THE DESTRUCTION OF NATURE AND VISIONS FOR SURVIVAL

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INTRODUCTION

The destruction of nature in the title of this work is obviously not meant literally, in the sense that matter and the laws of nature cannot be destroyed, at least under present terrestrial conditions - though life can be. But nature has many meanings; in one sense of the word, like that developed in Bill McKibbon`s *The End of Nature* (1), man`s effects on the non-human environment have now entered a qualitatively new, irreversible dimension, which is different from all the massive changes nature underwent prior to man`s existence. For the planetary crisis caused by the overproduction of oxygen by cyanobacteria two billion years ago, or the ice-ages initiated by planetesimals or meteorites colliding with the earth, or the geological catastrophes and shifts in the earth's tilt, all happened before human beings and human consciousness had evolved.

And the situation is different from the more localized environmental damage that accompanied and was consequent upon human life in its development up till recently, from the extinction of the mammoth to the deforestation of Europe, from the pollution of whole rivers to the smog of nineteenth century London. Now the biosphere is being weakened and disturbed, on a new level that is organically represented most crucially by the large-scale loss of living species and ecosystems, and inorganically by the increasing disorder, or rising entropy, in planetary systems - in for example, the destruction or dispersal of resources and soils, the pollution of water and air, and uncontrollable climate change.

The crossing of this Rubicon is partly a quantitative matter - the sheer scale of the disruption by comparison with all the previous centuries and millenia of human existence on the planet; and partly qualitative - the fact that it is now globally unified and in some respects irreversible. There is no longer any `untouched` or completely pristine nature at all on earth - that is, nature unaffected by human activity. In this sense nature, in a very deep and perhaps non-rational sense, has already been destroyed.

The word `nature` has been used to mean `the inorganic world`, `the organic world`, or both; it can refer exclusively to the non-human world, or can include the human world as well, inasmuch as humanity is made up of inorganic matter and organic processes; and it can also include humanity in all its aspects, if it is meant to imply that ultimately human society, consciousness, or mind, are parts of nature. Nature can refer to the totality of the earth`s biosphere, as does `Gaia`, or to the whole planet, with or without man. Or it can mean the whole universe or cosmos, with or without other possible forms of intelligent life.

Consciousness is therefore variously part of nature, or transcendent and beyond it - consciousness or mind thus representing the emergence of a new quality, which is capable of understanding the `spiritual`. Is this latter then a `supernatural` realm? Because, in the context of some metaphysical or poetic discourses, nature means the world of mystery, of imagination, the unknown, the boundless - an ineffable, awesome experience, known not by the cognitive, thinking, waking ego but by the spirit, the dreaming soul, the emotions, the erotic desires, the intuition. This is nature for some pantheistic mystics; yet often, apparently paradoxically, such non-rational forms of knowing move easily into pure sensuality. Nature, naturalness, is that which is experienced through the senses. This physical, sensuous world that is known without thought is within and without: we are immersed in it as a foetus is in amniotic fluid, and it is within us as the bodily fluids are within that same foetus. In Shelley`s psychically epic poem *Epipsychidion*, there is a knowledge that is too deep for the brief fathom-line of thought or sense; yet it is capable of killing the sense with passion. Intuitive sense sometimes weaves therefore into an earthy belief that human physiology and the physical urges manifested in `basic` behaviour, are `real` nature within man. But the concept of `human nature` is another issue altogether, which cannot be entered into in depth here.

The constant tensions and oscillations in the word nature are inexhaustible: there is the Nietzschean `will`, and the even deeper Nietzschean `indecipherable`. On the one hand the human will is precisely what distinguishes humanity from the rest of nature - in art, love, and transcendence. Yet on the other hand, in its Dionysian unruliness and self-creating power and indomitable urge to grow, it is nature itself, incarnate in Man.

But beneath even the will, for Nietzsche, was the ground of being, the genius of the universe, the indicipherable: clearly this is the `void` in Buddhist mysticism, or The awful shadow of some unseen Power, for Shelley. It is outside humanity, and utterly beyond human understanding - yet it is precisely what comes welling up in Beethoven`s Ninth Symphony or Wagner`s *Tristan and Isolde*, which are quintessentially human.

Needless to say then, the word `nature` does not have a single, fixed meaning! Like all significant words its meanings are multi-levelled, and vary according to the context of its use. Recognition of this is not to admit vagueness or inconsistency, but to acknowledge something essential to all discourse, except perhaps in certain very circumscribed areas of the so-called `hard sciences`.

`Vision` is sight, and insight - symbolized in the western tradition by Homer the legendarily blind poet, the loss of whose physical eyes only intensifies his spiritual, or visionary understanding. The elevated perception and millenial hope of Andean Indians, or of William Blake, or of Ernst Bloch, is vision - a dream at white heat, partaking of eternity, not a prophecy in a strictly empirical, predictive sense. It is a call

to a future that is different from the present, and different from that future which this present seems to be ushering in. It is a utopia, a hope, a product of human imagination: the revelatory flight of shamans, seers, religious prophets, philosophers, artists, poets, musicians, and also sometimes natural and social scientists. It involves intuition, a vision of inner and outer future promise; but also rationality and intellect, to concretize, judge, and try to distinguish the possible from the impossible or ridiculous, the desirable from the undesirable.

As for survival, there are of course many kinds. One extreme version might be mere bare existence - but for what proportion of presently existing humanity, after how much suffering, after how much irrevocable loss of nature due to human conduct; after how many barren, ugly, or dangerous zones have been created?

Another, more optimistic definition would see humanity rearranging itself globally: consciously, democratically, and humanely reducing its population, changing its forms of production, distribution, and disposal of wastes and the by-products of economic activity; and therefore having to radically change social and economic systems and structures.

There cannot be an `objective` or `neutral` survey, or review, of visions for human survival within the earth`s natural environment, though one can on some level survey ideas. I could not but convey a view that was mine; yet I agree with Max Weber`s distinction between `value-relevance` and `value-freedom`, according to which our values initiate and direct our choice of material for social scientific enquiry, although thereafter we should strive for (and can achieve) some dispassionate objectivity as we study our chosen concerns in the world. But I also agree with Karl Marx, that social thought must be, can only be practical-critical activity, as we cannot be `neutral`. Pure understanding is impossible: that idea only conceals an interest in upholding the status quo; we will understand things best if we recognize the need to change the world.

Yet I would not argue for a single, truly valid position - there is no one vision, but a plurality of visions, a constantly pluralistic dialectic, not a uniform truth. Visions, perspectives, and analyses shed light on the same reality in different and distinct ways, interact with one another and with the world, which is also always changing. Ideas are part of a pluralistic, interacting, dynamic world. No statement can be definitive: however wise or seminal, it is a single `moment` in a socio-historical process, which is itself a dimension of the larger processes of nature, however defined.

Humanity has affected the natural environment from its first appearance on the earth, but to a hugely escalated extent in the modern period, dating from the inception of capitalism in Western Europe, and immeasurably more since the Industrial Revolution.

Its effects have increased even more, indeed exponentially, in the last few decades. Analysis of the reasons for this involves a vast area of investigation, which includes the attitudes, worldviews, and ideologies of modern societies, and how they gear into and articulate with psychic orientations, culture, social and economic processes, structures, and activities. Visions of alternative worlds, of alternative kinds of relationship between nature and humanity, grasp each of these aspects, or levels, of human life. It is fruitless to ask whether ideas or structures or activities are of greater significance, or if the influence of one or the other comes chronologically first. This is the old 'base and superstructure' issue for historical materialism, which is best understood in a dialectical way, in which both influence each other all the time, totally; in any case they exist one inside the other, in mutual entailment, not separately. But although the totality of existence, the whole web of both human society and nature, is implicated in all 'visions for survival', the aspect considered here is at the level of ideas and sensibilities, in particular the views of and feelings toward nature which on the one hand predominate now, or on the other hand ought to predominate, in global human society.

It is a process of self-discovery: finding and adhering to the strands of thought about nature and man`s relation to it most appropriate to a social and economic policy - a human strategy of life and feeling - that could ensure sustainable production and undestructive metabolism with nature.

The prevailing western, now global, view of nature as expressed in practice, is as a `dead` or `soulless` mechanism, infinitely usable and exploitable, separate from humanity, but malleable to human ends. This has been part of an historic project of domination. The conquest and control of this mechanistic nature allows a limitless growth and expansion of wealth, things, knowledge, and power for humankind. From Galileo to Bacon, Descartes to Newton, it can be regarded as an ideology of either:

1) Western civilization, with its origins in Judeo-Christian and Greek religious-moral traditions, and/or

2) Modern capitalist science and technology, and/or

3) The male drive to dominate a feminine Nature, and/or

4) The bourgeois ruling class`s practice or project of exploiting the proletariat and nature.

The major contemporary counterveiling ideologies - green, conservationist, and in support of gobal sustainability and survival - could be seen as either:

1) The deliberate adoption of (a) green counter-tendencies in western civilization`s

history - the other Judeo-Christian, Greek, and medieval mythical, religious, and cosmological traditions which lost out historically. These include theological currents for which Man is God`s steward over the earth, or rationalist philosophies which urged for the harmony of humanity within nature; (b) primitive cosmologies of pantheistic flux, of harmonious interaction between humanity and nature, and of reverence for nature - which are particularly important to the politics of indigenous people`s rights within nature; (c) green worldviews that evolved within other civilizations, for example Taoism in China, or the cosmologies of Inca civilization with its ecologically sustainable collectivist agricultural system, and/or

2) Holistic, pantheistic, or non-mechanistic versions of modern western science, which brush history against the grain(2), from Giordano Bruno to Goethe, or Romanticism (especially William Blake, Wordsworth, Coleridge, Shelley, and Keats), to twentieth century philosophies of `alternative` science, and counter-tendencies from within contemporary science itself. The latter include the ideas of Henri Bergson, Alfred North Whitehead, Joseph Needham, Fritjof Capra, David Bohm, Brian Goodwin, Mae-Wan Ho, and Rupert Sheldrake on the one hand; and the scientific discoveries of Einstein and the anti-mechanist implications of relativity, quantum physics, post-Darwinian biology and evolutionary theory, and Jim Lovelock`s Gaia Hypothesis (which is both a scientific theory and a philosophy of nature) on the other, and/or

3) Eco-feminism, which draws upon aspects of the early nineteenth century European Romantic tradition`s critique of industrialism; from the philosophical possibilities in Nietzsche, Heidegger, Derrida, and other recent feminist theories; from `women`s traditions`, `women`s consciousness`, and the historically undervalued characteristics of domestic and caring work. An exemplary symbol of ecofeminism lies in a reading of Mary Shelley`s *Doctor Frankenstein* as a parable of male creation and male obsession for power, scientific manipulation, and control over nature; it also draws from other western counter-traditions, from primitive cosmologies and mythologies, and from the traditions of various non-western civilizations, and/or:

4) Proletarian revolutionary socialism, retaining its conviction that the class rule of the proletariat would instigate not only an era without exploitation of human beings by human beings, but also one in which the metabolism of society with nature would also be non-exploitative and harmonious. Green socialism, or eco-socialism, still requires radical changes in relations of political power and economic ownership, but considers they must be varied and distinct according to historical and geographical context in ways that are foreign even to the most tolerant, pluralistic, or anarchistic forms of earlier, pre-ecological socialism, especially Marxist.

This delineation is not, of course, in any way exhaustive or definitive. It is merely one, hopefully useful, way of conceptualizing matters. In this work I intend to look a little more closely at the first and third, and rather more at the fourth, of these four fields of

ideological vision; I have considered the second, and also indeed the first, third, and fourth though from different angles, elsewhere.

For each of these four fields, the crucial question is: how does a given worldview, favoured both for 'objective' rational-scientific reasons, and for 'subjective' intuitive, aesthetic, emotional, or spiritual reasons - for example the holistic, pantheistic, organicist, Romantic, or Gaian views of Posidonius, Cicero, Giordano Bruno, Goethe, the British Romantic poets, or Bergson - relate to or inform a social-political-economic-environmental strategy or policy? What are the environmental implications of a particular worldview? Clearly, an alarming number of diverse policies can apparently be informed by ideas that are similar in origin. Thus fascism, with its destructive, death-oriented irrationalism, drawing from nineteenth century Weltschmerz, has sometimes been partially informed by romantic-organicist philosophies of nature. Green Party policies might be said to rest partly on implicit Taoist and Gaian worldviews, with their small-is-beautiful philosophy. But so also could a practicable 'eco-socialist' strategy and policy find its intuitive inspiration and theoretical underpinning in a worldview that sees humankind as existing within Gaia - transcending the 'humanity or nature' dilemma, the 'progress or conservation' alternatives.

DOMINANT AND ALTERNATIVE ESCHATOLOGIES OF HUMAN DESTINY - SOME IMPLICATIONS FOR POLITICAL ECOLOGY

There are contradictions in Christian eschatology, which must surely heighten anxieties about whether one is a sheep or a goat, a tare or a good seed - whether the situation is thought of as exclusively predetermined by God, as Calvinism settled for, or as decided by a person`s moral actions in this life and his or her nature: both possibilities are present in the Bible. The psychological implications of this were thought through by Max Weber for Protestant Puritanism. Combined with the idea of a secret destiny - one`s goodness or evilness will be seen and recognized by Jesus at the Last Judgement even if it is unrecognized and ignored in life - these beliefs, if taken seriously, would surely encourage an obsessive, compulsive psychology; a self-righteous tendency to follow conviction come what may; a frenetic drive to do good whether it is understood or appreciated in life and by society or not. These are all characteristics which, if embedded in the `western psyche`, might be supposed to have encouraged actions that would often lead to human suffering, for example in wars, or in stern punishment of wrongdoers - especially given the belief that evildoers will be thrown by Jesus into the furnace of fire(3): but also to destruction of nature, especially when nature is associated with the Devil and sin. They would certainly not incline people to `flow with nature`, to identify with spontaneous natural processes in an unforced and undivided way, as might Taoism in China or Romanticism in the West. Though Buddhist reincarnation also entails belief in judgement after death, its application is much slower than the instant, eternal, Heaven-or-Hell judgement of Christianity, while the possibility of going up or down to a greater or lesser extent, would incline the Buddhist to a much less frenetic concern for the consequences of action or inaction. And the associated Hindu and Buddhist conceptions of time as cyclic and slow, encourage a tendency toward passivity, as against activity based upon western rationality and linear, irreversible, progressive time.

