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Interculture intends to contribute to the discovery and emergence of viable alternative approaches to the fundamental problems of contemporary Man, in both theory and practice. Its approach is meant to be integral; which means:

1. Intercultural: undertaken in light of the diverse cultural traditions of contemporary Man, and not solely in the terms of modern culture;

2. Inter and trans-disciplinary: calling on many 'scientific' disciplines, but also on other traditions of knowledge and wisdom (ethno-sciences) as well as on vernacular and popular knowledge;

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The Intercultural Institute of Montreal (formerly Monchanin Cross-Cultural Center) is an Institute for Intercultural education, training and research, dedicated to the promotion of cultural pluralism and to a new social harmony. Its fundamental research focuses on social critique and exploration of viable alternative approaches to the contemporary crisis. Its activities, which draw inspiration and sustenance from this research, aim at a cultural and social mutation—radical change—through gradual education and training. Its research and action have, from the very start, been undertaken in light of diverse contemporary cultures. It attempts to meet the challenges of our times by promoting cultural identities, their inter-action in creative tension and thus their eventual emancipation from the final and most subtle colonialism: hegemony by the mind. The Centre's cross-cultural research and action is carried out through its programs in the four following sectors: public education, training of professionals, services and research.

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SCIENCE AND CULTURE

Hinzmann: Science Is No Accident: Societal Change and the Rise of Modern Man

Nandy: Science, Authoritarianism and Culture

Baquer & al.: A Lesson for Science

INTERCULTURAL INSTITUTE OF MONTREAL

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PRESENTATION

Since 1543, a New Man has been born, very different from traditional Man: modern i.e. scientific and objective Man. The American Hinzmann attempts to explain briefly what has caused this revolution.

The two other texts come from Indians (India).

The main article, by Ashis Nandy, asserts that every age has its prototypical violence. The violence of our age consists in Modern Science, which is characterized by objectivity and rationality. It claims to be the universal criterion of truth and the only way to get to reality. It is a pathology which isolates us from all of reality and which constitutes a threat to the dignity of a great portion of mankind and even to the survival of Mankind and of the Cosmos. It is allied to authoritarianism and power: it is an enemy of democracy. It is uncapable of fundamental and radical self-criticism. Its destructive effects are never imputed to it.

The best positive critique of modern science, says Nandy, comes from the alternative cultural traditions of knowledge. However, the author warns us against the too well known authoritarianism of these traditions also. He proposes rather a critical traditionalism which criticizes without compromise the isolation and the exaggerated preoccupation with objectivity, but without ever denying the creative possibilities of a limited objectivity. He upholds the wisdom of a more integral consciousness, where there is an equal place given to knowledge, wisdom and love.

The third article, a much briefer one, invites modern science to learn a lesson or two from the farmer and his science/wisdom.

Robert Vachon

SCIENCE IS NO ACCIDENT:

Societal Change and the Rise of Modern Science

by

Gordon A. Hinzmann, Jr.

Scholars have considerable difficulty accounting for the rise of modern science in western Europe[1]. The publication of The Revolution of the Heavenly Orbs by Nicolaus Copernicus in 1543 clearly represents a fundamental shift in weltanschauung and is generally considered to mark the beginning of the Scientific Revolution. What is unknown is the cause of the change in outlook since the scientific world differed so markedly from that of most people in the Medieval Period, including members of the Church hierarchy who saw the world in miraculous terms (Bronowski, 1973). Conventional wisdom concerning the question suggests a scenario which involved a series of shocks or cataclysmic events such as The Crusades, the Bubonic Plague, and the discovery of the New World which jarred the traditional sense of order of large numbers of people so that they began to call into question the adequacy of prevalent explanations of the nature of the universe. They also began to challenge the Church, the most significant guardian of the established order, and the teachings of the ancient philosophers and thinkers as well and so to arrive at a new cosmology which described the universe in orderly, mechanical terms, rather than the mystical, miraculous ones which largely held sway until that time.

The usual assumption of conventional thinking in this picture of societal change is that people have remained fundamentally the same throughout. They retained the same type of inquisitive, probing mind both before and after the Scientific Revolution, the story goes; only the appropriate sharp stick of systemic shock was required to get people to cast off their old superstitions and embrace a

[1] Many scholars such as Lynn White, Jr. (1978) note significant changes in outlook by a few people beginning in the late twelfth century but offer only tentative speculation on the reason for the appearance of this different outlook and attitude.

new and more rational world view. While such events can be traumatic enough to produce a change in the way people think and feel about the world around them, I respectfully submit, however, that an equally legitimate assumption is that people were not the same during and after this period of change. Rather, New Men[2] were appearing in Europe at this time who were capable of seeing the world in different terms from their ancestors, and, in fact, who would have had difficulty seeing the world in the old way.

This assumption requires a different explanation for the rise of modern science, for if there are New Men in society, then there must be some explanation for their appearance at that time and also some explanation of the way in which they saw the world that was so different from the popular view of the time.

The assumption that people were not the same during this time, that New Men were appearing is really a consequence of a number of other significant assumptions. First among these is that different types of societies produce different types of people. Those who grow up in folk* societies see the world in personal terms; that is, they see the world as a collection of persons, not things. The entire Cosmos is alive; trees, stars, mountains, animals, even rocks have personalities and can be talked to, beseeched, reasoned with, provoked, entreated, offended, flattered, mollified, and so on. This personal view of the world is what Frankfort (1946) calls the "I-Thou" relationship, and is characteristic not just of primitive, tribal people, but was true of the ancient Egyptians and Greeks as well, even during their most civilized time[3]. When the Nile misbehaved, the Pharaoh prayed to its spirit to treat his people more kindly; he did not send his engineers upriver to Lake Victoria to check its level. Aristotle, perhaps the most famous of Greek philosophers, subscribed to a belief in which things followed a natural evolutionary development pattern; metals evolved from lower to higher states, just as babies evolved into adults. Such a view understands the world as alive, or something very close to alive.

While the monotheism of the Medieval Church cannot be compared directly with the animism of peoples in other times and places, still it is not entirely

[2] I have borrowed this term from Robert Heilbroner (1975), who uses it to describe the industrial entrepreneur in eighteenth century England. New Men, as the reader will see, are of the same societal origin as Heilbroner's.

* Editors note: the word "folk society" is used here according to the meaning given to it by Redfield. It refers to a society which is tribal-like, characterized by small, informal communities, where relationships are very interpersonal, are kin based and where there are no strangers. These small communities are clearly surrounded by boundaries and live on the outskirts, apart from civilization.

[3] Frankfort (1946:4) notes that "The fundamental difference between the attitudes of modern and ancient man as regards the surrounding world is this: for modern, scientific man the phenomenal world is primarily an 'It', for ancient - and also for primitive - man it is a 'Thou' ".

different either. For a world in which Satan can possess people and animals and act through them, when demons are to be found possessing the unsaved and the physically or mentally ill, when both God and the devil can control the behavior of virtually anything: clouds, storms, insects, tides, wild animals, volcanic eruptions, ad infinitum, the world is still alive in a fundamental way. It cannot be understood through knowledge of natural laws. It is mystical, magical, and miraculous. Galileo was forced to recant precisely because his work suggested otherwise. The European peasant of the Medieval period was, in other words, a member of a folk society, and still saw the world predominantly in personal I-Thou terms. So, for that matter, did a great many nobles and clerics. The point is that all these folk people related to a world that was imbued with life, either biological or spiritual; they did not see the universe as a collection of impersonal and inanimate objects, and their knowledge of it was not what could be called scientific. Concerning the relationship between folk people and their knowledge of the world, Redfield offers the following (1947: 300): "In the ideal folk society there is no objectivity and no systematization of knowledge as guided by what seems to be its internal order, nor is there any habitual exercise of classification, experiment, and abstraction to its own sake, least of all for the sake of intellectual ends. There is common practical knowledge, but there is no science."

If people possessing a world view like that just described have no science, then they would hardly make good scientists. A good scientist must possess many particular attributes, but chief among them is that of objectivity. He must be able to treat the world as a collection of objects detached from himself. In order to make sense of the world, he must consider that it involves discoverable principles and that it does not react to the whims and wishes of spirits, demons, devils, or persons. The world, as men such as Copernicus, Galileo, and Newton come to understand it, was a mechanical one. The clock-work metaphor to which such men subscribed is well known. Although they believed in a supreme being and possibly other supernatural beings as well, they no longer believed that God or any other entity personally manipulated each and every movement. The view of the world had changed from a fundamentally personal one to a fundamentally mechanistic one, at least for the kind of New Men who became scientists. In short, such men did not comprehend the world as folk people comprehended it. The logical step is to suggest that this was so because these New Men were not folk people. And if folk people are to be found in folk society, then one may conclude that European society was changing from a folk society into some other kind of society, one which could produce men who saw the world in other than personal terms. The second significant assumption, then, is that the people found in Europe were becoming a different type of people because European society was becoming a different type of society. The type of society which could produce these New Men was one not grounded in personal relationships, i.e. not a folk society[4]. The type of society usually contrasted with

[4] This line of thinking is one of whose antecedents are most clearly traceable to the work of Redfield and others who distinguished so clearly between folk society and urban society and the types of people who inhabited each. Any one not familiar with this viewpoint can refer to

folk society is urban society, a society in which social relationships with relatively unknown persons, commonly called strangers, predominate. If people are in frequent contact with large numbers of strangers, they must relate to them differently and interact with them differently than they do with persons well known to them, as is the case in folk societies. Such relationships with strangers tend to be impersonal, partial, and categorical. The categories may be derived from differences in social status, occupation, cultural differences, or from physical differences such as skin color. The point is that in relating to strangers, one needs to make some kind of categorical judgment in order to know how to relate to them, how to interact with them. Such contact with strangers then, promotes a view of one's fellow man which is not personal but categorical, and since categories are, by their nature, abstractions, views of one's fellow man become more abstract. If one can deal with strangers in abstract, categorical terms, why not clouds, trees, rocks, rivers, and rodents. They, like strangers, can become objectified. If one sees the world as a collection of objects, rather than as a collection of persons, one has, in a literal sense, become objective. Becoming objective is in turn a major prerequisite to becoming the kind of person who can do science.

