

The Illusion of the Two Cultures

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The Illusion of the Two Cultures

LOREN EISELEY

NOT LONG AGO AN ENGLISH SCIENTIST, Sir Eric Ashby, remarked that "To train young people in the dialectic between orthodoxy and dissent is the unique contribution which universities make to society." I am sure that Sir Eric meant by this remark that nowhere but in universities are the young given the opportunity to absorb past tradition and at the same time to experience the impact of new ideas—in the sense of a constant dialogue between past and present—lived in every hour of the students' existence. This dialogue, ideally, should lead to a great winnowing and sifting of experience and to a heightened consciousness of self which, in turn, should lead on to greater sensitivity and perception on the part of the individual.

Our lives are the creation of memory and the accompanying power to extend ourselves outward into ideas and relive them. The finest intellect is that which employs an invisible web of gossamer running into the past as well as across the minds of living men, and which constantly responds to the vibrations transmitted through these tenuous lines of sympathy. It would be contrary to fact, however, to assume that our universities always perform this unique function of which Sir Eric speaks, with either grace or perfection; in fact our investment in man, it has been justly remarked, is deteriorating even as the financial investment in science grows.

Over thirty years ago, George Santayana had already sensed this trend. He commented, in a now forgotten essay, that one of the

❖ LOREN EISELEY, author of books and essays in the domain of the natural sciences, has been devoting himself during a leave of absence from the University of Pennsylvania (1963-64) to some writing of an autobiographical nature. "The Illusion of the Two Cultures" was given at the Symposium held on October 29, 1963, at the Rockefeller Institute in New York, when the Richard Prentice Ettinger Program for Creative Writing (in the sciences), which Dr. Eiseley directs, was officially launched.

strangest consequences of modern science was that as the visible wealth of nature was more and more transferred and abstracted, the mind seemed to lose courage and to become ashamed of its own fertility. "The hard-pressed natural man will not indulge his imagination," continued Santayana, "unless it poses for truth; and being half-aware of this imposition, he is more troubled at the thought of being deceived than at the fact of being mechanized or being bored; and he would wish to escape imagination altogether."

"Man would wish to escape imagination altogether." I repeat that last phrase, for it defines a peculiar aberration of the human mind found on both sides of that bipolar division between the humanities and the sciences, which C. P. Snow has popularized under the title of the two cultures. The idea is not solely a product of this age. It was already emerging with the science of the seventeenth century; one finds it in Bacon. One finds the fear of it faintly foreshadowed in Thoreau. Thomas Huxley lent it weight when he referred contemptuously to the "caterwauling of poets."

Ironically, professional scientists berated the early evolutionists such as Lamarck and Chambers for overindulgence in the imagination. Almost eighty years ago John Burroughs observed that some of the animus once directed by science toward dogmatic theology seemed in his day increasingly to be vented upon the literary naturalist. In the early 1900's a quarrel over "nature faking" raised a confused din in America and aroused W. H. Hudson to some dry and pungent comment upon the failure to distinguish the purposes of science from those of literature. I know of at least one scholar who, venturing to develop some personal ideas in an essay for the layman, was characterized by a reviewer in a leading professional journal as a worthless writer, although, as it chanced, the work under discussion had received several awards in literature, one of them international in scope. More recently, some scholars not indifferent to humanistic values have exhorted poets to leave their personal songs in order to portray the beauty and symmetry of molecular structures.

Now some very fine verse has been written on scientific subjects, but, I fear, very little under the dictate of scientists as such. Rather there is evident here precisely that restriction of imagina-

tion against which Santayana inveighed: namely, an attempt to constrain literature itself to the delineation of objective or empiric truth, and to dismiss the whole domain of value that, after all, constitutes the very nature of man, as without significance and beneath contempt.

Unconsciously, the human realm is denied in favor of the world of pure technics. Man, the tool-user, grows convinced that he is himself only useful as a tool, that fertility except in the use of the scientific imagination is wasteful and without purpose—even, in some indefinable way, sinful. I was reading J. R. R. Tolkien's great symbolic trilogy, *The Fellowship of the Ring*, a few months ago, when a young scientist of my acquaintance paused and looked over my shoulder. After a little casual interchange the youth departed, leaving an accusing remark hovering in the air between us. "I wouldn't waste my time with a man who writes fairy stories." He might as well have added, "or with a man who reads them."

