# Nature and Human Intelligence

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## Abstract

Industrial power is grounded in epistemological and ideological choices made during past centuries. The modern self has evolved to be consistent with these choices, so that the psychological concept of "intelligence" indicates the facility with which a relatively autonomous thinker can manipulate a world consisting mostly of 'raw materials'. I explore the ways in which this concept legitimates and naturalises the exploitation of the natural world, and suggest that it also normalises a psychopathological personality configuration. I argue that an alternative conception of human abilities based in a recognition of and sensitivity to natural order and intelligence rather than in a conception of intelligence as a solely human property, is necessary if environmental, educational, and developmental theory and practice are to be consistent with the needs of the natural world.

*Keywords: intelligence, nature, technology, personality, psychopathology* 

# "Intelligence" and the Growth of Industrialism

The discipline whose task it is to explain and map the capabilities of the human mind is psychology; and psychology's understanding of these abilities is constellated around the concept of "intelligence." Apart from its direct effects in channelling our psychological understanding of how we humans interact with the world around us, this concept has also been widely used in education and business, where tests of "intelligence" often influence selection and promotion. More indirectly, psychological notions about what constitutes 'intelligent' behaviour pervade the wider fabric of society, affecting commonsense ideas about what constitutes mental ability, and lending certain styles of thought and action a higher status than others. At the same time, the concept of "intelligence" also reflects and encapsulates certain values and priorities within industrialism, so that the structure of industrialism appears as a seamless whole in which psychological concepts such as "intelligence" derive their validity and applications from their consistency with industrialist

practices whilst simultaneously legitimating these practices and making them appear consistent with human biological capabilities. In this paper, I argue that the concept in its currently dominant form expresses a pathological orientation to the natural world; and that our constructive alignment with the natural order requires a wider understanding of human potentials. Throughout this paper, "intelligence" signifies the psychological concept of that name, while intelligence is intended to refer to a more open and undefined notion of human abilities.

Psychological understanding of abilities is not limited to those which are explicitly based on the traditional concept of "general intelligence," and a number of researchers have over the past several decades argued that intelligence is better conceptualised in terms of a range of identifiable abilities, the number varying from 2 to 144. This, however, represents less of a departure from the 'general intelligence' approach than it might at first appear, since the abilities which are identified correlate positively with other abilities, and also with the central "g" factor which reflects this overall statistical communality. This statistical convergence towards a central factor is found even in models such as that of Howard Gardner (1983) which are not primarily derived from factor analyses of performance on IQ-style tests, as Messick (1992) has pointed out. By analogy, just as one can argue about whether an orange can best be conceptualised as a set of separately identifiable segments or as a larger whole, it becomes a matter of statistical taste whether one emphasises the partial distinctiveness of these correlated factors, or whether one interprets their statistical communality as reflecting the influence of a single underlying factor. Furthermore, as I argue later, even such approaches as Piaget's which do not owe explicit allegiance to this unexplained statistical convergence nevertheless share environmentally crucial metatheoretical assumptions, and so remain firmly anchored within the ideological structure of industrialism.

"Intelligence," as understood by psychometricians, is clearly an *individual* characteristic,<sup>2</sup> and in this respect psychology incorporates a long philosophical tradition, exemplified by Kant, in which order and coherence are understood to be properties of the thinker who categorises and manipulates an otherwise chaotic and unintelligent world. In postEnlightenment Europe, the emergence of relatively clear boundaries between self and world and the fading of properties which could not easily be accommodated within this dissociative scheme established the individual as the focus of sentience and intelligence. Accordingly, a world which was previously experienced as embodying a mysterious and Godgiven order became a world of regular laws and spiritless matter, amenable to scientific understanding and control the clay from which humans could mould their destiny. As Owen Barfield (1965) points out, the major turning point in the history of science occurred when thinkers such as Copernicus, Galileo, and Kepler began to believe that scientific hypotheses were not merely *models* of reality, but might actually be *true*. "Our collective representations," says Barfield, "were born when men began to take the models, whether geometrical or mechanical, literally" (1965, 51). Thus began a subtle but profound change in which the assumption that order must ultimately be derived from a godgiven natural realm was overtaken by the view that humans can impose on the world an order which is derived from the intellect. This increasing detachment of the intellect from the rest of the world is the basis of our construction of a "human" or "cultural" realm which often appears to stand in opposition to the natural world, and which possesses power over it. In its more recent, postmodern, incarnations, this paradigm not only proclaims our separateness from and ability to control nature; it even alleges that the natural world is a linguistically-constructed artefact of the way we order the world, so that, as Barry Barnes alleges, "natural order is always an ordering constructed by people and used to make sense of nature, never an ordering insisted upon by nature itself and imposed upon people by it" (1989, 202). This anthropocentric logic has a long history, and is, for example, reminiscent of Columbus' insistence that his crew swear, upon pain of mutilation, that the shore upon which they had landed (the island today referred to as Cuba) was part of the mainland of the continent (Todorov 1984). But while Columbus, fortunately, could not in reality *make* Cuba part of the mainland, today technology has the power, to a considerable extent, to make nature into an extension of our internal "reality." The concept of "intelligence" is located firmly within this tradition, perceiving order as something which is imposed on or abstracted from an ambiguous reality rather than something which we apprehend as a result of opening ourselves to an order which is beyond ourselves.

This constructed world, and the theories that constitute it, are in no absolute sense "wrong." The unquestionable power of technology testifies to the accuracy of the scientific vision as well as its instrumental effectiveness in exploiting the world for economic gain. However, a paradigm may accurately portray certain aspects of the world whilst repressing, and so facilitating the physical destruction of, those other characteristics which are inconsistent with it. For example, Mount Rainier could quite "accurately" be described in terms of its geological composition, just as Beethoven's 9th symphony can be described in terms of decibels, pitch, and duration; but in both cases something very important has been omitted. However, whereas the reduction of meaning would be obvious even to the tone-deaf when applied to the symphony, the reduction of the world to its scientific description becomes increasingly "natural" to those of us who have been trained to inhabit this world view since infancy, and so perceive "pests" and "carnivores" and discuss "biodiversity" and "intrinsic value" as if they were the unproblematic pieces which make up the jigsaw of our "environment." Like a jigsaw, however, the pattern which emerges from the whole suggests shapes and embodies relations quite different to those of the pieces themselves; and while these "pieces" may be partly constructed by our technological language and vision, the overall picture is one which is elusive to consciousness. The danger of the technological vision, therefore, lies in its incompleteness, and in our blindness to this incompleteness, which allow us to map the perceptual and conceptual selectivity which it incorporates onto natural realities. As this technologically constructed monocultural world is physically realised, it becomes increasingly consistent with the style of "intelligence" envisaged by social scientists, so that statements such as that of Barnes, which we referred to above, attain a certain ironic truth-value. In the limit, there will be no inconsistency between this anthropocentrically ordered world and the style of "intelligence" which gave rise to it; and modernisation, in Ulrich Beck's (1992, 10) words, will have "consumed and lost its other."