Another `manic` aspect of the Christian tradition - which again, was inherently contradictory from its origins - is the catastrophic world destruction that precedes the Last Judgement and the Millenium. This cataclysmic, conflagratory violence and retribution, involving not just Man but all of nature - indeed the whole universe - is hardly an idea which orientates the good life towards harmony with a nature which must be destroyed before the new, just, and good world is created. For as S.G.F. Brandon argues, despite.....adjustments and developments designed to cope with the needs of the faithful on a lifetime basis the Church still retained the primitive eschatology, derived from Jewish apocalyptic, of a Last Day, involving the catastrophic end of the world, and the resurrection and judgement of the dead. Although the old emphasis upon the immediacy of these things was no longer made,

the *Weltanschauung* of Christianity remained essentially teleological, in that it was informed by a profound sense that the whole cosmic process was the manifestation of the purpose of God, which was moving irresistibly to its telos or final end.(4)

In other words, though the Second Coming was no longer imminent in the minds of Christians after Paul`s lifetime, an extraordinary vision of violent, vengeful, universal destruction remained embedded in the core belief system of Christianity.

As the Final Judgement receded into the future, the idea of Purgatory developed as a solution to the problem of where the souls of the dead will wait in the meantime. The penitentiary system of Purgatory, in which ordinary sinners could be purified before passing on to the Beatific Vision on the Last Day, installed an idea of graded, but universal judgement immediately after death - though retaining ultimately the apocalyptic Heaven-or-Hell vision behind it. The Reformation abolished Purgatory, but in time introduced new versions of the same notion, as the essential theological problem remained. As Brandon observes: the prospect of immediate judgement seems to have become so closely associated with the natural fear of death that attention became concentrated on the final moment of dying.(5)

Once again, a very private concern with one`s life, that will be judged by Him, not other human beings nor anything visible or natural, is combined with a dread of death. This would seem to have been stamped into the inmost logic of Christianity, to remain with it whichever ways it unfolded in theological details over the centuries. As a tradition that extends over several historical epochs, and thus transcends particular forms of society, Christianity does seem to have been inclined to direct people towards extreme, absolutist, sometimes destructive actions more than other religions - though such a generalization is clearly problematical. The following statement by Brandon on Chinese religion shows how strikingly its general characteristics differed from Christianity:

“The Chinese, in contrast to many other peoples, did not tend to set mankind over against the rest of the universe as having a special destiny. Instead, they were inclined to integrate man with the rest of nature, and, as we have just noticed, they interpreted human nature as a product of the alternating and completing principles of yin and yang which operated in every form of being in the universe. According to a distinguished French Sinologist, the primitive Chines believed that the family stock (*la substance familiale*) was everlasting and coterminous with the earth upon which the family had its habitation and from the products of which its members lived. This *substance familiale* lay buried beneath the ground as *une masse indistincte*, and it was represented above ground, at any given moment, only by the living members of the family, which constituted, as it were, the individualized portion of the family stock. It followed, accordingly, that each birth within the family represented the reincarnation of a portion of the subterranean *substance familiale*, while each death meant in effect the return of a

part of the individualized family stock to the *masse indistincte* in the ground below.

"From some such conception the ancestor cult stemmed, and it became a basic factor in the integration of Chinese culture and society. Because ancient Chinese society was of a feudal nature, the family of the ruler epitomized the constituent families that made up the state. This situation found concrete expression in the fact that, in the seignorial town, the ancestral temple of the ruler was built adjacent to the altar of the gods of the Soil and of the Harvest, thus signifying the essential nexus between the royal ancestors and the material well-being of their descendants and dependents. In turn, each family had its own ancestor-shrine, where the tablets recording the names of the ancestors were inscribed and venerated. These tablets commemorated the more recently deceased members of a family, and thus conferred upon each a distinct individuality since he was remembered by name. Each subsequent death of a member of the family meant the storing away of the existing oldest tablet. Since this deposition involved the cessation of individually addressed mortuary offerings, the ancestor concerned was regarded as ceasing to exist as a shen and entering into the undifferentiated mass of the kuei.

"This ancestor cult, although punctiliously observed at all levels of society, was linked with the worship of no specific deity. Consequently, belief in post-mortem survival does not appear in the pre-Buddhist period of China to have produced any expectation of post-mortem judgement. The succession of life and death seems to have been accepted as a natural process, an aspect of the alternating rhythm of yin and yang, from which there could be no escape. A long life was naturally desired, and in Taoism, which in its original form expressed the fundamental Chinese view that man is essentially a part of nature, the desire for longevity or physical immortality produced some strange ideas and practices. Among the less sophisticated or mystically disposed, the menace of death evoked a profound dread that found expression in the imagined terrors of..... the departing soul ....."(6)

SOME THOUGHTS ON FEMINISM AND THE FEMININE ORIENTATION

To see contemporary occidental society as dominated by a masculine project of technocratic-exploitative capitalistic control over people and nature, might be described as a Marxist-feminist perspective. This would recognize that the majority of politicians, business people, technocrats, communications media controllers etc. are men, but that some are women, and moreover that the majority of men are not in such positions of power. It would accept that the majority of people who commit violent acts, rape, and sexually abuse are men, but that a few are women, and moreover that the majority of men do not commit violent acts, rape, or sexually abuse.

In other words, it would consider the subject of these practices to be the dominant structure or project of this `masculine-technocratic-exploitative-capitalist system`, not `men`. The subject is a socio-historical creation, which has emerged within social-historical time and can be transformed, as can its constructions of sexist and patriarchal cultural values.

There is a biological underpinning to the gender separations between men and women, but how this articulates with historically constructed masculinity and femininity, or with male power and female subordination, is complex, and not yet very clear to either the social or the biological sciences. The state of knowledge in this area is well summarized in the following by Hiram Caton:

"Just as the ecological crisis resulted from neglect or misunderstanding of nature, so at least some of today`s social ills perhaps arise from an attempt to mold and adjust human beings to conditions for which they are not naturally suited, and which they cannot endure without distress or neurosis. It is claimed that there is a species-specific repertoire of behaviours that can be successfully combined only in certain ways; and that to plan or hope in ignorance of them, or directly contrary to what they appear to allow, must lead to frustration in individuals and confusion in society."(7)

Probably no human behaviour occurs according to a pattern fixed genetically or by the neurophysiology of our bodies. Instead human beings are endowed with behavioural propensities, some of which are similar to those observed in other animals, while others are unique to humans. Development of the human infant`s behavioural repertoire, like his or her physical growth, is correlated with age; both are believed to be genetically regulated. Caton writes:

"The numerous parallels between animal and human behaviour, not merely with respect to type (for example, courtship and sexual display), but also with respect to function and often highly comparable physiology (sexual dimorphism based on genetic and hormonal differences) suggests that humans too might have a species-specific

behavioural repertoire. That the enumeration of such a repertoire must at the present time remain conjectural is not a good reason for ignoring the evidence suggesting that one or another behaviour perhaps belongs on the list."(8)

Social scientists have frequently believed, perhaps mistakenly, that biology explains only traits that are uniform and frozen; hence from the diversity of behaviours represented by the variety of cultures past and present, they deduce the absence of biological influence. But the biological sciences seek to explain both uniformity and diversity of traits, relative fixity and plasticity of behaviours. The biology of individuality illustrates this point. Each individual is a unique genotype, who differs somatically and behaviourally from his or her conspecifics; yet his somatic constitution and behaviour clearly belong to classes that are species specific. Thus, Caton says, "one may therefore not infer that observed differences in individual behaviour are due exclusively to socialization; this will be true in many instances, but false in others."(9)

The following comments of Peter Dickens can be added to this:

"The relationships between `nature` and `culture` have continued to haunt the biological sciences.....So far there has been very little satisfactory progress towards answering this question.....because the artificial distinction between what is `nature` and what is `culture` is difficult to sustain and, in the end, impossible to recombine in a coherent form.....

".....culture is created and shaped by biological processes while the biological processes are simultaneously altered in response to cultural change.....(but) it is mind and the sense of `self` which characterise the human species and which can allow them to override their biologically inherited instincts."(10)

But however the relationship between biology and society is understood, it is incorrect, from what we could broadly term a Marxist-feminist perspective, to see the subject of these dominant practices as `men`. Put in that way, it would mean that men, biologically and eternally, are impelled to subordinate women. This would assume they always have done so, which is untrue, and that all men relate in this way, to some degree, to all women when patriarchal structures dominate in a society - which is also untrue, since some men relate to women as equals, and some women dominate some men, even in a predominantly patriarchal society. A biological essentialist perspective, which ignores the fact that there is a social mediation of biological processes in all human existence, does not - according to Marxist-feminism - explain empirical reality; it is illogical and deceitful in its slippages and verbal elisions (for example, from `rapists` and `child sex abusers`, to `male dominators`, to `men`), and is finally an orientation of hostile, fatalistic nihilism.

Peter Dickens, in concluding the discussion quoted from above, says:

".....it may be possible to say that distinctive innate mechanisms influence the consciousness and practises of the two sexes in different ways, but such a recognition on its own does not tell us much about the precise forms of these practices. Still less does it lead to a special association between one sex or gender and the physical environment. This is because in the same way as nature itself is socially constructed, the biologically inherited propensities influencing human behaviour are mediated and modified in diverse ways by the contingent social circumstances of which people are part. Amongst these are of course the ways in which the two sexes are socially constructed, or gendered."(11)

An essentialist, sometimes termed `radical` feminist perspective towards `maleness`, as something intrinsically dominating, aggressive, and callous, cannot explain among many other things, how some men were Romantic poets who rejected the modern, aggressive, technocratic-capitalist project, in favour of organic, egalitarian, `feminine`, `sensitive` values. That kind of feminism cannot allow that Percy Shelley`s ideas were essentially congruent and in harmony with the values implicit in Mary Shelley`s critique of modernity in *Doctor Frankenstein*. He must have been in some sense on the opposite side from his wife, as he was a man: thus aspects of his personal life are apt to be thrown in arbitrarily to justify his denunciation.

This type of radical feminism cannot explain how Mrs. Thatcher was a woman, and it becomes inadmissable to mention such a basic and simple point in any controversy with ideological adherents of it. Such illogicality on the most immediate level tends to ensure that the argument lapses into bullying exclusions and *ad hominem* judgements, including the accusation that a man cannot understand this or that thing. The mode of analysis that attributes aggressive, dominating, callous behaviour to an essential maleness, is a new biologistic sexism, this time *misandrous*. It is as false, hateful, and hopeless as an argument that sought to explain Apartheid not in terms of European colonial history, nor racist ideology and capitalism, but in terms of the inherent characteristics of the 'white race.' 'All white people are potential murderers of black Africans' would be equivalent to the slogan 'all men are potential rapists.' The idea that the Germans, rather than the Nazis, murdered the Jews in the 1930s and 1940s due to their essential nature as Germans who, in the past, present, and future murdered and will again murder in order to purify their race; this is equivalent to the claim that 'all men gain from any rape'.

The intellectual vacuity of this variety of so-called 'radical feminism', is both in its content - its ideas, but also in its method of arguing. It relates to Marxist-feminism as Fascism or Stalinism does to Socialism. This kind of radical feminism is not simply an 'extreme' version of Marxist-feminism; it is an entirely different animal.

If patriarchy is a socially and culturally determined pattern of behaviour and

psychology, then a social process and movement is required to abolish it - like the movements to abolish slavery or to replace religion by secular belief systems such as science in the nineteenth century. In that case both men and women have to engage equally in the transformation, just as some men and some women are likely to defend the status quo, for it involves a set of institutions. (In practice, this is what has actually been happening over recent decades.) It is not simply 'women' struggling against 'men', any more than 'blacks' were simply struggling with 'whites' over slavery in the nineteenth century: on the global level it was a struggle between the forces for, and against, slavery (there were Africans who profited from the slave-trade, just as there were slave-owners from the Middle and Far East; whilst on the other hand there were whites who fought against slavery, and a few whites who were themselves slaves).

If, on the other hand, patriarchy is a biologically given trait for the human species, then its fitness in the evolutionary sense - i.e. ensuring reproductive success, is inherent and unchangeable unless a genetic modification is to be engineered. Like the inability of human beings to fly in the sky unaided, or the fact that the human sex drive is not seasonal, there is little point in treating it as a sin, and morally condemning it. This stance resembles Martin Luther throwing his ink-pot at the devil.

As already suggested, these ideas represent a reactionary degeneration of Women's Liberation or Socialist Feminism, into a new inverted sexism and dogmatic essentialist moralism, which has come to be dubbed 'political correctness.' This can actually reinforce the capitalist-sexist status quo, and help to uphold patriarchy in those strata that feminism does not or cannot reach - for example those women who are so unattracted to this kind of feminism that they are put off any version of it, or those who, not having access to the resources - educational, cultural, and financial - necessary to enter the feminist 'public sphere' are not easily able to separate the wheat from the chaff. It is a complex of values that exaggeratedly reflects modern capitalist society`s predominant emotional bankruptcy, its utilitarian, intellectual, analytical, 'jaundiced' lack of Lawrentian blood- and soul- feeling; and its spiritually withered and desiccated retreat from the passions (particularly in its Anglo-Saxon and Northern versions). The commodification, the careerist selfishness, and the dried-up calculatedness of this feminism that masquerades as a brave crusade for justice and liberation, is in reality just another shallow fetishism of gesture and style, another cult-sect culture of chic imitation. As part of the fragmentation, the deliberate non-communication, in short the alienation of late, or advanced, or post-modern capitalist society, this form of feminism with its affected anger within a wider culture of contempt, disregard, and disrespect of others, generally serves only to help maintain 'all the old rubbish', just as Stalinism, Fascism, Social Democracy, and Nationalism have at different stages and places in the twentieth century presented themselves as radical human alternatives to Capitalism, but have in fact shored up, retrenched, superficially altered, then sustained it in one or another of its variants.

