The Nature-Human Interface: Environmental Discourses and Sociological Theory

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This is to certify that the thesis entitled '**The Nature-Human Interface: A Study of Environmental Discourses and Sociological Theory**' submitted by **Mr. Arjun Sengupta** in fulfilment of the requirements for the award of the degree of **Doctor of Philosophy** of this University is an original work according to the best of our knowledge and may be placed before the examiners for evaluation.

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Chapter One: Introduction

The current environmental crisis seems to call out for urgent and concentrated efforts to better understand the society-nature relationship. In the light of this urgency, sociology and several other social science disciplines have sought to reassess their past; they have tried to examine the extent to which their canonical disciplinary traditions paid attention to the society-nature question. The results of this filial scrutiny have not been particularly heartening. Some have thrown up their hands in despair finding traditions like classical sociology to be quite irremediably ungreen (for instance, Murphy, 1995); some have chosen rebellion over despair and issued clarion calls for a new social science altogether (for instance, Catton & Dunlap, 1978); while still others have painstakingly sought for environmental resources in the works of individual classical theorists (for instance, Foster, 1999, 2012).

One problem with such efforts, necessary and timely as they may be, is that they fail to recognise that the society-nature relationship is a very *special* kind of relationship. It is *not* like the relationship between fish and the sea, or between frogs and a pond; it is not, in other words, a relationship between a species and a *particular kind of habitat or phenomenon*. To be sure, society, or human beings as a social species, are a particular kind of entity. But *nature*, the second term in the relationship, is all-encompassing; it is as *general* as general can be. To seek to understand the nature of *nature*, therefore, is to seek to understand the character of existence *in all its generality*. A comprehension of the society-nature relationship, in other words, would require an *ontological* investigation.

In what follows we try to understand the basic philosophical reasons why such ontological exploration could never take root in the mainstream of social and philosophical theorisation about nature. We look at the various kinds of divides – for instance, between *empirical* content and *normative* judgment, that this inability gave rise to. We then take a look at how contemporary environmental social theory has sought to address this absence of ontology, while operating on philosophical terms generated by the latter. We try to show that this awkward combination of criticism and shared premises leads to even deeper philosophical problems. Assessment of these problems leads us, finally, to the aims of the current study.

1.1 *The Expulsion of Ontology in Modern Philosophy*

Most of mainstream philosophy over the last two centuries has been deeply hostile to questions of ontology. Profoundly influenced by positivism, most academic philosophy in this period has viewed ontological concerns as either meaningless or illegitimate or both (Lawson et al., 2007). To be sure, this period has witnessed a veritable explosion in our knowledge and understanding of *specific* physical phenomena. The horizons of the natural sciences have expanded at an unprecedented rate during the course of the twentieth century. Ontology, however, or the investigation of the nature of reality *in general*, has remained by and large outside the remit of academic consideration.

At the philosophical level, this expulsion of ontology can be explained by the basic terms in which positivism casts the *epistemic* relation – the relation between the *knower* and *that which is known*. All knowledge must *directly* be founded on sensation, positivism asserts. For positivism, therefore, the acquisition of knowledge *does not involve* coming to know characteristics, properties or features of an *external world*, a world which *exists independently of the knower*. Instead, knowledge only entails an identification of correlations, patterns and regularities of sensations. For the knowing subject, in other words, it is not the external world, *but her own sensations which are the object of her knowledge* (Novack, 1963). Do these sensations reflect external objects – the external world? "We can never know and it is futile to speculate!" aver the positivists. The reason for this is that since it is assumed that knowledge must directly be based on sensation, *even knowledge of the relation between sensation and an external object must be verified through sensation*. The same question of veridicality, of *objective content*, would, however, arise for this "second" sensation as well. And so on and so forth *ad infinitum*. To comment on anything beyond the confines of immediate sense perception would, therefore, be violative of the foundational assumption of positivism. This constraint has cast its net far and wide in modern philosophy. It is the basic reason, for instance, why the Kantian "thing-in-itself" must remain fundamentally unknowable. It is the main reason, again, why *metaphysics* – in the language of positivism, any speculation on what "lies behind" sensation as it were – has become a bad word *across* mainstream modern philosophy.

In socio-historical terms, the banishment of ontology played a key role in the entrenchment and defense of the political hegemony of capitalism in western Europe. This role was a *dual* one. On the one hand, particularly in the seventeenth and eighteenth centuries, positivism was instrumental in countering theological justifications for feudal-aristocratic rule thereby aiding the bourgeoisie in strengthening and consolidating its political ascendancy (Rasmussen, 2013). Such theological justifications often invoked the authority of God and other forms of divinity, which *by definition* lay beyond the scope of sense perception. The positivist requirement that all knowledge be directly based on sense data thus cut the ground from under the feet of such arguments. Increasingly, it became difficult for lords and nobles and kings to premise their political authority on divine sanction.

On the other hand, positivism helped the bourgeoisie combat foes of a different kind as well. From the second half of the eighteenth century a distinctly ontological philosophy, *materialism*, increasingly became an instrument and vehicle of radical social and political criticism. While materialism has a long history stretching back to ancient Greece and India, it was in the political tumults of eighteenth century western Europe that it became a current of active and open ideological struggle. Materialism, in its bare essentials, is the thesis that matter is *primary* and mind *is secondary*. All of existence is material; mind or consciousness is merely one *form* or *state of organisation* of matter (Timpanaro, 1975). At the epistemological level, this ontological priority of matter over mind translates into the principle that our sense perceptions, ideas and concepts *reflect* an external, material world. Materialism as a philosophical doctrine can be directly contrasted with *idealism.* Idealism posits the primacy of mind over matter. It is mind which comes first, and matter develops from it. Most dominant religious views about the nature of the world, since the inception of religion itself, have been idealistic in this sense. Such views see the material world as the creation of a divine entity, which is predominantly if not purely mental in character.

In eighteenth century France, the notion that the mind arises from material processes became the basis for an uncompromising criticism of religion and a range of institutions associated with it. At the vanguard of such attacks were materialists like Diderot, d'Holbach, La Mettrie and Helvetius. According to Israel, in terms of espousal of egalitarianism and democracy, the French materialists were far more consistent than figures like Voltaire and Rousseau who later became synonymous

with the French revolution (Israel, 2006). The materialism of the former enabled them to envisage a kind of human universality that the latter could not.

The radical career of materialism, of course, does not end there. In the first half of the nineteenth century the German materialist philosopher Ludwig Feuerbach carries out an extensive assault on Christian thought and religious orthodoxy on the basis of explicitly materialist premises (Engels, 1886/2009; Wartofsky, 1982). These criticisms receive wide reception across the German speaking world. Materialism comes into its own, of course, with the work of Marx and Engels who, employing the notion of dialectics developed by Hegel, adopted a dynamic view of matter and, *as a result of doing so,* accorded a central role to human labour in the development of knowledge and material culture (Marx and Engels, 1932/1998). This combination of dialectics with materialism, or dialectical materialism as it would later come to be called, became closely associated with labour movements unfolding in Europe and beyond from the middle of the nineteenth century. The idea that it is the worker, and not the capitalist or manager or banker or priest, who is the foundation of society and civilization, was an electrifying one for the millions who were being ground down by capitalist exploitation. It told them that the ruling classes were dispensable and a world without them, without exploitation, could indeed be built.

Positivism aided capitalism in this struggle against labour, and still does, in a two-pronged way. First, positivism aggressively dismissed materialism as "metaphysical" since it was a thesis that dealt with the nature of things beyond the immediate circle of sense perception. The material character of all existence, the emergence of mind from material processes, the reflection of the material world in mental categories like sensation etc. were illegitimate propositions for positivism since none of them were "given" in immediate sense data (Sellars, 1946). On this view, a materialist account of the world is no better than a medieval, theological account since both of them trade in "metaphysical" speculation (Ilyenkov, 1982). Thus, a political worldview based on such a philosophy – socialism – must be equally metaphysical and speculative. This active discrediting of materialism by positivist philosophy is one of the reasons why the former, despite its enormous political significance over the last two centuries, has remained completely marginal to established mainstream philosophy.

