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Natural Being and a Coherent Society

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To appear in *Evolution, Order and Complexity* (E.L. Khalil and K.E. Boulding eds.), London: Routledge, 1996.

Abstract

Science is a system of concepts and tools for knowing and living with nature. As such, it should be integral to any human society from the most primitive prehistoric culture to the industrialized nations of to-day. But whereas the primitive lived *within* nature by her knowledge which is the totality of her personal and tribal experience, the civilized man is imprisoned *outside* nature, of which, therefore, he can have no real knowledge.

Cartesian mind-matter dualism and Newtonian mechanics began a process of the dissolution of our natural being; which Darwin completed by reducing organisms (including humans) to objects, isolated from the environment, and buffeted by blind selective forces. This deep

alienation from nature and from our own natural being is the human condition of the modern man. It is his paradise lost. From then on, nature would be opaque to him, condemned as he is, to a knowing from without, to a life alone and devoid of meaning.

In this paper, I wish to deconstruct the myth of the Darwinian man by re-examining the biological roots of human nature to show how it is inextricably bound up with the social. From studies on animal and plant communities to 'primitive' human socieities, we see that sociality is at the basis of life: it is the direct consequence and expression of the fundamental unity and interconnectedness of all nature. The unity of nature is itself a universal, intuitive insight that contemporary western science is validating in every aspect, particularly in the new biophysics of coherence in living systems. Authentic knowledge is premised on this coherence and interconnectedness. Social and moral values arise explicitly and naturally in a life coherent with authentic knowledge. From this perspective, culture is the creation of meaning and knowledge in partnership with nature, in which every social being participates. The coherent society is the society of natural beings living in harmony with nature's creative process.

The Conference of the Birds

According to ancient legend in Persia, all manner of birds gathered for a conference one fine day and were persuaded to disperse to the four corners of the world in search of the meaning of life. After many long and arduous years, they returned home only to discover that what they were seeking had been right there all along. They were blind to it, and the journey away was necessary to open their eyes [1]. This is in many ways the parable of western science. After centuries of intellectual wanderings that increasingly led away from nature, we are irresistably drawn back to her in the realization that there is no authentic knowledge, and hence no meaning in life, apart from nature.

Science is a system of concepts and tools for knowing and living with nature. As such, it should be integral to any human society from the most primitive prehistoric culture to the industrialized nations of to-day. But whereas the primitive lived *within* nature by her knowledge which is the totality of her personal and tribal experience, the civilized man is imprisoned *outside* nature, of which therefore, he can have no real knowledge.

Perhaps the single most decisive factor in the evolution of the knowledge system of the west (and it is a knowledge system rather than science in isolation), is that it depends on severing our intimate, manifold connections with nature at the outset. Cartesian mind-matter dualism is simultaneously a division of mind from body as well as the isolation of observer, as disembodied mind, from an 'objective' nature observed. Newton clearly brought out the stark consequences of this dual separation when he proferred reality as a desolate universe of absolute space and time, where inert, indifferent bodies are acted on by the push and pull of extraneous forces. Green grass and trees, fins and wings, are so many illusory 'secondary qualities' added on by our senses. Human joys and pains, likewise, can have no dominion; relegated as they are, to the realm of poetic fancy that hangs ever like a veil over objective reality.

That was the beginning of the dissolution of the natural being; which Darwin completed by

reducing organisms (including humans) to objects, isolated from the environment, and buffeted by blind selective forces [2]. This deep alienation from nature and from our own natural being is the human condition of the modern man. It is his paradise lost. From then on, nature would be opaque to him, condemned as he is, to a knowing from without, to a life alone and devoid of meaning.

But this exile is entirely self-imposed; and is neither necessary nor inevitable. Elsewhere, I try to show why this is the case, and how we may yet find our way back, if not to paradise, then surely to a more fulfilling and humane future through recovering our natural being, which is also the vehicle to authentic knowledge [3].

In this paper, I wish to deconstruct the myth of the Darwinian man by re-examining the biological roots of human nature to show how it is inextricably bound up with the social. Observations of animal and plant communities as well as 'primitive' human societies place sociality firmly at the basis of life: it is the direct consequence and expression of the fundamental unity and interconnectedness of all nature. The unity of nature is itself a universal, intuitive insight that contemporary western science is validating in every aspect, especially in the new biophysics of coherence in living systems. Authentic knowledge is premised on this coherence and interconnectedness. Social and moral values arise explicitly and naturally in a life coherent with authentic knowledge. From this perspective, culture is the creation of meaning and knowledge in partnership with nature, in which every social being participates. The coherent society is the society of natural beings living in harmony with nature's creative process.

The Darwinian Metaphor and the Darwinian Man

> He bought white ties, and he brought dress suits,
> He crammed his feet into bright tight boots -
> And to start in life on a bran-new plan,
> He christened himself Darwinian Man!
> But it would not do,
> The scheme fell through -
> For the Maiden fair, whom the monkey craved,
> Was a radiant Being,
> With a brain far-seeing -
> While Darwinian man, though well-behaved,
> At best is only a monkey shaved! [4]

Darwin's theory states that organisms evolve on earth as the result of the natural selection of random variations. There were three immediate sources for the theory [5]. The first was Paley's theological argument from design -- how it is that organisms so perfectly adapted to their way of life could be explained naturalistically, without invoking, as Paley did, a supernatural 'Maker'. The second was artificial selection, practised by plant and animal breeders who selectively bred from organisms with the desired characteristics so as to create new breeds. The problem was how selection could take place in nature where no obvious selector exists. A chance reading of Malthus provided the third ingredient, which was just the natural mechanism required. Malthus noted that human beings, like all organisms, have the natural propensity to increase exponentially, generally outstripping the rate at which food supply can increase. Consequently, populations numbers are kept down by starvation,

famine, disease and war which now and again take their toll. In Malthus' theory therefore, Darwin found the perfect solution to Paley's problem of how adaptation could be explained. All organisms have a natural propensity for exponential increase, outstripping the carrying capacity of the environment. Thus, only those organisms with characteristics that favour them in the struggle for existence will survive to reproduce. Heredity ensures that the offspring of those organisms will have the same favourable, or adaptive characteristics. In this manner, the population will become more and more adapted to the environment in subsequent generations. This then, is how natural selection is supposed to work.

