Gulliver's Travels*" in *Inside the Whale and Other Essays*, Harmondsworth, Penguin, 1962, esp. pp. 125-127.

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put together."[13] It would appear that Swift's contempt of science is aimed at those who indulged in scientific experiment at the expense of general welfare.[14] The Academy of Projectors in Lagado,[15] we are told, contained professors whose job was to

contrive new rules and methods of agriculture and building, and new instruments and tools for all trades and manufactures, whereby, as they undertake, one man shall do the work of ten; a palace may be built in a week, of materials so durable as to last for ever without repairing. All the fruits of the earth shall come to maturity at whatever season we think fit to choose, and increase an hundred fold more than they do at present, with innumerable other happy proposals. The only inconvenience is that none of these projects is yet brought to perfection, and in the meantime the whole country lies miserably waste, the houses in ruins, and the people without food or clothes.[16]

Swift is clearly condemning that technological advancement which loses sight of the more urgent and immediate tasks at hand. For Swift both pure and misapplied science are baneful and ought therefore to be castigated, which he does in the caricature of the scientist-technologist:

He had been eight years upon a project for extracting sunbeams out of cucumbers, which were to be put into vials hermetically sealed, and let out to warm the air in raw inclement summers. He told me, he did not doubt in eight years more, that he should be able to supply the Governor's gardens with sunshine at a reasonable rate; but he complained that his stock was low, and entreated me to give him something as an encouragement to ingenuity, especially since this had been a very dear season for cucumbers.[17]

[13] Jonathan Swift, *Gulliver's Travels*, Book 2, Ch. 7, Harmondsworth, Penguin, 1967, p. 176.
[14] Cf. Charles Peak, "The Coherence of *Gulliver's Travels*" in *Swift*, ed. C. J. Rawson, London, Sphere Books, 1971, esp. pp. 180-181.
[15] Marjorie Nicolson has ably demonstrated how closely Swift was satirizing the projects of the Royal Society, See her *Science and Imagination*, Ithica, N. Y., Cornell University Press, 1956, esp. pp. 135-152.
[16] *Op. cit.*, Book 3, Ch. 4, pp. 221-222.
[17] *Op. cit.*, Book 3, Ch. 5, pp. 223-224.

It seems that Swift sensed the futility that lay at the heart of a mindless obsession with science and technology. He depicted incisively the total lack of human relevance of many scientific experiments and questioned the ethic that went along with the scientific temper. His response, like that of Bacon, was marred by one-sidedness—though in fairness we ought to add that he gave credit to the scientists when it was deserved.

The rationalism which the eighteenth century insisted upon began to have its backlash in the closing decades of the century. The insidious growth of materialism in the Age of Reason led to several disquieting statements by the chief writers of the day. The so-called romantic revival drew attention to the dehumanizing tendencies of science and technology. Poets such as Blake, Wordsworth and later Keats, reacted strongly to what they felt was the spiritually barren and imaginatively sterile mode of living which they attributed to a stress on the scientific attitude. A common complaint was that science as practised and applied threatened the individual, especially his spiritual and moral qualities.[18] Despite these anti-science sentiments, the Romantics did not really produce a significant literary document which seriously questioned the scientific ethic. Mary Shelley's *Frankenstein*, however, examines the consequences when the scientist creates without a larger moral awareness.

The sub-title to Mary Shelley's book—"The Modern Prometheus"—suggests that Frankenstein, like Prometheus, was a figure who had ventured into areas of knowledge that could spell his doom. The difference between the two lies in the fact that, unlike Prometheus, Frankenstein is a creator in his own right[19] who, out of medieval alchemy and up-dated modern chemistry, gives reality to an old dream—the creation of life. But the ability to create is merely one theme of the novel. More significant from our point of view in Mary Shelley's handling of the relationship between Frankenstein and his creature, for in this

[18] Cf. "The literature of the nineteenth century, especially its English poetic literature, is a witness to the discord between the aesthetic institutions of mankind and the mechanism of science..., the literary romantic movement... refused to be confined within the materialistic concepts of the orthodox scientific theory." Whitehead, *op. cit.* pp. 88-89.

[19] Cf. R. E. Dowse and D. J. Palmer, "Introduction" to *Frankenstein*, London, Dent, 1970, p. vi.