Second, in a large number of countries in Europe, after the bourgeoisie established their political supremacy, they saw in their former enemies – the clergy and aristocracy – potential allies in the

struggle against labour. Even in the absence of such clear class configurations, the now entrenched capitalist class quickly realized that religious dogma and other traditional forms of social reaction could be invaluable ideological assets in keeping labour in check (Marx, 1855/1975). Positivism helped *indirectly* in cementing such alliances and mobilizing such ideological resources by *sharply delimiting* the scope of knowledge. Thus, if *knowledge* is restricted exclusively to patterns of immediate sense data, things beyond such direct sensory experience could be accessed by *faith*. George Berkeley, for instance, who is seen as one of the foundational figures of positivism, on the one hand launched a scathing attack on materialism as nothing but vulgar "metaphysics", but, on the other, assumed with utmost insouciance that our sensations are nothing but God's sensations and are, therefore, "objective" (Flage, 2014). Neo-Kantians, while not positivists, denied that *reason* could give us access to anything beyond immediate phenomena and the categories through which we interpret them; *faith*, however, could be a passport to whatever underlies direct sensation – the world of *noumena* (Oizerman, 1981). The essence of the two-pronged strategy must be clear by now. First, eliminate any *reasoned philosophical debate* on the nature of the world, nature of knowledge etc. from the ambit of philosophy by making an extremely narrow and constricted notion of knowledge your starting point. Second, once that elimination is complete, bring in *through the back door*, as it were, *ontological* views that are *more politically convenient* in the garb of faith.

1.2 *Nature and the Question of Ontology*

Over the last few decades, however, ontological considerations have resurfaced on the horizons of mainstream philosophy. The key driving force behind this phenomenon has been the increased concern in recent times over environmental degradation (White, Rudy & Gareau, 2016). From the nineteen sixties, the perception of environmental decline as a global crisis has steadily gained traction, and manifested itself in a range of very visible social and political movements, social theories and perspectives, and public debates and polemical confrontations. While initially confined to advanced capitalist countries in the West, intense and charged public engagement with environmental issues is today a genuinely global phenomenon.

But what does the rise of the contemporary environmental imagination have to do with a revival of ontology? To understand this, two important features of this imagination must be sketched in broad outline. The first feature concerns the *nature* of current environmental problems, and the

second concerns their *origin.* As far as the first is concerned, a large section of contemporary environmentalism views current environmental issues as symptomatic of a *qualitatively new* relationship between human beings and the rest of nature (Redclift & Benton, 1994). Several factors have contributed to this. Scientific developments over the last two decades have made it abundantly clear that some of the most pressing and seemingly intractable environmental problems like global climate change are *anthropogenic* in nature -- i.e. they originate in human activities. In the same period, the idea of the *Anthropocene*, a new geological epoch wherein human activities are the central driver of key geological and climatic variables, has gained considerable traction in both the scientific community and the public imagination (Lidskog & Waterton, 2018). These ideas have, in a way, strengthened already existing notions like the "end of nature" (McKibben, 1989) which essentially point to the scale of the human imprint on the natural world thereby suggesting the lost "naturalness" of the latter. This sense of altered human-nature relations has also been boosted by ideas of contemporary society being a "risk society" (Beck, 1992) where manufactured risks predominate, as against earlier societies where most risks were non-human in origin.

On the question of the origin of contemporary environmental problems, there is an overwhelming consensus across vast sections of environmentalism that they can be traced back to the concepts, ideas, values, and practices concerning the natural world that were ushered in by the Enlightenment in Europe (Pepper, 1996; Dusek, 2006). The Enlightenment was a long process of thoroughgoing social, political, and cultural change in western Europe from the sixteenth to the eighteenth century. It is usually seen as a part of the long transition from feudalism to capitalism in the region. Environmentalism, in its diagnosis of the Enlightenment as the chief source of environmental ills, makes four key allegations. First, the Enlightenment by bringing in a scientific view of the natural world – a world governed strictly by laws of nature, displaced pre-existing religious views of nature as animated by a range of divine and quasi-divine entities like God, angels, spirits, vital forces etc. (Descola & Palsson, 1996). Second, this "disenchantment of the world", to use the language of German sociologist Max Weber (Weber, 1919/2004), resulted in nature simply being seen as "dead matter". This amounted to a fundamental devaluation of nature (Plumwood, 1993). Third, this devaluation licensed wanton technological intervention in nature for the satisfaction of human ends. Since nature was not divine anymore, there were no moral constraints whatsoever upon this intervention (Merchant, 1982). The goal was the "domination of nature", and it was this drive which was fundamentally responsible for environmental problems in the modern period.

Fourth, the disenchantment and domination of nature, its complete subordination to human requirements, created a *separation* between human beings and nature. The Enlightenment, and all the processes it set in motion, tore asunder the pre-existing harmony and balance between humans and the natural world, a harmony where human beings saw themselves *as a part of nature* rather than as conquerors who command it *from the outside* (Mathews, 2005).

This basic assessment of the nature and causes of environmental problems by contemporary environmentalism has meant that certain tangled questions of an ontological character cannot viably be avoided by mainstream philosophy anymore. Fundamentally altered human-nature relations and wide-ranging criticisms of the Enlightenment call for a reassessment of a number of categories we take for granted. For instance, in the age of the Anthropocene, where human activities are the main factor driving geological and earth system changes, where does the "human" end and the "natural" begin? Is human influence enough for nature to lose its status as "natural"? If so, has humankind ever encountered nature in such a pristine and "pure" form? Or are such notions of "purity" misplaced and untenable? Are science and technology inherently destructive towards nature? Could they be instead harnessed towards environmental protection? Was there ever a simple and undisturbed harmony between human beings and nature? In any case, what would such a harmony *mean?* What would it mean for human beings to see themselves as a part of nature again? Is there *only one* way to be a part of nature, or are their multiple ways? What kind of kinship and affinity do human beings have with other species? What are the normative implications of such relations? What are the normative implications of *differences* that human beings have from other species? Is there such a thing as *human nature?* Or is it purely a matter of historical contingency? How do *social relations* complicate all the above questions?

Such questions cannot obviously be answered within the bounds of positivism and its narrow preoccupation with immediate sense data. Mainstream philosophy and social theory, in response to the sheer urgency with which these questions have gripped the public imagination, has therefore had to grudgingly widen its gates. Thus, one finds an increasing space being made over the last few decades for ontological and metaphysical themes in the active concerns of philosophy, sociology, political science and geography departments. Publications on ontological questions have increased manifold; several new journals have been established. Sub-disciplines directly addressed to environmental questions, like environmental ethics, environmental philosophy, and

environmental sociology, have established their autonomy and prestige as legitimate fields of enquiry.

1.3 *Cartesian Dualism and the Mind-Matter Split*

Among the ontological concerns directly spurred by reflections on environmental issues, of particular importance is the question of dualism. There is a strong consensus amongst a large section of environmentally-oriented social theorists, particularly those critical of the Enlightenment, that the philosophy of seventeenth century French philosopher and mathematician Rene Descartes was the foundational source of all erroneous attitudes towards nature that were then carried forward by the Enlightenment. Culpability, in particular, has been assigned to what is referred to as Cartesian dualism or as the "Cartesian split", which, in essence, is the idea that mind and matter are two fundamentally different kinds of things with nothing in common between them. It is asserted that this split was the *original*, or at least the *first influential*, form of the philosophical separation between human beings and nature which constituted the core of the Enlightenment ethos and which justified the large-scale destruction of nature in the modern period (for instance, Merchant, 1982; Plumwood, 1993, 2006; Callicott, 1989, 1999). It is somewhat ironic, however, that despite the rhetorical centrality of Cartesian dualism in such accounts, there is hardly any serious treatment of the content of such dualism. Let us, therefore, take a brief look at what Cartesian dualism is.