ON THE ECOLOGICAL CRITIQUE OF MARXISM

The ideas expressed here parallel those evolved in others` writings, for example those of Tim Hayward, Ted Benton, and Peter Dickens, but mine is nevertheless a different kind of ´discourse` from theirs. Mine is nearer perhaps to Juan Martinez-Alier`s in *Ecological Economics*, in that like him I find myself emphasizing the equal magnitude of fundamental problems in orthodox and Marxist theories, though in my case social rather than economic. For as we near the moment of exit from the twentieth century, the contest between Marxism and ´bourgeois orthodoxy` in most realms of socio-historical theory seems in retrospect increasingly to have resembled two boxers on a raft, who were equally ignorant about the raft on which they were fighting, and equally unaware of the threats to its, and therefore their own, continued survival.

I treat Marxism on a most general plane, allowing relevant distinctions between the almost infinite varieties of interpretation, theoretical and practical, to unfold in the course of the argument. I believe there are aspects that all varieties of Marxism (as forms of both thought and practice) share, when seen from a sufficiently distant viewpoint - as with the proverbial wood to be distinguished from the trees, and it is some of these that I address. Thus for example, from Marx to Stalin to Herbert Marcuse, all ´Marxisms` have assumed that an historical tendency toward increasing the productivity of labour is inherent to the ontology of social being, for the past as for the future; and that it offers the possibility, if not the inevitability, of progressive human emancipation.

I consider Marxism as a global twentieth-century project, with its roots in the writings of Marx and Engels; it has been the major alternative world-reality to that of Capitalism, but it is experiencing an eclipse if not an extinction at the end of the 20th Century. In actuality the hope that its dream could become reality was probably about over after the murder of Rosa Luxembourg in 1920, according to any realistic, retrospective assessment, but it took many decades for this to become clear to nearly everyone. The critique of Marxism is now obviously essential to finding appropriate responses to the now virtually globally-totalizing system of Capitalism, especially for those who believe, as I do, that such a response needs to be above all ecological.

During Marx`s own lifetime a revolution conforming to his own notions of total societal transformation did not seem to him a realistic possibility. After the abortive European revolutions of 1848 he proclaimed the proletariat not yet sufficiently developed; after the Paris Commune of 1871 he argued that the latter offered an invaluable glimpse, or foretaste, of the future ´dictatorship of the proletariat`, but that conditions had not yet obtained which could have allowed it to prevail. (Of course,

since ´objective` and ´subjective` ´factors` are mutually constitutive of one another for Marxism, the question of when conditions do or do not make revolution ´realistically possible` is ultimately indeterminable.)

No variant of Marxism considered a real ´revolutionary situation` had come into being - and then not all variants - until the Bolshevik revolution of 1917 in Russia, and following it the waves of more or less successful, but ultimately defeated, revolutions in Germany, Italy, and Hungary between 1918 and 1923. Thereafter the ´revolutionary tide` ebbed, but not surprisingly revolution still appeared a real prospect to many people for several years.

In the late 1960s and early 1970s, though there was less basis for it in the actual working-class politics of the period than in the earlier era, the total revolutionary transformation of society again seemed a possibility to many - both opponents as well as supporters of the project. Though such immediate hopes (or fears) evaporated during the seventies, many people continued to believe, as in previous periods, that though Marxism had no practical revolutionary task to accomplish in the forseeable future, to paraphrase Karl Korsch`s words about an earlier epoch, yet such conditions would eventually reappear. The contention here is that they will not; revolutionary transformation as conceived by the Marxist tradition, if it ever was a real possibility, is no longer a realistic or desirable project. Though hopefully circumstances will come into being in the future that allow radical changes for the better in the structures of society, these will not be of the kind Marxism envisaged, and nor will they be comprehensible through Marxism, nor assisted by it. The new millenium requires an entirely new kind of analysis of society, and a fundamentally new approach to altering it. The new thinking will have to transcend both Marxist and other dominant contemporary theories in respect of a whole host of major considerations, none of which is more important than the ecological one.

If the second of Marx`s Theses on Feuerbach had been paid more serious attention by Marxists, Marxism might never have become a rigid or dogmatic theory. It reads:

“The question whether objective truth is an attribute of human thought - is not a theoretical but a practical question. Man must prove the truth, i.e. the reality and power, the ´this-sidedness` of his thinking in practice. The dispute over the reality or non-reality of thinking that is isolated from practice is a purely scholastic question.”(12)

This surely means the subject of thought is humankind as a whole, the collective totality of thinking, interacting, mutually influencing classes, nations, peoples, groups and individuals engaged in an ongoing process of transforming themselves, the world, and their ideas about it. It also means the validity of any idea should not be granted until - and even then only provisionally - it has been proved in the world. With respect to a social idea this must mean its truth has been concretely demonstrated, in practice;

before which `final` judgement on it should be suspended.

We should always therefore be toying with or thinking through a cluster of ideas which may sometimes logically contradict one another, and we should always remember the changing nature and transience of the meanings of ideas within always-changing socio-historical contexts. And again, we should remember that the subject of thought in this second thesis of Marx`s is not one, nor even many individuals, but humanity as a whole. This subject always has had and always will have many heads, and if it were ever to come into harmony with its object - nature - this would be a very dynamic, diverse, and complex reality indeed.

The prevailing western, now global, view of nature as expressed in practice, is of a `dead` or `soulless` mechanism, infinitely usable and exploitable, separate from humanity, but malleable to human ends. This has been part of an historic project of domination. The conquest and control of this mechanistic nature supposedly allows a limitless growth and expansion of wealth, things, knowledge, and power for humankind. Developing from Galileo and Bacon, Descartes and Newton, it can be regarded as a practice and ideology of Western civilization, with its origins perhaps in Judeo-Christian and Greek religious-moral traditions, but finding real expression in modern capitalist science and technology, and their associated dominant ideologies. Eco-feminism has sought to link this restless, aggressive, urgent, Faustian spirit with a male drive to dominate a feminine Nature, whilst Marxism has seen it as quintessentially the bourgeois ruling class`s practice, or project, of exploiting the proletariat and nature.

Marxist revolutionary socialism has held to a conviction that the class rule of the proletariat will instigate not only an era without exploitation of human beings by human beings, but also one in which the metabolism of society with nature will become non-exploitative and harmonious. Green socialism, eco-socialism, or political ecology also require radical changes in relations of political power and economic ownership, but consider these must be varied and distinct according to historical, cultural, and geographical contexts in ways that are foreign even to the most tolerant, pluralistic, or anarchistic forms of earlier, pre-ecological socialism, including Marxist.

Such ideas have in part sprung from asking whether socialism as Marxism conceived it ever was or ever could be an `ecological` solution to bourgeois society`s destructiveness of nature. Like Michael Jacobs` theory of a `green economy`(13), or Martinez-Alier`s `ecological economics`(14), the ideas of eco-socialism feed partly from the growing discovery of inherent shortcomings and blindnesses in Marxism - which can no longer be thought of as simply `distortions` that came about `after Marx`. The problems are coming to be seen as intrinsic even to some of the most genuinely profound aspects of Karl Marx`s thinking.

Thus for example, Martinez-Alier discovers a continuous tradition of ecological economics or energetics in European economic and social thought since the 1840s, which was systematically and continuously ignored, misunderstood, buried or suppressed both by orthodox marginalist and Keynesian economics (for which value is the marginal utility accorded a good or service by a buyer), and by Marxism (for which value holds an essential relation to the socially average labour time required to produce a specific good or service in a given socio-historical context). Neither saw, as did Podolinsky, Eduard Sacher, Rudolf Clausius, Patrick Geddes, Pfaundler, Henry Adams, Soddy, Popper-Lynkeus, or Ballod-Atlanticus, that energy ought to enter into the reckoning of economic value, if indeed value should not quite simply be measured in units of energy. The latter saw that energy, including human energy, should be at the basis of a social scientific understanding of all societies and civilizations; that energy flows are at the heart of all social systems; and that the sun is the ultimate source of all energy - either directly, or with some delay in food and certain renewable fuels, or from its past in non-renewable fuels.

They saw, again unlike both orthodox and Marxist economists, that non-renewable resources cannot properly be given a value, either by a market at which future generations cannot bid and where future uses cannot be known, or solely in relation or reference to human labour. Their extraction should not be seen as `production` like any other, as it is in both orthodox and Marxist perspectives. There is `no free lunch in nature`, as every use of and transformation of energy must be paid for in terms of waste to be disposed of or in terms of used-up non-renewable energy resources; an infinite expansion of production, use of energy, or population, into the future is impossible and suicidal.

These realities are inconceivable within the terms of the static, out-of-historical-time (as well as out-of-nature) assumptions of orthodox bourgeois economics, which encourage waste. Thus for instance, in orthodox economic theory and practice the price of coal rests upon the currently existing efficiency of energy conversion, however low: capitalistic markets are incapable of `internalizing` the effects of pollution or responding to the need for recycling and minimizing of waste. Capitalist theory and practice are generally incapable of recognizing that, as Croll and Parkin put it, “The very notion of sustainability is predicated on perceptions of time, aiming to meet the needs of the present without compromising those of future generations.”(15)

But on the other hand the assumptions of Marxism concerning `abundance`, relative or absolute, underlie as Martinez-Alier puts it, an “approach, which.....did not.....comprise the flow of energy..... and this is why there has been no school of Marxist ecological historians or economists.”(16) The Marxist concepts of progress in the development of the productive forces and the productivity of labour, ignore the implications of increasing the average use of energy per capita, and of energy efficiency or inefficiency generally.

Marxist assumptions, common to virtually all its political tendencies, about the general need for modernization and mechanization of agriculture, are symptomatic here. Lenin for example, was convinced that large-scale agriculture - whether capitalist or socialist - was essential to increase both food output in absolute terms, and to increase the productivity of agricultural labour. He did not doubt the wisdom and need for expanding the use of fertilizers, weed-killers, pesticides, and machinery, the production of which rests upon coal or oil. A most significant moment in Marxism`s rejection of ecological economics and energetics is represented in Engels` letters to Marx concerning the ideas of the Ukrainian ecological socialist Podolinsky (1850-1891). Podolinsky attempted to measure the output/input ratio for agriculture in energy terms. Engels` reasons for rejecting Podolinsky`s approach are most revealing, and show quite clearly that he understood the principles at stake, but considered them irrelevant to and incompatible with Marxist materialism.

Engels argued that to establish an energy budget was only possible in primitive forms of production like hunting and fishing. Thus the energy value of fertilizers and other auxiliary means in modern agriculture would be difficult to calculate, whilst in industry it was impossible. However, as Martinez-Alier puts it: "Whatever the practical difficulties of such calculus, this is what is done in energy accounting."(17) More significantly Engels did not think that achieving a high energy output/input ratio, i.e. high energy efficiency, was in itself important. What mattered was "the energy productivity of human labour, which would depend only on the degree of development of the means of production."(18)

In other words, he saw no limits to the amount of energy that could be harnessed by human labour, and thus did not take into account the implications for waste and pollution of harnessing ever higher levels of energy per capita. Ever higher ratios of harnessed natural energy output, to direct human energy output, would make decreasing total output/input ratios, or decreasing energy efficiency in production, irrelevant. Not only were the absolute quantities of energy expended in production apparently unimportant so long as the productivity of human labour rose, but Engels seems not seem to have considered that the using up of non-renewable fuels presented any problem: "Podolinsky has completely forgotten that a man who works does not only incorporate present solar heat, he is rather a great squanderer of past solar heat.....coal, minerals, forests and so on....."(19). But Podolinsky had certainly not forgotten this; rather, it was at the centre of his whole argument.

Engels did not see the point, as Podolinsky did, of translating economic processes into the language of physics. Neither Engels nor Marx appreciated his suggestion that the labour theory of value should be given a basis in the sciences of energy.

For Marxism, social and economic progress rest upon the development of the means

and forces of agricultural production, which allows industrial and other non-agricultural activity to expand. This welcoming of, in relative terms, ever fewer agricultural workers in the name of progress implies that small-scale, labour-intensive, non-`industrial` agriculture is a survival from the past, doomed to extinction in either capitalism or socialism. Eco- or Green socialism considers this to be a mistake, from the points of view of the environment, of energy and mineral resources, of employment, and of cultural well-being. Rather, it inclines to the belief that in many circumstances the continuation or restoration of small-scale, labour-intensive, `traditional` forms of agriculture is both environmentally and socially most appropriate.

The Marxist conception of materialism neither encompassed `natural history` nor contemporary developments in the natural sciences satisfactorily, in spite of its claims in these respects. The physical processes involved in using fertilizers and pesticides to increase agricultural returns, for example, are assimilated into the concept of `productive forces` in a way that ignores crucial implications for nature, and thus in the end, for people too. The idea that capitalism fetters the development of its own productive forces after a certain stage, whilst socialism would guarrantee infinite development of its productive forces, ensured that Marxist movements turned their faces against the intellectual possibilities of thinkers such as Podolinsky. To the extent that Marxism has concerned itself with natural resources, this has not been an ecological treatment - that is, entailing consideration of the availability of resources, of waste disposal, or of intergenerational allocations.

Marxism has shown an almost exclusive concern with `human needs`, rather than `nature`s needs`, or in terms of contemporary debates, with economics over ecology(20). Marx himself did have a view of society engaging in an harmonious metabolism with nature as desirable, communism being the humanisation of nature and the naturalisation of man. But this meta-theoretical, dialectical interconnectedness of man with nature, did not translate into either the theory or the concrete analyses undertaken by historical materialism.

Thus, the concept of `sustainable development` that has been evolving since the Brundtland Report, is requiring a paradigm shift beyond Marxism. It requires that economic policies sustain or expand the environmental resource base. Economies may grow, but their forms of growth must remain firmly attached to their ecological roots, which should be nurtured, protected and replenished. The environment should no longer be regarded as outside ourselves, as simply a space to be inhabited. As Croll and Parkin put it, “the pre-Brundtland idea of the exteriority of the environment has an epistemological consequence. It presupposes that ultimately persons are passive in the face of environmental menace. Here the environment is a capricious or intentionally controlling agent and the human the object, who may nevertheless seek mastery over it. Instead we should resist a discourse of such oppositions as ´man` and ´nature` or ´society` and ´nature`: human ecology is human society.” (21)

Marx did make a critique of the imbalance between town and country, and between industry and agriculture, in capitalist development, which anticipated Maoism`s concern with their harmonious development. But he eschewed the idea of basing it in energetics and physical science, as he did not see the necessity for society`s practise to be conditioned by nature on this profound level. The same can be said of the Maoist period in China, which in retrospect is seen as having been very destructive environmentally.