In short, a new world view began supplanting the old in Europe beginning with Copernicus because the New Man, an urban man, was beginning to supplant the old in significant numbers about that time. While this urban man is hypothesized to have had his view of the world shaped by contact and interaction with large numbers of strangers, I am not suggesting that New Men were merely a by-product of the urbanization of European society or that urbanization is the only possible way to create significant numbers of these New Men (although once urbanization began in earnest as it did in Europe beginning in the eleventh century, such types of people probably began to appear in larger and larger numbers). There were other situations in which people found themselves in frequent and prolonged contact with strangers, many of whom were not even Christians. Moreover, Europe was besieged much of this time by numerous other cultural groups, first the Muslims, then the Mongols, then the Ottoman Turks. These kind of experiences can promote this objectification of one's fellow man (and oneself)[5].

several of Redfiedl's publications, chiefly "The Folk Society" (1947) ant The Primitive World and Its Transformation (1953).

[5] Slavery is another situation in which contact with strangers can be frequent and prolonged, or even if not, the division between master and slave is so sharp and so definitive of each, that categorical treatment of one by the other is almost inescapable, and so functions much like a stranger relationship in any case. In the European situation, it is not clear that the phenomenon of slavery was very influential in promoting the change in European society which I am discussing although it may have been highly influential at specific times and places in producing people with some very unfolklike characteristics such as existed in ancient Greece and Rome.

Especially intriguing in the European situation was the existence of a great many monasteries over a long period of time in Europe after the fall of Rome. For centuries monasteries were almost the only centers of learning, literacy, and classical culture in Europe (Clarke; 1971). Consequently, they served as destinations for scholars as well as refuges for traveling nobles and clerics, and later for large numbers of religious pilgrims, usually peasants in their peregrinations to various holy shrines. As such, monasteries may well have been "urban" places, and many long-time residents of monasteries might have had opportunities for frequent and prolonged contact with strangers whom they learned to treat in categorical ways. Thus, it may have been possible for some monks to themselves become much more "urban" than a typical member of European folk society in the Middle Ages. Certainly, it is clear that several monasteries and religious orders displayed highly atypical attitudes and behavior during that time[6]. The very nature of many monasteries could have been conductive to an "urban" type of nonconformity, even apart from the issue of dealing with strangers on a regular and prolonged basis.

The kind of person who is a product of socialization into an urban or stranger society, may be called something other than a New Man; he can also be called an individual. He is an individual because his personality and identity are shaped primarily through these stranger relationships. And just as an individual learns to treat others categorically, so he learns to treat himself. He learns to be categorical about his own identity and personality, to see himself from the perspective of the other; he becomes self-conscious in the true sense of the word. Such a human being can even, to some extent at least, be objective about himself. Following Redfield, such abilities are largely beyond the experience and imagination of folk people whose personalities and identities are formed and shaped in personal relationships almost exclusively. They can treat neither themselves nor others categorically, and they have no identity completely separate from those personal others whose identities are intertwined with their own. On the other hand, this New Man, this individual, sees himself as fundamentally alone, and his identity is separate from those others who helped to shape it but are <u>not</u> a part of it.

As prolonged and frequent contact with large numbers of strangers become more and more common such as occurs with increasing urbanization, the resulting changes in the nature of European society produced these New Men, these individuals, in ever increasing numbers. When individuals began to appear in larger and larger numbers some of them began to apply their new, urban perspective to the world around them, to see it differently from the way the folk person saw it, and to try to understand and explain it in an objective, impersonal way. When this began in earnest, science was born as we know it.

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[6] The Benedictines, for example, displayed an attitude toward work by the year 1000 which can best be described as a work ethic, preceding the Protestants by several centuries. Such an attitude is most atypical of folk people, then and now.

Finally, it is probably no coincidence that the beginning of the Scientific Revolution and the protestant Reformation occur within about a quarter century of each other. Weber's classic work on the nature of the protestant Ethic leaves little doubt that it was the sort of ethic which would appeal to this New Man, this individual. Protestantism, especially in its most ascetic early form, Calvinism, was a religion in which the human being had only himself to rely on for his own salvation. Moreover, while Calvinism's doctrine of predestination precluded anyone from securing his own salvation through good works, many came to see the performance of good works and the living of exemplary lives as signs that they were among those chosen by God for salvation.

Scholars often point to Protestantism, and especially to Calvinism, as a religion which helped to create the Protestant Ethic, and the independent, "rugged" individual who, as the veritable epitome of self-reliance and independence, best manifests that ethic. Insofar as the foregoing discussion about the changing nature of European society is correct, however, it is more likely that significant numbers of New Men or individuals already existed in European society for whom Protestantism in general, and Calvinism in particular, held a special appeal precisely because it was a religion for those who saw themselves as independent, relatively self-reliant individuals. It reinforced a world they already saw rather than creating one for them, and they embraced it wholeheartedly[7].

Seen in this light, the development of science in western Europe after 1500 is not a matter of historical accident. Rather, the fundamental change in the nature of European society itself from a folk society to an urban or stranger society had the consequence of producing new types of people whom I have called New Men or, more simply, individuals. It is these individuals who go on to develop science, and to embrace a new religion, Protestantism, which reflects their cosmology, turning away from the mystical, miraculous, and personal world of European folk society and the Medieval Church.

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[7] Viewed from this perspective, Protestantism can be seen as a religious ideology whose time had come. Its time had come, I believe, because of the rise of the modern, urban individual. Incidentally, certain other key developments of the late fifteenth and early sixteenth centuries, principally the Age of Exploration and the rise of commercial capitalism, may also owe to their existence to the rise of the same urban individual. These were events participated in and guided by the people who clearly were not folk people.

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SCIENCE, AUTHORITARIANISM AND CULTURE:

On the Scope and Limits of Isolation Outside the Clinic*

by

Ashis Nandy

I

Every age has its prototypical violence. The violence of our age is based not so much on religious fanaticism or tribal blood feuds, as on secular, objective, dispassionate pursuit of personal and collective interests. Every age also probably has a cut-off point when the self-awareness of the age catches up with the organizing principle of the age, when for the first time the shared public consciousness begins to own up or rediscover - often through works of art or speculative thought - what the seers or the lunatics had been saying beyond the earshot of the "sane", "normal", "rational" beings who dominate the public discourse of the time.

Thus, it was the mindless blood-letting of the first world war which created a new awareness of an old psychopathology of our times. As the range of human violence and the role of science in that violence began to weigh on the social conscience, a number of European intellectuals woke up at about this time to the dangerous human ability to separate ideas from feelings and to pursue ideas without being burdened by feelings. With the advantage of hindsight, one could trace the cultural sanction for this ability to changes in European cosmology in the sixteenth and seventeenth centuries. It was then that the anthropomorphic world-view began to give way to a mechanomorphic view of nature and society. It was then that what psychoanalysts may call a projective science - a science heavily dependent on the psychological capacity to project into the outer world the scientist's inner feelings and panpsychic fantasies - began to give way to a new concern with objective impersonal pictures of nature and society as the goal of

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* Reprint from: A. Nandy, Traditions, Tyranny and Utopias: New Delhi, Oxford University Press, 1987.

knowledge and as an indicator of progress. But it was the first world war which for the first time shook the popular faith in perpetual progress through increasing by objective science. And as all other traditions of science were moribund in the West and some of them were living in the East, the war, also for the first time, led to a serious, self-conscious effort to involve the East in Europe's self-doubts.

Sigmund Freud first gave a name to this splitting of cognition and affect. He called it isolation. He described it as an ego defence, a psychological mechanism which helped the human mind to cope with unacceptable or ego-alien inner impulses and external threats. According to Freud, the individual sometimes isolated an event, idea or an act by cauterizing it emotionally and by preventing it from becoming a part of his significant experience. The event, idea or the act was not forgotten; it was reincorporated into consciousness after being deprived of its affect[1]. This did not, Freud granted, really free ideas or actions from feelings. It merely replaced conscious associations by unconscious ones and displaced the affect to other ideas or events. (Freud also noted the heavy use of isolation in the character disorder called obsession-compulsion. The connection, by itself, may not seem important but it acquires a different meaning if we remember that some psychological works have referred to the obsessive-compulsive associations of modern authoritarianism. I shall come back to this).

Later, two second-generation psychoanalysts, Anna Freud and Otto Fenichel, were to define isolation more formally. Here is Fenichel on the subject, in his well-known textbook:

> The most important special case of this defence mechanism is the isolation of an idea from the emotional cathexis (load of feelings) that originally was connected with it... In discussing the most exciting events, the patient remains calm but may then develop at quite another point an incomprehensible emotion, without being aware of the fact that the emotion has been displaced...
>
> The normal prototype is the process of logical thinking, which actually consists of the continued elimination of affective associations in the interest of objectivity... Compulsion neurotics, in their isolation activities, behave like caricatures of normal thinkers... They always desire order, routine, system.[2]

Such a definition, however clinical or sterilized it may sound to its author, already verges on social criticism. It admits that order, routine and systems are not absolute values, that an over-commitment to them could be an illness. It also implies that objectivity, and the separation of the observer from the observed is not an unmixed blessing; sometimes it can hide fearsome passions.

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[1] Sigmund Freud, *Inhibitions, Symptoms and Anxiety* (1926), Standard Edition, Vol. 20 (London: Hogarth, 1959).

[2] Otto Fenichel, *The Psycho analytic Theory of Neurosis* (New York: Norton, 1945), p. 156.