Descartes proposes that mind and matter are two fundamentally different *substances* (Descartes, 1637/1998). A *substance*, in the philosophical usage of the time, was an entity which did not need anything else for its existence or definition – which was *self-subsistent* and *self-defining* (Swinburne, 2018). Thus, matter did not enter in any way into the *identity* or definition of mind; and mind did not enter in any way into the identity and definition of matter. There was, in other words, *nothing in common* between mind and matter; they were radically alien to each other.

On what grounds was Descartes making these claims? There were essentially three kinds of arguments he advanced over the years to support his dualist thesis. First, and this is the best known argument, Descartes claims that when he subjects the contents of his knowledge to radical doubt, the only item that withstands such scrutiny is the fact that he is thinking. It is *logically possible* that the apparent existence of the phenomenal world, the seeming reality of his corporeal body etc. are *illusory*. But what he cannot logically doubt is the *fact that he is indeed doubting*, which is of

course a mental exercise. Thus, his existence as a *thinking being* is the only thing he can be certain about. From this he infers, and this was a move which was heavily criticized even during his day, that the human mind is indeed purely incorporeal (Descartes, 1637/1998; Baker & Morris, 1996). Second, Descartes argues that for the soul to be immortal, and he saw the soul and the mind as the same thing, it had to be immaterial. The immortality of the soul was an important element of Catholic dogma of his times and he takes it for granted. He reasons that if the soul were corporeal it would perish with the body on death. Only a purely incorporeal soul could survive physical death and therefore be immortal (Rozemond, 1998).

Third, he argues that the nature of matter is such that it cannot possibly give rise to something as complicated as the mind (Cottingham, 1992). Descartes, it must be remembered, wrote and worked in a period in which the biggest strides in the natural sciences were made in the of areas of astronomy and mechanics. Both dealt with the movement and physical interaction of discrete bodies across space and time. Similarly, in the field of technology, it was the introduction and development of machines which dominated. These were mechanical machines, with the movement of separate parts being coordinated through simple mechanical processes. There was a tendency on the part of many who observed these developments in mechanics from close quarters to illegitimately extend insights gained from them to other domains of the natural world. Historians and philosophers of science have often referred to this as a "mechanistic" or a "mechanical" view of the world (Garber & Roux, 2013).

Descartes' view of the natural world was mechanistic or mechanical in this sense. This is what led him to regard animals and the human body as "machines" (Baker & Morris, 1996). But why could not such corporeal "machines" be capable of thought? Descartes argues that the overall behavior of a machine is dependent on the structure of its parts. In the case of animals, for instance, how the animal behaves depends on the structure of its organs. Since these organs are structurally simple, animals respond to various situations in fundamentally *fixed* ways. But the human body *too* is structurally simple. While the human brain may be anatomically a little more complex than that of other animals, the difference is just a matter of degree. This additional complexity *can in no way* account for the fact that human beings can respond to *any* situation in an *infinite* number of ways. In fact, Descartes argues, it is *inconceivable* that any arrangement of matter, *any machine*, would

have the complexity required for such infinite flexibility. Therefore, the source of mental functions and capacities must be extra-material or extra-corporeal (Cottingham, 1992).

A basic problem which any thesis of radical separation of mind and matter, such as Descartes', has to face is that we lead obviously corporeal lives. We form ideas and notions in our minds which we often translate into corporeal, bodily actions. If mind and matter have nothing whatsoever to do with each other, if they have nothing in common, how does the mind interact with the body and the rest of the material world? The Russian philosopher, Evald Ilyenkov, explains this problem in the context of certain comments by Malebranche, a follower of Descartes:

"Malebranche expressed the principal difficulty arising here in his own witty way as follows: during the siege of Vienna, the defenders of the city undoubtedly saw the Turkish army as 'transcendental Turks', but those killed were very real Turks. The difficulty here is very clear; and from the Cartesian point of view on thought it is absolutely insoluble, because the defenders of Vienna acted, i.e. aimed and fired their cannonballs in accordance with the image of Turks that they had in their brains, in accordance with 'imagined', 'transcendental' Turks, and with trajectories calculated in their brains; and the shots fell among real Turks in a space that was not only outside their skulls, but also outside the walls of the fortress." (Ilyenkov, 1977: 23)

The only answer that Descartes can provide to this question is to say that it is God who unites mind with matter when such interaction happens (Clarke, 2005). This, of course, is not a convincing answer at all. Not only because of the tendentiousness of the way in which it is made, but also, and more importantly, because God himself is mental in character for Descartes like it has been for most mainstream religions across human history. Therefore, God too would have nothing in common with matter. Thus, God uniting mind and matter *would be as impossible as* mind and matter interacting without the interaction of God.

But Descartes' answer *does* tell us that dualism is not a *symmetrical* relationship. It involves a radical split between mind and matter, but in the last analysis, *it is a form of idealism*. The essential reason is already clear in the point above: the mind plays a central role in our interaction with the material world, and in the absence of any ontological relations between the two the latter must be *reduced* to the former. For instance, God uniting or harmonizing the material world with our minds becomes conceivable only if the *material world itself is an expression of divine intellection and will*.

The same point could be made slightly differently as well. What can be said about the interaction between mind and matter *at one point in time*, could also be made about the relation *over time.* The human relationship with nature changes historically; material culture is a dynamic domain. Techniques of production, nature of inputs, things produced etc. go through transformations over time. These changes go hand in hand with a deepening knowledge of nature – a cumulatively enriched corpus of ideas and concepts of how nature or the material world works. If one assumes a radical split between mind and matter, *since the mental or cognitive character of our activities is obvious to us*, we would have to conclude that it is the development of ideas that is *by itself* and *uni-directionally* driving the development of material practice. If one is appreciative of such development, one could call it a result of the unfolding of sheer scientific and technological ingenuity, as scientistic or technocratic views often do. If one is skeptical of such development, say from a current environmental angle, one could call it *Promethean* or *productivist*. In either case, the basic assumption is an idealist one – that the unfolding of mental processes, of the *mind*, uni-directionally brings about changes in material practice. Nature or matter have no role in these transformations.

Having sketched Descartes' basic arguments for dualism, and the essence of the problem with such a view, given the sheer unanimity with which Cartesian dualism has been singled out for environmental blame, a few comments are in order. First, the idea of a purely incorporeal soul is by no stretch of the imagination something peculiar to Descartes. It has a long history both in philosophy and theology. For Plato, for instance, as we will see in Chapter 7, the soul or the mind was completely non-material. In fact, Plato saw the corporeal body as a prison or encumbrance for the soul, death therefore being an ultimate liberation for the latter (Plato, ca. B.C.E. 360/1914). There is nothing in Descartes even approaching such contemptuous denigration of the material world and corresponding glorification of the mind. Yet, ironically, we do not have Plato and his work being subjected to even a fraction of the withering environmental criticism that Descartes is subjected to. One could have understood this state of affairs had Platonism been a dead philosophical current. But it is alive and kicking across a range of fields, from ethics to the philosophy of mathematics.

Second, the argument that matter cannot possibly develop into mind has a hoary lineage. The typical form of such arguments has been to identify certain fragments of the natural world, separate

them from their *dynamic* relations with other aspects of nature, and then to argue that such *frozen*, *immobile* and *dead* matter can never possibly produce something as complicated as the mind. Neither can such material factors *explain* mental phenomena in any way. One of the most celebrated such arguments can, again, be found in one of Plato's dialogues, *Phaedo*, where the character of Socrates is criticizing the materialist trend in Greek philosophy just before his execution.