As Martinez-Alier says: "Marx mentioned that the concentration of population in the great cities damaged the natural conditions for the fertility of agriculture, and he quoted Liebig`s notion of an agriculture of spoliation in contrast to an agriculture of restitution.....Marx showed himself in favour of Liebig`s argument for small-scale agriculture in terms of its greater capacity to return fertilizing elements to the ground, as compared with large-scale agriculture producing for large and distant cities. Alfred Schmidt(22) was therefore right in pointing out that Marx`s use of the expression "metabolism between man and earth" was not metaphorical: it referred specifically to the cycles of plant nutrients. However, this approach, which in any case did not also comprise the flow of energy, was not integrated into Marx`s view of history, and this is why there has been no school of Marxist ecological historians or economists."(23)

Anna Bramwell is still more insistent that Marx and Engels were un-ecological. She criticizes Marxists like Marcel Prenant who tried to argue that the unity of man and nature was central to Marx`s thought: "Prenant..... quotes Marx in The German Ideology : As long as men exist the history of Nature and the history of men mutually determine each other..... The sentence.... is taken somewhat out of context, since there Marx stresses the non-existence of a pure nature, and the irrelevance of the concept to society. However, by stating that Marxism dares and knows how to dominate all known physical and biological laws Prenant expresses the man-over-nature philosophy behind Marxism.....

"The Communist Manifesto calls for the abolition of the countryside rather in the way that Old Testament biblical prophecy promises that there will be no more sea. Marx ably argues the case that pre-capitalist rural life has its own rules and values, that go under when capitalism triumphs; but his expectations of a socialist victory rest on the necessity of capitalism..... It exploits the peasant, and appropriates the peasant`s surplus. The capitalist loots the graveyards of Europe to spread phosphate on English fields. But Marx is not claiming that this amounts to over-use of natural resources, nor is he saying that farming without intensive fertilizer-use is better than farming with it..... He did not want the peasant world to survive. However admirable the pre-capitalist world might be, where it could be compared with capitalism to the latter`s detriment, it could not, by definition, continue into capitalism and beyond, into socialism."(24)

Marxism had no reason to assume, and devoted no systematic effort to ensure, that the ´dictatorship of the proletariat` would practise environmentally sustainable production as it emancipated society from humanly oppressive, and exploitative, political and economic relations. It had no reason to suppose that the ´dictatorship of the proletariat` would evince ecological understanding of the effects of industrial progress on nature, as it certainly would not have done in France in 1871, did not in Russia in 1917, nor in most of its subsequent incarnations. In a region of the world such as the Amazon rainforest, socialism as Marxism has envisaged it thus far, in any of its forms, would interfere both with native rights and the ecosystem. For Marxism has not, in spite of the theoretical importance it attaches to the idea of ´primitive communism`, considered that an ecologically sustainable mode of production might in some environments best be achieved by a continuation of the basic dynamic harmony of the traditional, indigenous human ecology. As Croll and Parkin put it:

"Shifting cultivation in sparsely populated areas enables farmers to keep forest or wilderness at bay through the slash-and- burn method so leaving the previous area to long-term fallow. Into this mosaic of shifting plots is fitted an indigenous system of intercropping of diverse plant species, which variously benefit from the different stages of regenerative growth in the return from cleared settlement to bush. Neither fixed settlements nor mono-cropping in ordered lines would be an improvement on the indigenous method."(25)

It is arguable that the average energy consumption per capita in the world must fall for human society to survive, whether under capitalism or socialism, so that even if a world socialist order arrived at such a high level of ethical development that everywhere people thought the free development of each is the condition for the free development of all, and was prepared to do everything possible to prevent famine anywhere, and worked to equalize consumption around the world, they would also have to accept a shrinkage, a regression in levels of existing kinds of production.

There is no way that the qualitative changes in production, in technology, in kinds of life-style that are necessary in both the North and South (especially as the present world population of approximately 6 billion is expected by many to double by 2050 AD) - reducing energy consumption per capita in one and increasing it in the other, but through wholly different, ´sustainable` forms in both - could spring from the development and expansion of liberated human needs as understood hitherto by Marx or within Marxism subsequently. The concept of ´authentic needs` would have to have built into it a new kind of idea of self-restraint for the sake of all humanity and the planetary biosphere. It might be argued that Marxism has always been potentially able to reckon with such a notion, in terms of its vision of a conscious, classless, all-rounded, liberated human being who has been restored to the essence of his and her ´species-being`: such a person considers the maximum fulfilment of his potential for happiness and creativity is inseparable from the overall emancipation of humanity. But

if this Marxist ethical standpoint is to encompass the contemporary global ecological crisis, it has to recognize that the West and all the rich elites elsewhere in the world must reduce per capita consumption in the process of radically reducing global inequalities (in consumption it should be noted - inequalities in ownership are perhaps not so absolutely important as Marxism has normally assumed them to be). The objective of socio-economic transformation cannot possibly be one of bringing the majority of the world`s population up to the levels of today`s affluent minorities. However, as both overconsumption and poverty come to be recognized as intrinsically unsustainable environmentally, it could be argued that socialism in some form is indispensable to, or necessary for - but not sufficient to ensure - an ecologically sound and sustainable society. But hitherto the Marxist version of socialism has not argued in a way that meets a proper consideration of these issues.

Croll and Parkin express it thus:

"There can be no single order or blueprint for sustainable development, given the wide cultural variations in ecological, economic and social perceptions and practices.....(yet) many problems of resource depletion and environmental stress arise from disparities in economic and political power so that sustainable development is conceived not so much to be about natural resources of the physical environment as about issues of control, power, participation and self-determination."(26)

But however this new form of society is defined, its success, indeed survival, will also rest upon an acceptance of the limitations to what can be done with and within a very finite Nature, on a planet with very great constraints operating upon the freedom of human choices in many spheres, which hitherto Marxism has not recognized except in terms of very vague generalizations, nor been able to reckon with even in its "purer" theoretical versions (let alone in its "actually existing" forms). A fundamental question really is whether Marxism differs from the mainstream perception of nature in Western civilization, from Francis Bacon and Rene Descartes to the World Bank, as an infinite and unlimited resource for humanity, whose history is ultimately and essentially a gradual and progressive freeing of people from nature`s laws and constraints. Writing of the World Bank`s World Development Report 1992, Bruce Rich says:

"It is astounding that at the end of the twentieth century, the complex ecological interactions and biological phenomena which sustain planetary life should be viewed as so many "sinks" to absorb pollution, as "resources" whose being is defined by human economic demand and for which, once markets are created and prices are set, substitutes will be found. At the heart of the report`s analysis is the extraordinarily risky wager that as-yet-undreamed-of technological fixes will magically make the world right. Here is the last gasp of a view of the world as pure, caricatural Cartesian "extension," as a homogenous "standing reserve" which can always be transformed into something else with the application of the correct method."(27)

The central question here is, how different from the capitalist viewpoint are the implications of the labour theory of value and the historical materialist project of an increasing mastery over nature, for society`s treatment of the environment?

In some respects Marxism, especially in some of Engels` writings (alongside and mingled with his mechanistic and positivist tendencies), does have an ontology of nature which might in principle be well-suited to environmentalism, as it sees nature as an Heraclitean flux - dynamic, processual, developmental and self-transformative, organized in a hierarchy of irreducible, qualitatively distinct, interacting levels (from the inorganic to the organic-biological, to human society, labour, and consciousness). This ontology is dialectical and holistic, self-consciously transcending the dualisms of positivistic and mechanistic materialism on the one hand, and idealist metaphysics on the other.

But a central problem in Marxism remains, contradictorily, that Frederick Soddy`s (1877-1956) critique of Keynes applies equally well to it . Martinez-Alier describes it thus:

"Soddy took issue directly with Keynes` views on long-term growth.... (he) defined wealth as a flow, which could not be saved, but only spent. Real wealth came solely from the flow of energy from the sun, and was consumed as it arrived and could not be stocked. Part of this wealth took the form of so-called capital goods and was carefully measured as financial capital, that is, as credits against the community. Real wealth, in the form of a wheat crop, for instance, would rot if stored for any length of time, whereas the wealth which took the form of so-called capital goods, and was registered as financial capital, was supposed not to rot but, on the contrary, to grow independently at compound interest, ad infinitum. This was a convention of human society, subject to contingent ethical values; these were historically variable, but could not run permanently counter to the principles of thermodynamics.....

"Keynes seemed to believe that wealth..... increased according to the rules of compound interest, a "fact" which he opposed to the Malthusian population "law"..... Capital, according to Keynes, was something akin to a cake, which, one day, thanks to compound interest, would be large enough to satisfy everybody..... excessive wwork, overcrowding and hunger would disappear, and mankind could devote itself to the exercise of its nobler faculties. Now we all know, remarked Soddy, that we cannot have our cake and eat it. Capital could not really be stored, as it was subject to a law of continuous decrement, because, in physical terms, it was energy embodied in certain objects, subject to the law of entropy."(28)

Soddy compared the payment of interest with perpetual motion: "A man with, say,

£20,000 invested at 5 per cent is in perpetual enjoyment without work of an income of £1,000 a year, and his heirs and successors after him. Consuming wealth every day of their lives, they always have the same amount as at first. This is not physics and it is not economics. Like all alleged examples of perpetual motion, it is a trick."(29)

Now for Marxism, once the distortions, exploitation, alienation (the state of society being out of conscious human control), invertions (reality being understood in upside-down ways) and so on, endemic to capitalism are surpassed, society will produce and consume in (relative) abundance. Though it is philosophically more aware than are "bourgeois" or orthodox perspectives that society exists within nature, and that nature exerts constraints upon human freedom (via the necessity of work and, in some of its versions, the impossibility of an infinite growth in individual possessions and consumption in their capitalist forms), which will be accepted by the self-conscious citizens of a socialist society, Marxism does not see society as part of nature itself in the sense of being enmeshed in its energy flows as did Podolinsky or Soddy. Society is still insulated from "outer nature", not by the illusions of capitalist ideology - the phantoms of finance, capital, interest, and the fetishes of orthodox economics etc., but by a view of humanity becoming somehow shielded, through progress of the productive forces, from the realities that animals and primitive people experienced: the laws of energy and the finiteness of resources.

Marxism rejected the Enlightenment materialism of Montesquieu, which sought to explain culture by geography and climate. Its critique of the static, "mechanical" materialism of Feuerbach, which explained human consciousness as the product of a material "being" conceived of as a fixed, human and environmental nature, was a crucial moment in its discovery of dialectical and historical materialism. But in this Marxism made a different, unnoticed mistake: it banished purely natural dimensions from the "productive forces" and the "material base" of society.

For though as Marxism insists, productive forces are always mediated through society - whether the Niagara Falls or a computer are means of production or not depends on the social relations and forms of knowledge prevailing in the surrounding society - nevertheless they consist of natural resources. Stone, metal, and fuels conform to "laws" of physics and chemistry, and animal and human resources (such as muscle and brain-power) conform to the "laws" of biology, biochemistry, and physiology. Thus, the unavailability of certain resources (for example stone and metal in some rainforest environments), or the lack of knowledge of metals on the part of the Maya - a civilization quite as advanced in other respects as many others that did know of them - determined a very distinct set of productive forces. Mayan civilization was essentially neolithic in terms of the materials and kinds of tool it used, in spite of developing complex relations of production, and a highly sophisticated "superstructure" of astronomy, cosmology, calendrics, mythology, and associated forms of historical and religious consciousness and imagination.

It is not that Marxism is incapable of analysing such issues, it is a question of the importance it is orientated to granting them. When considering a theoretical worldview as all-encompassing as Marxism, it is not only a question of whether particular conceptualizations, arguments, claims, predictions, or judgements are right or wrong that is at issue: it is also a question of which aspects of an infinitely rich and huge reality it chooses to emphasize, prioritize in terms of importance, select from and build into its models, laws, generalizations, and summary definitions - its entire agenda, in terms of what it talks about and what it does not, and the way it addresses what it does. It is worth considering whether Soddy or Ostwald would have come to see the connection between energy availability and the course of human history in the ways they did if they had been Marxists, or whether King Hubbert`s statement that "the key to man`s history is seen in his developing use of "extraneous" energy - energy other than derived from the food he eats,"(30) could have come from a Marxist. Certainly Marxism has not been inclined to recognize that, in the end, humanity will have to learn how to control energy with maximum possible efficiency, and with the minimum expenditure per person that is compatible with civilization, comfort, and happiness; and that moreover, this may be as important, or more so, than any of the major aspirations of Marxism, such as ending exploitation, satisfying human needs, disalienating society, or bringing about a self-determining system of production and social reproduction.

Whilst Marxism might be capable of understanding the collapse of Maya civilization in the 10th Century AD, an energetics-orientated social science would be much more likely to pick up on clues that might explain it in terms of ecological collapse. Thus it is probable that the intensive agriculture of Mayan civilization was practiced in a very fragile rainforest ecosystem, providing for ever larger numbers of men who were engaged in warfare and the building of temples. An increasingly insufficient proportion of social labour may have been deployed in land and irrigation management, in the large areas of terraced and raised-field agriculture.

It is likely that this crucial contradiction within Mayan civilization - dependence on an intensive agriculture in a fragile ecosystem, yet having to provide large numbers of men for war and building temples - would have resulted in insufficient labour being allocated to reclamation, and the neglect of tasks necessary for long-term environmental sustainability. Subtle, "green", fine-tuning activities might have been dispensable in the short-term but in the longer-term their absence could have brought about the sudden, total collapse of a technically and organizationally complex system. Such a breakdown would have been mutually reinforcing and spiral-like, causing loss of respect for religion and the priests and thus a breakdown of authority. Reduced organization in production would have resulted in a reduction of the food surplus and a worsened environment, which would in turn exacerbate factionalism and warring. Such a relative excess of expenditure of human energy on war and the construction of religious buildings, might be predicated on a very specific kind of contradiction

between productive forces and social relations, which would require an analysis of the implications of a complex form of agriculture which lacked metals.

