Introduction to the New Materialism(s): Deleuze, Barad and the end of the linguistic turn.

ABSTRACT

This paper is an introduction to the new materialism(s), which it does by tracing a history of the emergence of this paradigm by way of Gregory Bateson, Gilles Deleuze, Developmental Systems Theory, and the philosophy of Karen Barad. Most of the key concepts and terms used in the new materialism(s) are elucidated. Central to Bateson and Deleuze, and to some extent Barad and Developmental Systems Theory is the concern about capitalism and its effects on ecology, which is sub-focus of this paper. The paper concludes with some simple visual metaphors and links to Daoism, that facilitate ease of understanding this new way of thinking and can, hopefully, guide science, ethics, and society in forging a new relationship with ecology.

Key Words

New Materialism(s), Bateson, Deleuze, Developmental Systems Theory, Barad, Daoism.

Introduction

In 1972 Gilles Deleuze and Félix Guattari published *Anti-Oedipus*, which sold out in a few days, promoting them to celebrity status amongst French intellectuals. The sub-title was

Capitalism and Schizophrenia, but it was criticised for romanticising schizophrenia as a way of escaping the innate herd instinct that they saw as driving capitalism. Albeit this was the height of the anti-psychiatry movement, however it appealed to Marxists and gay activists not only in France, but also Italy, Germany, and Brazil (Dosse, 2010). Indeed Félix Guattari, a radical Lacanian psychoanalyst had ties with the Red Brigade, and although he didn't support their violence, he refused to condemn them. When their second book, *A Thousand Plateaus,* with same sub-title came out eight years later, it was accused of being too difficult and bewildering to read, and interest in them waned. However with the rise this century of the "new materialism(s)", a term first used by Deleuze, an established philosopher, a renewed interest in Deleuze and Guattari has been spawned (Ansell-Pearson, 2017).

This new interest has also extended to Gregory Bateson, as he was increasingly cited by Deleuze and Guattari (D&G hereafter) as their work progressed over a twenty year period (Shaw, 2015). Wittgenstein (2009[1953]) wrote about preparing a place for an idea, and Bateson could be said to have prepared a place for a number of ideas that came to fruition in D&G; that were then further developed by the new materialism(s). This essay begins by way of a brief summary of some of Bateson's ideas that were pertinent in the development of D&G's work, and his influence on postmodernism, especially how it developed in the form of family therapy that he helped spawn in the 1950s. Then this paper turns attention to D&G and how they furthered Bateson's ideas and introduced a philosophical thread that dates back to Spinoza in the seventeenth century. The new materialism(s) is then approached via Developmental System Theory, a theory that resonates with the new materialism(s) because of its central thesis of coevolution. The paper ends with a few examples of how this new paradigm is influencing ecological science, psychology and ethics.

Gregory Bateson

Bateson came to psychiatry in 1950 with 20 odd years of anthropology research behind him. There he had developed his concept of “schismogenesis”, which is the idea that there is an escalating pattern of interactions between two or more creatures (or groups) that tend towards climax or release. Examples can be diverse as sex, armament races between nations, temper tantrums by a child, or the one-sided pursuit of purpose by a culture (where only ‘our’ purpose counts) resulting in ecological disaster (Bateson, 1972). These escalating exchanges take two forms; symmetrical such as competition between two rivals, or complementary such as dominance-submission. Some cultures have developed rituals to prevent some of these exchanges escalating out of control or to a destructive climax, which he described in *Naven* (1958 [1936]). But sometimes that is not necessary as the introduction of complementary exchanges into symmetrical ones (or vice-versa) brings balance to the system. Bateson noted that Bali (in the 1930s) could be described as a ‘steady state’ culture, or as D&G (1987) were later to call it, a culture with plateaus, because they had developed child-rearing practices where exchanges seldom escalate.

After the Second World War Bateson teamed up with the psychiatrist Juergen Ruesch to see if these ideas could be helpful to psychiatry. Also at this time he was participating in the first Macy conferences in cybernetics. The war had posed the problem as to how anti-aircraft systems might self-correct, which gelled with his own intuitions about the role of feedback on schismogenic processes. He and Ruesch developed the idea that communication consists of a content aspect and a relationship or context aspect (Bateson & Ruesch, 1951). A couple of years later, when he formed the “Bateson Project” to research schizophrenia (or “strange communication”), he noted that people attracting this diagnosis frequently missed the

context (or relationship) aspect in their communications. The book with Ruesch makes a strong argument that psychiatry as a discipline needs to shift its focus from the individual to encompass the social matrix that people are embedded in; that is, the context. As is well-known the Bateson Project developed the double-bind theory of schizophrenia, and spawned the development of a form of family therapy based on cybernetics (Bateson et al., 1956).