#### **Abstract Formalism**

The incompleteness of this anthropocentric vision derives in part from its abstract nature; for grouping together items which share one or a few common properties is necessarily to ignore those properties which are unique to each individual thing. While non-industrial cultures often abstain from complex abstract schemes (Maccoby and Modiano, 1965), we tend to prefer the elegant consistency of the physical sciences to the untidiness, mystery, and openness to uniqueness which characterise less abstract world views, in a manner reminiscent of Descartes' desire to create a "new world . . . somewhere in imaginary space" which embodied nature's "established laws" (quoted by Shotter 1975, 76) — a preference which, as we will see, has certain pathological implications. The modern concept of time, for example, is an abstraction originating in the belief that God prefers regularity rather than the complexity and variation of the natural

world; and this metric is imposed on the variation of seasons and other natural cycles in rather the same way that a geographical system of co-ordinates is imposed on natural topology without regard for watersheds or other ecological characteristics. Such concepts are an essential precondition of our ability to manipulate the natural world, since they conceptually reconfigure it in a way that makes it amenable to technology. They are also the basis of our *understanding* of the world (which, as we noted above, we confuse with the world itself); and in this respect "intelligence" represents the overlap between the natural world and the industrialist order. The power that this paradigm embodies is achieved at the price of a loss of contact with the world and the ontological insecurity which this implies — a point which, as we will see later, draws together psychological and environmental considerations. These problems are uncommon amongst societies in which groundedness in the natural world is given a higher priority than technological power, such as the Kunjen of Queensland, whose seasonal categories have been noted by Virginia Strang (1997, 180):

Urrf = Raining hard (in the middle of the Wet)

*Arryul* = Fat Wallaby time / Cotton tree flowering time *Uy udnam* = Fat fish time / *Udnam albar* (fat fish after the Wet when the leaves come down / when there are many dragonflies . . .)

*Albar* = When the leaves come down (after the Wet)

*Uk-igay angan* = Tea tree and beefwood flowering time / crocodile egg time . . .

*Uk iy gai ahn yan* = Flying fox time / Flying fox after Bloodwood fruit / *Inh-agnggoy arriyjanerr*, Flying fox, time for eating . . .

The Kunjen calendar, then, is not an abstract pattern that is imposed on the world from an external and autonomous realm of human cognition or scientific necessity, but rather directly reflects something about the structure of nature. In the industrialised world, however, higher status is often accorded to those who work with abstractions rather than with specific, concrete physical realities - the theoretician over the technician, for example. Goodnow (1968) has referred to our preference for a purely cognitive style of problem solving which does not require counting fingers or beads, and has suggested that this preference may be consistent with the demands of a stratified society where manual labour is the province of the "lower" classes.

However, the environmentally and psychologically problematic character of our Western worldview does not rest in abstraction *per se*, but in our illusory belief that the abstract model we subscribe to somehow reflects a more profound understanding of the world than a concrete familiarity with it. This is what Barfield (1965) refers to as an "idolatry" of the

scientific world view - in other words, our mistaking an artificially constructed model for the reality of the world. While nonindustrialised cultures may sometimes invoke abstract representations of reality, these abstractions are invariably directly related to concrete aspects of the life-world, so that abstraction involves an *elaboration of the world that already* exists rather than an attempt to replace this world. For example, in Thomas Gladwin's (1970) discussion of Puluwat navigators (who successfully sail from one small island to another across large stretches of ocean) the abstract concepts which these navigators use are clearly and directly related to aspects of the physical world such as the shape of waves, the direction of currents, the positions of stars, and the behaviour of wildlife. In contrast, the style of abstraction typical of the developed world is one that is *distanced* from the physical realities of the earth. For example, modern navigational equipment, such as radar, inertial guidance systems, and weather information transmitted by radio do not even require the modern captain to venture on deck, so that the abstract scheme employed, together with the technology which emerges from it, enables us to retreat from the world rather than engage with it. For the Puluwatan navigator, abstract schemes are ways of enabling one to travel safely from one place to another, and in no sense adequately describe or substitute for the phenomenal world in which one must learn to live. That the techniques involved are not always entirely consistent with one another is therefore not a problem, since there is no confusion between "map" and "territory," and so this inconsistency does not threaten the phenomenal integrity of the world itself. In contrast, the greater importance we attach to consistency and unambiguous definition rather than to openness to the multifaceted character of the natural order suggests that we march to a technological rather than a natural rhythm. In other words, the coherence we identify lies within our models of the world rather than in the world itself, and as a result, it is all too easy to slip into the "epistemic fallacy," reducing nature to our cognitive appropriation of it (Collier 1994), and repressing those aspects of ourselves and of the world which cannot be contained within this elegant, instrumentally powerful, but profoundly incomplete "reality."