As I went back to my book I wondered vaguely in what leafless landscape one grew up without Hans Christian Andersen, or Dunsany, or even Jules Verne. There lingered about the young man's words a puritanism that seemed the more remarkable because, as nearly as I could discover, it was unmotivated by any sectarian religiosity unless a total dedication to science brings to some minds a similar authoritarian desire to shackle the human imagination. After all, it is this impossible, fertile world of our imagination that gave birth to liberty in the midst of oppression, and that persists in seeking until what is sought is seen. Against such invisible and fearful powers, there can be found in all ages and in all institutions—even the institutions of professed learning—the humorless man with the sneer, or if the sneer does not suffice, then the torch, for the bright unperishing letters of the human dream.

One can contrast this recalcitrant attitude with an 1890 reminiscence from that great Egyptologist, Sir Flinders Petrie, which steals over into the realm of pure literature. It was written, in unconscious symbolism, from a tomb:

I here live, and do not scramble to fit myself to the requirements of others. In a narrow tomb, with the figure of Néfermaat standing on

each side of me—as he has stood through all that we know as human history—I have just room for my bed, and a row of good reading in which I can take pleasure after dinner. Behind me is that Great Peace, the Desert. It is an entity—a power—just as much as the sea is. No wonder men fled to it from the turmoil of the ancient world.

It may now reasonably be asked why one who has similarly, if less dramatically, spent his life among the stones and broken shards of the remote past should be writing here about matters involving literature and science. It was while considering this with humility and trepidation that my eye fell upon a stone in my office. I am sure that professional journalists must recall times when an approaching deadline has keyed up all their senses and led them to glance wildly around in the hope that something might leap out at them from the most prosaic surroundings. At all events my eyes fell upon this stone.

Now the stone antedated anything that the art historians would call art; it had been shaped many hundreds of thousands of years ago by men whose faces would frighten us if they sat among us today. Out of old habit, since I like the feel of worked flint, I picked it up and hefted it as I groped for words over this difficult matter of the growing rift between science and art. Certainly the stone was of no help to me; it was a utilitarian thing which had cracked marrow bones, if not heads, in the remote dim morning of the human species. It was nothing if not practical. It was, in fact, an extremely early example of the empirical tradition that has led on to modern science.

The mind that had shaped this artifact knew its precise purpose. It had found out by experimental observation, that the stone was tougher, sharper, more enduring than the hand that wielded it. The creature's mind had solved the question of the best form of the implement and how it could be manipulated most effectively. In its day and time this hand ax was as grand an intellectual achievement as a rocket.

As a scientist my admiration went out to that unidentified workman. How he must have labored to understand the forces involved in the fracturing of flint, and all that involved practical survival in his world. My uncalled-for twentieth-century hand caressed

the yellow stone lovingly. It was then that I made a remarkable discovery.

In the mind of that gross-featured, early exponent of the practical approach to nature—the technician, the no-nonsense practitioner of survival—two forces had met and merged. There had not been room in his short and brutish life for the delicate and supercilious separation of the arts from the sciences. There did not exist then the refined distinctions set up between the scholarly percipience of reality and what has sometimes been called the vaporings of the artistic imagination.

As I clasped and unclasped the stone, running my fingers down its edges, I began to perceive the ghostly emanations from a long-vanished mind, the kind of mind that, once having shaped an object of any sort, leaves an individual trace behind it that speaks to others across the barriers of time and language. It was not the practical experimental aspect of this mind that startled me, but rather that the fellow had wasted time.

In an incalculably brutish and dangerous world he had both shaped an instrument of practical application and then, with a virtuoso's elegance, proceeded to embellish his product. He had not been content to produce a plain, utilitarian implement. In some wistful, inarticulate way, in the grip of the dim aesthetic feelings that are one of the marks of man—or perhaps I should say, some men—this archaic creature had lingered over his handiwork.

One could still feel him crouching among the stones on a long-vanished river bar, turning the thing over in his hands, feeling its polished surface, striking, here and there, just one more blow that no longer had usefulness as its criterion. He had, like myself, enjoyed the texture of the stone. With skills lost to me, he had gone on flaking the implement with an eye to beauty until it had become a kind of rough jewel, equivalent in its day to the carved and gold inlaid pommel of the iron dagger placed in Tutankhamen's tomb.

All the later history of man contains these impractical exertions expended upon a great diversity of objects, and, with literacy, breaking even into printed dreams. Today's secular disruption between the creative aspect of art and that of science is a barbarism that would have brought lifted eyebrows in a Cro-Magnon cave. It

is a product of high technical specialization, the deliberate blunting of wonder, and the equally deliberate suppression of a phase of our humanity in the name of an authoritarian institution: science, which has taken on, in our time, curious puritanical overtones. Many scientists seem unaware of the historical reasons for this development, or the fact that the creative aspect of art is not so remote from that of science as may seem, at first glance, to be the case.