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we see the modern parable of the scientist and his technology. If the monster turns out to be evil, Mary Shelley is surely hinting that the responsibility is Frankenstein's.[20] The implication is that if advancing science and technology cause disaster then surely we have only ourselves to blame. When, in the novel, Frankenstein senses that the monster has murdered his little brother, he suddenly realizes that he himself is the murderer. In the crux of this problem lies a moral ambiguity: if science and technology go wrong and cause harm, who is ultimately responsible? In *Frankenstein* the problem is made more complex by the fact that the man-monster which Frankenstein had created has his own justification for turning to bad ways. When Frankenstein confronts the monster and accuses him of the havoc he has caused, the monster replies:

> Yet you, my creator, detest and spurn me, thy creature, to whom thou are bound by ties only dissoluble by the annihilation of one of us. You purpose to kill me. How dare you sport thus with life? Do your duty towards me and I will do mine towards you and the rest of mankind.[21]

What is significant here is the emphasis on the bond that is inextricably established between the creator and his creation: Man as creator needs to come to terms with his creations.[22] Mary Shelley's novel reveals that in the relationship that is set up between the creator and what he has created lies a basic and fundamental danger—Frankenstein turns out to be both the master and the slave of the monster he has created. In George Levine's words, Frankenstein "has the technical power to create the monster, but not the moral power to cope with it".[23] One

[20] "The arguments of the monster and the action of the narrative suggest far more concretely and powerfully that the evil resides not so much in the creation of the monster—which is where the modern popularized myth of Frankenstein places the blame—but in Frankenstein's failure to take the responsibility for what he has created." George Levine, "Frankenstein and the Tradition of Realism" in *Novel,* Vol. 7, No. 1, 1973, pp. 14-30.

[21] *Op. cit.* p. 100.

[22] Most non-fiction writers who examine the issue agree on this as, for example, H. J. Muller, *op. cit.,* and Dennis Garbor, *Inventing the Future,* London, Secker & Warburg, 1963.

[23] Levine. *Op. cit.*

of man's most crucial tasks in terms of his science and technology is to have the necessary moral insights into the demands of the technology and see to it that these demands do not obliterate precisely those qualities which made man human.

There is, further, another very significant comment that Mary Shelley makes in her novel. Frankenstein's ambition to create lead him to neglect all his social relations; his ties with those near and dear to him are ruined by his scientific obsession. In him we have the picture of a scientist who is so absorbed in his work that he becomes isolated and alienated from everything around him. The situation thus conceived leaves little doubt as to the nature of the ambition itself: it becomes self-consuming. From a means, it becomes an end; and an end which, ironically enough, ultimately results in destruction. At the moment of his death, Frankenstein advises his friend:

> Farewell, Walton. Seek happiness in tranquility 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.[24]

The advice is well-received, yet the last lines contain that gleam of hope that inspires man to experiment and create.

The importance of *Frankenstein* as social comment cannot be over-estimated. In its terrifying imaginative exploration of the wreck caused by a mania for creation without its accompanying moral checks, the novel underlines the writer's fear of human inventiveness. The image of Frankenstein as the mad scientist, no matter how ill-founded, remains hauntingly alive.[25]

Charles Dicken's *Hard Times* deserves mention here, primarily for two reasons. First, it presents, in its naked deformity, what Sypher has called the "technological hero"[26]: Dicken's portrayal

[24] *Op. cit.* p. 236.
[25] The wide influence of this novel has been noted, among others, by Brian Aldiss, in his chapter on Mary Shelley in *Billion Year Spree*, London, Weidenfeld & Nicolson, 1973, pp. 7-39.
[26] Wylie Sypher, *Literature and Technology: The Alien Vision*, New York, Random House, 1968, p. 8. Sypher's emphasis is on the "implications of technism" while this study focuses on the response to technology by selected writers.