The Bateson Project recruited John Weakland. a chemical engineer, Jay Haley whose academic background was as a librarian, and later Don Jackson, a psychiatrist, to its ranks in Palo Alto, all of whom became notable family therapists in themselves. Although Bateson himself walked away from this form of family therapy, commenting that it was a "god-awful business" (Bateson & Bateson, 1987, p. 204). This was because the whole therapy field of the time (not just this form of family therapy) was devoted to the concept of power, and saw themselves as engineers wanting to leverage change. Large parts of the therapy field still has the same attitude.[1] Engineers are missing some of the relationship or context aspects, and could be said to be like the schizophrenics they studied. He acknowledged that he was slow to recognise this "monstrous lag in scientific and philosophical thought" (Bateson, 1991, p. 186). In particular he argued with Haley over the concept of 'power', and tellingly Haley developed strategic therapy and became the most quoted author amongst practicing psychologists in America in the 1980s (Richeport-Haley & Carlson, 2010; Carr, 2011). Bateson believed that this engineering attitude "led back towards ....Darwinism, [and] the survival of the fittest" (Harries-Jones, 1995, p. 28). A style of thinking we see corrected by the new materialism(s).

The double-bind theory of schizophrenia in the hands of the artistic D&G (1987) was likened to a lobster, where one pincer has the content and the other pincer has the way of

expressing (or the context of the message). As an example of a double-bind a father may instruct his son to “get angry with me whenever I do such-and-such”, but this may be expressed as “I won’t tolerate it if you get angry with me”. So it is a double-bind as it is a demand to do both (not one or the other), which is impossible. Bateson (1991, p 115) once described the logic operating here as well captured by the William Blake’s quote (from *The Marriage of Heaven and Hell*): “Prisons are built with the stones of law and brothels with bricks of religion” (p. 15). The same sentiment was expressed by Lao Tzu: “The more laws and restrictions there are, the more thieves and bandits there will be”. As paranoia escalates within a society we build more prisons, or the more sermons there are on “forbidden fruit” the more brothels are needed to meet the increase in demand. Add to this the escalating nature (or schismogenic process) of these double-binds, which Haley once described as being like a person caught in a revolving door, and you have the Batesonian recipe for schizophrenia (Elkaim, 2007). What D&G showed was that this also has a sociological aspect to it.

Also relevant for D&G’s subsequent development of Bateson’s ideas, was Bateson’s fondness for citing Adelbert Ames’ demonstrations (such as the Ames room) of how unconscious mental processes construct three-dimensional perceptions. In doing this Bateson established there are unconscious processes to our minds. (Today enactivists further support this by noting that post-cataract surgery patients have to move around in order to learn to see again (Hutto, 2011); much like Held and Hein’s (1963) discovery that newborn kittens do not develop depth perception if they are deprived of movement. Unconscious processes of perception are embodied (i.e., learnt through bodily movement.)

What is not so well known is that Bateson was “picking the brains” of Alan Watts, the popularizer of Zen, in the 1950s (Flemons, 1991). Also that Bateson, as well as some other

attendees at the Macy conferences took LSD during the 1950s. Bateson also arranged for his friend Allen Ginsberg (the beat poet) to take some at a research programme off the Stanford campus (Marks, 1979). These events, coupled with Bateson's participation in R.D. Laing's *Dialectics of Liberation* conference in London in 1967, as well as his collaboration with Stewart Brand of the *Whole Earth Catalogue* and *Coevolutionary Quarterly*, positioned Bateson as a prominent leader in the counter-culture movement of the late 1960s. So it is little wonder that D&G (1987) mention Antonin Artaud's and Carlos Castaneda's experimentation with peyote in Mexico as a way of liberation. The appeal of Bateson grew as D&G studied him more (Shaw, 2015).

The Linguistic Turn or Postmodernism

In the late 1980s and early 1990's there was flurry of papers marking the linguistic turn (or postmodernism) in the cybernetic family therapy (e.g., Anderson & Goolishian, 1988; de Shazer, 1991; Epston & White, 1992; Hoffman, 1990). Bateson (1972) had pointed out that although philosophers had separated epistemology (how we know anything) from ontology (what things are), to a naturalist they cannot be separated, because ones unconscious "beliefs about what sort of world it is will determine how he [sic] sees and acts within it" and vice-versa (p. 320). However with the linguistic turn the field embraced epistemology and said next to nothing of the ontology of the world. Paré (1995) wrote that with postmodern therapy there is a shift in "its focus to an epistemological domain, and leaving aside its former preoccupation with the 'real' world, which concerns ontology" (p. 3). Lyotard (1984) proclaimed this as the 'postmodern condition', which was affecting daily life as it was eroding certainty as well as scholarship in the late 20th century. As we shall see the new materialism(s) is offering a correction to this.