I am not so foolish as to categorize individual scholars or scientists. I am, however, about to remark on the nature of science as an institution. Like all such structures it is apt to reveal certain behavioral rigidities and conformities that increase with age. It is no longer the domain of the amateur, although some of its greatest discoverers could be so defined. It is now a professional body, and with professionalism there tends to emerge a greater emphasis upon a coherent system of regulations. The deviant is more sharply treated, and the young tend to imitate their successful elders. In short, an "Establishment"—a trade union—has appeared.

Similar tendencies can be observed among those of the humanities concerned with the professional analysis and interpretation of the works of the creative artist. Here, too, a similar rigidity and exclusiveness make their appearance. It is not that in the case of both the sciences and the humanities standards are out of place. What I am briefly cautioning against is that too frequently they afford an excuse for stifling original thought, or constricting much latent creativity within traditional molds.

Such molds are always useful to the mediocre conformist who instinctively castigates and rejects what he cannot imitate. Traditions, the continuity of learning, are, it is true, enormously important to the learned disciplines. What we must realize as scientists is that the particular institution we inhabit has its own irrational accretions and authoritarian dogmas which can be as unpleasant as some of those encountered in sectarian circles—particularly so since they are frequently unconsciously held and surrounded by an impenetrable wall of self-righteousness brought about because science is regarded as totally empiric and open-minded by tradition.

This type of professionalism, as I shall label it in order to distinguish it from what is best in both the sciences and humanities, is

characterized by two assumptions: that the accretions of fact are cumulative and lead to progress, whereas the insights of art are, at best, singular, and lead nowhere, or, when introduced into the realm of science, produce obscurity and confusion. The convenient label "mystic" is, in our day, readily applied to men who pause for simple wonder, or who encounter along the borders of the known, that "awful power" which Wordsworth characterized as the human imagination. It can, he says, rise suddenly from the mind's abyss and enwrap the solitary traveler like a mist.

We do not like mists in this era, and the word *imagination* is less and less used. We like, instead, a clear road, and we abhor solitary traveling. Indeed one of our great scientific historians remarked not long ago that the literary naturalist was obsolescent if not completely outmoded. I suppose he meant that with our penetration into the biophysical realm, life, like matter, would become increasingly represented by abstract symbols. To many it must appear that the more we can dissect life into its elements, the closer we are getting to its ultimate resolution. While I have some reservations on this score, they are not important. Rather, I should like to look at the symbols that, in the one case, denote science and, in the other, constitute those vaporings and cloud wraiths that are the abomination, so it is said, of the true scientist, but the delight of the poet and literary artist.

Creation in science demands a high level of imaginative insight and intuitive perception. I believe no one would deny this, even though it exists in varying degrees, just as it does similarly among writers, musicians or artists. The scientist's achievement, however, is quantitatively transmissible. From a single point his discovery is verifiable by other men who may then, on the basis of corresponding data, accept the innovation and elaborate upon it in the cumulative fashion that is one of the great triumphs of science.

Artistic creation, on the other hand, is unique. It cannot be twice discovered as, say, natural selection was discovered. It may be imitated stylistically, in a genre, a school, but, save for a few items of technique, it is not cumulative. A successful work of art may set up reverberations and is, in this, just as transmissible as science, but there is a qualitative character about it. Each reverberation in

another mind is unique. As the French novelist François Mauriac has remarked, each great novel is a separate and distinct world operating under its own laws with a flora and fauna totally its own. There is communication, or the work is a failure, but the communication releases our own visions, touches some highly personal chord in our own experience.

The symbols used by the great artist are a key releasing our humanity from the solitary tower of the self. "Man," says Lewis Mumford, "is first and foremost the self-fabricating animal." I will merely add that the artist plays an enormous role in this act of self-creation. It is he who touches the hidden strings of pity, who searches our hearts, who makes us sensitive to beauty, who asks questions about fate and destiny. Such questions, although they lurk always around the corners of the external universe that is the peculiar province of science, the rigors of the scientific method do not enable us to pursue directly.

And yet I wonder.

It is surely possible to observe that it is the successful analogy or symbol that frequently allows the scientist to leap from a generalization in one field of thought to a triumphant achievement in another. For example, Progressionism in a spiritual sense later became the model contributing to the discovery of physical evolution. Such analogies genuinely resemble the figures and enchantments of great literature, whose meanings similarly can never be totally grasped because of their endless power to ramify in the mind.