As we shall see later, competition for scarce resources is hardly the norm for natural animal or human populations; in general they do not increase exponentially because many social and biological factors intervene (before those associated with food supply) to keep the reproductive rate low so that the Malthusian scenario is seldom realized. Nevertheless, the Darwinian metaphor took hold in the western world, and became incarnated in the Darwinian man, who proceeded to remake the world in his own image.

The full title of Darwin's epoch-making book of 1859 was, *The Origin of Species by Means of Natural Selection or The Preservation of Favoured Races in the Struggle for Life.* If Darwin liberated the Victorian era from the domination of religion and superstition, he also delivered it well and truly to a nature painted 'red in tooth and claw'. Our continuing disharmony with nature derives ultimately from this unedifying image, which Darwin clothed with the full dignity of a scientific theory. At the same time, the emphasis on competition between individuals and the implied superiority of the 'favoured races' in the 'struggle for life' were most easily taken to be justification -- on the basis of natural law -- for the economic exploitation of the masses as for the colonization and oppression of 'inferior' races [6].

Thus, a metaphor borrowed from life in the Victorian English society, steeped in ideas of progress arising from unbridled competition in the free-market, of imperialist conquests and expansion, became enshrined as a scientific truth, dictating how we should see reality, and ultimately shaping reality in accordance to its dictate. The Darwinian man shall rule the world. Huxley invented a birthplace for him in the primitive society, where,

> '. . . the weakest and stupidest went to the wall, while the toughest and shrewdest, those who were best fitted to cope with their circumstances, but not the best in another way, survived. Life was a continuous free fight, and beyond the limited and temporary relations of the family, the Hobbesian war of each against all was the normal state of existence.' [7]

This picture was directly echoed by Freud, whose theory of the savage, patricidal primal horde is so far-fetched and ridiculous that it hardly bears repeating. The modern Freudian man, nonetheless, is the bulwark of the western industrialized society. According to a summary given by a sympathetic exponent,

> '. . . Freud believed in the person as a social atom requiring community only as a means to the satisfaction of his needs; in a primary hostility so strong that only sheer necessity or common hatred directed elsewhere could join people in love; in a certain biological inevitability of hereditary constitution, anatomy, and development, which strictly limits human possibilities; in an inner private existence which, although in part the result of early personal relationships, seems in later life, to make only indirect contact with external reality . . . and finally in civilization as the result of thwarted libinous impulses which have been deflected to symbolic ends. . . .' [8]

Such a view of human nature continues to validate the competitive, profit-seeking consumerist society of the industrialized west that in turn reaffirms and reinforces it until no alternative is conceivable. The Darwinian man is the constant, unchangeable parameter that must enter into every social equation. There can be no consideration other than cost and benefit, which creates at best, an uneasy equilibrium poised between loveless, self-serving individuals. 'Scratch an altruist, and watch a hypocrite bleed', so says a staunch defender of neo-Darwinism [9]. A more moderate, though no less revealing statement, is made in the opening pages of E.O. Wilson's book, *Sociobiology*, which applys neo-Darwinist principles to explain the evolution of social behaviour, thus creating the discipline of the same name:

> '. . . This brings us to the central theoretical problem of sociobiology: how can altruism, which by definition reduces personal fitness, possibly evolve by natural selection?' [10]

Why do sociobiologists find such common and commonplace human qualities so difficult to accept, that they need to do their utmost to explain them away? It has been suggested that part of the reason lies buried in their own psychology, which reflects the warped society that has nurtured them.

The Natural Being

'We crave to be more kindly than we are' [11]

In reacting to the claims of some sociobiolgists that competitiveness, aggression, and worse, the propensity for rape and murder in males are universal human characteristics, Clairborne points out that in reality, the overwhelming majority of human beings readily engage in activities to help or benefit others, whereas only a tiny minority have ever committed criminal acts. Therefore it may be argued that altruism, rather than aggression is the universal human characteristic. He does not regard altruism to be innate, however. Rather, he sees it as a learned behaviour based on the universal human capacity for empathy, that is, for deriving pleasure from other people's pleasure and distress from their distress. And hence, 'satisfying the needs of others, and thereby sharing their satisfaction, is intrinsically rewarding.' [12] This empathy, as I shall try to show, comes from the experience of connectedness with kin, with fellow creatures and ultimately with all nature.

Mutual aid versus mutual struggle

Kropotkin tells us that, under the influence of Darwin's *Origin of Species*, he began to study animal life in Siberia in order to find evidence of intraspecific competition. Two general features emerged from his observations. First, that there was indeed extreme severity of struggle for existence against inclement nature (as one would expect in Siberia); and second, that even under the most abundant animal life, there was no struggle for existence against one another [13].