"…who, when he endeavoured to explain the causes of my several actions in detail, went on to show that I sit [in prison] because my body is made up of bones and muscles; and the bones, as he would say, are hard and have ligaments which divide them, and the muscles are elastic, and they cover the bones, which have also a covering or environment of flesh and skin which contains them; and as the bones are lifted at their joints by the contraction or relaxation of the muscles, I am able to bend my limbs, and this is why I am sitting here in a curved posture.. and he would assign ten thousand other causes of the same sort, forgetting to mention the true cause, which is that the Athenians have thought fit to condemn me, and accordingly I have thought it better and more right to remain here and undergo my sentence…" (Plato, ca. B.C.E. 360/1914: 257)

Claims of the irreducible insufficiency of matter in explaining the emergence of human beings or even organic life are widely popular even today in anti-evolution and creationist circles. The rise of right-wing regimes across the world over the last decade has given such theories renewed vigour and aggressive platforms. It is rather interesting that apart from a few honorable exceptions (for example, Foster, Clark & York, 2008) such comprehensive denigration of matter and the natural world has escaped the ire of environmental social theory.

Third, the complexity of Descartes' view of animals and the human body as machines is almost inevitably lost sight of. Thus, those assertions of Descartes where he is baldly asserting a mechanical view of organic bodies are widely quoted in the environmentally aligned literature. For instance, it is almost trite to quote Descartes' view that for animals "it is nature which acts in them according to the disposition of their organs, just as a clock, which is only composed of wheels and weights is able to tell the hours and measure the time more correctly than we do with all our wisdom" (Massey & Boyle, 1999: 135). But what is often forgotten is that *despite* such occasional utterances, for Descartes, living bodies are no *ordinary* clocks or machines. They are endowed with a number of properties and abilities which are not captured by a conventional interpretation

of the machine metaphor at all. Thus, Cottingham quotes Descartes' list of functions which the mechanical body, both human and animal, can perform:

"digestion of food, the beating of the heart and arteries, the nourishment and growth of the limbs, respiration, waking and sleeping, the reception by the external sense organs of light, sounds, smells, tastes, heat and other such qualities, the imprinting of ideas of these qualities on the organ of the 'common sense' and the imagination, the retention and stamping of these ideas in the memory, the internal movements of the appetites and the passions, and finally the external movements of all the limbs which aptly follow both the actions and objects presented to the senses and also the passions and impressions found in the memory." (Cottingham, 1992: 246)

A number of these functions – sensation, memory, imagination etc. – transcend not just the analogy of the machine, but, as Cottingham points out, even current notions of purely physiological functions. To be sure, this was partly motivated by Descartes' overarching objective of cleansing the mind or the intellect of all sensible, material content. But, nevertheless, the imagining, remembering, feeling, passionate machine is a far cry from the "metal toy" image of the animal that has become customarily linked with Descartes in contemporary social theory.

1.4 *Dualism as Disenchantment*

One major problem with the insufficient philosophical attention paid to the nature of Cartesian dualism in the environmental literature is that in a vast majority of cases *dualism is understood as disenchantment of the world* (for example, Merchant, 1982; Shiva, 1989; Mathews, 1991, 2005; Kessler, 2019; Elvey, 2006). The conflation is rather problematic, and we shall be centrally concerned with its implications. Weber provides the now classic characterization of disenchantment in his lecture *Science as a Vocation*: "It is the knowledge or the conviction that if *only we wished* to understand [the conditions under which we live] we *could* do so at any time. It means that in principle, then, we are not ruled by mysterious, unpredictable forces, but that, on the contrary, we can in principle *control everything by means of calculation.* That in turn means the disenchantment of the world. Unlike the savage for whom such forces existed, we need no longer have recourse to magic in order to control the spirits or pray to them. Instead, technology and calculation achieve our ends." (Weber, 1919/2004: 87)

Thus, in Weber's account disenchantment is a process wherein the development of science and technology has resulted in an *overall understanding* of the world as driven by *material, causal*

processes, rather than *non-material*, *ideal forces*. But such replacement of ideal by material causes at the level of world outlook is not the same thing as dualism at all. In fact, *it could well be a step towards overcoming dualism*. For instance, Charles Darwin and the British geographer and naturalist A.R. Wallace arrived at the idea of natural selection independently. But while Darwin saw even the evolution of human intelligence as a product of natural selection, Wallace made an exception in the human case and brought in divine agency to explain the origin of human mental faculties (Rachels, 1990). In this case, Darwin's was the disenchanted view, allowing only for strictly material causes and processes; yet, *for the very same reason*, it was a non-dualistic one. He regarded the mind to be a product, *like any other natural phenomenon*, of material processes. Wallace's account, on the other hand, was an *enchanted* one; a mysterious, divine force played a role in the evolutionary process. Yet, it produced a dualism. The mind, as divine creation, was non-material; the body, on the other hand, being a product of material processes of natural selection, was physical.

Dualism and disenchantment, therefore, not only do not converge, they often have *opposite* implications. A part of the problem seems to lie in the basic characterization of science and scientific knowledge that environmentally oriented philosophical and social theory operates with. Indeed, such a characterization is evident in *Science as a Vocation* itself. Science enables us to control and predict certain aspects of the natural world because of a deepening *knowledge* of that world. In other words, there is an *ontological depth* that scientific endeavor gives us access to (Bhaskar, 1978). This depth translates into an increasing ability to *explain* phenomena of nature; *it may not mean at all an ability to predict and control.* A classic instance of this is the science of evolution, where the scientist aims for historical explanation rather than prediction (Mayr, 1982). The sheer complexity of phenomena is such that prediction, particularly in the arena of macro-evolution, is ruled out. Weber, in his insistent stress on control and calculability, essentially operates with a positivist or pragmatist understanding of scientific activity.

The other source of the conflation seems to be the fact that disenchantment has a *moral aspect* to it. The ideal and non-material forces which were thought to control the motion of the world, also *gave moral meaning to the world*. Deities, divinities and spirits, apart from being agents of causation in the natural world, were also sources of ethical norms and constraints for human beings. Thus, there was a *unity* between the nature of the world as a whole, and the character of

ethical life. When critics of disenchantment, Weber included, refer to the *loss of meaning* that science brings in its wake they are essentially referring to the severance of this unity. This severance can be interpreted as separation of human beings from nature, which in turn can be understood as dualism. Of course, the implicit assumption here *always* is that it is only through the positing of *purely ideal* entities that the unity of ontology and ethics, of *being* and the *good*, can be brought about.

1.5 *Reversal of Dualism as Re-enchantment: The Question of Radical Subjectivity*

One major implication of the conflation of dualism and disenchantment in environmentalist literature is that the *conceptual reversal of dualism is sought in the conceptual reversal of disenchantment*. The latter, often referred to as *re-enchantment*, involves the re-adoption of non-material entities as causal and moral agents (Berman, 1981; Jenkins, 2000). As the direct and explicit espousal of causal agency of non-material or purely ideal agents is somewhat difficult outside strands of environmentalism that are straightforwardly religious, the focus is usually on the restoration of moral agency. Further, since the goals of this re-enchantment are directly environmental, it is the moral status of natural entities themselves, rather than underlying ideal entities, which is at the centre of immediate attention.

Thus, the last few decades have seen the rise of professedly *ecocentric* or *biocentric* philosophical and social theorizing, which sees natural entities, usually *all organisms*, as possessing *intrinsic value* (Eckersley, 1992). Such approaches consciously pose themselves in opposition to what they call *anthropocentric* views which, on their account, see non-human organisms simply as *instrumental values* or things human beings can use as means to attain their own ends (Dobson, 1990). The most common way of grounding the intrinsic value of organisms is to say that they are bearers of moral entitlements or rights. The underlying theme here is usually one of *biospheric egalitarianism* – like humans are rights-bearing, *free* moral agents, so are all organisms (for example, Rolston III, 1975, 1988, 1994; Taylor, 1986; Regan, 1983; Fox, 1990).