Psychoanalysis was not alone. At about the same time that the young discipline was forging the concept of isolation, the surrealist manifestos of André Breton and his associates were rejecting conventional rationality and indirectly attacking the growing use of isolation in modern life. Salvador Dali, for instance, 'absurdized' in his art and life exactly this psychopathology. His watches which melted and his machines which were part-human were but instances where the lost affect was made to re-enter social perceptions, to shock or to enchant. Some years afterwards George Orwell was scandalized when the middle-aged Dali put into his memoirs, with obvious relish, the following incident which took place when Dali was six tears old:

> While crossing the hall I caught sight of my little three-year-old sister crawling unobtrusively through a doorway. I stopped, hesitated a second, then gave her a terrible kick in the head, as though it had been a ball, and continued running, carried away with a 'delirious joy' induced by this savage act.[3]

Orwell correctly guessed that Dali's pathology tied up with the pathology of a period and quoted a rhyme popular around 1912 to make his point:

> Poor little Willy is crying so sore,
> A sad little boy is he,
> For he's broken his little sister's neck
> And he'll have no jam for tea[4]

As if to prove Orwell right, Dali's autobiography became a best-seller.

Within a decade or two, a number of movements in literature and the arts caught up with the same pathology, often brilliantly though rarely self-consciously. Thus many of the scenic devices of Berthold Brecht can be read as attempts to tear away the mask which isolation allows the industrial society to wear. When one laughs with Brecht, one also laughs at the subversion of the defence of isolation. Under the structure of isolation lies, Brecht seems to say, psychopatic hypocrisy or sheer self-deceit. Those who have seen or read his *Mr Puntilla* (1940) will know that it is the story of a businessman whose personality is split. He is a heartless calculating machine when sober; humane and lovable when drunk. When sober, pathological isolation is the main feature of his personality. When drunk, the feelings he dissociates from his ideas and actions re-emerge uncensored and get reattached to his ideas and actions. That this happens only when he is drunk is, of course, Brecht's final comment on the psychopathology of modern society.

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[3] Quoted in George Orwell, 'Benefit of Clergy: Some Notes on Salvador Dali' (1944), in *Decline of the English Murder* (Harmondsworth: Penguin, 1965), pp. 20-30.

[4] From Harry Graham's *Ruthless Rhynes for Heartless Homes*, quoted in Orwell, 'Benefit of Clergy', p. 29.

Another instance from the popular arts could be Charles Chaplin's *Monsieur Verdoux* (1947), a black comedy set against the collapse of values in inter-war Europe. The movie makes subtle use as well as criticism of the mechanic of isolation. It tells the story of a lovable psychopath who marries and then charmingly kills his wives for money. Chaplin offsets this isolation against the larger isolation that the movie induces in viewers. As we isolate the acts of murder from the emotions they should arouse, we laugh at Chaplin's murders and sympathize with this hero. who does on a small scale what societies do on a grander scale[5].

Chaplin's folk philosophy found its clearest expression in Orwell's essay on the use of the English language to sterilize thinking and to cover up violence and cruelty[6]:

> In our time, political speech and writing are largely the defence of the indefensible. Things like the continuance of British rule in India, the Russian purges and deportations, the droppings of the atom bombs on Japan, can indeed be defended, but only by arguments too brutal for most people to face... Thus political language has to consist largely of euphemism, question-begging and sheer cloudy vagueness. Defenceless villages are bombarded from the air, the inhabitants driven out into the countryside, the cattle machinegunned, the huts set on fire with incendiary bullets: this is called *pacification* . Millions of peasants are robbed of their farms and set trudging along the roads with no more than they can carry: this is called *transfer of population* or *rectification of frontiers* . People are imprisoned for years without trial, or shot in the back of the neck or sent to die of scurvy in Arctic lumber camps: this is called *elimination of unreliable elements*.[7]

Orwell wrote this in the mid-forties. Around the same time, basing themselves on two major empirical studies done from Freudian and Marxist vantage grounds, some scholars began to mention the over-use of isolation by the fascist personality. Erich Fromm described the authoritarian person not only as sado-masochistic but as having a mechanical, rigid mode of thinking

[5] More recent examples of successful attempts to create black comedies on the basis of the human capacity to isolate are Stanley Kubrick's *Dr Strangelove* and *A Clockwork Orange*. Incidentally, black comedy as a genre is nearly absent in Indian and other non-modern creative traditions. It is probably a modern innovation.

[6] George Orwell, 'Politics and the English Language' (1946), in Inside the *Whale and Other essays* (Harmondsworth: Penguin, 1957), pp. 143-57.

[7] Ibid., p. 153.

characterized by isolation. Fascism, he said, thrived on the objectification of persons and groups[8].

Theodor Adorno and his associates, too, wrote about the 'empty, schematic, administrative fields' in the mind of the fascist and about the constriction of his inner life[9]. The fascist, they say, partitioned his personality in more or less closed compartments. He had a narrow emotional range and he rejected emotional richness, intuitions and the softer side of life. He admired organizations and their formal hierarchies and he sought security in isolating hierarchical structures[10].

If all this seems overly psychological, there were the scholars who traced the institutional roots of European Fascism to the separation of ideas from feelings, and of the rational from the irrational. Friederich Meinecke, for instance, located the origins of National-Socialism in the ancient 'bipolarity extending throughout life of the Western Man' between the utilitarian which was stressed and the spiritual which was suppressed, to the excessive emphasis on the 'calculating intelligence', and to a Machiavellian rebirth which transformed Machiavellianism from a trait of the aristocracy to that of the middle classes and, later on, the masses[11]. Alexander and Margarete Mitscherlich's psychological profile of post-war Germany fits the pattern:

> The most important collectively practiced defense is to withdraw cathectic energies from all processes related to enthusiasm for the Third Reich, idealization of the Führer and his doctrine, and, of course, actual criminal acts... The community of those who had lost their ideal 'leader', the representative of a commonly shared ego ideal, managed to avoid self-devaluation by breaking all affective bridges linking them to the immediate past... Had it not been counteracted by these defense mechanisms - of denial, isolation, transformation into the opposite, and above all withdrawal of interest and affect, that is to say of rendering memories of the whole period of the Third reich devoid of feeling - a condition of

[8] Erich Fromm, *Escape from Freedom* (New York: Holt, 1941).

[9] T. W. Adorno, Else Frenkel-Brunswick, D. Levinson and N. Sanford, *The Authoritarian Personality* (New York: Norton, 1950).

[10] All these traits were seen as aspects of the obsessive-compulsive personality of the fascist. I have already mentioned that in his earlier formulation of the problem Freud had posited a close bond between isolation and obsession-compulsion.

[11] Friedrich Meinecke, *The German catastrophe: Reflections and Recollections*, trans. Sidney B. Fay (Cambridge, Mass.: Harvard University, 1950), pp. 37, 51. Cited in Renzo De Felice, *Interpretations of Fascism*, trans. Brenda H. Everett (Cambridge, Mass.:Harvard University, 1977), pp. 15-17.

extreme melancholia would have been inevitable for a large number of people in postwar Germany...[12]

Hanna Arendt was to later contribute to the same awareness with her portrait of Adolf Eichmann, a plain-thinking, non-ideological, hard-working, bureaucratic killer who saw his genocidal responsibility as a problem of efficiency, organization and objective planning[13]. Arendt recognized that Eichmann was the ultimate product of the modern world, not because he established a new track-record in monstrosity but because he typified the evil that grew out of everyday isolation rather than from the satanism which comes from unbridled passions. (Appropriately enough, the great majority of his victims too were 'utterly unable to comprehend what had happened to them... They had no consistent philosophy which could protect their integrity as human beings, which could give the strength to make a stand... They had obeyed the law handed down by the ruling classes, without ever questioning its wisdom'[14]. Evidently in Eichmann's industry of death, mechanical, bureaucratic acceptance faced a mechanical, bureaucratic death machine).

Thus, since the 1920s, sensitive minds were warning us about the dangers of affectless sanitized cognition, about what Robert Pirsig calls 'a noncoalescence between reason and feeling'[15]. And, by the early fifties it was clear to many that fascism was the typical psychopathology of the modern world, for it merely took to logical conclusions what was central to modernity, namely the ability to partition away human cognition and pursue this cognition unbridled by emotional or moral constraints.

II

Only one area of modern life escaped the full impact of the critique of isolation: modern science. There were reasons for this. Modern science was structured isolation. The values of objectivity, rationality, value-neutrality and inter-subjectivity were definitionally the values of the modern scientific world-view. And these values *did* heavily draw upon the human capacity to isolate. Moreover, there was a latent awareness in the society that science was, at times,

[12] Alexander Mitscherlich and Margarete Mitscherlich, 'The Inability to Mourn', in Robert J. Lifton and Eric Olson (eds.) *Explorations in Psychohistory: The Wellfleet Papers* (new York: Simon and Schuster, 1974). pp. 257-70; see pp. 264, 266, 268-69.

[13] Hanna Arendt, *Eichmann in Jerusalem* (New York: Viking, 1963).

[14] Bruno Bettleheim, *Surviving and Other Essays* (New York: Knopf, 1979), pp. 56-7.

[15] Robert Pirsig, *Zen and the Art of Motorcycle Maintenance* (London: Corgi, 1976), p. 162.

isolation at its best and at its most exciting, that somehow the abstractive and generalizing capacities of science were closely related to the process of isolation. Theodor Kroeber, a relatively unknown psychologist, once perspicaciously described objectivity as a coping mechanism which was the healthy counterpart of the defence of isolation[16]. Science as a personal search for truth and as a means of human self-realization seemed to be a form of this creative objectivity. It did not seem that isolating to many. The attacks of the artists, writers and the fashionable mystics, in contrast, were bound to wash off as eccentric responses to the creative isolation of modern science.

Moreover, a part of the attack on science was diverted to technology. As the dehumanizing and mechanomorphic aspects of technology became obvious after the first world war, there emerged the view that questions of ethics applied mainly to technology , not to science. This was certainly the argument of the major social critics who shaped the popular response to science. Take for instance the two literary figures who helped to bring us up in the first half of this century: George Bernard Shaw and H. G. Wells. Shaw wrote savage indictments of modern technology in *Major Barbara* and *The Doctor's Dilemma* . But he also wrote fiery tracts pleading for more modern scientific management of societies. Wells's science fiction could be read as a trenchant critique of a science contaminated by human greed and violence. (*The Island of Docteur Moreau* and its vivisectional horrors, one may argue, were distant in only geographical terms; physiologically they were right in the midst of the modern world). Yet, when it came to social problems, Wells became a votary of scientism.