He went on to document at length numerous examples of mutual aid and mutual support among animals throughout the animal kingdom, from ants and termites to birds and mammals, quoting widely from published sources as well as from his own experience.

Ants regularly regurgitate food to feed hungry comrades that they happen to meet.

> 'If an ant which has its crop full has been selfish enough to refuse feeding a comrade, it will be treated as an enemy. . . . And if an ant has not refused to feed another ant belonging to an enemy species, it will be treated by the kinsfolk of the latter as a friend.' [14]

Pelicans always fish together, typically forming a wide half-circle facing the shore, then narrowing it by paddling towards the shore, catching all the fish that finally become enclosed in a circle. In South America, they gather in flocks of 40-50,000, part of which enjoy sleep while others keep watch and still others go fishing. Cooperation does not stop within species boundaries. Species may combine together to repell attacks, as the gulls and terns, who coooperate to drive away the sea-hen. The lapwings (*Vanellus cristatus*) attack the birds of prey so bravely that they merit the name 'good mother', given to them by the Greeks. Cranes live in excellent relationships not only with their congeners but with most aquatic birds. Their sentries keep watch around a mixed flock which is feeding or resting together.

A considerable body of present-day sociobiological theory is devoted to explaining, or explaining away cooperation in terms of the selective advantage that after all, must accrue to the cooperating individuals (see Bateson [15], for example). But this is a misreading of nature. In many cases, help is freely given to others from whom no return can ever be expected, and with whom the individual shares no genetic relatedness. Among mammals, dolphins are well-renowned for their intelligence and friendship towards humans. They will actually help fishermen drive fish into their nets if, after a long day, the fishermen have netted nothing and they call to the dolphins for help. However, if the fishermen are greedy and do it too often, the dolphins will ignore their call [16].

Goethe was once told by Eckerman that two little wren-fledgelings, who had run away from him, were found the next day in the nest of robin redbreasts who fed the littles ones together with their own. Goethe saw in this a confirmation of his pantheistic views [17]. It is surely this universal neighbourly tendency of birds to look after other's young that enables the cuckoos to exploit their hosts [18], and not because the latter are too stupid or mesmerized to distinguish foundlings from their own offsprings. In my experience, female and even male domestic cats, too, will readily adopt and look after kittens that are not their own. The love of young is such among the Indian langur monkeys that as soon as a newborn arrives, the troop's females will cluster around the mother, all reaching out gently to try and touch and lick the infant. During its first day of life, it will have passed through the loving arms of up to eight females [19].

What appears much more fundamental than cooperativeness or helpfulness is that animals tend to seek out and enjoy the society of others. The crane is in continual activity from morn till night, of which only a few hours are devoted to finding food. All the remainder of the day is given over to society life.

> 'It picks up small pieces of wood or small stones, throws them in the air and tries to catch them; it bends its neck, opens its wings, dances, jumps, runs about, and tries to manifest by all means its good disposition of mind, and always it remains graceful and beautiful.' [20]

Parrots, likewise, live in numerous societies or bands, the members of each of which remain faithfully together for good or bad. They also enjoy the society of other birds. In India, the

jays and crows come together from many miles round to spend the night in company with the parrots in the bamboo thickets.

Multispecies association of birds are so common that,

> 'it would be much easier to describe the species which live isolated than to simply name those species which join the autumnal societies of young birds -- not for hunting or nesting purposes, but simply to enjoy life in society and to spend their time in plays and sports, after having given a few hours every day to find their daily food.'

> 'And finally, we have that immense display of mutual aid among birds -- their migrations . . . birds which have lived for months in small bands scattered over a wide territory gather in thousands; they come together at a given place, for several days in succession, before they start, . . . Some species will indulge every afternoon in flights preparatory to the long passage. All wait for their tardy congeners, and finally they start in a well-chosen direction . . . the strongest flying at the head of the band, and relieving one another in that difficult task. They cross the seas in large bands consisting of both big and small birds. And when they return next spring, they repair to the same spot, and, in most cases, each of them take possession of the very same nest which it had built or repaired the previous year.' [**21**]

Similarly, social mammals are highly successful and associate in large numbers (until decimated by man). The numbers of solitary carnivores are trifling in comparison with the social herds of wild horses, donkeys, camels, and sheep that used to roam in central Asia; and elephants, rhinoceroses, monkeys, reindeer, muskoxen and polar foxes in northern Asia and Southern Africa.

> 'And how false, therefore, is the view of those who speak of the animal world as if nothing were to be seen in it but lions and hyenas plunging their bleeding teeth into the flesh of their victims! One might as well imagine that the whole of human life is nothing but a succession of war massacres.' [**22**]

Most of all, animals derive pleasure and satisfaction from life in society. Society was *not* created by 'man' as our anthropocentric view would lead us to believe, but is antecedent to our own species. Sociability -- the love of society for society's sake -- is at the very basis of animal life. Not only do numerous species of birds assemble together habitually to indulge in antics and dancing performances, but according to Hudson, nearly all mammals and birds (probably there are really no exceptions) indulge frequently in more or less regular or set performances with or without sound, or composed of sound exclusively. One has only to listen to the chorus of birdsongs mornings and evenings that happen regularly as clockwork during the warm seasons. The habit of singing in concert is most strikingly developed with the chakar (*Chauna chavarria*). Hudson described how he experienced this:

> 'Presently, one flock near me began singing and continued their powerful chant for three to four minutes, when they ceased the next flock took up the strains, and after it the next, and so on, until once more the notes of the flocks on the opposite shore came floating strong and clear across the water -- then passed away, growing fainter and fainter, until once more the sound approached me travelling round to my side again.' [**23**]