The postmodern turn was widespread in the humanities, and its roots are in Kant who proposed that all knowledge is interpretive, we don't have direct access to the thing -in-itself (*ding an sich*), thus paving the way to an emphasis on subjective reality and a scepticism of any universal truth. Often an appeal was made to quantum physics where it appeared that it was no longer possible to describe the behaviour of sub-atomic particles independently of observing them. The most sensitive realities, it was proposed, were so sensitive that any attempt to look at them changes them. This was the big idea in all the sciences throughout the twentieth century. Constructivists emphasised subjective reality by proposing that it made more sense to consider an organism's perceptual system constructing a world that is relevant to it, than the so-called objective world. Von Uexküll (1934) is frequently cited in support of this. This subjective reality is illustrated by change blindness demonstrations, such as when we fail to see someone in a gorilla suit enter the scene because we are too busy counting the number of times the players pass a basketball (Simon & Chabris, 1999).

As a result social constructionists urged therapists to stop looking for patterns that could be observed (ontology), and instead focus on how meaning arises in human systems (Hoffman, 1993). Hoffman also argued that as our constructions (meanings) are mostly determined by group think, social constructionism is preferable to constructivism. Derrida (1976) is frequently cited with his claims that in most cultures truth claims were a means of establishing authority and thus control over others, so deconstructing them was a way of resisting domination.

But is social constructionism guilty of denying a reality independent of human perception (or interpretation) as some critics have argued, and promoting a radical relativism (Andrews, 2012)? With constructivism "there is an important sense in which the only thing that doesn't

seem to matter anymore is matter" (Barad, 2007, p. 132). Is that the meaning of Kenneth Gergen's (1994) infamous quote "...constructionism is ontologically mute" (p. 72)? The Wittgensteinian psychologist John Shotter (2011) responded to this quote of Gergen's by pointing out, as Bateson had, that ontology and epistemology are not separate, and Gergen is not endorsing an 'anything goes' form of relativism, because he is revealing our nature as relational beings living in a constantly changing world. In other words that is hardly being ontologically mute. And this is close to what the new materialism(s) are also saying.

Deleuze

In Deleuze's rhetoric Shotter's "relational beings living in a constantly changing world" becomes the idea that as we live in an immanent world (or universe) we have to overcome any illusions of being conscious independent beings. So we are a part of the world, but not apart from it. These illusions will be overcome by attuning ourselves to the immanent organising principle of reality, which psychoanalysts called the "unconscious". Deleuze had published on this long before Guattari joined him. He was guided by Spinoza on immanence, who wrote that we can ground ourselves in the immanent mind of "God", where "God" is this immanent universe. Unlike the Abrahamic religions "God" doesn't stand outside of the universe (a transcendental position); "God" is the universe. A little Zen helps most understand this. If you study Zen for a while it suddenly dawns on you that your mind can have no boundaries (Watts, 1957). Your mind extends at least as far as you can hear and see. This is known as the extended mind thesis, which has come to occupy central place in the cognitive science of enactivism (Sganzerla et al., 2025). (I will call those not recognising this "Abrahamists".) Deleuze calls this the "plane of immanence" where we exist in the same non-hierarchical manner as other animals, plants, and inanimate things. Deleuze says that

when we realise this “everything changes” (1988, p. 85), for you realise that the extended mind makes you a part of something much larger. You are becoming conscious of your unconscious mind (or in religious terms, the Dao, or ‘God’ in an immanent sense).[2]

Bateson introduced his readers to this extended mind thesis when he puzzled where the blindman’s boundaries are. Are they at the tip of his stick? At the handle of his stick? Halfway down? He concluded these questions are nonsense, for the blindman’s attention is moving around a circuit that includes the sound of the tapping, the muscular extensions and contractions of the arms and legs, and the feel of the stick on the street. When he sits down for lunch a different circuit comes into play. Cognitive science is still plagued by the idea that we are passive brains encased in skulls that are receiving and processing these perceptions, but enactivism, especially radical enactivism, takes a more direct embodied approach (Hutto, 2013). The extended mind thesis is central to radical enactivism. These circuits of activity Heidegger (2010) also saw, with the skilled carpenter having a “ready-to-hand” relationship, or a sense of oneness, with his hammer. In the hands of D&G (1987) these circuits of extended minds become “assemblages”. One assemblage they describe is the horse-stirrup-lance (or bow) circuit of activity, which facilitated a new form of warfare once it was mastered and enacted. As now the knight (or the Mongol) warrior could use the lance (or bow) more effectively from horseback. D&G invite us to see the skilful use of tools as existing in relation to the interminglings that go on in an assemblage.

D&G call ‘territorialization’ where new components are integrated into an assemblage, and ‘deterritorialization’ when they are discarded or disconnected. Assemblages have emergent properties as we saw with the horse-stirrup-bow example; but they also saw flight as an emergent property in the assemblage that includes the bird, its feathers, the thermals, air density, and the wind etc. Psychotherapy is thus as a mix of territorialization and

deterritorialization of assemblages. D&G are asking us whether our unconscious, or extended mind, is an assemblage of mostly nature or capitalism.