A highly sophisticated religious system, which made large demands upon labour and resources, rested upon a stone technology with its highly labour-intensive implications. Perhaps the "laboral" or "exosomatic" uses of energy - in Soddy`s and Lotka`s terminology respectively - were in too high a ratio to "vital" or "endosomatic" uses, given the social formation`s particular "productive forces", and its particular "technique of extraneous energy-control" (i.e. energy other than that derived from food) - using Marx`s and King Hubbert`s terms respectively. It may also be that the Maya civilization was not a unified territorial entity but a number of independent warring city-states, a condition resting upon lack of metals and thus of effective weapons, which prevented unification under one chief or king. Under the given ecological and energetic conditions, a self-destructive level of strife may have become inevitable. The situation is summarised by T. Patrick Culbert like this:

"The magnitude of the population loss between A.D. 800 and 1000 was such that social malfunction alone cannot account for it. Maya agriculture became increasingly intensive as the population rose. Both terrace and raised-field systems in some parts of the lowlands covered territories of great size. The scale of the subsistence system, however, was such that it may not have had much potential for long-term stability. It would have needed management to ensure that farmers did not relax their efforts in any of the labour intensive routines. But there is no evidence that the Maya made any change in a management system that had developed in a time of considerably less complexity. Manpower demands for agriculture must have been very high. Nevertheless, the lavish use of labour for public construction continued until the point of the collapse. In addition, military competition between sites may have been a drain upon manpower, and the southern lowland Maya may have been under military pressure from the north. Finally, agricultural risks must have been greatly increased by intensification."(31)

If a primitive hunter or gatherer knows it is not worth going to hunt an animal or gather a plant unless the energy made available by that activity is greater than that expended in it (indeed, is suicidal in the not-so-long run), later societies, especially industrial capitalism, lose such awareness in the illusions born out of and generated by exchange, capital, and money. Marxist socialism (even in an "authentic" form, thus generously accepting that "actually existing socialism" was essentially untrue to the ideas of Marx), would have by no means refound such awareness as if by some automatic destiny, as it held to other illusions, whose implications with respect to human interactions with nature could have been equally disastrous.

Some of these crucial illusions in Marxism can be approached through a consideration of the ways it has viewed "creative production" to be an activity unique to humanity.

Marxism was right to emphasize the characteristics of human beings that distinguish them from all other living and non-living things. Cooperative labour, intelligent symbolic communication, and flexible creative behaviour are not absolutely distinct to human beings, but the quantitative leap in the degree to which these powers are possessed by them make it effectively a qualitative leap too(32). But creative production, though unique to humanity, nevertheless remains subject to all the laws of nature: it is not something that allows the human creative spark to defy those laws. Ironically, given its constant emphasis on demystifying bourgeois metaphysics, Marxism assumed the unfettered science and technology of communist society would allow "sustainable development", rather as the contemporary neo-liberal faith in clean "technological fixes" does for the "free" market. What is essentially required for a free and just society is for production to be under the control of the freely associated producers, producing according to a settled plan. It is assumed that if society is self-determining and unalienated in this way, it will interact harmoniously with nature.

But it can now be assumed, even if no actual historical experiment is thought to have proved it empirically, that this is not true. The producers could make wrong decisions concerning nature; the fact that the plan was democratically decided upon, humanly egalitarian, and responsive to the "real", authentic, material and spiritual needs of people (which are deemed superior to the needs of nature), would not ensure that it is ecologically sensitive, energy-wise, or respectful of limits to environmental carrying capacities. Why should it be assumed that a radically democratic "dictatorship of the proletariat" at any given moment in history, would either give greater weight to the needs of future generations, or have a less optimistic view of technical change (vis a vis its predicted capacity to substitute for future resource depletion), than a bourgeois regime?

Marx maintained at times, throughout his work, an Hegelian thread - which most branches of Marxism have tried remorselessy to exorcise as idealist, romantic, or mystical - for which human progress entailed the emergence of Absolute Spirit`s self-awareness through human consciousness. This overcoming of alienation, translated from Hegel`s dialectical, metaphysical idealism into Marxist dialectical materialism, becomes a vision of the growing self-consciousness of the material universe through humanity`s disalienation. This might provide part of a philosophical conception of socialism, the emancipated society, as the culmination of cosmic and biological evolution, whose progress requires that its activities are consciously embedded within these larger processes, so that economy and ethics will no longer be divorced from physics, chemistry, or biology: just as the natural sciences should not be seen as "neutral" forms of knowledge existing in a vacuum, or outside of society, free from the social constraints and determinants that pertain to every other mode of human thought and activity.

Yet Marxism rejected the suggestions of thinkers like Podolinsky and Soddy, and never

saw a need to found its ideas of human history upon the laws of thermodynamics, or the processes of photosynthesis. Its critiques exploded the "false consciousness" of commodity fetishism and scientistic reification, and turned reality "right side up" thus far. But in spite of its intimations of ecological awareness, it remained as sealed-up in illusions about humanity`s existence being outside of nature as did the dominant orthodoxies.

Thus, whereas Marxism penetrated the illusion that "capital is wealth", through showing its essence in class exploitation, Frederick Soddy showed that it was also something that usually accelerated the disappearance of stocks of fossil fuels; whereas Marxism demonstrated that shareholders were usurers whose class position permitted them to accumulate money from exploited labour, and to retain this position in perpetuity, Soddy showed that shares, receipts, and money were pieces of paper which through social convention ensured, for ever and ever, payment of interest, in total defiance of the laws of physics:

".....a high rate of reward for savings could only be paid if the savings became financially high-yielding investments, that is, if there were a high rate of growth of the economy, that is, if there were a high rate of destruction of non-renewable resources, that is, if the present value of the future demand for exhaustible resources were drastically discounted. All this hung together; though rather precariously because it depended on continuing physical availability, technological change and ill-distribution of income (nationally and internationally).....

"An economic system which allowed at least a part of the debt to grow at compound interest would have to be extremely prolific in scientific discoveries, as the nineteenth-century had been; even so, there was no way of escaping from the true economic principles of physics. Economics should not be mistaken for chrematistics, the art of making money, as Aristotle had explained. Perhaps Soddy had read Aristotle`s Politics. In any case, he believed in a science of economics which would not study the economy as regulated by the price system (this study could be called chrematistics), but as an analysis of the provision of the common wealth with the means of life which modern science made possible. A first step towards such a "scientific utopia" would be to limit the rights of creditors."(33)

If Marx showed that for every "plus" in capitalism there must be a "minus" in the sense that for every penny of unearned income owned by one person another has had a penny appropriated through unpaid-for labour, Soddy showed that through the law of conservation of energy a "plus" in terms of the production of one unit of value (a quantity of food, a manufactured article, or a machine) credited to the account of this planet, would have as its "minus" an equal debit to the account of the sun. Real wealth is always some form of useful energy embodied in an object: there is a fundamental difference between the logic of chrematistics and that of energetics, which often

reflects the difference between capitalist market logic, and traditional practice and common sense.

The productivity of labour, not the productivity of energy, was important to Marx and Engels. Expansion of production (and therefore increasing rates of energy-use and pollution, in the absence of any imperative towards maximising energy efficiency) would be at the basis of Socialism. Socialist growth would have no greater inclination to reckon with finite fuel stocks or with finite environmental carrying capacities for waste or pollution, than did Capitalism.

The development of humanity as something that emerged from the inorganic earth, and from life on earth, but which became something not just distinct from but independent of them - unique possessor of the Enlightenment`s Reason - is part of Marx`s vision of humanity. But the "project" of Enlightenment Reason, to create a human order in the light of Reason`s values of justice, equality and fraternity, allowed a view of this creative spark in human reason to emerge, that had humanity fly away from the earth; losing touch with the rootedness of, for example, characteristic Greek wisdom. The latter saw man as both mortal and streaked with potential divinity, but saw it as deadly hubris for man to aspire to be a god. But the atheistic, secular, materialist essence of humanity of the Enlightenment and then of Marx, retained the old Orphic and Christian notion of human spirit as something that strains to be rid of the body, the material, the earthly. In Capital Marx modified his earlier vision (in for example the 1844 Manuscripts) of absolute human freedom as that which breaks altogether from an oppressive, unjustified necessity through revolution, to a dualistic accomodation between the realms of necessity and freedom. Though in this more "realistic" reassessment of human historical destiny, necessity will never completely disappear, the necessary, or the earthly, will remain the opposite of freedom even in an optimally emancipated society.

At issue is the point that on one level Hegel, and following him Marx, saw what was specific about human spirituality as above or outside of nature: universal spiritual needs contrast with particular, natural needs. Inasmuch as this suggests human beings might find fulfilment in art, knowledge, love, justice and freedom rather than in consumption and the excercise of power, it is an "ecological" conception. But a radical dualism persists in Marxism, whereas "ecological spirituality" should perhaps be conceived as finding human fulfilment within nature - with nature and spirit intertwined, as in the Romantic visions of Wordsworth and Shelley, or in the holistic, unitary cosmologies of many oriental religions.

Perhaps at our point in history it is easier for us, than it was for the Marxist tradition, to see that although the transition to an eco-sustainable society will require Reason, this will have to take on a less hubristic form, more integrated with feeling, imagination, intuition and sensuousness, than Western revolutionary movements have hitherto

usually believed. Such an orientation would seek an harmonious, dialectical unity of reason and matter, freedom and destiny, spirit and earth-bound necessity.

It is symptomatic that Marx`s critique of industrial capitalism vis-a-vis its alienated metabolism with nature, is largely concerned with its callousness: the exploitation of labour by capital is matched by its callous disregard of nature as an aesthetic value, and by its violent plunder of its resources. The wearing out of soils leads to plundering graveyards for sources of phosphorus, and it is the demented ugliness of the behaviour, not the dangerous degradation of soils that outrages Marx. Its disharmony with nature reflects and spiritually reinforces the contradictions between capital and labour, between forces and relations of production, and relations between town and countryside. The critique on this level is abstract, metaphysical, moral, aesthetic, and metaphorical - however good in its own terms - but it does not reach a material, practical, physical, concrete, ecological understanding (as opposed to econonomic and political ones). Marx and Engels` disregard of Podolinsky`s suggestion that socialist political economy should incorporate analysis of energy flows, the laws of thermodynamics, input/output energy ratios in production etc, and thus make the terrestrial environment part and parcel of the critical analysis, pinpoints the issue very clearly. It is the exploitation and alienation within society that is most important, even if the capitalist system is also criticized for its plundering of nature; whilst in the overcoming of exploitation and alienation, concern is not given to the using up of non-renewable resources, to the waste and pollution that must derive from the envisaged ever-expanding socialist production, or to unsustainable overuse of renewable resources.

Rising productivity of labour, increasing control over nature, increasing satisfaction and happiness of humanity on all planes, including material: how different this is from an ecological vision that sees humanity`s future as part of the earth`s future, that sees sustainability, recycling, careful use of non-renewable resources - always with thought about how they could be substituted, as fundamental to the very basis not only of human satisfaction and happiness, but of survival; and quite as fundamentally important as the rise or fall of the productivity of human labour - indeed as being the basis upon which the latter`s development is and must always be shaped, developed, and altered. Indeed the triumph of reason and human emancipation, where linked to a Baconian notion of an infinite expansion of control over, and use of, natural resources, is a vision of the victory of humankind over and against the earth, as opposed to a victory for the reconciliation of humankind, as part of the earth, with the rest of it in an harmonious whole: that other, metaphysically expressed vision in Marx, of Communism as the definitive resolution to the conflict between man and nature.

Neither orthodox economics nor Marxism have been able to transcend the blind, suicidal dogmatism “of the view that economics does not include the computation in physical terms of available resources and of their employment for the satisfaction of

human needs over a period of time"(34). For example, Popper-Lynkeus`s "emphasis on basic needs and especially his proposal not to increase so-called "capital accumulation" and "economic growth", but rather to diminish the use of exhaustible resources so that the economy would be permanently viable, are quite different from Soviet concepts of economic planning", as Martinez-Alier(35) writes, and are different from any hitherto developed conception taking Marxism as its inspiration. Both Marxism and capitalist orthodoxy would "discount the future", that is act now without considering whether their actions will irredeemably hurt the world.

Thus for example, a green or eco-socialist solution to productive practices destructive of the Amazon rainforest would involve a highly labour-intensive and little mechanized agriculture, for reasons of ecological sustainability as well as to address the problems of poverty and unemployment; working with good output/input energy ratios and using minimal amounts of fossil fuel-dependent inputs; good protein and nutritional outputs per unit of land; producing variety and diversity with mixed crops, shrubs, and trees of different heights, thus working with the natural ecosystem of the rainforest and not degrading the environment - soil, flora, fauna, and climate especially - by exceeding the biome`s carrying capacity. Cattle-ranching or monoculture plantations, that frequently result from the logic of "chrematistic" economics, would less often be chosen; though a non-ecological socialist planning - even democratic - might choose them equally frequently and inappropriately, from an ecological perspective.

Market forces and price and profit chrematistics are not at the core of this ecological vision, as they are for orthodox economics; but neither are "property relations", in the way they have been conceived within conventional Marxist socialism. Rather, for eco-socialism the kinds of market, price, and profit systems adopted would be shaped by the imperatives of achieving human justice, satisfying human needs, and maintaining ecological sustainability; whilst the forms of property ownership best able to satisfy these imperatives would be allowed to emerge through democracy and egalitarian participation.

Now of course the subtlety of Marx`s thought (as opposed to countless vulgarisations of Marxist theory and practise) should not be lost in characatures or simplifications. Marx did not define socialism primarily in terms of a preconceived form of property ownership. Socialization, collective ownership and producer control etc. are very abstract notions of property, the chief purpose of which is to ensure the emergence of a society in which "the freely associated producers produce according to a settled plan" - the emphasis being on grass-roots democracy and conscious (not market-driven) decision-making. Socialism is society in "harmonious metabolism with nature" - egalitarian, democratic, able consciously to avoid internal conflict and destructive relations with nature, assuring security and well-being for all, providing the basis for the free development of each as the basis for the free development of all, i.e. advancing possibilities for the individuation and fulfilment of everyone. The socialist system of

property ownership derives from the will to create this kind of society, not as an end in itself.