One of the most poignant examples of such ambivalence was Bertrand Russell, amongst the first to sense the full destructive power of modern science and technology. In his *Icarus* , an essay on the future of science, as well as in a number of other works, Russell touched upon the relationships between authoritarian control, science and technology, and the instrumental use of isolated rationality. As a corrective, he wanted both reason and love, not isolated reason[17]. Yet, in his system, reason had an intrinsic legitimacy; love did not. Love had to be reasoned love; reason did not have to be feeling reason. He wanted love *and* reason, not love *in* reason.

At least two millennia before modern psychology was born, the *Kaushitaki Upanishad* advised one to try to understand the speaker behind the spoken word and the doer behind the deed[18]. And I hazard the crude *ad hominem* argument

[16] T. Kroeber, 'The Coping Function of Ego Mechanism', in R. W. White (ed.), *The Study of Lives* (New York: Atherton, 1963), pp. 178-98.

[17] See the 'Prologue" in Bertrand Russell, *Autobiography* (London: Unwin Paperback, 1975), p. 10.

[18] 'Kaushitaki Upanishad', translated with comments by Prafullakanta Basu, in *Upanishad* , Vol. 2, ed. Sitanath Tattwabhushan, trans. and commentary by Maheshchandra Vedanta-Ratna, and Prafullankanta Basu (Calcutta: Haraf, 1976), 2nd ed., 511-77; see pp. 563-64.

that Russell's own life provides clues to the disjunction between ideas and feelings that his philosophy endorsed. His emotional relationships showed that he never sensed the subtle exploitation in a two-person situation where one operated according to the principle of rational love and the other had faith in reasons of heart. He never imagined that what Freud might have called a rational transference could become - with its built-in bias for impersonal, negotiable, part-object relationships - an instrument of oppression. The simple, non-intellectual biography of Russell by his daughter Katherine Tait recognizes this. It unwittingly reveals how Russell's own children rebelled against the oppression of rational love. Katherine herself found religion and missionarism, both as a means of de-isolating and as a means of defying her aggressively atheistic father; and her brother found madness, of a kind which usually has the split between ideas and feelings as its main symptoms[19]. It is Mrs Tait's naïve comment in the context of her brother's illness which turns out to be *intellectually* the most challenging; she in effect wishes that her father had been more influenced by the open-ended, easily criticizable, more holistic and less scientific psychology of Sigmund Freud than by the positivist, progressive and ultra-scientific system of J. B. Watson.

Implicit in such torn creative minds of this century's Europe was the belief that while the context of modern science and its applications were faulty, the text of science was liberating. In fact, as diagnosed by the modernists, the problem was that the objectivity of science had not yet fully informed the social uses of science. That is, while the scientifically minded had used isolation, they had not isolated deeply and widely enough; feelings still dominated many sectors of human life, and theses sectors were waiting to be liberated by the further growth of the scientific temper.

Some years ago Gerald Holton, one of those optimists who are not embarrassed to seek security by surrendering more fully to the forces which cause the insecurity in the first place, declaimed:

> While we may intuitively feel that the choice is unpleasant, it is perhaps not necessarily so paradoxical as it may seem. A number of social or physical systems offer models in which stability, when disrupted by the introduction of a new factor, can be reestablished at some level only by increasing the role of the new factor even further[20].

Predictably, a majority of natural scientists toed this line. Not so predictably, many social analysts, too, chipped in with the same analysis. They valiantly tried to solve the social problems of science by promoting more science. The new credo was: the content or text of modern science is universal and amoral but its social context is often parochial, value-loaded and evil. Individual scientists, too, can sometimes be self-interested, hypocritical or opinionated.

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[19] Katherine Tait, *My Father Bertrand Russell* (New York: Harcourt, Brace, 1975), pp. 62-4.

[20] 'Introduction', in Gerald Holton (ed.), *Science and Culture: A Study of Cohesive and Disjunctive Forces* (Boston: Beacon, 1965), p. x.

Change the social relations of science and you will have finally an ethically pristine, fully liberating, modern science.

Entire schools of thought have by now grown up on this staple diet, and the Ernest Nagels and Peter Medawars have even tried to build an entire dietetics on it. As such ideas and their political power are widely known, I shall not discuss them further. Instead, I shall draw attention to the new generation of ordinary citizens and consumers of science who have been so well brought up on the principle of the purity of scientific texts that they, even when practicing homeopathy or palmistry or even when growing a sacred tuft of hair or going on a pilgrimage, have to justify themselves on scientific grounds. Among the third-world elites today, such uncritical acceptance of science as the absolute standard of validation is now more common than the Asian flu.

This growing body of uncritical supporters of science operate with the same folk philosophy with which, according to Bruno Bettelheim, apolitical victims often face oppression in "extreme situations'. Used to being obedient to the scientific establishment, they dare not oppose the ruling ideology. Each inhumanity imposed or legitimized by science is seen as a mistake of the system which could be corrected from within it[21].

III

Today, in the last quarter of the twentieth century, another response is conceivable. Older, tired and wiser, we can now take courage to affirm that the main civilizational problem is not with irrational, self-contradiction superstitions but with the ways of thinking associated with the modern concept of rationality; that modern science has already built a structure of near-total isolation where human beings themselves - including all their suffering and moral experience - have been objectified as things and processes, to be vivisected, manipulated or corrected. According to this view, the irrationality of rationality - as Herbert Marcuse might have described the pathology - in organized normal science - as Thomas Kuhn might have described the system - is no longer a mere slogan. It is threatening to take over all of human life, including every interstice of culture and every form of individuality. We now have scientific training in modern sports and recreations; our everyday social relations and social activism are more and more guided by pseudo-sciences like management and social work and by pseudo-technologies like transactional analysis and T groups. Our future is being conceptualized and shaped by the modern witchcraft called the science of economics. If we do not love such a future, scientific child-rearing and scientific pedagogy are waiting to cure us of such false values, and the various schools of scientific psychotherapy are ever-ready to certify us as dangerous neurotics. Another set of modern witch-doctors has taken over the responsibility of making

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[21] Bettleheim, *Surviving* .

even the revolutionaries among us scientific. In fact, the scientific study of poverty has become more important than poverty itself. Even in bed, our performance is now judged according to the objective criteria of some highly scientific, how-to-do-it manuals on sex.

Such a process has continuously justified our ability to freeze or fix a subject for study and to place it at a distance to evaluate. Those acquainted with Bettleheim's accounts of human beings facing arbitrary torture and murder will know why I have used the word 'distance' here. Distancing is a psychological device which both the victim and his oppressor have to use, one to ward off the reality of his fate and the other to reduce his victim into an object[22].

It is the second use which is pertinent to my argument here. It is the use which prompts Aimé Césaire to write the quaint formula: 'colonization = thingification'[23]. In its extreme form such objectification becomes necrophilia, the passion to kill so as to freeze, place at a distance, and love[24].

The warning against the rationality from which the objectification derives is best given in the words of Fromm:

> Logical though not rational if it is merely logical... (Paranoid thinking is characterized by the fact that it can be completely logical... Logic does not exclude madness). On the other hand, not only thinking but also emotions can be rational...
>
> Reason flows from the blending of rational thought and feeling. If the two functions are torn apart, thinking deteriorates into schizoid intellectual activity, and feeling deteriorates into neurotic life-damaging passions.
>
> The split between thought and affect leads to a sickness, to a low-grade chronic schizophrenia, from which the new man of the technologic age begins to suffer... There are low-grade chronic forms of psychoses which can be shared by millions of people[25].

Fromm here endorses, with the help of nosological entities similar to the ones I have used, the social analyses which nervously view a growing number of

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[22] Ibid., Part I.

[23] Aimé Césaire, *Discourse on Colonialism* , trans. Joan Pinkham (New York: Monthly Review Press, 1972), p. 21.

[24] Erich Fromm, *Anatomy of Human Destructiveness* (Connecticut: Fawcett, 1973). See also George Devereux, *From Anxiety to Method in the Behavioural Sciences* (The Hague: Mouton, 1967).

[25] Erich Fromm, *The Revolution of Hope: Toward a Humanized Technology* (New York: Harper and Row, 1974), pp. 42-3.

societies getting structurally and morally reorganized to meet the needs of organized science. He in the process unwittingly provides another reason why criticism of modern science from within the scientific world-view cannot go very far.

The importance of the other position which insists that the social problems created by modern science cannot be handled within the culture of modern science, has also grown because the idea of more science to cure the ills of science seems especially to enthuse normal scientists and the political spokesmen of the scientific estate. It is now obvious that the slogan of internal criticism and the search for the hair of the dog to cure dog-bite serve the interests of scientists rather well, for they delegitimize criticisms from the outside and suggest that while the scientific worldview cannot be judged by other worldviews, the other worldviews can be judged and indeed should be judged by science[26].

To give a well-known example, Paul Feyerabend, no lover of astrology himself, examines at one place a joint statement by 186 modern scientists, eighteen of them Nobel-laureates, against astrology[27]. He shows that none of the 186 had studied astrology before attacking it. Some of them, when contacted by journalists, were unashamed that they knew nothing about astrology. Their statement shows the same ignorance of the relevant findings of modern science. That of course did not stop them from passing judgement. Not only were they unwilling to apply their scientific method to judge the claims of a competing system, they did not stop to ask why they needed 186 signatures and not one, if the arguments were so good and so conclusive.

One is tempted to argue that the 186 signatures were necessary mainly to deny the principle of reciprocity. They were meant to deny the counter-claim that, if modern science claims the right to criticize other systems, it should give the right to criticize science if not to other systems at least to its own victims, that it should grant that a part of the ethical restraint on modern science may now have to come from outside science, from the totality of human experience confronting science.