As we have seen the idea of “plateaus” which is in the title of D&G’s second book, came from Bateson’s anthropology work in Bali, and is the idea that schismogenic processes don’t have to escalate. They describe thirteen plateaus in that book, but the implication is, as the title suggets, lots more. One example they give is the practice of the Chinese Taoists *ars erotica*, which Foucault also develops in his *History of Sexuality* (1978). Here the emphasis is on the man not ejaculting when sexually coupled. Foucault contrasted this with *scientia sexualis*, which is “know that” knowledge used by capitalism as part of its surveillance mechanism to discipline people for the purpose of enhancing productivity. Whereas *ars erotica* is “knowledge deflected back into sexual practice”, or “know how” knowledge developed as an “art” (Foucault, 1978, p. 57). Such practices are meant to temper desire, as we have become “desiring machines” under capitalism. Capitalism which encourages desires, is now said to be out of control and responsible for the ecological crisis because its main objective is the accumulation of capital, which it achieves by the free flow of commodities and labour by us as “desiring machines” (Fox, 2024). Also we have seen through the anthropology of Jean Briggs (1988) and the psychology of Darcia Narvaez (2014) what child-rearing is like in non-capitalist cultures.

Another phrase which D&G use frequently in describing how to achieve plateau’s is a “body without organs” (BwO hereafter) (Buchanan, 1997). The original idea came from a play by Antonin Artaud, and referred to the fantasy of having no organs, because organs give us desires, which are, at least, partially generated by capitalism (through the likes of advertising, etc). Our organs limit us and make us vulnerable, so the only way to be free from exploitation is to be a BwO. They argue that the body’s full potential will be available if

we had a BwO, and be better positioned to navigate the excesses of capitalism. More recently a number of scholars have written on how the martial arts, tai chi, yoga, and a variety of sporting activities may foster a BwO (Vodka, 2013; Yu & Ilundáin-Agurruza, 2016; Stivale, 2022). Being "in the flow" (or sometimes the "zone") is said to be a BwO, for as Yu and Ilundáin-Agurruza (2016) explain it is having an "inside-outside" connectivity. An "inside-outside" connectivity is prescribed in autogenic therapy, which comes as a result of contemplating as an alternative to "I breathe", "it breathes me" (Luthe, 1979). For most people doing this, after a while, breathing becomes not a matter of inhaling and exhaling, but the rise and fall of waves.[3] In yoga this is known as pranayama.

The anti-Oedipus title of the first book comes from Lacan's psychoanalysis, who unlike Anna Freud and the American psychoanalysts was not an advocate for strengthening the ego, for Lacan thought that this would only intensify social repression (Sharp & Faulkner, 2008). Félix Guattari, a Lacanian psychoanalyst, sought out the philosopher Gilles Deleuze in 1968, after reading some of his Nietzschean and Spinozean inspired "anti-identitarian" writings. At first Lacan refused discussion amongst his students of D&G's work, and even tried to prevent its publication (Dosse, 2010). However Lacan came to see that *Anti-Oedipus* was actually a continuation of his own work, and from then on was supportive (Caldwell, 2009). What Guattari saw in Deleuze was that the unconscious was Nietzsche's "Ur-Eine", or the primordial unity (of which we are part of, but not apart from). This immanent organizing principle of reality (or the *Ur-Eine*) is being identified today, by an increasing number of scholars, as the Chinese Tao (Dao), which was not named as such by Nietzsche as he had only limited access to Chinese thought (e.g., Moeller, 2004; Parkes, 1989; van der Braak, 2015). The *Ur-Eine* finds expression in *Anti-Oedipus* right from the start when D&G say they do not distinguish between man (sic) and nature; that man and nature are not two things, "rather they are one and the same essential reality" (p. 5). For Lacan, the ego develops

when we recognise ourselves in the mirror (sometime between 6 months to 18 months in age), and then we project a unity modelled on other visual objects that we see in the world. But what Guattari recognised in Deleuze's writings, is that this image is not fixed (a fixed view from the outside); it can be fluid, or that we can let go of it completely.[4] As their biographer Dosse (2007) makes clear, they were vastly different men in their temperament, but what drew them together was a mutual distrust of identity.

D&G develop what they call "schizoanalysis" as an alternative to psychoanalysis, as they claimed that psychoanalysis supports capitalism. In Lacan's view psychosis reveals the artificiality of the ego for psychotics haven't developed an ego separating them from the world. D&G refer constantly to Nietzsche as they develop their thesis that with schizoanalysis the ego can be dissolved. One of Nietzsche's arguments is relevant here. He pointed out that lightning does not stand apart from the flashing, or 'doing' does not stand apart from 'being' (and vice-versa). Our grammar is at fault here, for nouns are separated from verbs, but in nature they are not separated. Barad (2007) points out that Nietzsche alerted us to how very seductive this idea is. For example Descartes made the same error in separating thinking from being with his "I think therefore I am". This Cartesian foundational argument has been identified as a Batesonian double-bind alienating people from their bodies and environment, which largely goes unnoticed by most Westerners "because it is so universal" (Tarnas, 1991, p. 420). However a long line of social thinkers, stretching back to Marx and Weber, have noted how capitalist culture relies on people being individuated. D&G contend that Freud enforced the ego with his "daddy-mommy-me" Oedipal triangle, which schizoanalysis enourages us to shake off (1977, p. 51).