Indeed, "property relations" refers, in a dialectically sophisticated Marxist analysis, to all aspects of the social totality, not only to "ownership" in a limited sense - legal, for example - as it might in a crude or vulgar Marxism. It refers to the whole social structure, to forms of labour, to the forces of production (which should include consideration of energy and resources), and to forms of ideology and consciousness. Yet in Marxism it does not entail - as it must for eco-socialism - concern with energy flows, energy efficiency and input/output ratios, environmental degradation, sustainability, or improvement; or concrete concern for the future in terms of calculations of resource and energy availability, and long-term environmental sustainability. "Property relations", like "labour" and "forces of production", must be conceptually bound into nature and natural processes in an ecological vision; eco-socialism must be understood as embedded within, and as part of, wider Nature. It was an aberration for Marx (in the right direction) to claim such a large role for nature in explaining the "Asiatic mode of production": the need for large-scale irrigation in China was a major factor conditioning the historical transition from an early form of autarkic feudalism to the traditional Chinese forms of state, imperial bureaucracy, and landownership. But "nature" does not appear in such a determining role in Marx`s explanations of the emergence of specific social forms in the West: nature`s influences are there always much more "mediated" through society.

Martinez-Alier(36) makes the interesting observation that in contrast with most Marxist analyses "some writings on rural Spain after the revolution of 1936 come much closer to the concept of empirical ecological utopias, writ small, because they do not only explain the change in property relations and systems of work, and the change in social values, they also explain the techniques of production, the yields achieved in the collectives, etc." He continues:

"One of Max Weber`s arguments against socialism (apart from that of the extension of the power of the bureaucracy) was that a socialist economy would lack the means of rational calculation insofar as it involved physical allocation of resources rather than the use of money or a price mechanism, an argument which was developed by L. von Mises and Hayek, and which Oskar Lange attempted to answer in a famous debate. The allocation of exhaustible resources was not considered by either side in that debate.

".....The prices of natural resources in socialist economies have often been criticized .....because they were fixed according to the average cost. (and not the marginal cost) of extraction. This leaves aside the question of optimization of their inter-generational allocation which, both in the East and the West, is not separable from the social distribution of moral principles and from the interpretations of the history of science and technology.

“For instance, if the “Soviet” leadership were to become “green”, then they would follow a different policy of depletion of exhaustible resources and they would give a different value to the present and future diseconomies of nuclear power stations..... But, where do their moral views come from? And their beliefs in technical progress? Not from random individual idiosyncrasies, which would give a wider spread of attitudes instead of such a uniform pattern.”(37)

Marxism`s ecological blindness is summed up thus:

“Marx wrote sometimes that capitalism misused natural resources, but this did not seem to him to be a relevant fact in explaining capitalist dynamics. The concepts required were those of exploitation (based on the theory of labour value), class struggle, crises of over-investment or under-consumption (words are tricky - in any case, not pre-capitalist crises of subsistences). Crises were a sign that the relations of production were blocking the developmentt of productive forces. Marxists tend to believe that the protests of the ecologists against capitalism are of the same order as the moral and aesthetic protests of Ruskin, Morris and the “utopian” socialists.....

“.....Marx “imported” the concept of production and of surplus production into industrial capitalism without giving a place in analysis to the question of replacement of used-up means of production. The meaning of workers` maintenance was clear enough: physical subsistence, plus a cultural, historically variable element, not excluding gains obtained by class struggle. But there is nowhere in Marx, nor in later Marxists, an analysis of the replacement of used-up means of production in an economy based on exhaustible resources.....

“.....To the extent that Marxist economics has preoccupied itself with natural resources, the treatment has not been an ecological one (that is, consideration of availability of resources, of waste disposal and of inter-generational allocations), but a Ricardian one, that is, how rent paid to the owners of natural resources would alter the pattern of distribution of income, and of savings and investment.

“.....the (merely) metaphysical status that the concept of “production” has in Marxist economics, (is) no different from that of mainstream economics.....

“.....Marx believed that it was possible to talk about investment and about increased production not only in the language specific to capitalists, or in a language appropriate only for the analysis of capitalism, but in a language applicable to all economic systems, even to socialist economies.....a preoccupation with the intertemporal allocation of exhaustible resources is generally absent from Marxist economics, and this is not because the “problem” did not “exist” before 1973.

“Although Marxists would be in principle in a good position to mistrust the market`s perceptions, this does not mean that a “technologically determined” Marxism, or an even more restricted “energy-flow determined” Marxism, could exist, because judgements on technology and on the availability of energy cannot depend only on the “facts”, they also depend on social structure and social interests. One relevant question is, whose perceptions aresubstituted for the market`s myopic and class-biased perceptions? How is scientific and technological knowledge socially constructed and socially used?

“.....Marx mentioned that the concentration of population in the great cities damaged the natural conditions for the fertility of agriculture, and he quoted Liebig`s argument for small-scale agriculture in terms of its greater capacity to return fertilizing elements to the ground, as compared with large-scale agriculture producing for large and distant cities. Alfred Schmidt was therefore right in pointing out that Marx`s use of the expression “metabolism between man and earth” was not metaphorical: it referred specifically to ther cycles of plant nutrients. However, this approach, which in any case did not also comprise the flow of energy, was not integrated into Marx`s view of history, and this is why there has been no school of Marxist ecological historians or economists.”(38)

The opportunity that lay in Bogdanov`s attempt to define “productive forces” in terms of energy availability was not seized:

“Bogdanov (1873-1928) suggested the link between the study of energy flow and natural selection, and he was not averse to applying this notion to changes in human societies. This was influenced by Ostwald, and this is why Lenin`s attack on Bogdanov (in Materialism and Empiriocriticism , 1909), reached Ostwald too.....

“Lenin also pushed aside another question, which Bogdanov and some of his colleagues had, somewhat confusedly, introduced, that is, whether there could be a definition of “productive forces” in terms of energy availability. Lenin dismissed this idea and came close to dismissing the very concept of energy, because Lenin`s attack on Bogdanov also became an attack on Mach`s “empirio-criticism”, taken to be philosophical idealism in contraposition to good materialist ontology. In Mach`s theory of knowledge, the energy laws were not presented as realities of nature but as mental constructions - as all other physical, chemical and biological laws - meant to explain, with as much “economy of thought” as possible, the data of our senses. Lenin`s refusal of Mach`s so-called idealism was a pity, not only because the Leninist cloud of suspicion towards “Machism” thickened around the concept of energy, and even more around social energetics, but also because Mach`s theory of knowledge allows the history of science to be fitted into a Marxist view of history much better than an immovable materialist ontology such as that proposed by Lenin.”(39)

Neurath wrote that Marxist propositions about "productive forces" should be converted into propositions about the flow of energy in agrarian and industrial production, yet generally Marxism ignored ecology, and was blind to the idea that nature`s carrying capacities must be limited. It was bound to an unscrutinized assumption that fossil fuels can and will be replaced by other sources of energy, unproblematically, in the future.

Thus in spite of some conceptual possibilities that might have allowed Marxism to develop ecologically, it did not. It retained, like orthodox or bourgeois perspectives in economics and sociology, a view of human society as disembodied from nature - "exempt from ecological constraints"as Peter Dickens(40) puts it. Society is not seen as a sub-system of the planetary ecological system, nor as one energy-flow system within wider ones. It could not therefore help, in spite of its radicalism towards and differences from orthodoxies, but promote a vision of future society as endlessly expanding, and thus at length destroying the earth. Its basic and fundamental realities and values lay in human labour, production, and human needs - excluding, marginalizing, making secondary or merely necessary conditions out of: energy, matter, resources, the biosphere and the life support system, along with their realities and values. Alain Lipietz puts it like this:

"Nineteenth-century socialism and Communism attacked the political economy of the time for failing to recognize that social conditions were a product of the age and therefore contestable: so one political economy was challenged by another. By contrast, the task of political ecology is even more daunting - to remind people of what they have purely and simply forgotten..... that human beings and nature are a single whole, that human beings are part of nature....."(41)

The distinct and very great achievement of Marxism, was to go beyond earlier kinds of materialism - most crucially in Marx`s critique of Feuerbach - and show how humanity, as a social being with consciousness, could not be studied as if it were material in the same way as mere inorganic or organic processes are, nor even as other living things are. "The chief defect of all materialisms up to now, including Feuerbach`s", was their lack of grasp of history and cultural development, of the fact that human nature is no static permanence, but is always mediated through actual societies, always varying, never fixed or pure. Ironically, for Marx, the "active side of reality was developed abstractly by idealism, which of course does not know real sensuous activity as such."

Marxism succeeded in recognizing society as material in this sense, and avoided the pitfalls of mechanical materialism. It grasped change, development, and consciousness yet without taking on the mystifications of idealist philosophy, especially Hegel`s. However, in the brilliance of its comprehension of the difference between Man and the rest of nature, of the distinction between human labour and the behaviour of other animals, and the difference between human and non-human intelligence, Marxism lost

something else very important. Human beings conform to the laws of gravity and of thermodynamics quite as much as the rest of nature, and are a part of the biological evolutionary process as much as the rest of living nature. It is not entirely true that "the essence of man is no abstraction inherent in each separate individual." There is much of human existence that is identical for all human beings, and is indeed lodged in the nature of each and every individual. And, though in contrast to biologistic, or idealistic accounts of man, it is very important to understand human existence in terms of "the ensemble of social relations", thus to grasp the changing, self-developmental, conscious aspect of the human condition, the famous thesis is wrong if it is taken to mean that everything in human existence is socially relative.

Thus, for a human infant to become a human being, paradoxically he or she must be socialized into a particular culture, through a particular language, set of customs, values etc. There is no human being "in general" - no pure, "natural", abstract human nature, and in that sense Marx`s thesis is quite correct. But it is not true that human societies are capable of every conceivable variation, that there are no limits or bounds to "human nature", either in terms of the forms of consciousness or of behaviour that are possible; nor in terms of resisting conformity to the biological, chemical, or physical laws that apply equally to the rest of nature. If an "oversocialized" view of nature is to be avoided, ecological dimensions of human life must be seen as in crucial respects not socially relative, but rather as stubbornly independent of human consciousness, and of the meanings and interpretations societies give to nature or their own activities. So may many other things be, from core aspects of sexuality to what Joseph Campbell called spontaneous ideas - myths and beliefs that spring up in the human mind wherever and whenever human beings live.

Thus, precisely in its great achievement - transcending the abstract, scientistic, behaviourist, unhistorical, "dumb generality"of previous materialisms but also the metaphysical, unscientific limitations of idealism - Marxism missed that core of materiality within human history that the ecological worldview is aware of. In the tragic irony of the twentieth century, societies which have claimed to base themselves on Marxism have both jettisoned the idealistic (in the loose sense) aspect of Marx`s worldview – the urge to overcome alienation, to establish radical democracy, universal justice, and complete freedom of expression; to unleash the creative spirit that allows humanity to fly in his or her imagination - yet have not understood the material basis of society at all where this involves the environment, in respect of resources, pollution, or energy efficiency. And in this latter area, unlike in the former, they cannot be accused of purging Marx of his awkward ideas, since Marx failed to include these considerations within his "historical materialism".

Many real liberatory possibilities in Marx`s conceptual framework lie in his theory of alienation, according to which the fragmented decision-making processes of capitalism ensured it was out of the control of human consciousness, thus blind and destructive.

The greed, ignorance, and irresponsible short-term concern of capitalists for profit is merely a surface phenomenon of this deeper,alienated essence. Society under the control of the freely-associated producers, acting in cooperation according to a settled plan, would be an unalienated, conscious, social self-determination which according to its essential character would always strive to live and labour harmoniously within nature. Communism would be the complete humanization of nature and naturalization of man - with society being its own subject and active history its predicate, replacing the conditions where society is the object of its own alienated forces, the object of its own life-activities usurped by the state, by class exploitation, the market, alienated technology, false consciousness etc.

This general philosophical facet of Marxism could be taken out of and maintained by an ecological political worldview, once historical Marxism had been properly examined for its ecological shortcomings, and it were fully understood that these are more than superficial and amendable by mere additions or supplements to, or developments of, historical materialism.

In some of Marx`s accounts - though not the more holistic, Hegelian ones - the contradiction between productive forces and relations of production is the foundation of history. This is something separate from nature; although obviously it occurs within and affects nature in a physical sense, and in another final sense history is part of nature, nevertheless the mechanism does not logically require its being thought through in relation to nature. As Ernesto Laclau puts it, "the "rational" form of the historical process (i.e. the contradiction between productive forces and relations of production) lacks something external to itself and can thus be reduced to the manifestations of its endogenous development"(42).

Thus, being posited as the foundation, in a sense that post-structuralism would term essentialist, i.e. as the master-narrative of a centred, dialectical unity of history, this contradictory process turns attention away from the "natural" factors and processes underpinning history. It does not entirely preclude the attribution of causal significance to nature - again one could consider Marx`s recognition of geography as crucial to China`s social development, via the necessity of irrigation for successful agriculture, for example. But Marxism has always been inclined to regard, as typical counter-examples, problems of population increase or resource availability, as products of socio-economic processes rather than also as "natural" causes of them.