Any idea of external control on science, however, sounds like a denial of free thought to many. Discredited by the clumsy, some times tragic battle waged against science by the medieval church, the idea of external control seems dangerous even now, when science rules the world. But could it be that the church in its obscurantism was expressing its fears of a system of knowledge freed from the restraints of ethics and social conscience, however faulty that ethics and however rigid that conscience? The answer may be less unfriendly to the church today when modern science is a part of the global establishment, when most faiths have become defensive and all organized faiths are seeking

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[26] I have discussed this issue in more detail in 'Science in Utopia: Equity, Plurality and Openness', *India International Center Quarterly* , 1983, 10(1), pp. 47-59.

[27] Paul Feyerabend, 'The Strange Case of Astrology' , *Science in a Free Society* (London: NLB, 1978), pp. 91-6.

endorsement from science. Today the issue is: which pathology has become more unsafe for human survival, that of scientific rationality or that of its 'irrational' subjects?

IV

The problem I am posing is, I hope, clearer. I am suggesting that when the world of uncritical traditions faced the first onslaught of organized modernity, the principle and practice of isolation played a major role in it. Modern science at that stage was a creative, and modern authoritarianism a pathological possibility of the ability to isolate. Gradually, over-isolating, fully organized modern science has become another pathological correlate of the demise of traditions and the erosion of cultures, the false claims of the rationalists, scientific socialists and Hobbesian liberals notwithstanding.

The earlier creativity of modern science, which came from the role of science as a mode of dissent and a means of demystification, was actually a negative force. It paradoxically depended upon the philosophical pull and the political power of traditions. Once this power collapsed due to the onslaught of modern science itself, modern science was bound to become, first, a rebel without a cause and then, gradually, a new orthodoxy. No authority can be more dangerous than the one which was once a rebel and does not know that it is no longer so.

The moral that emerges is that modern science can no longer be an ally *against* authoritarianism. Today, it has an in-built tendency to be an ally *of* authoritarianism. We must now look elsewhere in the society to find support for democratic values.

Why has something which began as a movement of protest become part of the Establishment? Why do the moderns continue to view science as a cornered voice of dissent fighting powerful opponents when it all too visibly owns the world? Why do even the radical critics of society exercise restraint when criticizing science?

Any answer to these questions must begin with the admission that modern science is both a social institution and a search for new meanings and aesthetics. During its first two centuries, it was the second aspect of modern science which predominated. In Europe till the eighteenth century the scientist was claiming the right to search for another truth and adopt another mode of reaching it. But that philosophical quest was a hangover from the days of classical science and the scientists recovered from it soon enough to produce, by the end of the nineteenth century, a formidable organization and strong links with that other child of seventeenth century Europe, the modern nation-state system. In another five decades, the scientist has become the main author of the establishment

cosmology. He is now the orthodoxy; he is now the Establishment. So much so that to perceive him still as a weak, unorganized fighter against authority can spell disaster for all of us.

When science was primarily a philosophical venture, it allowed for more plurality. In the days of organized science there is little scope for a scientist to protect his individuality as a scientist. Overorganized science has managed to do the impossible: it has become a market-place and a vested interest at the same time. It has an organizational logic independent of the creativity of the individual scientist but dependent on - and subserving - his material interests. Thus, there is an inner incentive for the scientist - for even the most creative among them - to orient their creativity to the dominant culture of science. The scientist can fully encash his creativity in the market-place of science only if he plays according to the existing organizational rules of modern science and, better still, if he remains unconscious of the rules in the fashion of what Georg Lukacs calls the silent species[28].

This depoliticization is camouflaged by a special brand of pseudo-politics. The normal scientist, who could be defined as the practitioner of Thomas Kuhn's normal science, is expected to be politically involved, but he is expected to operate *as if* the pathology of modern science lay only in its context. He can shout himself hoarse over nuclear armaments - as a pacifist, a liberal or as a Marxist - but he cannot say that violence lies at the heart of modern science. He may speak of the origin of science in superstitions, prejudices and myths; he can speak of the persistence of these in the individual scientist; but he cannot speak of their persistence in the text of science. In other words, there is now a standard officially-sponsored model of political dissent for the scientists. If a normal scientist follows that model, science rewards him handsomely, otherwise he is valued not as an eccentric professor but as a lunatic who has missed his professional bus. It is this cultural twist which has pre-empted basic internal criticism in science.

This point can be made in another way. The culture of modern science gives a special role to the scientist in defining the concerns of science, whether these concerns be textual or contextual. But it encourages him to shirk all responsibility if something goes wrong with the concerns. That responsibility is passed on to other citizens. Thus, the scientist gets the credit for the constructive discoveries of science, not for the destructive ones. Indeed, his training encourages him to either criticize science only in terms of its context ('Nothing is wrong with nuclear research; the politicians and the generals are the ones who misuse it and produce nuclear arms') or reduce all contextual problems to textual ones ('If science threatens an ecological disaster, do not seek woolly social or political solutions; seek scientific ones, for science can always solve the problems it has created').

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[28] Georg Lukacs, ' The Twin Crisis', in San Juan, Jr. (ed.), *Marxism and Human Liberation* (New York: Delta, 1973), p. 316.

This is the other way the culture of science is structured by ego-defence like isolation and denial, and controlled by a small number of two-dimensional scientists who, unlike the political elites, have exempted themselves from criticism, checks and competition. The bureaucratic violence that results is endorsed by the total socialization of the individual through modern child-rearing, education and mass media. The scientist decide the use of science in society; the lay person considers such control proper. Increasingly, scientists exercise their power with the enthusiastic approval, in fact on the demand of a section of the society. Both sides view the suffering inflicted by or in the name of science as a needed sacrifice for the advancement of human rationality and social progress.

The traditional cultures, not being driven by the principles of absolute internal consistency and parsimony, did allow the individual to create a place for himself in a plural structure of authority. In such cultures the individual always had some play vis-à-vis the institutions he worked with. For instance, a guru could be a false consciousness to many but, traditionally, one man's guru was always another man's anti-guru. Such fragmentation of the world of gurus was presumed by every disciple of every guru. So there were at least varieties of false consciousness competing for the allegiance of the believers. Such multiplicity is not granted by modern science which, because it presumes universal norms and unitary truths, must reject all gurus, and claim religious allegiance to one truth and one form of liberation. So you have faith but faith without the different forms of godmen, revelations and prophets which enriched the traditional religions.

Finally, the four pluralities science disarmingly accepts. In each case, there is an implicit but irrevocable principle of hierarchy as well as a totalist vision of social consciousness. First, there is classical science, by which one means pre-modern Western science, seen as a heroic, but an earlier, romantic and inferior stage in the evolution of true knowledge, the final stage of which is presumed to be modern Western science. In this hierarchy classical science is fitted in as a museum-piece, not as an alternative view of nature and humanes.

Second, there are the ethnosciences, the non-modern, non-Western traditions of science which are seen as semi-scientific reservoirs from which modern science may have to pick up insights and practices, rejecting the rest as so much mythology and magic. The borrowing by modern medicine of reserpine from Ayurveda does not imply any respect for the philosophy or the structure of the Ayurveda; it shows a pragmatic openness towards some specific findings of Ayurveda. It is the respect we show an alert child who by chance spots a misplaced railway ticket which the elders should have spotted in the first place but, through a series of accidents and oversights, did not.

Third, there is the internal plurality of competing scientific theories. It, too, has no intrinsic legitimacy. If science has more than one explanation of a phenomenon, the expectation is that only one of them will finally win and establish its hegemony; otherwise a new theory will emerge and supplant all the competing theories. Usually, of course, there is one dominant theory in existence; this is held by the scientists in the fashion of, to use Kuhn again, a totalizing dogma.

The fourth plurality, too, is internal. Scientists grant legitimacy to divide between what J. R. Ravetz calls the mature and the immature sciences[29]. Though theoretically any kind of science can be immature, in practice the social sciences are so classified, mainly because of their paradigm-surplus nature. For all paradigm-scarce disciplines are definitionally mature following Kuhn. This is despite the critical power the human sciences sometimes derive from their paradigm-surplus nature and from their ability to offer wider social choices as well as openness of vision[30]. The main function of this concept of maturity is to avoid having critical social sensitivity close to the heart of science.

The pluralities of science, therefore, are no pluralities at all. They may be necessary for the progress of modern science but to participate in or manage such a culture of science requires something more than the qualities imputed to the stereotypical scientist; they require a complex of psychosocial skills most frequently found in the authoritarian personality, either as part of a search for 'authoritarian domination' or as an expression of 'authoritarian submission'.

V

I have said that modern science was once a movement of dissent. It then pluralized the world of ideas. I have said that it is now the center-piece of the Establishment cosmology and can function neither as an instrument of basic criticism nor as an expression of skepticism - its philosophical hallmarks at one time. I have also said that modern science, at its best, was once a creative response to a particular psychological problem, the pathological response to which later turned out to be modern authoritarianism. I am now suggesting that modern science, which began as a creative adjunct to the post-medieval world and as an alternative to modern authoritarianism, has itself acquired many of the psychological features of the latter. In fact, in its ability to legitimize a vivisectional posture toward all living beings and non-living nature, modern science is now moving towards acquiring the absolute narcissism of a new passionless Caligula.

Modern science began by giving a dissenting meaning to the man-nature relation. It was not merely another ideology claiming that other ideologies were false or inferior; it was another view of the human condition which sought to make all ideologies redundant. (The end-of-ideology argument, so popular a decade ago, can be seen as a projection of the triumph of this anti-ideology in

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29 J. R. Ravetz, *Scientific Knowledge and Its Social Problems* (Harmondsworth: Penguin, 1973), pp. 156-9.

30 The problem of pluralities has also been discussed in Ashis Nandy, 'Science in Utopia', *India International Center Quarterly*, 10(1), pp. 47-59

human mind and society). In its earliest form, modern science disturbed the older world image not so much by being unconditionally true, but by introducing a new style of demystification which subverted parts of the European tradition that had become stale, self-justifying and inconsistent with experience. This is why when specific scientific theories were falsified and reduced to the status of myths by the growth of modern science, it did not lead to any great jubilation among the believers, not even when the falsified theories dealt with matters of theological concern. The believers sensed that modern science had offered a way of looking at things which was partly independent of the changing content of modern science. They sensed that one could not escape the critical gaze of modern science by taking advantage of the changes within it.