Had D&G explored Alan Watts (1958), as Bateson did in the 1950s (Flemons (1991), they may well have come across another psychologist who wrote that the strengthening of the

ego was an error; the first American psychoanalyst Trigant Burrow (1968). I think that with Burrow they would have found a simpler and more elegant anti-Oedipus theme than Lacanian theory (Drury & Tudor, 2022). Burrow's core idea was similar to Freud and Lacan, in that the child starts out with oceanic consciousness, or one-mindedness with mother, but instead of objectifying the mother (as Freud claimed), the child objectifies him- or herself. This becomes largely forgotten in Western culture, but we are capable of retaining (or regaining) our primary awareness, through embracing our *Ur-Eine* or unconscious. Coincident with D&G's schizoanalysis Burrow had 'phyloanalysis', so named because Burrow believed this error was common to at least the "tribe" (the culture), if not to us as a species. Furthermore, Burrow established a physiological way of measuring this ego-less state from the ego state. As a result of constantly monitoring ourselves (in the panopticon mirror as Foucault would have it), our attention has become divided, which Burrow called "ditention"; but if we pay attention as animals and children do (and some indigenous people (Drury & Tudor, 2022)), that is in a more holistic way, which Burrow called "cotention".[5] He published research on this in the prestigious journal *Nature*, some 30 years before the biofeedback phenomenon starting publishing comparable research with meditators. Burrow's cotention is D&G's BwO, and ditention is what prevents us seeing the "gorilla".

To obtain a sociological perspective of how Westerners developed an ego, which many anthropologists report most outside of Western culture find peculiar (e.g. Henrich, 2020), it may be helpful to look back at the Copernican revolution. In this understanding, humans were radically displaced from the centre of the universe to a tiny planet on the edge of one insignificant galaxy amongst millions in an indifferent universe. Kant developed this vision further by arguing all knowledge is interpretative (we don't have direct access to reality), which paved the way to postmodernism's emphasis on subjective reality and scepticism of any universal truths. However the seeds for this were sown much earlier when the Hebrews

came out of exile in 539 BCE. Israel and Judea had been caught between the much larger Egyptians and Babylon, and forced into slavery. They were freed by the Persians and allowed to return home, but when they did they brought with them influences from Persian Zoroastrianism. At that point their former polytheistic religion became more strongly monotheistic (Gnuse, 1997; Patai, 1967). “God” went from being clearly a metaphor for the whole universe to a transcendent entity that stood apart from the universe. And from a Goddess (as the Chinese Taoists also have it) to more clearly male (Smith, 2001). Thus the Copernican revolution can be viewed as a correction of this monotheistic vision of the universe; a universe which according to Copernicus was inert and mechanistic. “God”, in this vision, may well have gone to sleep after setting “His” (mechanical clock-like) creation in motion.[6] Little wonder that Westerners feel so alienated from nature, and so cling to a “God” who gives them hope.

By way of contrast cosmogonic (creation) myths emphasize the immanence of creation amongst most indigenous cultures. For example, New Zealand (Aotearoa) Māori tell of how the sky father (Ranginui) and the earth mother (Papatūānuku) were joined together, and their children, born between them in darkness, separated them by pushing them apart (Royal, 2003). Immanent accounts are of the form of how the one became many without any external intervention. Many Abrahamic religions explain “God’s presence” by claiming “He” is both transcendental and immanent. However from Spinoza onwards many philosophers have joined Nietzsche in claiming this idea of “God” as a transcendental being is dead. There is little doubt that the Judahites were traumatized as a result of spending seventy years in slavery, which may account for them clinging to an exclusive monotheism when they returned home (Markl, 2020; Smith, 2001). A similar clinginess is seen as a strategy for coping with trauma today (van der Kolk, 2015).[7] However this transcendental “God” will

eventually come to occupy a similar place as the tooth fairy or Santa Claus; at best a culturally useful fiction.

Developmental Systems Theory

Deleuze has been influential in the development of the new paradigm of the "new materialism(s)" (hereafter NMs). I begin the description of this with Bateson's account of coevolution as it has influenced a related paradigm known as Developmental Systems Theory (hereafter DST) (Oyama et al., 2001). Bateson offered an alternative to what is known as the "modern synthesis" of evolutionary biology that was spawned by his father William Bateson, when he (William) plucked Gregor Mendel's paper from obscurity. Mendelian inheritance, with its dominant and recessive genes, was central to evolutionary biologists in the twentieth century. The "error" (or limitation) Gregory saw with this is that the focus is only on the individual species (and their behaviour); how they are shaped by natural selection. Gregory Bateson offered as an alternative:

> The evolution of the horse from *Eohip pus* was not a one-sided adjustment to life on the grassy plains. Surely the grassy plains themselves were evolved *pari passe* [sic] with the evolution of the teeth and hooves of the horse and other ungulates. Turf was the evolving response of the vegetation to the evolution of the horse. It is the *context* which evolves. (1972, p. 164; emphasis in original)

Thus a change of focus was called for, and today evolutionary biologists are developing a new paradigm fitting this. As Corning (2023) notes, Darwin's second book, *The Descent of Man*, which was published 12 years after *On the Origin of Species*, is now "coming into view" as a distinct evolutionary theory. Whilst *Origin* can be seen as focused on the individual and the competition for existence, the *Descent* can be seen as stressing co-operation between

species; or in a word, coevolution. To repeat, this paradigm shift is comparable to Deleuze's anti-identitarian stance; both are a shift in focus from the relata to the relationship.