Many years later, Allee [**24**] was stimulated to re-examine Kropotkin's thesis when, by chance, he discovered that even such lowly animals as isopods aggreagate most eagerly to form social clusters. From this, he was led to review abundant evidence of swarm formation in the living world, starting with the single-celled photosynthetic organism Euglena, through

to insects, birds and mammals. He concluded that sociality is indeed universal:

> 'The growing weight of evidence indicates that animals are rarely solitary; that they are almost necessarily members of loosely integrated racial and inter-racial communities, in part woven together by environmental factors, and in part by mutual attraction between the individual membrers of different communities, no one of which can be affected without changing all the rest, at least to some slight extent.' [25]

As an example, he referred to the grassland bison community of the Great Plains in North America. The bison herds kept the grasslands closely cropped, preventing the invasion of herbs and shrubs. This provided a rich habitat for grasshoppers, crickets, mice and prarie dogs, all of whom converted the grass into meat, on which the plain Indians, buffalo wolves, hawks, owls and prarie chickens fed. The plants of the community,therefore, cannot be considered in isolation from the animals. This is but the age-old wisdom of ecological connectedness and interdependence of all living things that is universal to indigenous cultures all over the world [26]. The dominant modernist culture of the industrialized west is unique in its persistent denial of the unity of nature.

Allee and his colleagues also carried out numerous experiments demonstrating that society *per se* has important effects on the behaviour and physiology of individuals in it, not all of which can be interpreted as contributing to an increase in survival value. The ill-effects of crowding are well-known and clearly documented for animals such as fruitflies and laboratory mice. What is not so well-known is that under-crowding is also deleterious for the survival of individuals. Goldfish and planarians, when isolated, succumbs to poisoning more readily than when grouped [27]. Embryonic development in sea urchins is significantly accelerated when the eggs are massed together [28]. And ciliate protozoa reproduce faster in groups than when isolated, the reproductive rate being also dependent on the density of bacteria on which they feed [29].

Of especial interest is Allee's demonstration that goldfish learn faster in groups than as individuals, through a combination of imitation and group cohesion [30]. From this arises the concept of 'social facilitation' of behaviour which may have important implications for our own species that are as yet unexplored.

Having demonstrated that cooperativeness and sociality is for animals the most natural state of being, Kropotkin went on to cite abundant evidence of mutual aid, compassion and moral feelings among so-called primitive human societies. The relative lack of competition and strife in most traditional cultures have long impressed anthropologists. The point is not that competition or rivalry never occurs. Competition, like cooperation, is a social phenomenon; it does not follow that corresponding preformed human qualities of competitiveness and cooperativeness actually exist. There is, at bottom, a feeling of connectedness with other beings, a desire for society -- sociality, or love. According to Kropotkin, sociality not only offers the greatest advantage in the struggle for life under *any* circumstances (as opposed to competition, which is only advantageous under some circumstances), but it also favours the growth of intelligence, language, social feelings and a 'certain sense of collective justice' akin to morality. Sociality, the desire, or propensity for society, is the regulating and cohesive principle in both animal and human society. It exists prior to any consideration of selective advantage. In a sense, Kropotkin, and also Bateson [31] (a strong advocate of cooperation among contemporary neo-Darwinists), invert cause and effect in trying to

explain why cooperation or mutual aid could have evolved by natural selection. Qualities such as compassion or empathy, based on the same experience of connectedness with other beings, are also antecedent to life in organized society. Life in society may of course, reinforce and enhance those qualities, but they would never have arisen through any externally imposed social order were they not already heartfelt and integral to the natural state of being.

The origins of love and hate

In direct opposition to Freud and his many followers, for whom sex is the single most important human instinct on a par with survival, the Scottish psychologist Ian Suttie saw love as primary. The idea of love comes from the ministrations of the mother or caretaker during infancy. From this arises an emotion of tenderness which considers the whole world of people as possible companions, who are to be enjoyed and loved, and from whom apreciation is sought [32]. Hate or aggression has precisely the same source: it arises when love is lost, or threatened with loss, frustrated or thwarted. Thus, only the capacity to love predisposes us to hate; the stronger the love, the deeper the hatred that comes into being should love fail. Like Kropotkin, Ian Suttie came to his conclusions from studying social behaviour among animals as well as primitive societies. Sociality is congenital to human beings as much as it is to all animals (even those that are not obviously social). And sociality is in turn, the root of culture and creativity.

Just as play is universal among animal societies, it is an integral part of human development. Play gives the individual reassuring contact with fellow human beings which is lost when the mother's nurtural services are no longer required or offered. From play arises creativity: play therefore, and not necessity, is the mother of invention. Donald Winnicott, a contemporary of Suttie, located play, and by extension, creativity and culture, in the 'potential space' that comes in being between mother and infant who, through the realization of love, remain connected as they become separate [33] What is it to live? he asked. It is to live creatively. Thus, cultural and creative activities do not result from the sublimation or suppression of the sexual instinct, as Freud supposed. Instead, they are the *raison d'être* of human existence, the very meaning of life and a direct extension of the primal, irreducible feeling for love.