However, like some of the schools of social criticism it directly or indirectly spawned, modern science too developed features which were to help it, as a critical tradition, to demand and get uncritical support. Not only did modern science gradually develop a rigid, unidirectional mode of demystification which saw all such other modes as subsidiary or peripheral, it began to see all alternatives to its mode of demystification as conspiracies against human good. This was backed up by a self-justifying tough-mindedness[31]. What was first a quality of consciousness was now institutionalized and concretized as a 'thing' and as an independent reality, in fact the only reality.

First, there was the concretization of concepts. Rationality, for instance, was once an attribute of thinking. It became a concrete body of knowledge and a set of methods of knowing. Adjectives thus became nouns and the psychological became the crypto-physical under the influence of an anti-intraceptiveness which, in another context, was later found to be closely associated with modern authoritarianism.

Second, the worlds of nature and, later on, human nature came gradually to mean the worlds of the sciences of nature and of human nature. This is not the old argument about science cornering culture, though that argument too, has some power. I am speaking of the operationalism which reduces reality to the reality accessible to the methods of science, and then reconstructs the 'whole' reality - of nature, persons or cultures - by extrapolation from that operational reality. The dangers of such concretization - and the isolating, part-object relations it promotes - are especially obvious in the human sciences. In psychology, for instance, intelligence tests are no longer seen as imperfectly operationalizing intelligence; intelligence is now what the intelligence tests measure. A strategy of research has come to define the whole of the reality of human intellect.

I am often told that this is a price we must pay for the growth of science, and once the infant science of psychology matures, it should be able to handle the complexities of human nature. I am not so sure. The rewards of operationalism and that of the control it gives over individuals and groups are enormous. And

[31] The word has been borrowed from modern psychology which uses it to distinguish indirectly the more scientific from the less, and the better from the worse.

once it is institutionalized in a society, it acquires more and more autonomy. The means gradually begin to define the goals and ultimately become the goals. In another context, Freud might have called this an instance of process pleasure - the pleasure which should be associated with an instinctual goal but is displaced on to the process of reaching the goal.

Finally, within the scientific estate there is the pressure on objectivity to move closer to objectification due to the constant stress on the subject-object dichotomy. In the modern knowledge systems, this dichotomy is seen as a major pathway to power through knowledge and to knowledge through isolation[32]. This has necessarily led to a further endorsement of mechanomorphism. The old European concept of the world machine included the idea of God the clock-maker which, retrogressive though it may sound to modern ears, did provide a check on the potential for isolated cognition implied in the idea of the world as a machine. The new secularized concept of the world machine represents a desacralized mechanomorphism which admits no limit on itself. Behaviourists like J. B. Watson and B. F. Skinner have only taken to its logical conclusion this process of objectification. How far they derive their legitimacy from the promise of scientific control over human fate is obvious from the fact that behaviourism remains the official ideology of both the orthodox modernism of the West and the critical modernism of Soviet Marxism.

Any mention of the duality of the observer and the observed prompts a section of scientists and philosophers of science to mention particle physics, Werner Heisenberg or microbiology. And then some social scientists join them with Freud's concepts of transference and counter-transference or the structuralist concept of the savage mind. As if these concepts defined the mainstream culture of modern science or disturbed the poise of the normal scientist pursuing his normal science! I do not think it an overstatement to say that the culture of normal science, as we know it, will collapse if it gives up the division between the observer and the observed or the hierarchy between the scientists ant the laity.

Once again we are close to what some psychologists have identified as a basic feature of political authoritarianism: all'round objectification and the idea of a leadership supposedly representing both the true interests of the masses ant the superior understanding of those interests. Political authoritarianism *has* to see the citizen as a subject whose subjecthood is no different from that imposed on the laity by science. The sometimes harmless distance between the scientist and his subject becomes in politics the chasm between a self-declared elite - the 'revolutionary vanguard' in some theories of progress - and their increasingly voiceless objects of manipulation: the reportedly immature masses, underdeveloped, primitive, and carrying the heavy baggage of false consciousness. Seen thus, the culture of modern science is part of a more general theory of imposed secular salvation, the other special case of which is modern authoritarianism.

[32] Gregory Bateson is one of the many who have suggested that the objectivity of experience is a typical Occidental view of the worlds. See his *Mind and Nature: A Necessary Unity* (Toronto: bantam, 1980), pp. 33-4

It is therefore not a paradox of our times that to contain modern science many are falling back on what has been one of the main targets of modern science during the last three hundred years - cultural traditions. It is part of the attempt to protect the plurality of human consciousness and provide a critique of science from outside. In so far as the various in-house criticisms of modern science have not defied modernity and in so far as modern science is inextricable from the modern consciousness, in many societies one is forced to fall back on the traditional worldviews. At least the latter have tried to protect, at the margins of the 'civilized' world, the crucial insight that the battle against isolation is joined when one gives up the concept of a fully autonomous observable and opts for the dyad of the observer and the observed as the basic unit of analysis. A number of non modern systems of thought have sought freedom and understanding in the deliberate search for a continuity between the observer and the observed, in cross-identifications and empathy. Here, for example, is Toshihiko Izutsu speaking of Islam:

> The problem of the unique form of subject-object relationship is discussed in Islam as the problem of *ittihad al-alim wa-al-ma' lum* , i.e. the 'unification of the knower and the known'. Whatever may happen to be the object of knowledge, the highest degree of knowledge is always achieved when the knower, the human subject, becomes completely unified and identified with the object, so much so that there remains no differenciation between the two. For differenciation or distinction means distance, and distance in cognitive relationship means ignorance[33].

True, the traditional philosophies generally place such unity of the knower and the known outside everyday life, which these philosophies often see as unavoidably dualistic. Nonetheless, the awareness of such possibilities delimits the role of modern science and helps one to see it as only a finite system of knowledge and as a corrective to an overly projective worldview. Such delimitation in turn allows the peripheries of the world to use their traditions as a legitimate vantage ground for social criticism.

This, however, only brings us to another question: what kind of tradition can be used as tools of criticism and what kinds are open to criticism? Apparently, the answer to this question is known. One knows the kind of tradition which renaissance science criticized and the reason thereof. The moderns never tire of remembering the isolating, heartless, frozen aspects of traditions which Galilean science attacked. Modern Indians, too, never fail to remind themselves that the last two hundred years of Indian life have been a continuous struggle against not merely the colonizing West but also the negative aspects of Indian traditions. Even the counter-modernists grant that cultural traditions can become ritualized, self-justificatory and a means of perpetuating

[33] Toshihiko Izutsu, *The Concept and Reality of Existence* (Tokyo: The Keio Institute of Culture and Linguistic Studies, 1971), p. 5.

institutionalized violence. They grant that traditions, too, may push one to isolate their contents. It is probably in the nature of any complex cultural system to seek self-perpetuation through isolation. After all, according to Freud, the main role of rituals is to isolate, and a culture is hardly conceivable without its own quota of rituals[34].

This is only another way of saying that no culture can survive on a staple diet of passions. Nothing can be as dead as last year's passions. A culture must constantly persevere, if that is the word, to survive on an appropriate mix of non-heroic self-definition and ritualization of everyday life.

Let us not, however, minimize the complexity of the problem. Choosing the right tradition is not a matter of choosing from among the discrete elements of a culture. A culture is not a grocery store, with each customer a free purchaser and each purchase an independent purchase. A culture is an interconnected whole with some strong interconnections and some weak; a culture has some odd, unpredictable, ill-understood bonds with those who live by it, use it or even disown it. Within it, you have some options only if you exercise others, and the options exist only if yet others are not exercised. The choice of traditions I am speaking of involves the identification, within a tradition, of the capacity for self-renewal through heterodoxy, plurality and dissent. It involves the capacity in a culture to be open-ended, self-analytic and self-aware without being overly self-conscious[35]. There are traditions, or at least constructions of traditions which, even when you introduce crucial changes into them, are not threatened. These traditions can give meanings to the changes in terms of categories internal to them. Because they have subtraditions which operate as baselines for social criticism, they are accustomed to converting external criticisms into internal ones. On the other hand, there are traditions which are so fragile or so consistent internally that the removal of a single plank may mean total collapse. In neither case can one mechanically apply the principle of choice.

Fortunately, cultures are usually more open and self-critical than their interpreters. In the first half of this century, Ananda Kentish Coomaraswamy wrote his brilliant critique of the modern civilization. He contrasted this civilization with the traditional vision of man - humane, contemplative and just. He thus took to an elegant conclusion the critique initiated by Thomas Carlyle,

[34] Freud, *Inhibitions, Symptoms and Anxiety.*

[35] Apart from my obvious indebtedness to the critical tradition, I have in mind here the meaning of 'analysis' that emerges from the works of Philip Rieff on Freudian ethics. See especially his *The Triumph of the Therapeutic : The Uses of Faith After Freud* (New York: Harper, 1968). Such a meaning in some ways ties up with the concept of criticism as used throughout this paper. Though neo-Freudian and neo-Marxian in origin, the concept does have some degree of cross-cultural validity. It certainly ties up with the critical uses to which some forms of *advaita*, especially the theory of *maya*, could be put. Also relevant in this context is the work of one who may seem a strange bed-fellow, Karl Popper. See his 'Towards a Rational Theory of Tradition', in *Conjectures and Refutations: The growth of Scientific Knowledge* (London: Routledge and Kegan Paul, 1972), pp. 120-35.

John Ruskin, William Blake and Leo Tolstoy on the one hand and a galaxy of non-Western thinkers on the other. However, even if one grants that everyone has the right to project a utopia in the past, Coomamraswamy's tradition remains homogeneous and undifferentiated from the point of view of man-made suffering. His defence of the charming theory of *sati*, for example, never takes into account its victims, the women who often died without the benefit of the theory. By refusing to consider this mundane issue, Coomamraswamy's traditionalism ceases to be critical, however open it might be metaphysically to the idea of self-criticism and self-renewal. Such traditionalism reactively demystifies modernity to remystify traditions[36]. It also promotes isolation, even if in a much less dangerous form than did Dr Josef Mengele and Shiro Ishii under the banner of science.