DST, which takes coevolution as central, can be regarded as both a philosophy of science guiding research, as well as a philosophy of nature. Gallagher (2017) has claimed it as a foundation for enactivism, the new cognitive science. Coming as a surprise to some, DST claims that instinctive behaviours and biological forms that were once attributed solely to genes, are also nurtured into existence by a receptive environment. Development is no longer seen as totally predetermined by instructions contained in the genes, but is also determined by the environment in which a particular embryo develops in (Lewontin et al., 1984). So with a shift in focus to coevolution we see how the environment is playing a cooperative role in a species development. The "nest", in the broadest sense of that word, is the context in which the organism develops.

For example, In birds and reptiles, parents regulate the temperature of the eggs at critical times, and so determine the gender of their offspring. Pecking behaviour in birds has its foundations in the beak resting on the beating heart in the egg. Ants construct their environment, which in turn construct them (which in turn further develops the nest which further constructs subsequent ants). Ant colonies usually begin with a single queen burrowing down about half a metre where a few tiny workers are hatched. These travel back up the scent trail left by the queen, occasionally getting lost and leaving new scent trails, and begin foraging for food. A nest takes about five years to fully develop to ten thousand ants, with each (except the queen) living about a year. There is a greater division of labour as the nest develops, with the roles of each determined by the scent trails left by previous ants, the number of larvae that the nursery is feeding, and the age of the nest (Gordon, 2010). There is no central plan unfolding and the queen has no authority and does little except lay eggs.

The individual ants "nature" is nurtured into expression by the stage of the nest it is hatched into. In the "modern synthesis" causal privilege was assigned to nature (or genes) to explain heredity, development, and evolution; but now nurture is given more privilege. Biologists focus has shifted to "the nest life cycle, not the organism life cycle" (Sterelny, 2001, p. 336).

So a big picture emerges with DST that no longer sees nature as a neo-Darwinian aggregate of competing individuals (which Bateson was also against), but a network of cooperative symbiotic relationships, that evolve, to use Varela (1991) phrase, by "laying down a path in walking" (p. 237). Mycorrhizal fungi, such as fly agaric mushrooms, colonize the root systems of trees, to set up a symbiotic relationship where the tree supplies sugars or lipids to the mushrooms, and the mushrooms supply water and minerals to the trees. Most mammals do not develop their immune system and digestive system without gut bacteria. Laying down a path in walking is to bring forth a world. So Tennyson's "nature, red in tooth and claw" or Hobbes state of nature as "solitary, poor, nasty, brutish, and short" where its "war of all against all", and the only escape is for individuals to enter a social contract, is, at best misguided, at worst self-fulfilling, as it is a vision that inspires mistrust in nature.

The New Materialism

Just as DST requires a shift in focus to biological coevolution, a similar shift in focus is required for the New Materialism(s) (NMs), to what they call "intra-action". Intra-action is the in-betweenness of a relationship, and it differs from inter-action in that in inter-action the two poles remain the same, or come first, but in intra-action the poles are produced in the process of coming into being (Barad, 2007). In other words the relationship comes first

and the two poles or ‘relata’ materialise as a result of the intra-action, in much the same way as organisms do in coevolution.

Barad developed this idea of intra-action from studying the physicist Neils Bohr, who had theorized that nature generates complementary properties (e.g. waves and particles, or location and momentum). If Bohr set up his apparatus one way light would be revealed as waves, but a different set up would reveal light as particles. Barad called this setting up one way the ‘agential cut’, where the agential cut would determine the properties of, say light. Heisenberg’s ‘uncertainty principle’ explains this by referencing Kant; we cannot know for certain these things owing to the unavoidable disturbance created by our measuring interaction. An epistemological explanation. But Bohr differed with his ‘indeterminacy principle’ which was an ontological explanation.[8] Bohr claimed that it was the interaction (or what Barad later called the ‘intra-action’) between the measuring instrument (or for that matter any other quantum system) brought that property into existence. As time went on Heisenberg came closer to Bohr, but remained with Kant and the ‘linguistic turn’ (Camilleri, 2009).