While the technological world view generally portrays a world shorn of those qualities which imply its holistic nature, spiritual significance, or the interconnectedness of its parts, those characteristics which are necessary to the functioning of the technological/economic system — such as quantity, physical properties, or chemical composition — are emphasised. Take, for example, an item from the Wechsler Adult Intelligence Scale (Wechsler 1955): "Eight men can finish a job in six days. How many men will be needed to finish it in a half day?" Here, we are expected to convert the situation into a purely numerical one — i.e., 6x2x8=?. The physical

aspects of the situation (sweat; grime; the texture of the rock; the heat of the sun), the social aspects (what do the men say to each other? Are they labourers? Convicts? How do they share the work?), their relation to the work (Why are they digging this ditch? How do they feel about the project?) this whole world is lost. All that is left is the equation 6x2x8=?. The multidimensionality of the situation has disappeared, and any reference to "nonessential" aspects would be regarded as indicating a lack of intelligence. There is no psychological test which measures the ability to locate oneself within a cultural or natural context, in contrast to the numerous tests which assess the ability to isolate "essential" elements of a situation from those which are "nonessential." This ideological preference can be traced to the Cartesian divorce of rationality from other human faculties; for the mentality which can perceive a forest purely in terms of board-feet of lumber, or a lake as acre-feet of water is entirely consistent with Descartes' (1950, 194) description of the earth "as if it were merely a machine in which there was nothing at all to consider except the figures and motions of its parts ... " The ontological reduction which is implied by this viewpoint is thus the basis of a material reduction which results from its enactment: the reduction, for example, of complex fossil deposits to "fuel," or of a forest ecosystem to "grazing land." Such reduction is the basis of technological power.

#### **Ideology and Intellectual Development**

Just as ontogeny in some respects recapitulates phylogeny, so the historically developing dissociation between individual consciousness and the world is also echoed in the stages of individual development. Is it possible, then, to perceive in the development of "intelligence" from infancy to adulthood a movement from a contextualised, embedded form of representation towards one which is egoic and which dissociates self from world?

At first glance, exactly the opposite trend seems to occur. According to theorists such as Piaget, the child moves from an egocentric orientation towards a "decentered" view of the world. But on closer examination, it is not so much that the world of the infant is "egocentric," but rather that the boundaries between the nascent infantile consciousness and the "outside" world are unclear. One can read the child development literature as a description of a process of negotiation, involving the child's developing sense of self, the world "outside," and the child's "significant others" — a process which normally, within the industrialised world, results in the emergence of a self which is relatively autonomous, self-directing, and detached, and which seeks to control and exploit the world for its own ends. According to

Piaget (1950, 7), "... every relation between a living being and its environment has this particular characteristic: the former, instead of submitting passively to the latter, modifies it by imposing on it certain structures of its own ..."

In some ways, the child can be viewed as *less* egocentric than the adult, in that within the nascent infantile ego, intelligence, feeling, and subjectivity are not restricted to the self, but are properties shared by aspects of the outside world. For example, in the developmental jargon, (s)he may "impute life to inanimate objects." However, as Barfield (1965, 67) points out, the doctrine of animism, according to which the fancy of "primitive man" had "peopled nature with spirits, [presupposes that] nature must first be devoid of spirit; but this caused the scholars no difficulty, because they never supposed the possibility of any other kind of nature." Thus in certain respects, the "egocentricity" which is supposed to characterise infantile experience may in fact reflect the infant's lack of conformity to an ideology which makes particularly assumptions about the human monopoly of subjectivity and intelligence — assumptions which historically and cross-culturally are far from universal (Padel 1992; Heelas and Lock 1981). Thus while it may be generally accurate to envisage the world of the infant gradually extending outwards to include, firstly, the infant's own limbs, then objects touched, and finally the world beyond, there is nothing in this process which implies that individual subjectivity is necessarily developed in contradistinction to a world experienced "objectively." On the contrary, even Piaget's own data suggest that children, if they are permitted to, experience the world empathetically, as alive and enspirited; and as Paul Shepard suggests, it may be our socialisation into an often urban, manufactured environment which gradually teaches us to abandon the notion that the world is alive:

The absence of numerous nonhuman lives, a variegated plant-studded soil, the nearness of storms, wind, the odors of plants, the fantastic variety of insect forms, the surprise of springs, the mystery of life hidden in water, and the round of seasons and migrations . . . builds in the child the sense that nonlivingness is the normal state of things . . . that the world . . . is not one which feels or thinks or communicates (1982, 102).

Furthermore, the assumption that the industrialist representation of the world is a "decentered" one is extremely dubious. This representation, as we have noted above, is the product of historical processes whereby the world has come to be seen as material, passive, and lacking in spirituality and intelligence, by a detached observer who maintains a privileged position in relation to it. Edgerton (1976) and Romanyshyn (1989) have shown that the post-Renaissance thought which underpins technology is closely associated

with the development of linear perspective vision — a style of perception which explicitly distances the sentient, detached observer from a world which is viewed "objectively." To the extent that such a representation is shared throughout the "developed" world, it cannot be described as "egocentric." But equally, to term it "decentered" is to ignore its anthropocentrism, its traditionally masculine bias, and its embodiment of a historically developing divide between subjectivity and the world outside that subjectivity. If the industrialist system is recognised as a physically realised projection of that personality configuration which has evolved in the industrialised world, then its consistency with the intellect, which appears to testify to its "decentredness" and "rationality," appears artefactual and inevitable. The order of nature is in many ways excluded by this system, its existence indicated only by environmental and psychological problems, and by the violence which marks its boundaries with industrialism.

It is hardly surprising that the central assumptions of Piaget's theory — still today the most influential theory of intellectual development — should converge with those of the intelligence testing movement, given his involvement in the development of the Binet intelligence scales in the early years of the Twentieth Century. For example, Piaget perceives the growth of intelligence as involving a movement of thought away from the world, rather than an engagement with it, so that

The whole development of mental activity from perception and habit to symbolic behaviour and formal thought is thus a function of [the] gradually increasing distance of interaction . . . [between thought and the world] (1950, 8-9).

This process, according to Piaget, culminates in the stage of "formal operations," which is normally reached during adolescence:

With formal operations there is even more than reality involved, since the world of the possible becomes available for construction and since **thought becomes free** from the real world (1950, 151) (my emphasis).

This declaration of intellectual independence from the world, implying the creation of a psychosocial realm separate from the natural order, can be seen as a defining characteristic of modern industrial society. As Susan Buck-Morss (1975) puts it:

For Piaget, the first great cognitive leap is the prototypical experience of alienation. It is the ability of the child to divorce subject from object, hence to grasp the building block of . . . industrial production . . . With the attainment of object permanency, the idea of an object . . . becomes a substitute for the thing itself, indeed . . . is granted greater cognitive value than the material object, and the child is capable through symbolic play of leaving reality unchanged (1975, 40).