A problem arises here, however. Most mainstream modern accounts of *free moral agency*, the latter being central to the concept of moral entitlement, operate with a notion of freedom which is fundamentally unconstrained. A free agent, on such accounts, is someone who chooses her own ends *on criteria chosen by her* (Schneewind, 1997). There is nothing in the *intrinsic, objective*

nature of the ends that can constrain her choice. In other words, the choice of ends, in order for it to be free, must have a *radically subjective* character.

Indeed, this radical separation between the intrinsic nature of ends, on the one hand, and standards of choice and action, on the other, *is an aspect of Weberian disenchantment itself*. The inability of the objective nature of ends -- the nature of the world -- to constrain freedom or choice is nothing but the severance of the unity of being and the good referred to in the previous section. There is nothing in the constitution of the world *that can tell us what to do,* that can serve as a guide to ethical action.

While Weber, of course, does not deal with environmental questions and is historically remote from contemporary concerns of environmental re-enchantment, this contradiction nevertheless is present in his work. It is reflected, importantly, in the strange tension that pervades his approach to the question of rationality. On the one hand, he is critical of what he calls *zweckrationality* or purposive rationality, and its indifference to the question of ends (Brubaker, 1984). This indifference, for him, is at the core of what he sees as the constant conflict of values unfolding in the advanced capitalist society of his day. But at the same time, he also holds that rationality or reason cannot be an arbiter in a choice between ends. Reason can give us access to *facts;* it can tell us the best *means* to achieve an end. But the choice of ends is a fundamentally *non-rational* decision (Turner & Factor, 1984). Goals, ends, objectives etc. belong to the domain of *values*, and there, reason has no sway. Between any two ends, there is an irreducible subjectivity of choice, radically uninfluenced by the nature of the ends themselves. Weber says: "According to our ultimate standpoint, the one is the devil and the other the God, and the individual has to decide which is the God *for him* and which is the devil." (Brubaker, 1984: 72)

Thus, Weber is also a firm adherent of what is referred to as the fact-value distinction (Turner & Factor, 1984). This is a methodological variant of a division that was most famously affirmed by the Scottish philosopher David Hume in claiming the impossibility of deriving an "ought" from an "is". In a now well-known passage from his *Treatise of Human Nature*, Hume argues:

"In every system of morality which I have hitherto met with, I have always remark'd, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surpriz'd to find, that instead of the usual copulations of propositions, *is,* and *is not*, I meet with no proposition that is not connected with an *ought,*

or an *ought not*. This change is imperceptible; but is, however, of the last consequence. For as this *ought* or *ought not*, expresses some new relation or affirmation, 'tis necessary that it should be observ'd and explain'd; and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it. But as authors do not commonly use this precaution, I shall presume to recommend it to the readers; and am persuaded that this small attention wou'd subvert all the vulgar systems of morality, and let us see, that the distinction of vice and virtue is not founded merely on the relations of objects, nor is perceiv'd by reason." (Hume, 1739/2011: 409)

Thus, morality cannot be deduced from how things *are*; there is an unbridgeable gulf between the *is* and the *ought*. So widely accepted has this idea been in mainstream modern philosophy, that it has often been referred to as "Hume's Law". A closely related expression of the same idea is G.E. Moore's objection to what he calls the "naturalistic fallacy" (Sinclair, 2019). A naturalistic fallacy, according to Moore, is the inference of the "goodness" or "badness" of a thing, i.e. the positive or negative normative evaluation of a thing, from its natural properties. For instance, statements like "the sun is good because it gives us warmth" and "this tree is good because it is laden with fruit" would be examples of the naturalistic fallacy as the "goodness" of the sun and the tree are being deduced from their respective natural or physical features.

1.6 *Feudalism, Morality and Material Ends*

1.6.1 *Split between Universality and Particularity: Roots of Feudal Enchantment*

But is a radical separation between is and ought, between *being* and *the good*, an inevitable consequence of disenchantment? Must an understanding of the external world as driven by material, causal processes necessarily yield an ethics fundamentally split from the nature of that world? We do not think so. We are of the view, rather, that the understanding of disenchantment as producing an ethics abstracted from the material, phenomenal world is the result of a very specific socio-historical juncture – i.e. *the rise of capitalism from pre-capitalist social formations.* The point could be usefully illustrated by taking the transition from feudalism to capitalism as an example.

Before we get to that, however, what must be recognised is that ethics are *social standards* of activity. The need for ethical constraint and regulation, the need for *binding* moral commitment, arises in the context of the need of human beings to cooperate with each other (Sayers, 1998). But

why do human beings need to cooperate with each other at all? Cannot social cooperation be optional? It cannot. Because human beings can reproduce their *life process*, their very existence as human beings, *only* through material practice which is unavoidably and irreducibly social (Marx, 1932/2007, 1847/2010). Therefore, in the last analysis, it is our social material practice, our socially mediated interaction with nature to secure our means of life, which accounts for the existence of ethical standards.

In class-divided societies, this relationship between material practice and ethical standards assumes an inverted form. Class-divided societies are characterised by division of labour, most fundamentally between physical and mental labour (Marx & Engels, 1932/2010). A set of people carry out the actual physical tasks of production, while another set oversee and organise production. Under feudalism, which was the pre-eminent form of class division in certain parts of the world for much of the last two millennia, the feudal lord would typically command or direct the productive activities of various vassals, serfs, peasants, artisans and others within his realm (Bloch, 1961). Now, each productive activity has a *specific, inherent nature* that gives it *social significance*. A peasant's activity could be aimed at cultivating wheat; a carpenter's activity could be aimed at making agricultural implements for the peasant; an ironsmith's activity could be geared to making tools for the carpenter. Considered in material or natural terms, therefore, every productive activity has an *end* which is both *particular* and *universal*, and *for the same reason*. It is the *particular* qualities and attributes of the wheat crop, stemming from the particular quality of the labour that produces it, that enables it to satisfy a *social* – i.e a *universal* – need (Chitty, 1993).

The *social form* of feudalism, however, means a severance of this unity of particularity and universality. The subordination of productive activity to the *will and command of the feudal lord*, rather than to specific social needs, creates a *divergence* between the *sources* of particularity and universality of ends. The ends of activity are now particular *in so far as they are material, phenomenal objects with specific qualities*; they are universal *in so far as they express will of the feudal lord.*

Separating the qualities of the object from the needs it satisfies, amounts to separating the object from its inherent material connections with other objects. The tools produced by the ironsmith are separated from their material, physical relations with implements produced by the carpenter. The implements made by the carpenter are separated from the wheat crop grown by the peasant. **Ends,**

therefore, conceived as material, particular, sensible ends, are sundered from each other. At the same time, since the will of the feudal lord, which serves as the social connection of ends under feudalism, is aimed at *preserving its own dominance rather than fulfilling specific social needs*, it is necessarily bereft of any material, sensible particularity. *Anything*, any productive end, could be commanded by the feudal lord, as long as it subserves the latter's interest. Thus, **ends, conceived in their universal connections, are seen as products of a will or mind that transcends the world of material particulars**.

Three important consequences follow. Since ethics, as we saw earlier, are essentially social standards of activity, the particularity-universality split would imply that ends in their natural determinations are relegated to the domain of *non-moral* particularity; while the *same* ends, pursued as dictates of an extra-material governing will, partake of *moral* universality. A strange duality, therefore, arises. On the one hand, material ends in their qualitative particularity, along with the qualitatively determinate labour that attains them, is normatively *devalued*. Nature, as a realm of *material specificity*, becomes a degraded domain bereft of ethical content. At the same time, material ends pursued as expressions of a universal governing will become *ethical par excellence*. Nature, as a realm *manifesting a transcendental will*, becomes a domain charged by ethical meaning. This duality, in our view, is the key to understanding the nature of *enchantment* under feudalism. The moral elevation of nature *depends* on the moral devaluation of nature.