This is how I see the real original motive for gifts: they were not solely nor primarily *exchanges*, even less so a primitive form of trade, as most anthropologists seem to believe. The item given is above all a sign of love. It refers to all other loves by association. 'A yam dug out from my garden is the fruit of a labour of love by my own effort and the magic of mother earth, who makes all things grow. I give you this yam because it is good to eat, it nurtures you and makes you strong.' 'In return, I give you my hand-axe that I have lovingly fashioned out of the beautiful stone that I came upon one day during my walks. It must have been a gift from mother earth herself, in order that I could make this axe for you.' The item given overflows with meaning referring without bounds to all of nature *which is fully connected with, and accessible to the primitive consciousness*. This meaning is irretrievably lost when exchange is reduced finally to money: money which changes hands impersonally and indifferently, obliterating all reference to value, to labour, or to love, because it is itself valueless and formless.

Suttie began his book with some questions for his colleagues [34] :

> ‘In our anxiety to avoid the intrusion of sentiment into our scientific formulations, have we not gone to the length of excluding it altogether from our field of observation? Is love a fiction, an illusion of a weak mind shrinking from reality, and if so how and why should our minds . . . ever have created the "idea" of love?’

Science, he argued, should be concerned with the whole range of our experience. In its failure to deal with sentiment and human attachments, mechanistic materialism is but a form of sublimated intellectual play. Suttie himself demonstrated that it *is* possible to have a science of feeling, but only *with* feeling. I suggest that the re-integration of intellect with feeling is essential to a full experience and understanding of nature, in other words, to an authentic knowledge of nature from *within* [35].

What I propose is a knowledge system based explicitly and firmly on natural human values, a knowledge system which is already implicit in many aspects of contemporary western science, as I shall make clear in the next Section. In claiming to be value-free and objective, western science has systematically obliterated human values and divorced us from our feelings and experiences, which however remain to haunt our dreams in hidden, subterranean forms, making us strangers to ourselves. We are constantly being fragmented into a rational thinking domain, opposed to an irrational domain of feeling: of head versus heart, with a strong emphasis of head over heart. Science and technology without value or purpose, that is, without heart, fall easy prey to the artificial value system of vested interests whose only criteria for validation are monetary cost and benefit; while cost to human life, plant and animal life, takes second place at best. The present global environmental crisis is a crisis of a materialistic lifestyle based on the ruthless exploitation of nature and of our fellow human beings. An exploitation which has been mediated, aided and abetted by the prevailing western science and technology. In that respect, it is also a crisis for western science and technology and a challenge to scientists to respond to the needs and sufferings of peoples all over the world.

Nature from Within

To know nature from within is to recover the primitive natural wisdom that is consistent with human life, that sees nature as she really is: the evolving plenitude that affords the existence of things, the source and sustenance of all life, and the ultimate inspiration for the human consciousness striving to know and to create. In a culture that has lost none of this feeling of real participation in nature’s creative process, science, as much as art, is a quest for greater intimacy with nature that involves our whole being. The ideal state of true knowledge and inspiration is a state of total coherence with nature in which the knower and the known are mutualy transparent. In ancient China, this entails the spiritual union of the knower with the *tao*, the creative principle that generates the multiplicity of things. As the tao is eternal, the knower partakes of the eternal in all things through the tao. Similarly, in ancient Greece, true knowledge is unobscured participation in the divine mind [36] from which all creation spring. In this coherent state, one’s actions are guided not by a disembodied objective intellect, but on the contrary by a passionate total involvement and harmony of mind and body in nature. Our desire merges with nature’s desire, just as our action is fully in step with hers.

The feeling for the unity and interconnectedness of nature is not just a romantic notion entertained by poets and mystics and the so-called primitive consciousness. It is an universal intuitive insight that contemporary science is driven to validate in all aspects.

In biology, by far the most tenaciously held dogma for the whole of the present century is that the genes of organisms are immune from environmental exigencies and are therefore passed on practically unchanged to the next generation. Within the past 20 years, as the tools of molecular genetics become more and more precise, people begin to discover that the genes can change as readily as many other characters of the organism in response to the external environment. So much so that molecular geneticists have coined the term 'the fluid genome' to describe the large variety of processes that can chop and change the genes, expand or shrink different parts of the genetic material [37]. Recent experiments also indicate that adaptive genetic mutations are non-random in that they are much more likely to occur than non-adaptive ones [38]. All the evidence indicates that organism and environment are intimately interconnected, from the sociocultural domain right down to the genes. Stable inheritance *depends* on this very interconnection, rather than on a mythical, unchangeable genome. The process of heredity has a dynamic stability which resides in the feedback interrelationships that can propagate from the external environment through the physiological system to the genes. Organisms and environment, like figure and ground, engage in ceaseless rounds of mutual definition and transformation which is the essence of evolution [39]. Similar cycles of feedback between the biosphere and the physicochemical environment are the basis of stability for the global ecosystem.

The present global environmental crisis is the direct consequence of a knowledge system based on a denial of the unity of nature. And nature responds with a message that has become all too clear in recent years: she is one indivisible ecosystem, and whatever insult is perpetrated in one part of the globe will have repercussions, not only locally but globally as well. Lovelock's Gaia hypothesis encapsulates the ancient ecological wisdom in a contemporary form: the collective activities of the biosphere as a whole maintain the earth's atmosphere and temperature far away from thermodynamic equilibrium in conditions that are suitable for life [40]. In other words, instead of every individual organism working for its own selfish ends as envisaged in neo-Darwinian theory, it is the extent to which they effectively cooperate in cycles of mutual feedback and interdependency that life for all is possible. This is also a generalization of the principle of mutual aid among animals that Kropotkin and Allee expounded on. More importantly, organisms are not so much passively adapted to the environment by natural selection, as actively adapting the environment to themselves [41]. That is, *they actively participate in shaping their own evolution.* This arises naturally from the interconnectedness not only of all life-forms, but also between the biological and physical realms: each shapes the other in successive cycles of mutual stabilization and transformation. Every species is endowed with powers that are given by all the rest. In a very real sense, each is implicated in every other by material and energy flow, and possibly also the flow of information, as we shall see. There is an irreducible wholeness of being and becoming on earth. This wholeness encompasses our relationship to reality at the most fundamental physical level.