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of Thomas Gradgrind is noteworthy in its stress upon Gradgrind's "facts and figures" mentality—a mentality that rejects all concern for human emotions:

> Thomas Gradgrind, Sir. A man of realities. A man of facts and calculations. A man who proceeds upon the principle that two and two are four, and nothing over, and who is not to be talked into for allowing anything over... With a rule and a pair of scales, and the multiplication table always in his pocket, Sir, ready to weigh and measure any parcel of human nature, and tell you exactly what it comes to. It is a mere question of figures, a case of simple arithmetic.[27]

The indictment of an attitude that refuses to go behind facts to discover the human is superbly dramatized in the novel and summed up in Louisa Gradgrind's accusations:

> "What do *I* know, father," said Louisa in her quiet manner, "of tastes and fancies; of aspirations and affections; of all that part of my nature in which such light things might have been nourished? What escape have I had from the problems that could be demonstrated, and realities that could be grasped?"
>
> As she said it, she unconsciously closed her hand, as if upon a solid object, and slowly opened it as though she were releasing dust or ash.[28]

An attitude to life solely determined by the parsimonious ethic of technology could hardly be tolerated by a man like Dickens who delighted in those very expressions of emotions which reveal man's humanity.[29]

Hard Times is worthy of mention also for its description of and industrial town—a characteristic feature of the technological society. Coketown is repulsive for its depreciation of the individual. In it man loses his identity and becomes totally sub-

[27] Charles Dickens, *Hard Times*, London, Dent, 1966, Book 1, Ch. 2, p. 2.
[28] *Hard Times, op. cit.*
[29] "In *Hard Times* Dickens dramatizes in strikingly symbolic terms the opposition between a soul-destroying relation to a utilitarian, industrial civilization (in which everything is weighed, measured, has its price, and in which emotion is banished), and the reciprocal interchange of love." J. Hillis Miller, *Charles Dickens: The World of His Novels*, Bloomington, Indiana University Press, 1969, p. 226.

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merged in the abhorrent non-human spirit of the place. The ugliness of Coketown, a consequence of technology,[30] underlines once again Dicken's strong reservations about the industrial revolution. Coketown was

> red brick, or of brick that would have been red if the smoke and ashes had allowed it; but as matters stood it was a town of unnatural red and black like the painted face of a savage. It was a town of machinery and tall chimneys out of which interminable serpents of smoke trailed themselves for ever and ever, and never got uncoiled. It had a black canal in it, and a river that ran purple with ill-smelling dye, and vast piles of buildings full of windows where there was a rattling and a trembling all day long, and where the piston of the steam engine worked monotonously up and down like the head of an elephant in a state of melancholy madness. It contained several large streets all very like one another, and many small streets still more like one another, inhabited by people equally like one another, who all went in and out at the same hours, with the same sound upon the same pavements, to do the same work, and to whom every day was the same as yesterday and tomorrow, and every year the counterpart of the last and the next.[31]

The faceless character of Coketown appals the reader for it reflects only too vividly the negative effects of man's narrow march of progress. The town thrives at the expense of its people and imprints its cold and impersonal self upon them. Though it is difficult to be certain if Dickens actually detested industrialization,[32] it cannot be doubted that his perceptions of the dangers of such a process were keen and acute. *Hard Times* retains an almost specific relevance for us especially through the

[30] Cf. Lewis Mumford's analysis of Coketown in *The Story of Utopia*, New York, Peter Smith, 1941, pp. 211-221.

[31] *Hard Times, op. cit.*

[32] Dickens dedicated *Hard Times* to Thomas Carlyle who was strongly opposed to the dehumanizing tendencies of industrialization. Michael Goldberg, in *Carlyle & Dickens*, Atlanta, University of Georgia Press, 1972, gives an incisive account of Carlyle's influence on Dickens.

There can be no doubt that the industrial result of town growth, with towns becoming ugly, dirty, unsanitary, oppressive to the individuals, filled Dickens with horror. Cf. the urban degradation of London in, for example, *Little Dorrit*.

manner in which Dickens so powerfully conveyed the unexpected ill-effects of a way of life which, from another point of view, brought material benefits.