Second, the ultimate *source* of ethical value is the governing will. Being completely unconstrained by material particulars, it can will or command *any* particular activity and confer ethical sanction upon it (Markoff, 1996). This also means that the governing will is conceived as *free* in a *materially unconstrained way*, and this freedom is intimately tied with its goodness. The materially unconstrained nature of freedom can be understood in another way. Freedom essentially involves a choice between particular ends. In order to make this choice, the ends must be compared with each other (Kirchin, 2012). But since ends, as particular ends, have been robbed of their inherent, material interconnections, such comparison is not possible. The choice, then, must necessarily be unconstrained by the inherent nature of the ends. Both freedom and ethical value, therefore, are *constitutively transcendental; they lie outside the domain of material causation.*

Third, do *feudal subjects* too possess free will? Yes, because without the assumption that they have the faculty of freedom, feudal rule would not have to present itself as a moral system at all

(Sartorio, 2016). Further, given the ruling notion of freedom, the freedom of the subject as well would be materially unconstrained. However, the *exercise* of such freedom would be subservient to the performance of *particular* activities stipulated by the governing will. Thus, materially unconstrained freedom under feudalism does not have *equal* moral consequences for everyone. For the bearer of the governing will – the feudal lord – free will means the ability *to decide the ends of others*; for others, free will means the ability *to overcome their natural, bodily urges and inclinations* in order to pursue those ends (Blom, 2010). The lord's freedom is end-imposing; the subject's freedom is end-receiving.

1.6.2 *Medieval Philosophy, Enchantment and Non-Universality*

The above implications run as prominent and consistent themes through the course of pre-medieval and medieval European philosophy, a tradition roughly coterminous with the rise, growth and consolidation of feudalism in Europe. Three of these themes warrant discussion. First, pervading the entire tradition is an *otherworldly* outlook (Lovejoy, 1936; Novack, 1965). The material world is seen as an *inferior* domain of changing, imperfect particulars lacking *genuine* reality; and it is contrasted with a transcendental, extra-material realm of eternal universals. The latter, essentially the realm of the incorporeal divine mind, is thought to possess genuine being. This contempt for the material world, *contemptus mundi*, is essentially Platonic in origin; but its influence over medieval philosophy, in a more immediate sense, is attributable to Neoplatonic philosophers like Plotinus (205 - 270 CE) and Porphyry (*c.*234 – *c.*305 CE). For Plotinus and Porphyry, the world of material particulars was fundamentally characterised by *privation* or *lack* (Lloyd, 1998). Particulars presented a stark contrast with the perfect universals or *ideas* that existed in the *nous* or the divine intellect. Thus, a particular material thing that was beautiful could only realise the universal idea of beauty imperfectly *as it was a material thing*. Matter, therefore, only detracted or *took away from* the perfection of ideas.

This deprecation of matter and the material world was accompanied by a devaluation of material activity. For Plotinus, matter is the *principle of evil*. The good resides in the extra-material domain. Material, sensuous activity with material ends, therefore, is fundamentally *impure* (O'Meara, 1995). The first step on the moral journey towards the good, and medieval moral thought was preoccupied with the question of ethical transformation, was *catharsis* or liberation from all attachment to material ends (Remes, 2008). St. Augustine (354-430 CE), enormously influential

for the future course of both medieval philosophy and Christian theology, saw material ends as the *lowest* of all categories of ends, the highest being the contemplation and love of God. *Sin* consisted essentially in the refusal to turn from the pursuit of the material and temporal to that of the immutable and eternal (Dilman, 1999). For Thomas Aquinas (1225-1274 CE), whose work is often regarded as the pinnacle of medieval philosophy, the ultimate goal of all exertions of the will was *beautitude* or happiness. But material ends could provide happiness of only a limited and inferior kind. Material objects, being particular, could only bring gratification to the body which itself belonged to the domain of particularity; the soul, belonging to the realm of universals, could find true happiness only in universal ends, the supreme of which, like for St. Augustine, was knowledge and love of the divine (Copleston, 1993).

Second, despite this thoroughgoing debasement of the material world, the transcendental realm was *at the same time* seen as manifesting itself as the former. Universal ideas in the divine mind, through efficient causation by the divine will, expressed themselves as particular phenomenal objects (Koterski, 2009). Thus, nature, otherwise condemned as an unintelligible mass of disjointed particulars, achieves integrity and meaning *as an expression of cosmic will.* For the Neoplatonists, for instance, the sharp rejection of the reality of the material world is accompanied by a view of nature as being ordered by divine agency into a moral hierarchy of perfection often referred to as the *chain of being* or *scala naturae*, an idea that would remain influential till the early modern period (Lovejoy, 1936). For St. Augustine, "the very order, disposition, beauty, change and motion of the world and of all visible things silently proclaim that it could only have been made by God, the ineffably and invisibly great and the ineffably and invisibly beautiful…" (Copleston, 1993: 69)

This divine infusion of moral meaning takes place in the case of material activity as well. The route is somewhat more complicated. For a number of medieval philosophers, including St. Augustine and Thomas Aquinas, knowledge or apprehension of God includes knowledge of divine moral law. This law includes very centrally the four cardinal virtues, *justice* being pre-eminent amongst them (McInery, 1993; Kenyon, 2019). *Justice* had a markedly different meaning in medieval philosophy and theology from what it has in the modern period. Plato's *Republic*, which introduced the four virtues, saw justice as consisting essentially in the *maintenance* of the ideal hierarchical social order comprising philosopher-rulers, warriors and direct producers (Plato, ca.

B.C.E. 375/2005). Justice lay in "doing one's own work and not meddling with what isn't one's own", a requirement fundamentally of sticking to one's station in life (Brooks, 2006: 71). This ideal of justice, in its bare essentials, was adopted by almost all of medieval philosophy. It enabled an incorporation of the normative requirements of the feudal order into the divine moral law. The depth of this incorporation can be gauged from the fact that for Thomas Aquinas the virtue of religious worship and reverence was *subsumed within* the virtue of justice since the relationship between human beings and God, between creature and Creator, was seen as akin to that between *subject and lord* (Copleston, 1993).

Feudal obligations, therefore, have the full moral force of the divine will. Material activity, which as particular, sensuous activity is disparaged to no end, acquires a strong obligatory charge as a part of divinely mandated feudal justice. Material practice *as material practice* is contemptible; material practice *as feudal duty* is pious obligation. The feudal lord commands in the name of the divine law; the subject must obey in deference to the divine law. Justice consists in the preservation and perpetuation of feudal class rule.

Third, this fundamental inegalitarianism is reflected in the dialectic of reason and freedom in medieval philosophy. As mentioned earlier, freedom of choice under feudalism must assume a materially unconstrained character because particular material ends are robbed of their inherent interconnections. Further, it was also noted that while everyone has a will that is free in a materially unconstrained way, this freedom has unequal consequences for different classes. How are these differential consequences of freedom conceptualised and rationalised philosophically?

For most of medieval philosophy, the ultimate source of ethical value is the divine will. The divine will is inherently good in its *self-sufficiency,* i.e. its transcendence of the domain of material need, and in its *benevolence*, i.e. its free creative generation of the material world (Lovejoy, 1936; Marenbon, 2007). *Every earthly* will, every individual human will, in so far as it attains the good, attains it in a *fundamentally derivative way*. Freedom of the human will does not have any value *in itself*; freedom is a means by which the will can turn away from the lure of material ends and attend to the imperatives of the divine will.