The inseparability of the observer and observed, or knower and the known, and the universal wholeness of being, are nowhere as clearly brought home to us as in quantum physics. Quantum physics is the culmination of a long series of attempts to fragment reality into the

smallest particle; only when physicists got down to the infinitesimal, indivisible quantum, they find that the whole exercise was futile: it cannot be done at all! It turns out that in order to have a consistent representation or theory, it must be supposed that observer and observed are one indivisible system, and that the very act of observation transforms reality from an indefiniteness of multiply superimposed states of being to a state of definiteness, which however, cannot be predicted in advance. Moreover, the same act of observation can simultaneously determine the state of a system which is widely separated from the one observed, as though reality were indeed, an organic, universal whole. This has prompted David Bohm and his colleagues to reformulate quantum theory on the basis of universal wholeness: every particle or being is embedded in a field, or quantum potential consisting of the influences from every other being in the universe [42]. From this perspective, wholeness and interconnectedness are actual and primary, just as fragmentation and separation are illusory.

How then, can we think of reality at all? Nature has resisted all attempts to describe her simplistically, in terms of a flat, comon sensible literalness. The reductionist, atomistic science whose aim it was to do just that, when pushed to the very limit, can only reaffirm that reality has breadths and depths beyond our attempts at description and comprehension. As our knowledge of nature deepens, so too the magic and the mystery; (the same magic and mystery that were accessible to our ancestors). She is both wave and particle, both here and everywhere at once. To know her requires not only the analytic intellect of the scientist, but also the vision of the mystic, the imagination of the poet, and the sensitivity of the artist. In other words, it requires our whole undivided being participating fully in knowledge [43].

The Coherence of Being

I hinted that organisms may be interconnected with one another and with their physicochemical environment by information flow, as well as material and energy flow. It is already generally accepted that physical parameters such as day length and other seasonal variables are informational in that organisms respond to them physiologically. There is a long standing debate concerning the relationship between biological rhythms and periodicities in the environment. One hypothesis, advanced by Brown [44], is that the biological rhythms are closely attuned to the rhythms of the earth (which are in turn attuned to those of the sun and the moon). Many of these natural rhythms are electromagnetic in nature. There is now a substantial literature on the sensitivity of organisms to weak electric and magnetic fields occurring either naturally, or close to power lines and other electrical appliances; although the mechanisms involved in this sensitivity is not fully understood [45].

A possible clue comes from a consideration of the nature of biological organization. There is a tendency for many molecular biologists to assume that the answer to biological organization will come when all the molecules in organisms are isolated and analyzed. But biolgical organization is a dynamic, macroscopic order extending over astronomical numbers of molecules; spanning distances at least millions of times the size of individual molecules. This organization enables organisms to transform energy with the rapidity and efficiency rarely achieved elsewhere, and to be extremely sensitive to specific signals in the environment [46]. For example, muscle contraction can be as efficient as 98% in converting chemical energy to mechanical work; and it is estimated that our eye is sensitive to a single

light quantum falling on the retina.

Some thirty years ago, the nobel laureate biochemist, Albert Szent-Györgyi [47] already pointed out that we can only begin to understand the characteristics of living systems if we take into account the collective properties of molecules akin to superconductivity and superfluidity. This idea was developed at around the same time by solid-state physicist, Herbert Fröhlich [48], who suggested that living systems may have collective modes of activity somewhat similar to superconductors operating at physiological temperatures. Metabolic energy, instead of being lost as heat, is stored in the form of collective, or *coherent* electromechanical and electromagnetic excitations. These coherent excitations could be responsible for generating and maintaining long-range order. They also make possible highly efficient energy transfer and transformation of energy and the detection of very weak electromagnetic signals.

Evidence for the existence of coherent excitations in living organisms come independently from the work of Fritz Popp and his coworkers [49], who showed that practically all organisms emit light at very weak intensities which can nonetheless be detected with a sensitive photomultiplier placed with the organisms in a dark chamber. The nature of this light (biophotons) can also be studied as rescattered emission, or delayed luminescence, after brief illumination with an ordinary light source. As the result of nearly 20 years of experimentation, Popp advances the hypothesis that biophotons come from a coherent electrodynamical field within the living system. This field has a wide range of frequencies that are coupled together to give effectively a single degree of freedom, and that may be the basis of biological organization. Living systems are thus both emitters and receivers of electromagnetic signals originating from the physicochemical environment as well as from other organisms. We have recently demonstrated, for example, that synchronously developing fruitfly embryos can interact nonlinearly to generate coherent light emission which are orders of magnitude higher than the self-emission rate [50]. This adds a whole new dimension to the interconnectedness in nature in terms of information flow as mentioned above.

Another important aspect of coherence is that it suggests a relationship between local and global (or individual and collective) that has previously been deemed contradictory or impossible. It turns out that a coherent field shows space-time correlations between different points; however, these cross-correlations are precisely the products of the self-correlations at each point. In other words, any number of points in a coherent field will behave statistically as though independent of one another [51]. A coherent state is thus one of maximum global cohesion and also maximum local freedom! The inevitable conflict between the individual and the collective, which serves as the starting point for all social (as well as biological) theories of western society, is not so inevitable after all. Perhaps it is time for social theorists to adopt a new set of premises.