John Donne, in the seventeenth century, gave powerful expression to a feeling applicable as much to science as to literature when he said devoutly of certain Biblical passages: "The literall sense is alwayes to be preserved; but the literall sense is not alwayes to be discerned; for the literall sense is not alwayes that which the very letter and grammar of the place presents." A figurative sense, he argues cogently, can sometimes be the most "literall intention of the Holy Ghost."

It is here that the scientist and artist sometimes meet in uneasy opposition, or at least along lines of tension. The scientist's attitude is sometimes, I suspect, that embodied in Samuel Johnson's remark that, wherever there is mystery, roguery is not far off.

THE ILLUSION OF THE TWO CULTURES

Yet surely it was not roguery when Sir Charles Lyell glimpsed in a few fossil prints of raindrops the persistence of the world's natural forces through the incredible, mysterious aeons of geologic time. The fossils were a symbol of a vast hitherto unglimped order. They are, in Donne's sense, both literal and symbolic. As fossils they merely denote evidence of rain in a past era. Figuratively they are more. To the perceptive intelligence they afford the hint of lengthened natural order, just as the eyes of ancient trilobites tell us similarly of the unchanging laws of light. Equally the educated mind may discern in a scratched pebble the retreating shadow of vast ages of ice and gloom. In Donne's archaic phraseology these objects would bespeak the principal intention of the Divine Being, that is, of order beyond our power to grasp.

These images drawn from the world of science are every bit as powerful as great literary symbolism and equally as demanding upon the individual imagination of the scientist who would fully grasp the extension of meaning that is involved. It is, in fact, one and the same creative act in both domains.

Indeed evolution itself has become such a figurative symbol, as has also the hypothesis of the expanding universe. The laboratory worker may think of these concepts in a totally empiric fashion as subject to proof or disproof by the experimental method. Like Freud's doctrine of the subconscious, however, such ideas frequently escape from the professional scientist into the public domain. There they may undergo further individual transformation and embellishment. Whether the scholar approves or not, such hypotheses are now as free to evolve as the creations of art in the mind of the individual. All the resulting enrichment and confusion will bear about it something suggestive of the world of artistic endeavor.

As figurative insights into the nature of things, such embracing conceptions may become grotesquely distorted or glow with added philosophical wisdom. As in the case of the trilobite eye or the fossil raindrop, there lurks behind the visible evidence unseen vast shadows no longer quite of that world we term natural. Like the words in Donne's Bible, enormous implications have transcended the literal expression of the thought. Reality itself has been super-

seded by a greater reality. As Donne himself asserted, "The substance of the truth is in the great images which lie behind."

It is because these two types of creation—the artistic and the scientific—have sprung from the same being and have their points of contact even in division, that I have the temerity to assert that, in a sense, the two cultures are an illusion, that they are a product of unreasoning fear, professionalism and misunderstanding. Because of the emphasis upon science in our society, much has been said about the necessity of educating the layman and even the professional student of the humanities upon the ways and the achievements of science. I admit that a barrier exists, but I am also concerned to express the view that there persists in the domain of science itself an occasional marked intolerance of those of its own membership who venture to pursue the way of letters. As I have previously remarked, this intolerance can the more successfully clothe itself in seeming objectivity because of the supposed open nature of the scientific society. It is not remarkable that this trait is sometimes more manifest in the younger and less secure disciplines.

There was a time, not many centuries ago, when to be active in scientific investigation was to invite suspicion. Thus it may be that there now lingers among us, even in the triumph of the experimental method, a kind of vague fear of that other artistic world of deep emotion, of strange symbols, lest it seize upon us or distort the hard-won objectivity of our thinking—lest it corrupt, in other words, that crystalline and icy objectivity that, in our scientific guise, we erect as a model of conduct. This model, incidentally, if pursued to its absurd conclusion, would lead to a world in which the computer would determine all aspects of our existence; one in which the bomb would be as welcome as the discoveries of the physician.

Happily, the very great in science, or even those unique scientist-artists such as Leonardo, who foreran the emergence of science as an institution, have been singularly free from this folly. Darwin decried it even as he recognized that he had paid a certain price in concentrated specialization for his achievement. Einstein, it is well known, retained a simple sense of wonder; Newton felt like a child playing with pretty shells on a beach. All show a deep humility

THE ILLUSION OF THE TWO CULTURES

and an emotional hunger which is the prerogative of the artist. It is with the lesser men, with the institutionalization of method, with the appearance of dogma and mapped-out territories that an unpleasant suggestion of fenced preserves begins to dominate the university atmosphere.