But how do human beings *know* what these imperatives are? Through the use of *reason*. But reason, like knowledge, has a distinctly otherworldly character in medieval philosophy. This is so in three crucial senses. First, the fundamental subject matter of reason is the transcendental world

of divine intellection. Reason, as a faculty, is essentially attuned to the realm of divine ideas and moral laws (Copleston, 1993). Material objects and processes cannot be the subject matter of reason as they are particular, and reason is universal. Even where it is acknowledged that reason could also be a guide in the pursuit of worldly ends, for instance by Thomas Aquinas and St. Bonaventure (1221 – 1274 CE), reason is divided into *ratio inferior*, an inferior reason dealing with the temporal world, and *ratio superior*, reason proper with its gaze fixed on the eternal (Mulligan, 1955).

Second, while the capacity to reason, i.e. to apprehend the divine mind, is an inherent potential of the human soul, its actualization depends on divine agency itself. The human intellect and will, unaided by divine intervention, can never reach the ultimate truth. As Aquinas says, "no created substance can by its natural power come to see God in His essence." (Copleston, 1993: 404) This has been expressed in medieval philosophy and theology in various ways. The idea of *grace* or gratuitous approval by God, as a prerequisite for access to divine moral law, runs through the entire history of medieval philosophy and Christian thought. In St. Augustine, we encounter the idea of *illumination*, or the lighting up of the soul by a divine glow which enables reason to perceive moral law (Mathews, 2005). For St. Bonaventure, this illumining light was the Word of God itself, which enabled reason to both grasp divine ideas and laws *and* see their necessary character (Gilson, 1965). Key to such divine aid to reason, it must be remembered, was its *non-universality* and *gratuity*. It was only a select few that received grace or illumination; most would be denied access to the divine moral vision. Further, the act of assistance was completely gratuitous on God's part; there was no way of forming a *positive* idea of what would make God provide such aid in a particular case. The basic reason was that such a positive idea would in effect imply an *entitlement* against God which would militate against the essence of the creature-Creator relationship.

Third, one could, however, have a *negative* idea of what divine aid required; medieval philosophy seemed clear on what *not* to do. The greater one's entanglements in the material world -- the more enmeshed one was in the pursuit of material ends -- the lower one's chances of receiving divine illumination (Dilman, 1999). The greater the *distance*, therefore, from material activity, the greater one's chances of not being ruled out. Such distance, in other words, was a *necessary condition* for the empowerment of reason.

Quite obviously, this implied that access to the moral law was the *preserve of a particular class*. A neat coherence emerges, therefore, between the freedom-reason dynamic in medieval philosophy and the normative requirements of feudalism. All individuals have a will that is free in a materially unconstrained way. But this freedom does not have ethical value in itself; it is a *means* of orientating the will to the divinely mandated good. Knowledge of the divine good or divine law can be had through reason. But reason can be exercised only by those uninvolved in material practice. It is only the feudal ruling class, or the priestly strata closely allied with that class, which can apprehend the divine law through reason. But the divine law, in its precepts of justice, endorses the feudal order *itself*; it sanctions the power of the feudal lord to command and commit his subjects to particular kinds of material practice. In other words, it ensures the *distance* of the feudal lord from material activity which is the precondition for access to the divine law *in the first place*. There is a self-reinforcing character, therefore, to this inequality. The non-universality of reason and the non-universality of freedom supplement each other.

1.7 *Capitalism, Freedom and Reason*

1.7.1 *Commodity Production and Hegel's Derivation of Quantity from Quality*

A transition from non-universality to universality takes place with the rise of capitalism. Capitalism, also being a class-divided society, continues to be characterised by a split between particular ends and universal ends. The ability of products of material practice to satisfy social needs is still divorced from the *reasons* for which such activity is undertaken. However, unlike in feudalism, material activity under capitalism is not based on anyone's personal rule or governing will. The social or universal character of material ends, therefore, cannot be expressed as effects of a *unifying mind*. How then is this social character expressed? In other words, how is material activity under capitalism socially coordinated? The answer, quite obviously, is through *commodity relations*.

A product of material activity, *as a commodity*, can be viewed under two aspects according to Marx (Marx, 1867/1978). It can be seen, on the one hand, as a particular object with specific qualities and properties – an object with a *specific use*. Marx refers to this aspect of material, qualitative determinacy as the *use value* of the commodity. As a use value, as a *particular* object, a commodity appears in *no relation* with other commodities. As "natural determinate being", the commodity is *unique* (Meaney, 2002: 17). At the same time, the commodity exchanges with other

commodities at specific *quantitative* ratios in the market. In so far as it does so, the commodity appears as *qualitatively homogenous* with all other commodities, and only *quantitatively distinct* from them. Marx refers to the rates at which the commodity exchanges for other commodities as its *exchange value.*

The material activity or labour producing the commodity assumes a two-fold character as well. On the one hand, this labour is of a qualitatively *particular* kind. As such, it determines the specific qualities – i.e. the use value – of the commodity. Labour, in this naturally determinate, particular aspect, is *concrete labour* in Marx's terms. In this aspect of particularity, individual commodity-producing labour is posited as unique – *as unrelated* to every other commodity-producing labour. However, labour also assumes, in commodity production, the character of *human labour in general* or labour devoid of any material, qualitative properties. It appears simply, in other words, as *homogenous* human labour or "labour-power expended without regard to the mode of its expenditure" (Marx, 1867/1978: 46). The *quantum* of such homogenous or, as Marx terms it, *abstract* labour spent in the production of a commodity determines its exchange value. Exchange value, therefore, is a measure of the amount of *labour time* embodied in a commodity while producing it.

The nature of the split between particularity and universality under capitalism begins to get clear now. The commodity as a *use value*, as a specific end of concrete labour, lacks all social significance. In order to be socially significant, in order to fulfil social needs, it must *first* be sold and bought in the market – i.e. it must assume the character of *exchange value.* About commodities, therefore, Marx says, "Exchange value is their social relation, their economic quality." (Marx, 1939/1973: 141) Thus, ends in their natural, particular determinations are *radically* individual; the *same ends*, however, as universal or social ends are *radically* bereft of particularity. By the same token, labour as concrete labour is completely individual; as social or universal, such labour is completely abstract.

But a crucial question arises here. How is it that unique, *qualitatively* specific objects are able to assume a *quantitatively commensurable* form at all? How is it that specific kinds of labour are able to assume the character of homogenous labour? Political economy before Marx, while raising this question, was singularly incapable of answering it. This inability led them to assume that the *double* or split character of labour and its products under capitalism was a transhistorical feature

of human productive activity itself (McCarthy, 1988). Marx was able to *historicise* this double-ness *precisely* because he successfully answered the question of the relationship between quality and quantity. The answer receives its most explicit treatment in the *Grundrisse*, and draws heavily on Hegel's derivation of quantity *from* quality, as ontological categories, in the *Science of Logic* (Marx, 1939/1973; Hegel, 1812/1969).

Hegel's derivation, in broad brushstrokes, is the following. Any phenomenon, in so far as it is a specific phenomenon, has specific qualitative attributes and properties. But these specific properties are always the result of a *specific causal process* that generates the phenomenon (Harris, 1983). This process, however, if it is to be specific at all, must be *a quantitatively determinate* one (Meaney, 2002). For example, a natural pond as a specific phenomenon can be produced by a range of natural processes. To take just two, a pond can form as a result of water from rainfall collecting in a natural depression; or it can form as a result of a block of ice breaking off from a retreating glacier, making a depression in the ground, melting into it and thus filling it up with water. As processes causing the formation of a pond, they are specific, qualitatively distinct processes. But this specificity also has an *inherent quantitative dimension*. The first process, *given its very nature*, may produce a pond in a matter of a few days; the second may take years. Days and years are *quantities* of time. A pond, therefore, as a qualitatively determinate phenomenon which is caused by specific processes which are necessarily quantitatively determinate, is *quantitatively determinate itself*. The specific causal origin of phenomena implies the *unity* of quality and quantity.