This developing schism between the intellectual and material worlds reflects Piaget's adherence to a dualistic epistemology reminiscent of Kant's prioritisation of abstract rationality over concrete particulars. The influence of this epistemology ensures that normative intellectual development is aligned with the requirements of capitalism, so that the detachment of the intellect from the material world, and its justification in terms of allegedly "universal" abilities and developmental trends has become, according to Buck-Morss, "the dominant cognitive structure with the emergence of Western capitalism" (1975, 39). This allows the dispassionate categorisation, reduction, and destruction of the natural world — processes which are both conceptual and, eventually, physical.

Thus thought, according to the Piagetian paradigm, abandons the phenomenal diversity of the natural order to coalesce around certain logical principles of addition, grouping, multiplication, and so on. These logical principles are presented as reflecting indwelling and inescapable physical and biological structures, and intellectual development is measured in terms of the extent to which a person "possesses" a relevant principle. The misleading character of this formulation lies not in what it claims, but what it omits; for while the natural world, as we saw earlier, *can* be described in these terms, its diversity and multidimensionality far exceeds the grasp of any single model. Consequently, a number of writers have questioned the nature of the relation between operational structures and the physical realities of the world. Garfield (1983, 187), for example, asks whether Piaget, "while thinking that he has told us something important about the child's coming to understand reality . . . has [instead] informed us about certain logical categories or formal concepts which he has mapped on to the world of the child." Garfield goes on to consider whether Piaget's approach leans excessively towards idealism; there is a danger, he suggests, that "the world we construct is not a real world at all" (1983, 193).

But this may be to overstate the case; for whatever the source of the convergence between operational logic and the "laws" of the physical world, there can be no doubt that this convergence exists. The form of rationality jointly defined by economics, psychology, and other facets of the industrial system is a powerful and in some respects highly successful way of comprehending the world, and it would be naive to suggest that it could simply be replaced by some "non-instrumental" form of rationality. What is often forgotten, however, is the partiality and historical specificity of the logical principles towards which the modern child tends to develop. As the part which social and cultural factors play in intellectual development becomes more widely recognised (Gellatly, Rogers and Sloboda 1989; Byrne and Whiten 1988; Resnick et al. 1991), it is becoming increasingly clear that, in Gellatly's (1989) words,

Individuals do not elaborate, or get greater access to, principles; rather, they learn accepted social practices. They discover what is the accepted way of proceeding in particular circumstances and, maybe, what principles to invoke as justification . . . (1989, 129).

That intellectual development is not merely the more-orless successful discovery of universal principles is also indicated by cross-cultural work which indicates that human ability undergoes dramatic qualitative changes as we traverse cultural boundaries (Goodnow 1968). Viewed in cultural perspective, it is clear that the style of rationality demanded by "intelligence" tests is one which taps our willingness to isolate and manipulate those particular conceptual possibilities which are foregrounded by industrialism, and to suppress those alternative possibilities which suggest structures inconsistent with industrialism. To return to our "jigsaw" metaphor, "intelligence" tests focus on the shapes and intersections of the pieces, but ignore the more elusive forms which emerge when we allow these artificially produced shapes and intersections to give way to the overall picture. And while the individual shapes from which our understanding of nature is conceptually "constructed" may vary according to cultural context, the emerging "picture" portrayed by the complete puzzle will be independent of this conceptual diversity. According to this "jigsaw" metaphor, then, intellectual development in the industrialised world is a process of learning to recognise and manipulate the "pieces" whilst ignoring the overall picture represented by the complete puzzle — or "learning to see one thing by going blind to another," as Aldo Leopold (1949, 168) put it.

What occurs, then, in the early years of life, is the movement away from an undeveloped form of consciousness in which the boundaries of self are diffuse, towards a self which is defined by its alienation from world and which imposes onto the world an elegant web of logical rules which are powerful in their generality but misleading in their incompleteness. These rules — summarised in Piaget's nine "grouping structures" — form the basis of a relation to the world which is consensually accepted as "objective," but which in fact represents a culturally specific and ideologically loaded vision which has potentially fateful consequences.

A distinction which is useful in understanding this process is that between "fluid" and "crystallised" intelligence. "Fluid" intelligence, or "intelligence A," is defined as an innate potential, a capacity for development (Hebb 1949; Cattell 1971). This potential, as a result of experience, becomes transmuted into "intelligence B," or "crystallised intelligence," which is directly related to those forms of behaviour and cognition that are valued and practised within any particular culture. As a result of this developmental process, a flexible, undeveloped openness to alternatives, to order as it may present itself, implying a diversity of possible alignments, is replaced by a singular, static, abstract understanding which imposes a pre-ordained order on the world. "Fluid" intelligence is tapped by test items measuring the ability to perceive pattern in unfamiliar stimuli, or to rearrange elements of a figure in a meaningful way; while "crystallised" intelligence is measured by subtests such as "Information" (general knowledge), "Vocabulary," and other measures of one's acceptance of a culturally specific knowledge structure. It is not surprising that "fluid" intelligence declines after reaching a peak in the early teens, whereas "crystallised" intelligence has been found to increase into late middle age, reflecting the increasing allegiance to the consensual view of reality and the decreasing awareness of alternatives which accompanies our progress towards "maturity" in the industrialised world. The danger of this degree of cognitive specialisation is that while the individual can operate more and more powerfully within one particular conceptual scheme, the instrumental effectiveness of this scheme seduces us into forgetting that it embodies only one way of construing reality out of many possible ones. What is more, if this way of construing reality emphasises the imposition of cognitive categories on to an essentially passive world, then we will become increasingly blind to those patterns and processes that these categories overshadow. While the emergence of specific forms of "crystallised" intelligence reflecting the demands of a particular social and natural context may in some ways be adaptive to the individual, the longterm sedimentation of these forms into a rigidly accepted social "reality" which forgets its own roots and limitations can only damage our relation to the natural world. In psychoanalytic terms, the increasing allegiance to conscious, rational, literal forms of thought is inevitably accompanied by a corresponding repression of fluid, symbolic, metaphorical processes, which thereafter must exist as unconscious, inexpressible possibilities.