As a scientist, I can say that I have observed it in my own and others' specialties. I have had occasion, also, to observe its effects in the humanities. It is not science *per se*; it is, instead, in both regions of thought, the narrow professionalism that is also plainly evident in the trade union. There can be small men in science just as there are small men in government, or business. In fact it is one of the disadvantages of big science, just as it is of big government, that the availability of huge sums attracts a swarm of elbowing and contentious men to whom great dreams are less than protected hunting preserves.

The sociology of science deserves at least equal consideration with the biographies of the great scientists, for powerful and changing forces are at work upon science, the institution, as contrasted with science as a dream and an ideal of the individual. Like other aspects of society, it is a construct of men, and is subject, like other social structures, to human pressures and inescapable distortions.

Let me give you an illustration. Even in learned journals, clashes occasionally occur between those who would regard biology as a separate and distinct domain of inquiry and the reductionists who, by contrast, perceive in the living organism only a vaster and more random chemistry. Understandably, the concern of the reductionists is with the immediate. Thomas Hobbes was expressing a similar point of view when he castigated poets as "working on mean minds with words and distinctions that of themselves signifie nothing, but bewray (by their obscurity) that there walketh . . . another kingdome, as it were a kingdome of fayries in the dark." I myself have been similarly criticized for speaking of a nature "beyond the nature that we know."

Yet consider for a moment this dark, impossible realm of Fayrie. Man is not totally compounded of the nature we profess to understand. He contains, instead, a lurking unknown future, just as the man-apes of the Pliocene contained in embryo the future that sur-

rounds us now. The world of human culture itself was an unpredictable fairy world until, in some pre-Ice-Age meadow, the first meaningful sounds in all the world broke through the jungle babble of the past, the nature, until that moment, "known."

It is fascinating to observe that, in the very dawn of science, Bacon, the spokesman for the empirical approach to nature, shared with Shakespeare, the poet, a recognition of the creativeness that adds to nature, and that emerges from nature as "an art which nature makes." Neither the great scholar nor the great poet had renounced the Kingdom of Fayrie. They had realized what Bergson was later to express so effectively, that life inserts a vast "indetermination into matter." It is, in a sense, an intrusion from a realm that can never be completely subject to prophetic analysis by science. The novelties of evolution emerge; they cannot be predicted. They haunt, until their arrival, a world of unimaginable possibilities behind the living screen of events, as these last exist to the observer confined to a single point on the time scale.

Oddly enough, much of the confusion that surrounded my phrase, "a nature beyond the nature that we know," resolves itself into pure semantics. I might have pointed out what must be obvious even to the most dedicated scientific mind: namely, that the nature which we know has been many times reinterpreted in human thinking, and that the hard, substantial matter of the nineteenth century has already vanished into a dark, bodiless void, a web of "events" in space-time. This is a realm, I venture to assert, as weird as any we have tried, in the past, to exorcise by the brave use of seeming solid words. Yet some minds exhibit an almost instinctive hostility toward the mere attempt to wonder, or to ask what lies below that microcosmic world out of which emerge the particles that compose our bodies, and that now take on this wraithlike quality.

Is there something here we fear to face, except when clothed in safely sterilized professional speech? Have we grown reluctant in this age of power to admit mystery and beauty into our thoughts, or to learn where power ceases? I referred a few moments ago to one of our own forebears on a gravel bar, thumbing a pebble. If, after the ages of building and destroying, if after the

THE ILLUSION OF THE TWO CULTURES

measuring of light years, and the powers probed at the atom's heart, if after the last iron is rust-eaten and the last glass lies shattered in the streets, a man, some savage, some remnant of what once we were, pauses on his way to the tribal drinking place and feels rising from within his soul the inexplicable mist of terror and beauty that is evoked from old ruins—even the ruins of the greatest city in the world—then, I say, all will still be well with man.

And if that savage can pluck a stone from the gravel because it shone like crystal when the water rushed over it, and hold it against the sunset, he will be as we were in the beginning, whole—as we were when we were children, before we began to split the knowledge from the dream. All talk of the two cultures is an illusion; it is the pebble that tells man's story. Upon it is written man's two faces, the artistic and the practical. They are expressed upon one stone over which a hand once closed, no less firm because the mind behind it was submerged in light and shadow and deep wonder.

Today we hold a stone, the heavy stone of power. We must perceive beyond it, however, by the aid of the artistic imagination, those humane insights and understandings that alone can lighten our burden and enable us to shape ourselves, rather than the stone, into the forms that great art has anticipated.