Five years after the publication of *Hard Times* there appeared a book which was to leave its mark on all posterity. This was Charles Darwin's *The Origin of Species* (1859). While the theory of evolution which this book postulated is mainly centred on the biological sciences and hardly concerns itself with matters literary, for our purposes, Darwin's influence is seen in the way in which science and technology become associated with the destiny of man in the notion of evolution as a conceptualized history of man's growth. Society came to be seen as an organism which, like man, was bent upon an ever-increasing upward path.[33] Invariably, science and technology, products of man's thinking and inventiveness, gained importance as being the tools by which man could shape his evolutionary destiny. The ideas of progress which Bacon had put forward now became more real—progress, like evolution, was seen in vertical terms and its chief determinants, namely science and technology, received an added impetus.[34] Man's consciousness of time and history now became a dynamic one and hardened into a belief as leading to a better world. Man was now endowed with an immense sense of self-importance and an urgency of mission; he now had a purpose and every ounce of energy was to be utilized in achieving this purpose—the scaling of the evolutionary ladder until paradise itself was established here on earth.

The theory of evolution encouraged speculations about man's destiny, his limitless future, while retaining a grasp on reality. Put side by side with the industrial revolution that was gaining momentum, Darwin's theory helped to strengthen the inextricable link between man and his environment and made it clear that,

[33] One of the greatest proponents of social evolution was Herbert Spencer, who had a wide following in the second half of the nineteenth century. Cf. Herbert Spencer, *On Social Evolution*, ed. J. D. Y. Peel, University of Chicago, 1972, and Herbert Spencer, *Structure, Function and Evolution*, ed. Stanislav Andrevski, London, Michael Joseph, 1971.

[34] "The progressive attitude only becomes really powerful and realistic with the emergence of a new view which sees progress not only as a moral postulate, but as a historical reality derived from an observation of facts... Such an adequate background for Utopian humanism was provided by the theory of evolution." Richard Gerber, *op. cit.* p. 8.

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as time went by, man had to reckon seriously with his changing environmental conditions—conditions, moreover, which were now to a large extent controlled and created by man himself through his ingenious use of science and technology.

The theory of evolution led to a radical change in the nature of literary works dealing with the theme of science and technology: the focus was now usually futuristic—writers stretched their imaginations to try to discern what the outcome would be, given man's ever upward climb. Hence the writings became more speculative and the imagination of writers proved fertile enough to invent new technologies and foresee the effects of these on man. Because of various social, economic, scientific and technological developments, the latter half of the nineteenth century saw a proliferation of literary works which, in one way or another, reflected the spirit of the age. Among these were Bulwer-Lytton's *The Coming Race* (1871), Edward Bellamy's *Looking Backward* (1888), W. H. Hudson's *A Crystal Age* (1887) and William Morris's *News From Nowhere* (1890) which shows how Darwin's theory was assimilated and reflected as a progressive or regressive tendency. Samuel Butler's *Erewhon* (1872), a book which, though not in itself very remarkable, is nevertheless significant for its application of the evolutionary theory within the realms of science and technology.[35] Part of *Erewhon* is an effective satire upon the belief in technological progress:

> There is no security against the ultimate development of mechanical consciousness, in the fact of machines possessing little consciousness now. A mollusc has not much consciousness. Reflect upon the extraordinary advance which machines have made during the last few hundred years, and note how slowly the animal and vegetable kingdoms are advancing. The more highly organized machines are creatures not so much of yesterday, as of the last five minutes, so to speak, in comparison with past time. Assume for the sake of argument that conscious beings have existed for some twenty

[35] "His attempt to apply the idea of Darwinian evolution to the machines, and to extend the relevance of the survival of the fittest from the biological to the mechanical, reflects not merely the influence of Darwin's theory, but a widespread fear about the nature of progress in mid-nineteenth century industrial society." Peter Mudford, "Introduction" to *Erewhon*, Harmondsworth, Penguin, 1970, p. 14.

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million years: see what strides machines have made in the
last thousand? May not the world last become? Is it not
safer to nip the mischief in the bud and to forbid them fur-
ther progress?[36]

Butler cautioned against man's slave-like dependence on machines
and in his book orders the destruction of all machines lest they
become man's rulers. Darwin's influence is seen very markedly
in Butler's apprehension of technology's spiralling development
leading to man's bondage.[37]

The pessimism associated with increasing advancement of
science and technology is not characteristic of only literary
writers; even the most down-to-earth man in the street has
his fears of the possible consequences if science and technology
are not handled with care. The human imagination, it would
appear, is more apt to be moved by fear than by hope and slips
easily into the exploration of situations which inspire fear. This
may well be an expression of the latent instinct of self-preser-
vation—that an impending threat to the race is incisively antici-
pated before its actual arrival. The point of salvation rests on
man's ability to muster courage and to learn from the warnings
given by the more imaginative of his fellow-men—hence one of
the relevances of writers who deal with science and technology.