NMs theorists also turn to Deleuze’s exposition of Spinoza’s philosophy (1990) that because the universe is ”dynamic and alive” (p. 45) that it has this property (of being capable of being cut), or this property makes the universe “dynamic and alive”. Barad (2007) endorses this claim with: “this new sense of aliveness applies to the inanimate as well as the animate” (p. 437). Jane Bennett (2010), another prominent NMs philosopher, claims that Ilya Prigogine’s work on dissipative structures lead to an understanding that the inorganic has a vitality or is composed of “vibrant matter”. Thus the static inert model of matter (the billiard ball universe, or “God” had gone to sleep after setting it all in motion), has given way to a living universe, or a vitalism. This view stems from Spinoza’s claim that there is no distinction

between creator and creation (Deleuze, 1990); or if you prefer, “God” is immanent. A view that also attracted Wittgenstein (Baltas, 2012).

However the problem that NMs faces is that few physicists or philosophers of science are endorsing it (e.g., Hollin, et al., 2017; Jaksland, 2020). The interpretation of quantum physics has been a contested matter for over a century, and the difficulty maybe one of interpretation. Some of the criticisms appear to me to stem from a Kantian view, or Abrahamist assumptions that relata precede relationships. Unfortunately, unlike DST where Lewontin and colleagues have been answering questions, and as a result winning over more adherents, Barad has been a little slow in addressing questions raised about NMs (Everth & Gurney, 2022). This is a pity as NMs has potentially much to contribute to sciences such as psychology, to say nothing of the anti-capitalist and ecological sentiments expressed by D&G.[9]

For example Barad “agential realism” assumes that we are not independent observers, as science has presumed for some centuries, for with intra-action, the observer at least starts out connected with what they are observing. That is to say we also exist at the quantum level. “Agential realism” is the recognition that what emerges is a property of the intra-actions. One of the implications of this is that NMs has an attraction to the philosophy of Emmanuel Lévinas (1974), because Lévinas shares the view that we are primordially and pre-cognitively connected to each other; or in a word we are “relational beings” (Drury & Tudor, 2023). As relational beings Lévinas claims we have an infinite responsibility for each other. My responsibility for you is only limited by my responsibility to (or entanglements with) others. Thought is born when I have two or more competing responsibilities. Lévinas and Wittgenstein, were both attracted to Dostoevsky’s character Father Zossima who said: “Each of us responsible for everyone and everything, and I more so than others” ([1880]

1958, p. 339). Some NMs claim that Lévinas is incomplete as it doesn't include our ecological entanglements, so his philosophy must be extended (Geerts & Groen, 2020). Our ethical responsibility is not only to each other, but also the beings of the world (Haraway, 2016).

Also to the best of my knowledge nobody has compared intra-actions with the Taoist idea of yin-yang, despite, as we have seen, a number of scholars claiming that Nietzsche's *Ur-Eine* is the Tao (Dao). Yin-yang implies *hsiang sheng*, which translates as "mutual arising" (Watts, 1975, p.22), a comparable idea to Barad's intra-action. The yin-yang symbol, known as *taijitu*, is also on Neils Bohr's coat of arms. Yin-yang dialectics is a methodology for resolving problems and restoring harmony (Huang, 2016; Zang, 2024). For example the reintroduction of wolves (which can be seen a "yang" force) into Yellowstone Park where elk (a "yin" force) were overgrazing has been seen as restoring harmony (Carey, 2016). Or an increase in corporate social responsibility (CSR) (a "yin" force) counteracted the potentially disruptive "yang" forces of some purely profit driven business practices in China (Wang & Tan, 2023). Interestingly Wang and Tan framed this in terms of coevolution, which shows how much these paradigms overlap.

Besides the *taijitu* symbol for yin-yang, the graphic work of M. C. Escher (1992) can also be seen as representing intra-action or yin-yang (or coevolution).[10] In many of Escher's works figure and ground create each other. In "Hand with reflecting sphere", Escher holds a sphere reflecting his studio, blending creator and creation; which aligns well with Barad's view that "environments and bodies are intra-actively co-constituted" (Barad, 2007, p. 170). In "Verbum" we see the gradual emergence of distinct forms from intra-activity in the quantum realm (where Schrödinger's cat is neither alive nor dead), to become separate relata (where the cat is alive or dead) in the macro-world. This parallels Spencer-Brown's *Laws of Form* (1969), which is a mathematical treatise on how forms emerge. As we saw

with the ants, there is a continuous recursive or evolutionary process where the ant is shaped by the evolving nest, which in turn is shaping the nest. *Laws of Form* is endorsed by Wolfram's (2002) in his treatise on a computational universe. Both Barad and Spencer-Brown explore the foundational processes of emergence; Barad from entangled relations and Spencer-Brown through the generation of logical forms. Escher's "Verbum" serves as compelling visual metaphor of Barad's physics-based account of creation, and Spencer-Brown's mathematical account of creation.