The Coherent Society

Can we envisage a society that is consonant with our new, and hopefully, more authentic knowledge? I shall call it *the coherent society* to resonate with our knowledge of unity and coherence, in the hope that we can ultimately live and act coherently with our knowledge. It

also carries the notion of a life coherent with nature, and with our own natural being.

Biological organization has long served as the metaphor of social organization for utopians and other social theorists alike, for example, Spencer, Comte, and St. Simon, to name but a few [52]. A mechanistic view of life thereby visits on society a whole set of unfounded and mistaken assumptions of which social Darwinism has had the most devastating influence [53]. Two unspoken, deeply ingrained beliefs, encapsulated in Darwinism are that 'man' is above all, an isolated individual motivated solely by self-interest, if not aggression; and that in the absence of an externally imposed social and moral order, chaos will reign supreme.

From our vantage point of 'nature from within', all nature is a unity which we ourselves participate in shaping. Connectedness and sociality are primary, just as aggression and hate are the result of frustrated or failed love. The Darwinian/Freudian man is the product of a patriarchal, repressive society built upon the denial of love at every turn. It is neither the universal nature of human beings, nor the ineluctible human condition [54] A consciousness fully indigenous to nature is grounded in nature, and connected to all being. She is never isolated nor alone; hence she roams freely and without fear. She is kind and loving and ever in possession of the highest of moral feelings; for morality itself is derivative of the experience of real interconnectedness with kin, with fellow creatures and ultimately with all nature. In this interconnectedness, the sufferings and joys of others are as those of the self. Such is the natural, heartfelt morality that needs no external schooling.

What do primitive, indigenous cultures tell us concerning human nature? One of the most relevant studies is that conducted by Margaret Mead and her colleagues on *Cooperation and Competition Among Primitive Peoples* [55]. They asked the question: what does the literature on primitive peoples yield on the subject of competitive and cooperative habits which throw light on the problem of culture and personality? It is a monumental work, and probably the only of its kind. Nevertheless, I cannot help noticing how the mere phrasing of the question is itself problematic (which is to some extent recognized by Mead). When one has more than a passing experience of other cultures, it becomes all too obvious that categories, such as cooperation and competition, which have well-defined meanings in one culture may have no relevance at all in another. In the book, cooperation is defined as the *act of working together to one end*; whereas competition is defined as the *act of seeking or endeavouring to gain what another is endeavouring to gain at the same time*. The usual way to define goal or end in the west is in terms of something accomplished, something gained. What can it possibly mean in a culture that does not value material gain *per se*? It is significant that in summarizing the studies, Mead admitted that 'cooperative' and 'competitive' were not opposites, and that a category of behaviour, 'individualistic' must be added, in the sense that collective vs individual behaviour refer to overt behaviour, and not to goals. Similarly, in summarizing the findings, one of the headings for character formation is 'ego development'. She wrote:

> '. . . I am using the ego in the sense in which Freud used it in his earlier work, as the ego drives which he opposes to the sexual drives. A satisfactory short definition for the purposes of this analysis has been given by Dr. Kenworthy: "In the use of our term *ego needs* is implied the self-protective, self-maximating tendencies so often described under the caption of the self-preservative instinct."' [56]

This perpetrates the greatest confusion of all. 'Self-preservating' and 'self-maximating' are

entirely different things. None of the cultures which she has classified as ‘weak’ in ego development has any trouble in self-preservation, though they often regard self-maximating behaviour as socially abhorent. In the west, people seem quite unable to distinguish between the ‘sense of self’ and ‘selfishness’; and many indigenous peoples and foreigners alike are said to lack a sense of self simply because they do not value personal possessions and do not act selfishly. Significantly, Mead had to conclude from the studies that strong ego development can occur in individualist, competitive or cooperative societies.

The studies also suffer from incompleteness. The most notable -- and this is perhaps general to most anthropological studies -- is the absence of a description of the art (and sometimes also myths) of the cultures concerned. One is thus left with the feeling that we are missing a most valuable insight into the soul of the society. I hope that future studies will take this on board.

Despite these limitations, a number of generalizations emerged from the studies which are illuminating (though these are not necessarily the ones recognized or emphasized by Mead). Of the thirteen cultures examined, six were identified as cooperative, four, individualistic and only three were competitive. Mead arranged them in the form of a triangular diagram; the midpoint of each side representing the most intense development of that emphasis (Fig. 1). Of especial interest are the cultures classified as individualistic. The Arapesh, for example, are a peaceable good-natured people, helpful to a fault. They minimize blood relations, fixed membership in any given group or rigid association with any piece of land. There is complete individual freedom of choice in association with any group, and the groups are extremely fluid, changing freely with the particular collective task involved. Their economic affiliations therefore cross-cut all boundaries of geography and blood kinship, and are based upon personal ties and friendship between individuals, which serve to tangle the members of each group into many other groups.

The Arapesh are classified apart from the cooperative cultures as ‘individualistic’ (although they engage in collective tasks almost all of the time!) simply because mere helpfulness without any personal gain or end in sight is considered other than cooperation. As in many natural animal societies, *helpfulness is an expression of sociality for its own sake*, which is more fundamental than cooperation towards a common end. In many respects, the Arapesh culture exhibits a coherent society where individual and collective are maximally expressed, and there is no conflict between the two. Mead attributed this to the elimination of the distinction between the self and the good of others, which is also achieved in all the societies classified as cooperative. To me, this is also a concrete demonstrationn of empathy: satisfying the needs of others and thereby sharing their satisfaction is itself intrinsically rewarding. No other ‘pay-offs’ is relevant or required.