A cursory survey of literature past and present will reveal
two operative types.[38] First, and more common, is literature which
takes man's environment largely as given and concentrates on
the great complexity of human actions and emotions. The novels
of Henry James and Joseph Conrad, for example, focus on the
inner self of man and what we get is a deep and often profound
psychological probing into the consciousness of the individual
as he confronts life and its many problems. Literature in this
category may be termed reflective or introspective. Its strength
lies in the subtle handling of the inner life of man and invariably
the impact that such literature makes is centred primarily on its

[36] *Op. cit.*, Ch. 23, p. 199.

[37] In recent times Jacques Ellul's *The Technological Society* (1964) has re-
iterated this fear very powerfully in non-fictional terms.

[38] Much of what follows has been discussed in different terms by Robert
Conquest in his seminal essay "Science Fiction and Literature" in *The Critical
Quarterly*, Vol. 5, No. 4, (1963), pp. 355-367.

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portrayal of character. Such literature is usually judged by the intensity of characterization and by the more general elements of psychological realism. Over the last few hundred years, it has found its biggest triumph mainly in the novel. It is interesting that the rise of the novel as a definite form of literature in the hands of Samuel Richardson and Henry Fielding should coincide with an increasing emphasis on the individual experience.[39] Philosophies prevalent in the eighteenth century supported the writer's focus on the individual's attitude towards life. Descartes and Locke, especially, put the individual on a pedestal and asserted the primacy of subjective reality. In the context of this growing philosophical ethos it could not but be that the writers concentrated their efforts on the dramatization of the individual's personal response to the environment within which he found himself. The environment was there, but mostly in the background and it was the individual perception of the environment which called for the greatest artistic energies. The environment was presented essentially as static so that the dynamics of interaction were chiefly worked out by the character of the individual. In Defoe's *Moll Flanders*, for instance, the attention is primarily on Moll herself even though her surroundings are presented as influencing her actions. The so-called stream-of-consciousness novel owes, basically, its origins to this overwhelming stress that came to be laid upon character as the most important element of a literary form.

The second type of literature is that which takes human nature largely for granted and centres its attention on the environment. Here the chief interest of the writer is on the effects of the environment and environmental changes upon human behaviour. Well's *War With the Worlds* and Huxley's *Brave New World*, for example, inevitably highlight the external life of man, and gain strength in the manner by which they present the impact of the environment upon individuals. The contexts within which the individual finds himself are now the main considerations. As a result the environment is portrayed as an active, influential phenomenon that is seen to exert itself upon human nature. Because the environment is so much larger and so much more

[39] Cf. Ian Watt, *The Rise of the Novel*, London, Chatto & Windus, 1957, esp. Ch. 1.

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impersonal, its impact is felt not only by an isolated individual, but by whole societies and populations. This implies that the individual experience or response is not quite as central as the consequences wrought upon societies in general. Thus the individual is proportionately reduced in stature and what we get is an exploration of the consequences of environmental effects upon human nature as a whole. Character, which found its greatest force in the individual experience, thus often gives way to the primacy of the plot. Thus, though we are concerned about Winston Smith's feelings and responses in Orwell's *1984*, what seizes our attention is the effect on him of the changing environments. This type of literature finds its expression mainly in a milieu in which great changes are taking place. And while it is true that change has been a constant feature of human history, it is worth noting that at certain periods change has been more marked, especially when it is traced to science and technology. Implicit in this observation is that as such changes became more pronounced, so did this second category of literature become abundant and gain value. Literature of this kind has become very popular today since it is difficult to give attention to the individual when whole populations are being changed by fresh and far-reaching scientific and technological developments. If such literature has somehow not received the attention it merits it is because most literary critics have been nurtured on the first category of writing as outlined above. This has resulted in their using works from the first category to judge works which, by their very nature, belong to the second category, which, of late, has been termed science fiction, a genre rapidly gaining ground.

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