Likewise, one may concur with Coomamraswamy that the untouchables in traditional India were better off than the proletariat in the industrial societies. But this could be an empty statement to those victimized by the caste system today. When many untouchables opt for proletarization in contemporary India, is their choice merely a function of faulty self-knowledge? Can we draw a clear line between the experts on traditions and the laity, and declare the latter's knowledge, feelings and values irrelevant to the understanding of traditions? Are we not then replicating nineteenth-century colonial anthropologists and historians who stratified persons, races and cultures into the producers and the consumers of knowledge, into those who were historians to the world and those who were objects of history? I am afraid Coomamraswamy's traditionalism, despite being holistic by design, does not allow a creative, critical use of modernity within traditions. This never happens with the living traditions which Coomamraswamy theoretically supports. The Ramayana and the Mahabharata, for instance, take into account the modern consciousness in the form of the personality types represented by some demons (*danavas*, *daityas*, *rakshasas* and *asuras*), and some anti-heroes such as Karna. These types are rejected; but they are first considered seriously, given due respect and used as critiques of the types favoured.

An excellent example of the critical use of modernity within tradition is the two hundred years of the recent past of Indian society from Rammohun Roy to Gandhi. Throughout the period, continuous and sometimes successful efforts were made to make the modern world a meaningful - and manageable - part of Indian experience. Even the parallel negative past of modern India - from Radhakento Deb, who opposed Rammohun Roy, to Nathuram Godse, who killed Gandhi - can be read as an unsuccessful effort to arrive at a creative use of modernity. That such efforts did not always succeed or that they often led to dangerous visions should not blind us to the seriousness of the efforts, Deb opposed the abolition of *sati* by the British, but was a pioneer in women's education. Godse was an ultra-Hindu, but the Hinduism he fought for was more modern than Gandhi's. A part of Coomamraswamy's problem arises from his emphasis on the classical at the expense of the folk and on the 'pure' at the expense of the 'hybrid' and the 'dirty'. Perhaps if he had not had that odd

[36] See 'Evaluating Utopias' in this volume.

middle name, if he had not had to disown his mixed origin and bicultural consciousness, or live away from his tradition for so long with such enormous knowledge of it, he might have defended Indian culture less uncritically.

Today, with the renewed interest in cultural visions, one has to be aware that commitment to traditions, too, can objectify by drawing a line between a culture and those who live by that culture, by setting up some as the true interpreters of a culture and the others as falsifiers, and by trying to defend the core of a culture from its periphery. Such uncritical commitment tends to undervalue the folk as opposed to the classical, the contextual as opposed to the textual, the reinterpreted as opposed to the professionally interpreted, and the subsequent or 'interpolated' as opposed to the earlier or the 'original'. As in science, so is culture. A closed system tends to become a vested interest, sometimes in the name of openness.

Some of the models of Hinduism produced during the last one hundred and fifty years neatly exemplify the consequences of such onesidedness. They glorify Hinduism but tend to look down upon the Hindus. Thus, Swami Vivekananda's traditionalism defended the texts and symbols of Hinduism fully but sought to improve the Hindus by giving Hinduism an institutional structure borrowed from Western Christianity. Though he attacked some of the Westernized reformers of Hinduism, he also sought to create, by his own admission, a Western society of Vedantic Hindus to pay back the Imperial West in its own coin[37].

Vivekananda, like Bankimchandra Chatterji before him and Bal Gangadhar Tilak after, sought to blend with Hinduism elements of positivism, socialism, nationalism and masculine Christianity, including the Protestant work ethic. This spirit of synthesis has played, for better or for worse, a significant role in Indian politics for nearly one hundred years[38]. The other versions of Hindu nationalism have been cruder; they have devalued the living Hindu and sought to improve his character and potency, to turn him into a proper counterplayer - often a mirror image - of the conquering Westerner and the 'potency-driven' Muslim. In its self-hatred, Hindu nationalism has wanted to rewrite Hinduism as a 'proper' religion, as well-organized and well-bound as organized Christianity and Islam. The ordinary Hindu probably senses the threat to his survival posed by such cultural engineering; politically, Hindu nationalism had been reduced to an urban, semi-modern middle-class phenomenon[39].

[37] Ashis Nandy, *The Intimate Enemy: Loss and Recovery of Self under Colonialism* (New Delhi: Oxford University Press, 1983), chapter 1.

[38] Ibid.; also 'The Making and Unmaking of Political Cultures in India', in my *At the Edge of Psychology: Essays in Politics and Culture* (New Delhi: Oxford University Press, 1980), pp. 47-69.

[39] A pathetic expression of this ideology was Nathuram V. Godse, the assassin of M. K. Gandhi. For an analysis of the clash between two forms of Hinduism protesting differently

The psychogenesis of such nationalism has been explored in depth in Rabindranath Tagore's novel *Gora*, which tells the story of an ultra-Hindu who turns out, at the end of the novel, to be the abandoned child of an English couple. An accident of life history here symbolizes a deeper cultural equation: the more doubtful one's roots, the more desperate one's search for security in exclusion and in boundaries. Gora, however, proves himself more authentic than those he symbolizes. At the end of the novel he opts for the wisdom of a more inclusive consciousness, not as a compromise but as superior form of Hinduism.

Tagore here is hinting at another kind of tradition which is reflective as well as self-critical, which does not reject or bypass the experience of modernity but encapsules and digests it. Such a tradition refuses to give primacy to the needs of pure cognition at the expense of totality of consciousness and it refuses to sanction total redefinition of itself in response to defeat or humiliation. It of course rejects imitation, but it goes beyond that and rejects, as a path to self-esteem, the compulsion to be only the other culture. Even in defeat, it retains its authenticity, though it incorporates the experience of defeat as relevant.

Not being a Gandhian, I can say without any apologia that Gandhi represented such a concept of critical traditionalism aggressively. (Tagore recognized this, and though he had reservations about many aspects of Gandhism, it was the Gandhian theory of nationalism which he found least offensive). Not being a Maoist, I can afford to say, now that the semi-educated peasant is no longer in fashion, that in some of his incarnations he probably had an inkling of what was involved in such rootedness. He attacked Confucianism, but, often against himself, he sought to fit Marxism within Chinese culture rather than the other way round.

Not being a Marxist, I shall only hesitantly say that Marx himself was often a prisoner of the nineteenth-century scientism and the petty ethnocentrism it underwrote. In spite of his seminal contribution to the demystification of the industrial society, he had no clue to the role modern science had played in legitimizing such a society and in the repression of other cultures and societies[40]. (And if one is not sensitive to the way science has provided a model of domination in our times, one cannot be sensitive to the way the non-modern cultures can provide a baseline for social criticism). A faithful product of Enlightenment, Marx acquitted science and put it outside history, locating the source of human exploitativeness solely in the sphere of political economy. It is thus that his theory kept the door open for scientific social engineering based on objectification of persons and groups. That is why Stalin is not an accidental

against colonialism, see Ashis Nandy, 'The Final Encounter: The Politics of the Assassination of Gandhi', *At the Edge of Psychology*, pp. 70-98; and "Godse Killed Gandhi?', *Resurgence*, January-February 1983, (96), pp. 28-9.

[40] A third generation Marxist like Jürgen Habermas has done better in this respect. See his 'Science and Technology as Ideology', in *Toward a Rational Society* (London: Heinemann, 1977), pp. 81-122.

entry in the history of Marxism. He remains a brainchild of Marx, even if, when considered in the context of Marx's overall vision, an illegitimate one[41].

The critical traditionalism I am talking about does not have to see modern science as alien to it, even though it may see it as alienating. It sees modern science as part of a new cognitive order which can be occasionally used for critical purposes within the earlier traditions. Such traditionalism uncompromisingly criticizes isolation and the over-concern with objectivity, but it never denies the creative possibilities of limited objectivity.

Wisdom recognizes continuities as much as change; it recognizes optimality and the limits of applicability of concepts and character-traits. As in the clinic, so in the culture. Ultimately, intelligence and knowledge are poor - in fact, dangerous - substitutes for intellect and wisdom.

VI

I might be able to make my point better by recalling a brief, apparently trivial, episode in the life of M. N. Roy. It is said that once when he was ill during his last days, Roy insisted that his wife Ellen wear, while nursing him, a red-bordered white sari as his mother used to do in his childhood. Others have disputed the veracity of the story. Being rationalists, they evidently see the irrationality of any rationalist as dangerous spicy gossip. That a person may not choose to work with objectivity in all situations seems to them not merely vulgar; it is a fall from humanness itself.

But should objectivity work in all cases? I like to believe that when Roy reportedly 'fell' from his rationalism by seeking a symbolic reaffirmation of his private concept of motherhood and mothering, he was actually admitting the continuities in the symbols of nature and *caritas* . Perhaps against his will, he admitted some of the undying concerns of his culture and the subtler modes of cultural communications among human beings who are ready to 'listen'. That is, he accepted the limitations of the conventional concept of rationality and tried to be true to the full meaning of his own faith - that human reason and morality expressed the harmony of the cosmos[42]. That is why Roy wanted from his wife not only professional nursing and the institution called medical after-care, but

[41] See also on this subject Leszek Kolakowski, 'Marxist Roots of Stalinism', and Mihailo Marcovic, 'Stalinism and Marxism', in Robert C, Tucker (ed.), Stalinism: Essays in Historical Interpretation (New York: Norton, 1977), pp. 283-319. On the roots of technocratic Marxism in the positivist Marx, see Albrecht Wellmer, *Critical Theory of Society* (New York: Herder and Herder, 1971).