Marx`s Preface to A Contribution to the Critique of Political Economy is, as Laclau puts it, an "attempt to reduce the historical process to an ultimately intelligible structure." The latter is conceived as the laws of movement intrinsic to the interaction between productive forces and relations of production: all else is "outside", including nature, with either no influence, or only a secondary influence, on the process. As Laclau puts it, "if.... history is faced with a permanent outside.... the rationalism of the

Preface and its attempt to reduce the historical process to an ultimately intelligible structure are dissolved."(43)

The theory does not stand up - logically, or in terms of its capacity to grasp history: and although this is not Laclau`s own concern, its failure to think nature into the very core of the historical process is a major part of its inadequacy. What Laclau terms "another way of defending the historical schema of the Preface "is to "accept the irreducible presence of an "outside", but (argue) that this "outside" can be conceptualized in precise terms. In that case, its relations with the "inside" constituted by the main line of historical development could also be rationally conceptualized. It would have been a case of a false "outside" after all."(44)

This latter is indeed what some versions of historical materialism have tried to do. They have well understood the centrality of nature and natural processes to history, but have assumed that as nature is always confronted, appropriated, experienced, and thought about through a particular set of social mediations, ultimately the role of nature in history is socially constructed, or as Marx and Engels put it in The German Ideology : "We recognize only one science, the science of history."(45) But, to quote Laclau again, "the theory of history based on the necessary development of the productive forces is faced with an "outside" which strips it of any ultimate coherence."(46)

In other words, this "outside", which includes nature, is actually so crucial and omnipresent in history that any theory which keeps it "outside" and hopes then to reintroduce or reintegrate it afterwards, ultimately lacks any explanatory power. Such is a theory that "relegates any data which calls into question the development of the productive forces to the abnormalities typical of a "historical pathology" in which we have the joint discussion of earthquakes, kidney diseases..... and the fall of the Roman Empire!"(47) Or, put another way: "It is characteristic of Hegelian and Marxist visions of history that (they) attempt to integrate (new) understanding into a most traditional kind of theory of the positivity of the social - a theory based, of course, on what Heidegger and Derrida have termed the "metaphysics of presence."(48)

It is of course true that all perceptions of and judgements about nature are made within the human mind, including the view that there is an ecological crisis. It is an illusion to imagine literally that inorganic or non-human organic nature can have its own consciousness, that there can be non-anthropocentric thought in the full sense of these words. But this does not mean the Marxist conception of "man`s insertion into nature" is satisfactory. It does not justify the assumption that nature is there entirely for human use, that its own pure existence is not an absolute, intrinsic value, nor that the earth`s biosphere is not inherently "healthier" - in natural ecological terms such as possessing a wider diversity of species and ecosystems, or exhibiting higher biological productivity - in some conditions than in others. Such judgements are made by humans

but may be independent of human wants and needs. To say that a polluted river is a problem, may not therefore be merely an anthropomorphic judgement, as some Marxists would maintain.

Indeed, a more appropriate recognition of nature`s independent existence, for example in terms of Marcel Wissenburg`s hierarchy of levels of rights - for animals, plants, and non-living things - may necessitate modes of understanding and communicating that are intuitive, poetic, or mystical. These may allow that human beings can meet nature in relationships of harmonious interaction beyond those that rational thought can grasp, with its alternatives of anthropocentric domination on the one hand (which it tends to assume is normal and justified if non-human nature is not conscious), and anthropomorphic eco-philosophy or ecocentrism on the other, which are so easily ridiculed within a rationalist outlook.

The concept of equal rights being accorded to human beings and other individual living things, in the rational liberal sense of the term, is both unrealizeable in practice and against "commonsense", and therefore unlikely to convince and mobilize majority (human) support. But on the other hand the assertion that human beings are more important than non-human nature - understood in terms of ecosystems, species, resources etc. - is to encourage unsustainable development, for if human beings live at the expense of nature at this level they destroy it incrementally, and thereby destroy the basis for continued human existence. A resolution to this seeming paradox requires perhaps a blend of the rational and the intuitive (even mystical): all living things have minimal rights, but of qualitatively different kinds. Those accorded hierarchically to non-human organisms - higher animals, other animals, plants etc. - are granted if at all by humans, since non-humans cannot speak for themselves and to argue for their self-proclaimed or self-proclaimable rights is to invite potentially anti-democratic, authoritarian and irrational ideologies and practices. It invites certain human beings to claim that communications from outside humanity have disclosed information especially to them, yet as if of a human, rational kind (repeating the historical problems of deistic religious exclusivity and dogma). But the principles of rational liberal rights are only arrived at and dispensed on the basis of (human) democracy, public discussion, and fully transparent law.

Yet on the other hand, there is an intuitive - Blakean, Wordsworthian, Shelleyan, or Taoist - sense of the Oneness of all nature, all parts of her possessed of equal and absolute rights, which holds an absolute, ethical claim upon human behaviour and conduct:

> I know
> That Love makes all things equal: I have heard
> By mine own heart this joyous truth averred:
> The spirit of the worm beneath the sod

In love and worship, blends itself with God.
(Percy Bysshe Shelley)

"Little Fly
Thy summer`s play,
My thoughtless hand
Has brush`d away.

Am not I
A fly like thee?
Or art not thou
A man like me?"
(William Blake)

This feeling is compatible with, and underscored by ecology, the Gaia Hypothesis, and much of the "cutting edge" of contemporary physical and biological science, for example in the writings of David Bohm, Fritjof Capra, and Rupert Sheldrake among others.

The aspect of Marxism that advocates limitless expansion of production, growth in productivity of labour, unleashing the forces of modern scientific production from the restricting fetters of capitalist relations, increasing control over and domination of nature for the purposes of satisfying human need - making it "serve human ends" - this is the Promethean myth turned into Frankenstein nightmare. With its disregard or ignorance of the effects of its actions on nature (the Other), and hence back upon Self (humanity), it is a hard, "masculine" vision of the future, that pursues an unconstrained "interrogation of nature", forcing her to yield up her secrets, in order to plunder her bounties. This contrasts with a "feminine" conception of man returning, unalienated, to nature, harmonizing subject with object, reintegrating the human faculties in the all-rounded individual who lives in community, equality, and cooperation with other all-rounded individuals. This is a vision of life without hierarchies or reified bureaucracies, engaging in harmonious, unalienated, interacting metabolism with the rest of nature, as that part of nature which is conscious and practices labour.

The new ethos that evolved with the emergence of urban manufacturing and rural capitalism, and of modern science in the sixteenth and seventeenth centuries, was symbolized in the ideas of Francis Bacon and Rene Descartes among others. It considered nature to be unlimited in its capacity to yield wealth and satisfactions to human beings, and to satiate the infinite development of human needs. Endless expansion was assumed to be at the heart of progress - expansion of wealth, production,

productivity of labour, population, etc. etc. Such a notion relied on the idea that mind could control matter: science`s practical mastery of nature was united with the ethos of magic in this vision of nature as a cornucopia waiting to be opened up. Modern social theory`s inadequate grasp of society`s immersion in, or embeddedness within nature, rests upon an ontological and epistemological continuity with this perspective. For modern sociology the subjects of society, in both its internal interactions and in its interactions with nature, are at bottom rational minds - ensconced in physical and biological bodies certainly, yet it is the mind that is primary in Max Weber`s emphasis on rational, intentional, understandable "social action"; in Marx`s theory of the class basis of consciousness, of social interests, of creative struggles etc. Perhaps Durkheim, with his strong emphasis on human interdependency in society - whose laws are so ineluctably outside of and transcendent to individuals - is the least guilty of this, though his theories certainly do not explicitly conceive of society in its interrelatedness with nature and natural processes in the way an "ecological sociology" requires - that is, understanding social systems in terms of energy-flows and in relation to the laws of biology and thermodynamics. Each of the three major "founders" of Sociology, as well as the majority of other important and influential social thinkers of the period, assumed a fundamental dualism in their ontologies and epistemologies of human society in its relations to (the rest of) nature.

We are now faced, therefore, with the necessity, and difficulty, of conceiving human development - in history, society, culture, consciousness, and mind - as occurring within, and as a part of, nature, "natural processes", the "natural environment".

A recognition that Marxism, like all other "general theories" of society, has tended to see society as functioning both 'beyond' any biologically given or 'inner' human nature, and also outside the "natural environment" - or rather perhaps, as enclosed by it, but in a crucial sense separate from it, leads to the acknowledgement that a crucial aspect of postmodernist thinking is correct. It grants that "the social" is not a single, indivisible object of whose existence we know, regardless of whether we have yet understood it "scientifically" or not. It means that a problem for Marxism is not merely whether it effectively grasped the essential characteristics, features, laws, or processes of "society" in its theories, but whether there is any determinate, unitary entity that should be called "society" - i.e. whether we know, at any place or time, where nature begins and society ends and vice versa; whether for example, the environmental sciences, biology, and paleontology do indeed map and interpret zones distinct from those mapped and interpreted by archaeology, anthropology, sociology, psychology, political science, economics etc.

Thus the question is not just whether Marxism, like other post-Enlightenment philosophies of human history and society, has adequately or inadequately theorised these fundamental processes - if it did that at least better than other philosophies, this would grant it a validity equal to many other scientific theories: for example, the

evolutionary paradigm of Darwinism, which has similarly by no means resolved all the problems of biological evolution. Nor is the problem just that Marxist social categories have implicitly assumed that an infinite expansion of material productive forces and of human exploitation over nature is possible, necessary and ethically progressive - for if that were so its fundamental categories could surely be adjusted and transformed to accomodate an ecological awareness. It is that Marxism cannot even begin to understand the thoroughly "decentred" way in which human realities (from demography to industrial ecology) should be seen - through multiple levels of explanation: through the physical, geological, and engineering sciences, the biological and medical sciences as well as through the "social and historical sciences" - whatever they may be, and also through the "sciences of the spirit" - aesthetics and mythology among others - though this last point pertains to yet another problem area for the "totalising" thrust of Marxism.

Marxism"s categories block the new conceptualisations that are needed for grasping the complex ways in which nature and humanity interact, and the senses in which humanity is a part of, though a special part of, nature; of the problematical question of what actually is "social" rather than "natural" (as well as the problems it has, in common with other "social" theories, in comprehending the "spiritual" dimensions of human existence - though this, once again, is a different problem from that concerning "society`s" relationship to the "natural environment").

The problem is quite simply that Marxism assumes a priori a distinctly boundaried, privileged, and singular ontology of "the social", and thus cannot help reducing other levels down to it or pushing itself outward upon them, thus totalizing them all under its epistemological dominance; and this is quite apart from the particular categories and laws that make up Marxism, or from the particular conceptions as to what form of totality "the social" constitutes, in any of its forms. Thus, these issues cannot be resolved through arguments about "what Marx really said", or about "which version" of Marxism we are using, as Marxism"s defenders persist in trying to do.

As time goes on, Marx"s life work comes to seem not merely an unsatisfactory account of what it purports to describe, analyse, and explain, but to have fundamentally misconstrued what it would mean to create a "science of humanity". It is no longer a matter of distinguishing what is valid in Marx from what is wrong; separating the wheat from the chaff. His legacy is paradoxical, and perhaps unique in the history of thought. For on the one hand, he can stand beside Newton, the great synthetic scientist of the physical, organic world (in terms of what was knowable about it in his time); and beside Darwin, the great synthetic scientist of the living, organic world (in terms of what was knowable about it in his time). Marx"s theoretical system, though from our present vantage point irredeemably inconsistent, contradictory, and fractured, was indeed the first comprehensive attempt to create an inclusive, scientific mode of explanation of human history, society, and consciousness; of human nature and human

activity. All subsequent thought in these spheres has been on some level a reaction to, or a development from, his ideas; refractions from or responses to the refractions from his work. No matter how much others" achievements – Durkheim`s and Weber`s for example - went beyond Marx, this essential claim remains valid. It will probably always be fruitful - as it certainly still is now - to take Marx`s work as some kind of reference point, however far behind it is necessary to leave it.

Yet in another sense, Marx`s theories are not like Newton`s or Darwin"s theories. Although advances upon the latter are not simple accumulations upon a fixed bedrock (since in particular Newton`s laws have become ultimately "wrong" in the light of Einstein`s theory of relativity), yet there is a certain substantiality in their understandings of reality that is less erodable by time than those of Marx. The very enterprise of Marx must dissolve in front of our eyes, for us to move on; for his thought to continue to yield insights, to suggest fruitful questions and lines of enquiry, to be the useful reference point just mentioned, the whole social science process must begin again. The 'cognitive sciences of language', to take one example, have come to show that the relationships between biology and culture, nature and socialization, and therefore between 'base' and 'superstructure', are quite different from those assumed, partly unconsciously, by the whole 'culture' of Western social science, including those strands emanating from Marx. Rather than seeing man as an animal with a biologically given predisposition to acquiring language, the actual language acquired being determined by the culture into which an individual is socialized, Steven Pinker (49) insists that the very nature of creative learning, and of the creative use of language, is more an individual re-creation or re-invention of language. Rather than a pouring of culturally relative signs, sounds, and rules into a developing child, learning a language is a universal human instinct, an innate 'technology' in a sense, like the human eye or the egg-laying behaviour of a female fly, or the bat`s use of a kind of radar for detecting its prey.

It is not so much that this model reduces in importance the role of culture in the human condition - since obviously the diversity of real languages is borne largely by the diversity of human cultures - but that it qualitatively alters the way the interaction between the biologically given and the culturally relative should be conceived. It is obvious that such considerations put an entirely new face upon a great many 'problems' within social theory, especially those within Marxism. To the essential question: 'Why has the modern working class not transformed capitalist society into some form of socialism, as Marxism thought it could, should, or would?', a whole new set of answers can be thought through, that go far beyond ideas about 'obstacles' to the transformation - varying from the reification of consciousness and culture to nationalism, from the complexity of the international division of labour to the interconnectedness of the world market. Any major shift in our understanding about what is 'innate' or 'universal' to the human mind, 'intrinsic' to the very nature of human culture or 'implicated' in any system of material production at all, is bound to fundamentally change our

understanding of how and to what ends social transformations can or should be made.

This is not merely a matter of deciding 'certain things cannot be changed', establishing the fixed features of human or other nature, as if in a mood of gloomy resignation or of pessimistic realism, something to be avoided if at all possible. That is always the way 'progressive' politics, from socialism to feminism, has viewed the situation, so that 'idealists' are more reluctant than 'moderates', 'pragmatists', 'realists', 'sceptics' etc. to 'give up' on cherished hopes.

But it is not always helpful to see 'nature' as fixed, 'culture' as malleable. Universal characteristics of the human mind, or fundamental ecological principles, do not simply act as blocks on possible transformations of society; knowledge about them may open up otherwise unthought of opportunities, and though constraining some kinds of social utopia, or relegating others to the realms of impossible fantasy, more frequently it may constructively set the terms for how and through what means societies can be changed. Such knowledge may also lead to a recognition that some things cannot and should not be changed, things which older 'progressive utopias' were determined without compromise to abolish or alter. It may also lead to seeing that other things must be changed which before it had seemed impossible, undesirable, or unimportant, to change. Still other things it may come to seem unnecesssary to change, or because difficult and risky, yet inessential, as simply not worth the effort of changing.

Socialism and feminism especially, have with insufficient clarity and self-consciousness, distinguished or prioritized the different categories of radical aspiration; changes absolutely necessary for survival or fundamental to morality, have been jumbled up with preferences based on taste, ephemeral opinion, or even the idiosyncrasies of individual influential leaders and thinkers, as well as upon impossible fantasies, without even an intention being expressed of separating them out in principle. The concepts, common in socialist philosophy, of different stages and epochs, in which societal problems of different quality and dimension are resolved at different speeds, were not founded on this kind of perspective.