Nature's structure is, in a healthy world, that of the unconscious, invoking multiple meanings, ambiguity, metaphor, and symbolism. As Gary Snyder modifies Thoreau's famous dictum: "wildness is not just the preservation of the world, it *is* the world" (1990, 6). In psychological parlance, the (healthy) unconscious *is* nature. The technical order is a reduced version — a special case — of the natural order; just as consciousness is a special case of the unconscious. As Gregory Bateson and Mary Catherine Bateson (1987, 30) argue, ". . . metaphor is not just pretty poetry, [it] is the logic upon which the biological world has been built." Animals, thus, communicate metaphorically, as is illustrated by one of Bateson's examples:

... wolves ... go out hunting and then come home and regurgitate their food to share with the puppies who weren't along on the hunt. And the puppies can signal the adults to regurgitate. But eventually the adult wolves wean the babies from the regurgitated food by pressing down with their jaws on the backs of the babies' necks ... the previous year one of the junior males had succeeded in mounting a female. Up rushed the lead male — the alpha animal — but instead of mayhem all that happened was that the leader pressed the head of the junior male down to the ground in the same way once, twice, four times, and then walked off. The communication that occurred was metaphoric: "You puppy, you!" (1987, 28)

Bateson argues, more generally, that natural processes do not follow the laws of logic so much as symbolic relations such as syllogism. Take, for example, the syllogism:

Grass dies; Men die; Men are grass.

This expresses the metaphor "men are grass." From a logical point of view, this is clearly "incorrect," and indeed, it has been taken as diagnostic of schizophrenic thought disorder. Within a "logical" framework, men and grass are entirely distinct; humans are "separate" from the natural order; and the metaphoric relations that knit the world together are denied. But, as Bateson points out, to completely deny the validity of such syllogisms "would be silly because these syllogisms are the very stuff of which natural history is made" (1987, 27). Furthermore, they are, as Chapman and Chapman (1973, 182) have pointed out, "reality oriented and adaptive." To say that "men are grass" is not just meaningless nonsense; it expresses something important about our mortality and our place within the natural community. Given this, it is hardly surprising that syllogistic reasoning has survival value. Take, for example, the syllogism:

Some fruit are berries; Some fruit are poisonous; Therefore: Some berries are poisonous. The conclusion "some berries are poisonous" is logically invalid, but is nevertheless quite likely to be correct. Denying such syllogisms any sort of validity may ensure one's survival in a mathematics department, but heaven help the mathematician who gets lost in a wilderness area.

This is not to deny that abstraction has a place in a healthy understanding of the world, *so long* as there is a fluently articulated relation between the abstract representation and the concrete, phenomenal realm. Unfortunately, the style of abstraction developed in the industrialised world, as Margaret Donaldson (1978) has argued, is one in which an abstract representation is taken to be *better than*, and a *replacement for*, the phenomenal, concrete world. For example, take the well-known Piagetian task involving a string of wooden beads — mostly brown, a few white. The child is typically asked: "Are there more brown beads or wooden beads?" directly counterposing a perceptually salient class to a somewhat more abstract one. Success at this task requires that the child downplay the salience of the colour, prioritising the more abstract dimension of "woodenness."

The separation from the world is even more obvious in other cases. Donaldson (1978) quotes an example, from Werner (1948), which is fairly typical of the sort of conversation an anthropologist might have had with an informant until quite recently. The native speaker was asked to translate into his language the sentence: "The white man shot six bears today." "How can I do that?" said the Indian. "No one could shoot six bears in a day." Such a reply is likely to be regarded as "unintelligent" by those who move easily within an abstract world only tenuously connected to a natural context which we are largely indifferent to.

This dissociation of intellect from the world, however, is often regarded by psychometricians as a *desirable* quality rather than a problem, in keeping with the preference for "pure" cognition which we noted above. Unfortunately (from the experimenter's point of view), relatively uneducated people typically find it more difficult to marginalise their experiential knowledge of the world, and so tend to perform less well on measures of intellectual ability. For example, in Sylvia Scribner's (1977) research with unschooled Vai people of Liberia, one of the problems used was: "All women who live in Monrovia are married. Kemu is not married. Does she live in Monrovia?" (493). Respondents "working from . . . the known fact that there are unmarried women in Monrovia . . . could arrive at an incorrect answer . . ." (493-494) because they abandoned the premise that "all women who live in Monrovia are married." Scribner's characterisation of such answers as "incorrect" seems to reflect the preference of many experimenters for an abstract, logical world that is only tenuously connected with knowledge gained through direct experience. She goes on to argue that her findings represent "the strongest evidence to date that traditional people can and do engage in valid deductive reasoning . . . provided they put brackets about what they know to be true and confine their reasoning to the terms of the problems" (1977, 494). Amongst "uneducated" people, Scribner continues, "performance . . . is rarely free from the intrusion of real-world knowledge" (1977, 494). From an ecological view-point, however, it could be argued that such "intrusions of real-world knowledge" are essential in aligning conceptual functioning with material, social, and ecological realities; and that it is their *absence* rather than their presence that should be regarded as problematic.

Donaldson (1978) criticises this emphasis on abstract ("disembedded") thought within education, and its separation from the everyday experiential realities lived by children, pointing out that younger children in particular will naturally try to contextualise problems which are presented as purely abstract. What is learned within this sort of educational context is not so much the *ability* to abstract, but rather allegiance to the principle of abstract formalism (Buck-Morss 1975): that is, the structuring of experience according to the separation of form from content. Thus education can be seen, in part, as a learning process in which the child is taught to exist comfortably within the detached world of abstraction. (S)he does not, of course, become oblivious to the phenomenal experience of the world. (S)he will still see, and react to, the colours of leaves and sky, the feel of wind and rain, and the sounds of river and animal, and the states of being which these may induce. However, these qualities, unlike physical attributes such as mass, quantity or length, will remain relatively unarticulated by the dominant systems of thought available within Western culture, and so will be experienced as relatively trivial - noticeable but ultimately insignificant aspects of our everyday lives.

For our purposes, however, the implications of this work go beyond education. It is a small step from the mentality which can ignore the context of the "six bears" type of problem to that which can comfortably perceive a forest simply as a quantity of lumber. And, incidentally, it is an equally small step to the classification of humans according to race or gender; for prejudices, whether racial, sexual, or ecological, are based on abstractions which implicitly deny individual variation, context, and the potential wholeness of human experiencing.

#### The Human Monopoly of Intelligence

We have seen that "intelligence" rests upon two basic processes — the separation of an intelligent, knowing self from the rest of the world, and the alignment of this self with an abstract model of the world which, owing to its necessarily partial and reduced character, omits important dimensions and characteristics of the world.