[42] M. N. Roy, *Reason, Romanticism and Revolution*, Vol. 2 (Calcutta: Renaissance, 1955), p. 301.

wanted these hard realities to be given meaning with the help of the traditional symbols, and the feeling and aesthetics associated with them. He was recognizing the mysteries called maternity and wifeliness, and accepting Thomas Mann's maxim that 'It is love, not reason, which is stronger than death'. He was de-isolating.

I want to believe that this disputed episode in Roy's life is true. To admit such an episode is to admit that Roy was, through his apparent irrationality, expressing his superior intellect and his superior wisdom, if not a higher form of rationality itself.

A LESSON FOR SCIENCE*

by

Ali Baquer, Ashis Nandy, J.P.S. Uberoi, H.Y. Mohan Ram and Norman Reynolds

Traditional farmers have their own ways of viewing the world. Attempts to increase food production must be based as much on these as on the findings of modern science.

Proponents of agroeconomic efficiency often regard the traditional methods of agriculture as the main hindrance to progress. Is this really so? It is true that those engaged in agriculture in developing countries are often stubbornly loyal to their old cultural modes of production. They either reject the new agro-technology or adopt it half-heartedly. What prompts them to turn away from modern methods?

The technocrats believe that they have the skills to activize a society. They believe that all a society needs are these skills to increase production. So they talk in terms of rationalization of production processes. Their theory of agricultural growth assumes that knowledge is advanced solely in modern laboratories and other institutions of higher learning, discovery, verification and testing. From there the real and true principles, pure and applied, tried, tested, are transferred to the field. The mind of the receiver, the ultimate 'beneficiary' of this knowledge, is seen either as a blank slate to be written upon or as a slate already smudged by non-scientific practices or traditions which must first be wiped clean.

* First published in India in Mazingira Forum 10, pp. 69-74.

The farmers, on the other hand, as members of the society selected for such technological changes, have an implicit sense of social responsibility for protecting their cultural values. Over a long period of time they have learned to survive within the limit of Earth's resources. They have developed a mode of production which guarantees self-respect not only to each individual associated with the farm but also to the flora and fauna within the farm and outside. They put more emphasis on quality of life than on levels of consumption. They often believe that a partial sacrifice of their standard of living, the amount and range of their produce, the 'productivity' of their man-power, the principles of modern marketing and, ultimately, the alien standards of modern science and universal rationality, are but a modest price to pay for the values they have inherited from their ancestors.

Science as ethnoscience

The concept of ethno-agriculture sympathizes with such a philosophy of science-in-life. It assumes that effective links can be established among modern botany, social sciences, agriculture and agronomic development, management skills and the potential of farmers in the context of their traditions, values and aspirations.

The main assumption underlying such a concept of agriculture are as follows. First, the natural habitat of man is not only his home and the sources of his livelihood but also the laboratory of his thought. That is, everyone at all times possesses an intellectual philosophy, implicit or explicit, which includes a general theory of nature and coherent special theories of such things as soil and plant classification and use.

Second, it may be possible to develop the outlines of a meta-language of translation that can give approximately equal value to a particular native system of thought and to what is known as modern western scientific theory. Such an attempt would help in integrating or synthesizing the two systems and promote cross-translation of theories.

Third, agricultural policy is a means of solving problems in an intellectual partnership with the farmer, not of perceiving him as a mere repository of mindless needs and attitudes. Scientific humility rather than a patron-client relationship is the core of all social policy.

Fourth, farming is more than just a means of food production. Nor is the farm only an enterprise and the farmer only an entrepreneur. These modern concepts of the farm and the farmer have been crated by external factors such as the capitalist agricultural system and market economy. It is possible to see farming as a part of a peasant economic system and identify factors which preserve the traditional structures.

Fifth, the farming community is the backbone of the society and farming is an activity which concerns the whole society. It is not merely an economic function but a social role and a complex set of activities taking place at the farm. Thus it is impossible to study farming without studying its relationships with rural crafts, rural industries and rural services and without examining its context in the natural environment and the laws of nature as defined by the farmers.

Science as authority

A wide range of institutions is currently working in the field of rural development and agriculture. The research being carried out is multi-disciplinary, technically competent and voluminous. However, an overview of this research shows that the practical gains derived from it by farming communities have been scanty at best and non-existent at worst. In fact, in most cases the ideas developed in laboratory have had to be tested by the farmers themselves in the field.

This disjunction between research and reality is an inevitable outcome of viewing knowledge as something which stems from the laboratory and is then offered through extension services to farmers who are expected to act on it. Such a concept of a vertical flow of information does not sufficiently appreciate the value of feedbacks, nor that of participation by the recipient and providers of services in the design, execution and management of research.

Such a concept also accounts for the low salience of the social sciences in the definition of biological research priorities. The agricultural research establishments maintain that priorities should emerge from the difficulties faced by biological research and that the difficulties in applying this knowledge are not crucial to the fixing of the priorities. If farmers do not adopt new practices, the first reaction is to believe that the farmers do not know and they ought to be told. The next reaction is to argue that the economic incentives are not attractive enough and they should be manipulated. The assumption is that the social sciences should help solve these unresolved problems in the transmission of biological knowledge and not worry about the content of biological knowledge.

Science as integration

Such a philosophy of science in society necessarily leads to a neglect of the knowledge of the farmers and to an acquired ignorance of thought systems other than that of modern science. Yet many hard-nosed modern scientists have recognized that the modern scientist will be in fundamental error if he refuses to use native taxonomies and proposes instead improvised ones on the basis of his own scientific culture. "The preservation of the indigenous terms for the local fauna", one of them has argued, "is not just a matter of piety and integrity, it is a duty of science".

There is a need today - vaguely expressed across economics, cultural anthropology, agronomy and botany - for a base or a theory of relations that can help modern scientists to utilize the knowledge and expertise of farmers and others to overcome agrotechnical roadblocks, so that the farmers can achieve both satisfactory levels of production and an ecological efficient use of resources. The nature and thrust of new agrotechnology make the so-called 'primitives' suspect their own ability to come to terms with their own knowledge and environment. But the farmers have learned over a long period of time the value and meaning of their own actions connected with farming. They do not care if their actions are not always remunerative in monetary terms. They know that their farms could exist even when they have no direct production or service function. Their farms provide them with a social basis and give them a sense of continuity and work satisfaction. Their economy and farm structures have retained a certain dynamic balance with the socio-political forces in their environment. Their model offers its own prescriptions of how to maintain the health of soil and water resources and on how to deploy raw materials, energy and manpower. All theses concepts are pieces of a system of thought, an integral aspect of a 'primitive' classification - a classification that may prove more sophisticated than the one offered by modern science and technology.

Classifying, as opposed to not classifying, has a value of its own. Animals and plants are not known by the primitive man simply because they are useful. They are deemed to be useful or interesting because they are first of all known. Classification is the sensible expression of an objective coding and the result of observation and cataloguing of relations and connections. It records and expresses patterns of thinking about the world.

Scientific explanation, too, is the discovery of an arrangement. The whole aim of theoretical science is to carry to the highest possible and conscious degree the perceptual reduction of chaos that began in so lowly and unconscious a way with the origin of life. One can question if the order so achieved is an objective characteristic of the phenomena or an arftifact constructed by the scientist. But the basic postulates of science remain that nature itself is orderly and science is ordering.

Limits of science

Something analogous takes place in the domain of culture. Every culture orders its own conception of the natural and social universe. Indeed, man began applying himself to the most difficult task: he tried to make rational that which was immediately presented to the senses. Thus, it is possible that the primitive man's sense of causality, his all embracing determinism, may anticipate not only science itself but even methods or results which science did not incorporate until at a late stage of its development. This is another way of saying that the primitive man is not a product of a different and earlier stage of the development of human mind. Rather, there are two 'strategic levels' at which nature is accessible to scientific enquiry: one roughly adapted to human perception and imagination; the

other at a remove from them. They represent two different routes. The former is close to, and the later remote from what is commonly called sensible intuition.

The 'unconscious' of certain scientific orthodoxies, in particular that of the logical positivists, says that statements that are not formal-mathematical or logical propositions and which cannot be empirically verified must be meaningless. The emphasis on verification has pronounced all metaphysics as meaningless, even though it is out of metaphysics - and out of superstitious, mythical and religious conceptions of the world - that science has emerged. It has also promoted the belief that each new discovery makes life more certain and that knowledge moves inexorably forward from an existing and certain base.

A majority of agricultural scientists are working happily within this orthodoxy. By applying accepted theories - a mundane practice classifiable under normal science - they are denying to science a wealth of knowledge held by their clients, the farmers. Neither have theses scientists any sense of awe about science nor about the world it reveals. A liberating ethos for scientific investigation demands a broader concern with nature - human as well as non-human. It demands that the scientists take account of the active element in learning and understanding. Knowledge is an activity; it is a construction. Each individual constructs his understanding of the world and each generation reconstructs the way its culture represents the world.

Science as learning

How is this reconstruction learnt and transmitted? People learn only of their own volition and not at the will of outsiders. People learn when they see a reason for doing so. This reason can be rational and scientific or metaphysical and traditional. The best reason to learn, however, is the existence of a problem that must be solved. That is why one needs to know how the farmers define their problems and the steps they take to solve them. How do they assemble the information, impressions, data, opinions and other components of awareness? How do they recognize their own need to learn and how do they satisfy their curiosity to understand the worlds around them?

Based on this 'survey' of their problems, their tasks and environments, how do they go about rearranging ideas, concepts and relationships? In other words, how do they arrive at their theories? How do they, then, try out theses theories in their day-to-day life? What do they do to review the outcome of their actions? How do they cope with their disappointments? What type of feedback verifies or rejects their theories? How do they modify their actions in the light of the lessons they learn?

A systematic study of this entire process of learning could be of immense value. This learning would be greatly enhanced if the farmers themselves are actively involved in finding the answers to the above questions. The study of ethno-agriculture can create opportunities for the farmers and for all those working for them and with them, to learn by enquiring and to learn by doing.

The academic distinctions often drawn between investigating a situation (research), helping to understand it (learning), and securing rational change in it (action) are false. They are indeed indistinguishable endeavors. None does, can or should take place without the other two.

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