A shift in understanding of 'nature', and of the kinds of interaction that operate between 'nature' and 'culture', will obviously alter not only our ideas about 'culture', but our views of how 'culture', 'society', and 'economy' might be changed.

The three major areas of science are those of a) the inorganic world; the universe (studied by physics, chemistry, astronomy, cosmology etc.), b) the organic world; life; biological evolution (studied by biology, biochemistry etc.) and c) the human world, i.e. consciousness, mind, culture and society (studied by the social sciences, history, archaeology and many more. Some sciences focus on the interfaces of these science-areas, e.g. the study of biogenesis is at the interface between a) and b), as it concerns itself with the complexification of the inorganic dimension into the organic dimension

of life, a qualitative jump from one kind of self-organizing structure or process into another. Similarly palaeontology and ethology are concerned with another qualitative leap, or self-complexification, from b) to c). The three major science-areas are hierarchically nested in that each higher one subsumes the one or ones beneath it and, for that reason, they are necessarily simultaneous.(50)

Since their inceptions in human consciousness - which are difficult to date, as thought about each of these three science-areas is as old as thought itself - each of the three has shifted its perceptions of what its object of investigation is, about where the interfaces between each lie, and of course about the methods, theories, and worldviews with which they work. Their self-reflections, self-images, and forms of self-consciousness, change through the processes of dialectical interaction between science itself and the philosohpy of science, and each through its complex interactions with and within 'the socio-historical totality' - though this latter is extremely difficult to define, involving as it does not merely the particular society or civilization within which the science is developing, but the entirety of human history, which in turn necessarily involves the dimension of 'nature' that is contained within the notion of 'humanity' - not merely 'society'. For example, how much of all scientific knowledge rests upon species-specific cognitive and other characteristics of the human psyche (in the ways implied by the theories of Levi-Strauss, Chomsky, and Julian Jaynes among others)? How much should variations in behaviour and consciousness as between individual human beings and whole societies, be attributed to different 'environments' (social or natural), acting on a malleable, unfixed 'human nature' on the one hand, or be conceived instead as expressing phenotypically the diverse and varied potential of the human genotype?

Each of the three major science-areas are constantly influenced by, and borrow from, the models, paradigms, and theories generated within the others. Thus Darwin's theory of evolution borrowed from the essentially socio-economic theories of Malthus, only afterwards to exert much greater influence, as 'social Darwinism' or 'neo-Darwinism', upon sociology, sociobiology, political science, philosophy, etc. (which then influenced bilogy once again, 'ideologically'). Physics and biology in the nineteenth century exerted inordinate influence on the 'founders of sociology,' Marx, Durkheim, and Weber, no matter how much each was concerned in his different way to construct a science of society sui generis. Hegel`s philosophy - especially his ideas of developmental process through time, and of structural transformation - opened up conceptual possibilities for nineteenth century geology and biology as well as history.

For much of the twentieth century, critical social philosophy, especially Marxism, made possible a critique of 'positivism' and 'empiricism' in the inorganic and organic sciences, allowing alternative visions to appear of living and non-living natural processes as developmental, creative, and open-ended, in contrast to the essentially static, timeless, mechanistic and deterministic presumptions of orthodoxies within the 'natural sciences'. But now however, the table has turned once again, for the 'cutting

edge' of the inorganic sciences, especially physics, has given rise to chaos theory, complexity theory, non-linear and non-deterministic models of physical processes, which are proving vastly important for the social sciences. The new notions of complexity, emergence, indeterminacy, creative self-organization; of systems that transform not only their own structures, but their own laws of transformation, open up possibilities of understanding human history`s unpredictability and open-endedness that make even the most subtle theories heretofore existing, of dialectical social change, look rigid and banal. Above all, they throw the social sciences into a new state of perplexity and thrilling awareness of their ignorance with respect to what human society is ; where the interfaces between inorganic and organic nature, and society, lie.

Advances in the environmental sciences and climatology, in ecological economics and energetics, and anthropolgy, for example, wholly remove any complacent certainties about how and to what degree the availability of natural resources, including energy sources, and of food and water, dictate, delimit, determine, or structure human history and society. Meanwhile advances in biology, genetics, the brain sciences, psychology, linguistics, ethology and primatology among others, serve to dissolve any determinate answers, and all ungrounded certainties, concerning when and how the human mind and human society evolved, about what constitute their essences, and therefore what precisely 'sociology,' for example, studies which other disciplines do not. (Interestingly, advances in biotechnology particularly have made the blurred boundaries between human society and nature especially obvious, but in reality this blurredness was always the case, and to a very much more ubiquitous extent than immediate thought about this new, dramatic example implies.)

What appeared to Marxism as a self-evident distinction between society on the one hand and nature on the other, can no longer be accepted as such; the assumption that society is man-made and therefore transformable, whereas nature is neither, is no longer tenable in respect of any of its four assertions. But more than that, it is no longer clear where nature ends and society and consciousness begin, nor even that such a line exists even in principle as a precise demarcation. The entire nature-society dialectic, in reality and in conceptual analysis, has become infinitely more complex and difficult.

It has become possible to conceive of human development - the 'Human Revolution' as Mellars and Stringer(51) term it - in its totality (which by no means suggests all is known about it - quite the contrary); in terms of the emergence of humanity over a very long period of time, in a process which is both a biological and a cultural evolution, wholly intertwined. No longer can we think of a period of purely biological evolution, giving rise to a new species with its unique possessions of consciousness, language, capacity for cooperative labour, and society; after which a purely cultural, economic, technological, social, and political history takes over. The prevailing view in the social sciences, especially when based on Marxism, has been that the longest

period of human development was essentially a matter of biological, physiological, and behavioural adaptation of Man to the natural environment, after which more recent human history (though the precise moment at which the supposed transition from biology to culture and history occurred, was never specified) has become the unfolding of so many forms of cultural and socio-economic organization: the last phase of paleolithic society, the neolithic stage, ancient civilizations, a variety of types of feudal society, and then capitalism. This historical unfolding was no longer a biological evolution, but rather the development of different types of society all resting upon biological potentials already laid down genetically in human prehistory.

It has now become necessary by contrast, due to palaeontology, to envisage an emergence over hundreds of thousands of years, of human hunter-gathering society, which after 60,000-70,000 years in its Homo sapiens sapiens form, in contrast to its earlier Homo erectus , archaic Homo sapiens , and Homo sapiens neanderthalensis forms, evolved into new stages of human reality, new kinds of complex emergence on the levels of both the individual and society; first in the development of a fully recognizable symbolic culture, then in small-scale settled agriculture and animal domestication, and then in civilizations. (Recognizable artistic products are found at the opening of the Upper Palaeolithic era about 40,000 years ago, Homo sapiens sapiens having already emerged about 100,000 years ago.) All these developments are inseparably both biological and social, organic and cultural; what we have come to call nature and society interlock in infinitely complex ways at every step - whether in relation to genetics and behaviour, to physiology and economic production, or to the 'laws of physics' and technology. The processes involve the sciences of the brain as well as the philosophy of mind; involve understanding constant human population growth in history as simultaneously a biological and a social phenomenon. Even the history of the modern era, which is only a few hundred years old, cannot be thought of as pure 'socio-cultural history', as humanity unfolding itself outside of, or even inside of, nature, in ways that retain the society/nature dualism. There can be no sensible historical analysis of the 'capitalist mode of production' which brackets off the physiology of the human nervous system and brain, or analysis of the particular moment in the history of the universe, of the solar system, of the planet earth, and of life, in which it is occurring.

To take one example: in order to understand the nature, causes, and consequences of the phenomenon of Nazi Germany, we need to use not merely all the economic, social, cultural, and psychological sciences and philosophies, but also biology, palaeontology, neurology, biochemistry etc., in an enmeshed, inter-embedded, and cross-disciplinary way. Or, in order to consider the 'social transformation' required to arrest modern civilization`s growth and expansion beyond the earth`s ecological carrying capacities, and even to begin to consider the forms that society ought and might develop into in order for humanity to survive beyond a few more centuries, we come to realize that we need to think through an interrelated, multi-disciplinary complex of sciences and

philosophies, in ways that are only beginning to emerge dimly in the scholarly imagination. To take another issue, more specific but nevertheless vast and fraught in its ideological implications, our thinking for decades on the mother-child relationship in human societies has oscillated between dogmatic, socially conservative biologism - speaking in terms of what is 'natural' - and feminist sociological assertions, made without proper empirical basis or cross-disciplinary scientific examination, that 'the myth of mothering' is a purely relative, culturally constructed institution, entirely the product of patriarchy, male power, and women`s oppression. 'Moderate' positions in between these 'extremes' have been a blend of these mind-sets, hence have not broken from the dualistic worldview intrinsic to both. It may now become possible to think in a new way about the issue, through an interwoven complex including sociology, psychology, biology, and philosophy (and also palaeontology, palaeoanthropology, primatology, ethology, archaeology, ethics and aesthetics, the study of myth, religion, and cosmology), in order to go beyond simplistic, complacently prejudiced positions.

Social theory has always been vital to the social sciences. It deals with the essential epistemological and ontological issues involved, it cannot be evaded: What is society? How best to analyse and interpret it?

One weakness of most social theories, as has already been said, independent of or transcending all the great differences between them (from Marxism to Durkheimian sociology etc.), lies in their retaining the dualism of nature and society which is common in modern western thought from Bacon and Descartes onwards. The Enlightenment`s distinction between nature and reason grew into the social sciences` dichotomy between nature on the one hand, and consciousness or human society on the other. 'Progressive' and socialist social theories have shared with more academic, orthodox social theories an assumption that human history and society are something separate and wholly emergent from nature, no longer subject to the same laws, now that they have become a new realm of reality with its own distinct laws; and thus that the social sciences need to ignore biology and ecology, as well as the physical and chemical sciences, rather than understand biology and ecology as being 'mediated' by/in/through society. Implicitly biological and physical processes have been assumed to have stopped having relevance to human reality, *qua* history and society, once culture and history began.

REFERENCES

(1) Bill McKibben: The End Of Nature, Viking Penguin, 1990

(2) Quotation from Walter Benjamin: Illuminations, Collins/Fontana, 1973, p 259

(3) New Testament quotation from S.G.F. Brandon: The Judgement Of The Dead, Weidenfeld and Nicolson, London, 1967, p 102

(4) Op. cit.: pp 110

(5) Op. cit.: pp 112-3

(6) Op. cit.: pp 179-181

(7) Hiram Caton: Domesticating Nature. Thoughts on the Ethology of Modern Politics, in Elliot White (Ed.): Sociobiology and Human Politics, Lexington Books, Massachusetts, (1981), p 109

(8) Op. cit.: p 110

(9) Op. cit.: p 112

(10) Peter Dickens: Society and Nature. Towards a Green Social Theory, Harvester, (1992), p 126-8

(11) Op. cit.: p 141-2

(12)"Theses on Feuerbach* in Karl Marx and Friedrich Engels: The German Ideology , International Publishers New York, (1967), p 197

(13) Michael Jacobs: The Green Economy. Environment, Sustainable Development and the Politics of the Future, Pluto Press London (1991)

(14) Juan Martinez-Alier: Ecological Economics. Energy, Environment and Society, Blackwell Oxford (1993)

(15) Elisabeth Croll and David Parkin: Anthropology, The Environment and Development, in Croll and Parkin: Bush Base: Forest Farm. Culture, Environment and Development, Routledge London and New York (1992), p 9

(16) Martinez-Alier: op. cit., p 221

(17) Ibid., p 222

(18) Ibid., p 222

(19) Ibid., p222

(20) Tim Hayward: Sustainability as a Normative Concept, in Contemporary Political Studies 1995, Vol III, Political Studies Association of the United Kingdom

(21) Croll and Parkin: op. cit., pp 7-13

(22) Alfred Schmidt: The Concept of Nature in Marx, NLB London (1991)

(23) Martinez-Alier: op. cit., 221

(24) Anna Bramwell: Ecology in the 20th Century. A History, Yale University Press (1989), p 34

(25) Croll and Parkin: op. cit., p 14

(26) Croll and Parkin: op. cit., p 9

(27) Bruce Rich: Mortgaging The Earth. The World Bank, Environmental Impoverishment and the Crisis of Development, Earthscan, London (1994), p 264

(28) Martinez-Alier: op. cit., p 128

(29) Soddy, quoted Martinez-Alier: op. cit., p 131

(30) M. King Hubbert, quoted in Martinez-Alier: op. cit., p 146

(31) T. Patrick Culbert: The Collapse of Classic Maya Civilization, in Yoffee, N. and Cowgill, G.L. (Eds.): The Collapse of Ancient States and Civilizations, University of Arizona Press, Tucson (1988), pp 99-100

(32) Ted Benton: Biology and Social Theory in the Environmental Debate, in Redclift, M. and Benton, T. (Eds.): Social Theory and the Global Environment, Routledge, London and New York (1984), pp 40-41

(33) Martinez-Alier: op. cit., pp 131-2

(34) Ibid., p 197

(35) Ibid., p 197

(36) Ibid., p 215, note 5

(37) Ibid., pp 216-218

(38) Ibid., pp 218-221

(39) Ibid., pp 225-226

(40) Peter Dickens: Society and Nature. Towards a Green Social Theory, Harvester Wheatsheaf, (1992) p xi

(41) Alain Lipietz: Towards a New Economic Order. Postfordism, Ecology and Democracy , Polity Press, (1992) p 49

(42) Ernesto Laclau: New Reflections on the Revolution of our Time, Verso, (1990), p 8

(43) Ibid., p 10

(44) Ibid., p 10

(45) Marx and Engels: op. cit., p 10

(46) Laclau: op. cit., p 12

(47) Ibid., p 13

(48) Ibid., p 13

(49) S. Pinker: The Language Instinct , Penguin, 1995

(50) J. T. Fraser: Time and the Origin of Life, in J.T. Fraser and M.P. Soulsby (Eds.): Dimensions of Time and Life. The Study of Time VIII, International Universities Press, Connecticut, (1996), p7.

(51) Paul Mellars and Chris Stringer (Eds.): The Human Revolution, Edinburgh University Press, (1989).