Such a situation is not in itself pathological so long as it reflects a temporary, provisional stance that is counterbalanced by other, more integrative ones. The problem arises when we mistake the separation of self from world and the abstractions which accompany it as unchangeable realities, together with the consequent confusion of scientific models with the reality they attempt to explain. Complementarily, this growing allegiance to an intellectual, rational conception of the world has led to a corresponding diminution in the perceived importance of arational elements of the human personality, such as emotion, intuition, or spirituality, together with the cultural, religious, and epistemological structures which could articulate them (e.g., Kleinman 1988, 50-52). As this provisional epistemological stance hardened into a taken-for-granted assumptive world, so those properties of the world that were not included were gradually lost from consciousness. Like the "trash" species that are swept up and burnt in clear-cutting operations, those human faculties that were not perceived as useful faded from the psychological universe; and meaning frequently became synonymous with scientific meaning. In Robert Romanyshyn's terms: "The shift is from the created order of nature to the creation of meaning established by the self in its withdrawal from the world" (1989, 80).

In reducing our relatedness to the earth, these repressive changes affect both partners to this relation, distorting the world "outside" the "individual" as well as individuality itself. Our denial of the natural order, in other words, is simultaneously a distortion of our own subjectivity, leading to the repression and denial of those attributes of nature that could challenge the ideologically-generated dissociation between self and world. Most famously, for example, Freud asserted that the id exists in conflict with the agent of culture within us, the superego — as well as, to a large extent, the ego. Thus the conflict between Western culture and the natural world resonates with an *internal* conflict, as Freud (1961) demonstrated in *Civilisation and Its Discontents*; and our socially-acquired intellectual faculties have been turned against our natural predispositions.

Freud recognises this quite explicitly, suggesting that "our intellect can function reliably only when it is removed from the influences of strong emotional impulses . . ." (1973a, 287). In this conflict between intellect and other aspects of our being, Freud was quite clear about his own loyalties: "Our best hope for the future is that the intellect — the scientific spirit, reason — may in the process of time establish a dictatorship in the mental life of man" (1973b, 171). Such accounts make clear that the operation of intelligence requires the repression of the non-intellectual aspects of human personality; and so parallel to the ontological reduction of the external world by the scientific paradigm, there is a *psychological* reduction, so that arational modes of being remain repressed and unarticulated. This situation, in which a partial worldview based on conscious rationality interacts with a complementarily reduced world, cannot be seen as ecologically healthy.

Freud's view of this conflict between intellect and arational aspects of selfhood portrays it as a battle between the advanced, sophisticated views of the civilised world and the blind, inarticulate desires of "primitive" nature, reflecting the assumptions of his time that the natural world is a simple, amorphous world largely devoid of structure or religious significance. However, since Freud's day, and in response both to disquiet about the totalitarian claims of some scientists and to the growth of an ecological awareness within the scientific community itself, we have begun to acknowledge the incompleteness of this view, recognising that the world is not without its own, natural order. In the same vein, later psychodynamic writers such as Fairbairn (1952) have argued that the "instinctual" foundation of the human personality is more complex and intelligent than has hitherto been recognised, and that the fundamental instinctual drive is a relationship seeking one — in other words, one which seeks to locate the self within some structure of meaning larger than the ego. In short, nature "within" as well as "external" nature may be more "intelligent" and structured than we have been willing to recognise; and a healthy relation to the natural world may imply a resonance and an interaction between these structures, problematising the assumption of our separateness from the rest of nature.

Similarly, Eugene Gendlin has criticised the view that any non-egoic experience is necessarily unrealistic, regressive, and unorganised, arguing that,

The assumption that order is always something imposed began with Western science. Before that time, naturalistic observations were catalogued, and many kinds of order and pattern were found. Modern science **imposes** its mathematical grids and records only the results of its own operations. At the beginning it was a dramatic, much-discussed idea that one could ignore everything in nature, and substitute mathematical relations. But as that method succeeded more and more, it became acceptable to say that there really isn't anything there but what we impose . . . (1987, 265-266).

In contrast, Gendlin argues that the body, and non-egoic experience in general, is complex, symbolic, and subtly structured. The loss of such experiencing, and the failure to recognise the order which it implies, leaves the self weakened and isolated from the world; for just as a disembodied intellect deprives us of our animal nature, so the same split renders our animality unintelligent. The natural order is only perceptible to us if we are genuinely *in relation* to the world. Thus while the type of "rational" consciousness which we have developed in the industrialised world tends to *separate* us from the world and from each other, non-egoic experience is often a *relational* mode, one which implies a continuity between a self which can interact with the world in ways which are spontaneously diverse, fluid, erotic, and creative, and a world which embodies a multiplicity of complementary structures and possibilities.

As an example of how the narrowing of our experience to fit the psychological concept of "intelligence" suppresses other possible forms of relation to the world, consider the well-known case of Clever Hans, the horse which appeared to be able to solve simple arithmetic problems, the answers to which he would communicate by tapping a hoof the appropriate number of times on the ground. It was eventually found that Clever Hans' talents lay not in arithmetic, but in responding to subtle cues which were unintentionally given by its owner. In this case, the talents of Clever Hans were considered to have been disconfirmed, and the remarkable skills that the horse did unwittingly demonstrate were scarcely noticed. Such anthropocentric judgements implicitly define intelligence as an abstract ability which exists entirely within the detached mind of the individual; and other forms of intelligence which involve relation to or communication with something or someone outside the individual are discounted. In effect, this sort of definition prioritises those intelligent processes which occur within the individual, but denies the possibility of any intelligent structure which might transcend individuality. The world is thus made to appear structureless, lacking in intelligent form or purpose, and so fit only to be manipulated for human purposes. This is entirely consistent with Descartes' invalidation of animal intelligence:

[While it]... is ... a very remarkable fact that although there are many animals which exhibit more skill than we do in some of their actions, we at the same time observe that they do not manifest any at all in many others. Hence the fact that they do better than we do, does not prove that they are endowed with mind, for in this case they would have more than any of us, and would do better in all other things. It rather shows that they have none at all, and that it is nature which acts in them according to the disposition of their organs ... (quoted in Wilson 1982, 184).