The most suggestive generalizations from the studies are that cooperative societies are all in which personal property is consistently undervalued; there is a strong sense of security afforded by kin group and other extension groups; there is no attempt to exercise power over other persons and interestingly, all share a belief in an ordered universe. Competitive societies on the other hand, place a high valuation on property for individual ends, have a low sense of security correlated with a strong will to power over others; and finally a belief in an arbitrary, disordered domain of the supernatural which is prevailingly antagonistic to them.

Mead concluded that the social structure itself has an overriding determinate influence on whether the culture is competitive or cooperative; whereas there was no correlation with the means of subsistence (whether food-gathering, hunting, agricultural or pastoral), nor with the state of technologies, or with the dictates of the natural environment.

In social structure, she suggested that competition was prevented by (1) a rigid hierarchical social system such that rank interposes between would-be competitors; (2) a social system through which the desired end is converted from an individual to a group end; and (3) cultural phrasing which displaces the emphasis from the objective situation to some other sphere in which competition is not so possible (for example, the Zuni and Arapesh transforms the scarcity of land into a perception of the scarcity of labour and hence encourages cooperative labour). Inherent in this suggestion is the widely-held underlying assumption that competition is a pre-existing quality which must be mitigated, or ameliorated by some means. Moreover, she oversimplified the situation with regard to the structural differences between competitive and cooperative social systems:

> '. . . In the cooperative cultures, there are real closed groups within which the individual's status is defined, and within which he is given security in relation to his fellows, the society depends upon the structure for its perpetuation, not upon the initiative and ambition of individuals. In the competitive culture, there is no closed society, fighting exists within the group of loosely integrated lineages, no individual is secure in relation to his fellows because success is defined as the maintenance of higher relative status; and the culture is organized around the initiative of individuals.' [57]

One might easily gain the impression from the foregoing description that cooperative societies are closed and hierarchical, and rigidly controlled by rituals. This is not the case. Although the Maori have a system in which status is inalienable, the Samoans have a system in which status is movable, the Zuni have no status at all, and the Dakota are quite egalitarian. What is more significant is that they all share an emphasis on natural kin relationship which can be very extended; and hence, I believe, *they are best able to retain and express their natural sociality (and security) on which cooperation depends.* In this light, the so-called competitive societies may be such because they have lost the means to express their natural sociality, resulting in a pervading sense of insecurity and hence in competitiveness.

Perhaps the most significant feature of cooperative societies, for the purpose of this essay, is that they all have a view of an ordered universe. Inherent in this belief is that nature is knowable and hence it is possible to live with her and within her. On the contrary, an antagonistic, disordered view of nature such as pervades the western industrialized societies, gives rise to the idea that nature is ultimately unknowable, being governed solely by chance, and must hence be dominated or conquered.

Viktor Schauberger was an unusual Austrian scientist who lived at the beginning of this century [58]. He was fascinated by the natural properties of water and water flow, a subject totally alien to the academic scientists of his day, who were still steeped in Newtonian mechanics. One of his many insights is that water naturally flows in a rolling and meandering fashion which has a coherence of its own, and that a river has the greatest carrying capacity when it is allowed to flow naturally. Under those conditions, it deepens its bed as it flows and does not silt up. However, when people started to control floods by

building straight concrete banks along the river, the water, unable to roll and meander under its own impetus, begins to silt up the river bed, and sooner or later overflows the banks. Instead, he suggested that by installing flow-regulators on the river bed which encourages the natural flow, such disasters could be averted. The moral is in how to let nature take its course, to live creatively *with* her, rather than to exert control by stopping her in her tracks. In the same way, our coherent society must be such as to be mindful of our natural social being, to give it full expression in partnership with nature.

Schauberger already noticed, in the very early days of logging in the Austrian Alps, that there was an intimate relationship between water and forest; and has predicted the loss of ground water and floods that would follow when the forest covering is removed from the water-sheds. We are seeing the disastrous confirmation of his theory to-day in the destruction of tropical forests throughout the Third World. Vast areas have already turned into wasteland. In the Mae Soi Valley in Thailand, we saw 70 sq. kms of such wasteland; and in the midst of it, a mere acre of the primary forest left as 'sanctuary' [59] It was not until we entered this sanctuary that the impact of what had been lost struck home with full force. The santuary is a copse of giant trees surrounded by a shallow stream. Many of the trees are at least two persons armspan, standing perhaps a hundred feet tall. Thick curtains of epiphytes drape over their tops and sides, while below, the dappled sunlight catches now and then, the sheen of broadleaves in the undergrowth, or the occaisonal fluttering wings of butterflies. It must have been paradise. I came away with a distinct sense of having taken my last leave of earth. We have yet to find the way to know nature as she really is, to be mindful of her being, so that we can live with her. It is in knowing her that we shall have the most intimate knowledge of ourselves.

Nature has a spontaneous dynamic order which is the source of her creativity. We too, can integrate ourselves into this natural order, to live coherently with her and with ourselves; to create in the wake of ever-creating nature.

Acknowledgment

I am grateful to the Elias Khalil and Kennth Boulding for comments and suggestions to improve the manuscript. The shortcomings which remain are entirely my own.

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59. This visit was part of the International Honours Programme on Global Ecology, Integrating Nature and Culture, 1990-1991, organized from Bard College, Boston.

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