Intra-action offers a new tool for psychoanalysis because it goes to the heart of relationships or the unconscious as the extended mind. The psychiatrist Eric Graham Howe, known as the Druid of Harley Street, offers, to my mind, the clearest understanding of what Nietzsche called the *Ur-Eine*, the Chinese the *Dao*, and enactivists the extended mind (Edwards, 2023).[11] By using capital letters to talk of the undifferentiated extended mind, and lower case spellings to talk of the ego (in a similar way as Winnicott had with WOMAN and woman), he was able to separate the experience of universal (or the transpersonal) LOVE from love, or the primary CONSCIOUSNESS from egoic consciousness, or I from me; and of how love emerges from LOVE, consciousness from CONSCIOUSNESS, or me from I, in a much clearer way than many religious figures, both East and West, had attempted to dating back to antiquity. By identifying with only one of these poles Howe sees a lack of relatedness, which must be overcome for wholeness to occur. At the very centre of our being we are undifferentiated, but from birth onwards differentiation occurs with pairs of opposites such as happiness and sadness, pleasure and pain, loss and gain, fame and shame, arising. We only know happiness because we know sadness, but as our egos develop we forget (or play at forgetting) half our wholeness[12]. Nietzsche chastised us for pursuing one relata in *Beyond Good and Evil*.

The new materialism(s) is allowing psychology and sociology to move beyond textuality to gain a clear understanding on just how phenomena arise, as well as some of the ethics governing research (Fox, 2016). Capitalism doesn't foster much intra-action, and psychology is still hampered with development theories glorifying narcissistic egoism (in much the same way as Freud did) (Bilbao-Nieva & Meyer, 2024). With 20,000 citations of Barad's book, many in the social sciences, a plethora of examples of how the new materialism(s) is being applied can be found (Scholz, 2024). Scholz (2024) also brings some clarification to the problem of replication of psychological research. She argues that Barad's 'agential realism' requires that much more attention be given to the context of the experiment; attention that takes into account, what's called the "ontical indeterminacy" (refer to Bohr's "Indeterminacy principle"), and this will go some way in resolving the replication problem. By doing this we will be in a better position to declare what findings are earth-wide for humans, and what findings are more context sensitive.

Conclusion

A new tool for science is emerging with the new materialism(s) of Barad and others. It is called 'intra-action'. This is the culmination of a process begun with Baruch Spinoza in the seventeenth century, when he started pondering what an immanent universe would look like. As we have seen this new paradigm is far from complete, especially its link with quantum physics. However it is closer to East-Asian philosophy as they had maintained an immanent view of the universe. This new paradigm has sufficiently emerged that we can see its form, first brought to the attention of social science by Deleuze and Guattari. Deleuze and Guattari's hope was that desire could be liberated from capitalistic exploitation and be allowed to flourish in ways that foster ethical responsibility. Barad developed the new

materialism(s), which offers the most comprehensive theoretical platform for studying the human sciences and ethics. This may be considered a further step to an ecology of mind.

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[1] "Power is the heavy stone wrenched from your garden of tenderness".

[2] Unlike Freud, the unconscious for both Jung and Eric Graham Howe was not a place nor a thing; which is a similar view as Wittgenstein who pointed out that Freud had not discovered an underground cellar. See Jung's *Collected Works* (18, p.59) for an interesting exchange between Howe and Jung about the total self (what is now called the extended mind) is the same bigness as the universe.

[3] "Breathing, Aetherial bliss".

[4] Eric Graham Howe claims it is necessary go through an ego stage before finding a "transpersonal" stage later in life (Edwards, 2023).

[5] Licensing bodies require most therapists to gaze into a panopiticon mirror to self assess, although there is little evidence that it safeguards or improves practice. "Virtue is the heavy stone crushing your inner-sense".

[6] This vision impelled science to find the causal mechanisms of everything, for these laws would allow us to predict everything. However this cosmic clock image is crumbling. Chaos theory was the first to nock causality of its throne by noting that nature is self-organizing out of chaos. Then came the new materialism with its intra-action.

[7] For those who have been traumatized "Grab hold tightly, let go lightly".

[8] There is some confusion because Heisenberg often used the term 'indeterminacy principle' also, but I suggest naming Heisenberg's the 'uncertainty principle' and Bohr's the 'indeterminacy principle' for the sake of clarity.

[9] Causality is further nocked from its throne by considering how a Martian, schooled by Hume with his account of causation, would have to conclude, that a cat repeatably walking past a hole in a fence that the head causes the tail. When we have a unified universe we see more clearly that distinctions are not separations.

[10] Barad completes an enactivist account of perception by emphasising an organism's active participation in what they observe. She does this by disssolving the traditional subject-object split, citing quantum physics, so that the observer is not outside, but a part of the phenomena he/she is observing. In the same way that the classical world emerges out the quantum substrate, so too are our perceptions produced out of our entanglements by way of our movement. This is simply expressed in many of Escher's graphics, where birds or fish emerge from out of entanglements of both.

[11] Howe's *Cure or Heal?* takes psychotherapists to task for not being open to their whole self, and being more like engineers leveraging a change in people, that provides a temporary cure but doesn't restore them to wholeness. Much like Burrow's difference between a change in ditention versus cotention.

[12] As in Berne's *Games People Play*, or the Hindu idea of *lila*.