This tortuous line of reasoning can only be seen as a transparent ploy to maintain the distinction between the human "mind" and a "nature" which is *defined* as mindless — a distinction maintained by many contemporary animal

researchers. As Tim Ingold (1996, 26) has recently pointed out, for example, while the hunting and foraging behaviour of humans is usually viewed as the result of consciously formulated cognitive strategies, the often comparable and "eminently rational" strategies of non-human animals are generally considered to have been "worked out for them in advance, by the evolutionary force of natural selection." However, this taken-for-granted discontinuity between the "animal" and "human" realms is beginning to come under fire. Beatrix Gardner, for example, has suggested that "the uses and misuses to which we put animals have to do with lines that we draw, differentiating ourselves from them" (1993). In a similar vein, the developmental psychologist Patricia Greenfield has indicated how important language is to the maintenance of an anthropocentric understanding of the world. She describes how her daughter combined words with things rather than with other words, so challenging the autonomy of an intellectual realm from which nonhuman animals are excluded:

[My findings] were very unpopular, and [were] very heavily criticised — I think, to a large extent because of the bias that words are "realler" than non-verbal elements. That is, if someone expresses something in a word, you know it was really there . . . Children can do something, and it's called language . . . A chimpanzee does the same thing, and it's not language . . . (1993).

Research on animal "intelligence" is, in many cases, not about identifying their similarities to us, but rather about confirming our uniqueness. It is a way of distancing them from us — setting them in a sort of mechanistic aspic, and constituting their roles within an anthropocentrically-constructed world. Just as this justifies the enslavement of nature outside the boundaries of the self, it also does violence to selfhood, since a world experienced as unintelligent is one which denies us the possibility of a relation with it, and so represses those relational capacities which the early object relations theorists first identified in the 1950's as basic human needs. "It is impossible to gain any adequate conception of the nature of an individual organism if it is considered apart from its relationships to its natural objects," Fairbairn suggested, "for it is only in its relationships to these objects that its true nature is displayed" (1952, 139).

If we see the world as containing its own forms of natural intelligence, then *human* capabilities must partly reside in our capacity and willingness to recognise and embody this broader intelligence. This implies a quite different attitude to the world than that required by technological power: an openness to structures and processes beyond the self, and a recognition that wisdom resides partly in our ability to live consistently with these structures and processes. An example of this attitude is given by Edmund Carpenter in his discussion of the Eskimo relation to their world. The Eskimo word "sila," for example,

... means both thought and outside ... In one sense, it refers to the world outside man, especially weather, elements, the natural order . . . But sila also refers to the state of the inner mind; "silatunerk," has intelligence, shrewdness; "silaturpok," prudent, thinks ahead . . . Thought, to the Eskimo, isn't a product of mind, but the forces outside of man . . . Sila, goddess of the natural order, is also the goddess of thought. The successful hunter is her conscious self: he who obeys her laws, prospers. He who ignores her, suffers and dies (1973, 44-45).

Carpenter is describing a world in which intelligence, rather than being located within the minds of individuals, is a property of the world that the individual can learn to share in. If we are attentive to the structure of the world, then we can share in its intelligence, like Heidegger's cabinetmaker who "makes himself answer and respond above all to the different kinds of wood and to the shapes slumbering within the wood" (1968, 14). This state of attunedness to the world, which is becoming increasingly rare as industrialisation spreads over the globe, is well expressed by the behaviour of the Eskimo carver:

... [holding] the unworked ivory lightly in his hand, turning it this way and that ... whispers: "Who are you? Who hides there?" And then: "Ah, seal!" He rarely sets out to carve, say, a seal, but picks up the ivory, examines it to find its hidden form and ... carves aimlessly until he sees it, humming and chanting as he works. Then he brings it out: Seal, hidden, emerges. It was always there: he did not create it, he released it; he helped it step forth ... The Eskimo language has no real equivalent to our words 'create' or 'make', which presuppose imposition of the self (1973, 59).

This openness to the character of the world as it chooses to manifest itself is also a distinctive aspect of traditional Eskimo styles of perception. Carpenter notes that

With multiple perspective, the moving eye of the observer himself is drawn unconsciously into the scene. Similarly, Eskimo narrators shun a single perspective, preferring to describe an object from many angles . . . (1973, 137).

Thus the images and ideas which are generated are not so much the products of individual "intelligence," but rather emerge as a result of the joint interaction of the individual and those natural and cultural structures which in part constitute individuality: ... when the task of artistic inspiration and creation is assigned to the unconscious, the images that result are corporate ones: they do not come from the depths of any private, individual unconscious; they come from individual dreams, but from dreams that also belong to the whole tribe. Nothing about them can be called private or individualistic. The dreamer looks inward, but his trip takes him directly to the collective unconscious, that storage system for the collective experience of the tribe. When he returns, he is often better able to handle functions of the mind too obscure for deliberate, conscious activity, and to do so lucidly, communicating easily with those who share these complex perceptions and ancient memories (1973, 180).

We are dealing here with a form of intelligence, and a relation to the natural world, very different from that which is dominant within industrial society. In contrast to the Eskimos' "ecological" interpretation of intelligence, describing someone as "intelligent" on the basis of their having a high IQ score is to assess their success in *separating* themselves from their context and functioning as self-contained manipulators, a stance that clearly embodies the technological-commercial ideology of the "developed" world. Such "intelligence" reflects the facility with which one inhabits the schizoid fantasy world spawned by Descartes — a world of abstraction and mathematical purity, devoid of grime, mystery, untidiness, or poignancy. As Kummer and Goodall complain: "We almost completely lack an ecology of intelligence. No other dimension of behaviour has so systematically not been studied . . ." (1985, 203).

# "Intelligence" as Psychopathology

Writers such as Cushman (1990) have pointed out that individual pathology dovetails, often unnoticed, with key characteristics of a society which feeds off that same pathology:

... the bounded, masterful self has slowly and unevenly emerged in Western history. This is a self that has specific psychological boundaries, an internal locus of control, and a wish to manipulate the external world for its own personal ends... our terrain has shaped a self that experiences a significant absence of community, tradition, and shared meaning... The post-World War 2 self thus yearns to acquire and consume as an unconscious way of compensating for what has been lost: It is empty (Cushman 1990, 600).

Individual pathology is much harder to recognise if it is consistent with a deep-seated *cultural* pathology than if it diverges from contemporary cultural assumptions; and in this

respect, the insights of object relations theorists such as Guntrip (1980) that schizoid psychopathology is "more or less universal" in modern society are glimpses that the domination of the intellect is not simply a problem which is restricted to a few aberrant individuals, but rather is one which pervades our whole cultural context. Clearly, Western culture will perceive success in terms of abilities defined in accordance with the value system that Cushman (1990) identifies - that is, one which rewards the facility with which we can maintain "clear boundaries," demonstrate an "internal locus of control," and effectively "manipulate the external world." The concept of "intelligence" formalises these "abilities" and disguises their ideological character by abstracting them from real-life situations - most obviously, in tests which involve the uncontextualised use of symbolic manipulation or memory, but also in those which are contextualised in such a fragmentary way as to offer only the appearance of a meaningful context. For example, comprehension items from the widely used Wechsler Adult Intelligence Scale (Wechsler 1955) such as "Why does land in the town cost more than land in the country?" convey a superficial impression of deriving from a morally and culturally cogent context. while maintaining their ideological presuppositions at a sufficient distance that they remain tacit and unaddressed. In this way, anthropocentric assumptions pose as mental "abilities," and the selection of individuals by their "intelligence" is covertly a process of measuring ideological conformity.

The configuration of personality which embodies and complements these presuppositions has been explored by object relations theorists (e.g., Guntrip 1980; Fairbairn 1952), according to whom an insufficiently nurturant infantile environment causes the splitting off and repression of the "libidinal" (nurturant, loving, needy, creative) aspects of the ego, leaving the "central ego" as a mechanical, relatively unemotional, superficially well-adapted self, rather lacking in empathy, spontaneity, and passion. This "schizoid" personality structure embodies in an unconscious, chronic form Descartes' allegiance to the intellect, and his corresponding rejection of sensory or emotional experience. In Guntrip's terms:

Highly abstract philosophy seems unwittingly designed to prove Descartes' dictum "Cogito, ergo sum," "I think, therefore I am," the perfect formula for the schizoid intellectual's struggle to possess an ego. A natural human being would be more likely to start from "I feel, therefore I am" (1980, 65).

The schizoid character, which Guntrip sees as "virtually universal" within western culture, is the psychological embodiment of an abstract, rational system of thought in which the world is perceived in terms which are largely mechanical, mathematical, and material. A mechanistic world view is profoundly consistent with a schizoid personality structure in which internal object relations are substituted for external object relations, and psychological and ideological reductions proceed hand in hand in a dialectic which systematically excludes otherness. The repression of arational qualities is the connection between a narrowly instrumental worldview and an impoverished emotional and spiritual life — a scenario that culminates in the devastation of the earth. As we shrink inwards, away from a world often experienced as hostile, damaged, and lacking in meaning, so the internalised feelings of rejection, anger, and fear which result from the disappointment of our integrative, relational needs unconsciously motivate us to control, order, and master the environment which we found so lacking. As a central component of this project to master and control, "intelligence" presents itself as a formalisation of apparently basic, unavoidable laws of relation between humanity and the natural world, concealing its defensive origins as a substitute for a healthier relation. Thus the schizoid personality structure, which results in part from the inevitable inability of the mother, in isolation, to satisfy the child's need for meaningful relation, is one which can neither relate empathetically to the natural world nor transmit any meaning-laden view of that world to the following generation. Given this dramatic loss of meaning, what is left to us is to manipulate the world according to our perceived material and emotional neediness; and our "intelligence" indicates our potential success in this soulless project. As Ferenczi succinctly put it:

Pure intelligence is thus a product of dying, or at least of becoming mentally insensitive, and is therefore in principle madness, the symptoms of which can be made use of for practical purposes (1955, 246).

The idea that intelligence may be understood as characterising any well-functioning natural system, rather than being exclusively a property of the human brain, represents a fundamental challenge to the ideological basis of industrialism. Within an ecologically aware subjectivity, a concept that assesses one's prowess at manipulating other parts of the world will have a definite but nevertheless limited use. Because the concept of "intelligence" implies an individualistic, competitive world consisting of individuals striving against each other, it conceals the extent to which individual humans might complement and resonate with other natural entities to jointly define structures and processes that transcend cognitively imposed categories. Conventionally, the exquisite balance between the behaviours and characteristics of the members of a natural community, rather than being seen as "intelligent," tends to be viewed one-sidedly as the outcome of a vicious process of "natural selection," so maintaining the view that nature "out there" is neither integrated nor intelligent. This image of the natural world as a fight for survival between members of competing species, while it is obviously partially correct, disguises the cooperative, purposive qualities of the whole. In recent years, for example, it has become more widely recognised that evolution itself possesses characteristics which are difficult not to acknowledge as intelligent; and as Jonathan Schull argues, "plant and animal species are information-processing entities of such complexity, integration, and adaptive competence that it may be scientifically fruitful to consider them intelligent" (1990, 63).

#### Conclusion

The concept of "intelligence" encapsulates, naturalises, and legitimates a wide variety of commercial, technological, and educational practices within the industrialised world. However, I have suggested in this paper that although the abstract logical principles to which the concept refers undoubtedly have a foundation in physical reality, their selective nature, together with the denial of much of the phenomenal world by the vision which they underpin, indicates that "intelligence" is heavily saturated with ideological presuppositions which are destructive to the natural world when realised through technological power. In addition, this conception of human ability is based in the Enlightenment dissociation of self from world that is one of the root conditions of environmental destruction. The widespread acceptance of "intelligence" as the foremost indicator of human potential is symptomatic of a profound imbalance in our relationship with the world and, complementarily, of a pathological configuration of selfhood. If we are effectively to address the environmental problems facing us, we will need to reassess the character of our abilities, the exclusivity of the "rationality" which we use to comprehend it, and in particular, the priority which we give to the intellect over other forms of knowing.

#### Endnote

- 1. Email address: david.kidner@ntu.ac.uk
- 2. This is usually simply taken-for-granted, although occasionally explicitly stated, as in Sternberg (1985, 43).

#### Acknowledgements

The author would like to thank John Barry, Malcolm Plant, and two anonymous referees for their perceptive comments on an earlier draft of this paper.

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