But this also means that qualitatively distinct phenomena are quantitatively *commensurable* (Harris, 1983). A sand dune may take just a few hours to form, while a mountain may take millions of years. This quantitative difference stems from the very different quality of the causal processes that underlie their formation. The quantitative difference *by itself*, however, is a relation that is independent of the qualitative content being compared. If we assume, for the purpose of illustration, that the time taken for the formation of a sand dune and for that of a mountain stand in a ratio of 1: 100,000,000, this ratio *itself* does not contain any reference to the specific qualities of either sand dunes or mountains. Thus, quantitative determinacy, while being *grounded in qualitative specificity*, requires comparison in terms that are *devoid of the latter*.

Marx uses this necessary implication of quantity by quality to understand the dual or split nature of the commodity. A product of labour, *under any kind of social formation*, in so far as it has specific qualities – i.e. in so far as it is a use value, must be seen to result from a specific causal process. This causal process, of course, is *none other* than the concrete labour process that goes into making the product. As a specific kind of process, as we just saw, it must have a quantitative determination (Meaney, 2002). To say that a particular kind of labour process is used to produce a particular product *is also to say* that a *particular amount of time* is taken to produce it. For instance, the introduction of the potter's wheel significantly reduced the time taken to produce a single pot. Previous processes like coiling, in which the potter had to manually roll clay into long threads and then press them together to form a pot, required a much longer time to be spent on every pot. Thus, the product of labour, *even when not a commodity*, is quantitatively determined; and this quantitative determinacy, far from being opposed to qualitative particularity, *stems from that particularity itself.* Further, this implies, as we again saw above, that particular products of labour, *even in societies where there is no commodity production*, are quantitatively commensurable with each other. Products can be compared with each other in terms of the amount of labour time that is required to produce them without any reference to the specific kind of labour that goes into such production.

Now, what happens to this unity of quality and quantity under commodity production? *It remains*; its *social form*, however, takes on a specific character. The private ownership of the means of production, a product of history, means that the production of use values and their actual use *are mediated by exchange*. As the *end* of production, therefore, the specific quality of the product is *subordinated* to its quantitative determination. Production of specific objects is not carried out with the *objective* of fulfilling specific needs, but with the aim of realising the monetary equivalent of labour time embodied in them in the market. The production of use value is subordinated to the production of exchange value (Marx, 1867/1978). It is on account of this subordination that use values *appear* radically disjointed; they appear disconnected from the concrete social labour that produces them and the specific social wants they can satisfy. Exchange value, on the other hand, appears as something that has nothing to do with use value – as *transcendental* of use value. Thus, Marx writes in the *Capital*, "Exchange-value, *at first sight*, presents itself as a quantitative relation, as the proportion in which values in use of one sort are exchanged for those of another sort, a relation constantly changing with time and place. Hence exchange-value *appears* to be something

accidental and purely relative, and consequently an intrinsic value, *i.e.*, an exchange-value that is inseparably connected with, inherent in commodities, seems a contradiction in terms." [*emphasis mine*] (Marx, 1867/1978: 44)

1.7.2 *The Nature of Universality Under Capitalism*

What is crucial to remember, however, is that while the ontological unity of quality and quantity makes it possible, under conditions of commodity production, for exchange value to appear as transcendental, *the very same unity sets limits to such transcendence*. The domain of exchange value *remains tethered*, in a fundamental way, to the domain of use value. This can be seen in the following four aspects of the relationship between the two. First, for an object to be a commodity, it must have a use value (Marx, 1867/1978). If an object does not have the capacity to satisfy any specific need, it would not exchange in the market at all and, therefore, obviously, not have an exchange value either. Second, exchange value, being a measure of the labour time required to produce a particular product is determined by the particular nature or quality of the labour process. Exchange value, therefore, expresses the quantitative determination of the specific use value.

Third, the quality of the labour process, as we just saw, is historically variable. At different junctures of socio-historical development, the same product can be produced using different kinds of concrete labour. Different kinds of labour naturally also means the use of different kinds of *producer goods* – different sets of raw materials, tools, implements, machines etc. These goods are use values themselves and are consumed in the process of production. The quantitative determination of a product, therefore, depends on the kind of use values drawn into the concrete labour process. Exchange value, which expresses this quantitative determination, is a measure thus not just of labour time *simpliciter* but of *socially necessary* labour time (Marx, 1867/1978). If a capitalist's product embodies more labour time than is necessary, given the *average conditions, methods and techniques of production* socially in use at the time, she will in effect be selling the product at *lower than its value* in the market and be eventually driven out.

Fourth, survival in the market demands more of the capitalist. Competition among capitalists puts pressure on each of them to continually increase the exchange value they realise in the market. This can be done by an individual capitalist if she sells her product at higher than its value in the market – i.e. if her product embodies less labour time than is socially necessary (Marx, 1867/1978). But she can do this only through changes in the *quality* of the labour process. Such changes, again,

would mean a changed and expanded set of inputs which, of course, would be *determinate use values*. Marx provides the example of the introduction of power-looms in England which reduced the time required to weave yarn into cloth by half. The drive for greater exchange value, in this case, led to a shift from the hand-loom to the power-loom, which was a shift from one set of specific use values to another. Therefore, the subordination of production to exchange value creates an inherent tendency in capitalism to constantly expand the ambit of specific needs and the concrete abilities to satisfy them. Of course, it is the self-same subordination that frustrates this potential.

The nature of transcendence of the *universal* under capitalism and feudalism can now be compared. While under feudalism, the governing will has an other-worldly character, turned only towards the preservation of its own emancipation from material activity, the universal principle under capitalism – exchange value, despite transcending material particulars, has a decidedly *this-worldly* character. Exchange value can be produced, realised, expanded etc. only through the production and consumption of use values (Marx, 1939/1973).

Second, *the reign of the governing will is absolute*; it *unidirectionally* determines the particular, material activities to be carried out. Under capitalism, by contrast, while exchange value has a relative independence from qualitatively specific labour and its products, the overall boundaries of that independence are set by the latter. As we saw above, the domain of exchange value, at a basic level, remains tethered to that of use values and concrete labour. If a capitalist insists on producing something which has *no* use value, her product will simply not sell in the market and realise any exchange value. She will be driven out of the market. If she uses a particular labour process to make a product, which requires three times as much labour time as is socially necessary, she will, again, be driven out. If she refuses to exploit her workers and invest the surplus in making periodic, specific changes to the labour process to enhance productivity, she will not be able to survive the competition. Thus, exchange value as an object of pursuit, while devoid of material content, requires reckoning with the realities of material activity.

1.7.3 *Capitalism and Disenchantment*

This distinctive nature of universality is reflected in the notions of freedom and reason that reign under capitalism. Like under feudalism, under capitalism too freedom appears as materially unconstrained. The subordination of quality to quantity, itself stemming from the private

ownership of the means of production, means that the individual capitalist is free to pursue exchange value *through the production of any particular product, with any particular qualities*, as long as she can viably realise exchange value through its production and exchange. The objective of production is not to satisfy specific social needs; the objective is simply to earn exchange value, and the capitalist will produce *whatever* helps her do that. Thus, capitalism requires a notion of freedom that is unconstrained by the specific nature of material ends. It requires a freedom of the will that is conceived as transcending all natural particularity. Material causation of such a will would amount to its negation.

Unlike in feudalism, however, this lack of material constraint *does not mean a turn away from the material world*. Freedom of the will, under capitalism, is not a means to extricate oneself from the world of material pursuits and strive after *externally mandated ends* (Schneewind, 1997). The purpose of freedom is not to prevent material ends from becoming hindrances in the pious observance of feudal duty. Under capitalism, freedom to choose *between material ends is a good in itself* (Sayers, 2011). For an individual capitalist, as we saw, the very pursuit of the abstract goal of exchange value renders the choice of the final product, labour process, material inputs etc. an important one. Freedom in these matters is at the core of capitalist social relations; they are at the heart of the private ownership of the means of production itself (Selsam, 1947).

Further, since this freedom to choose between material ends is a good in itself, and the will does not have to orientate itself to some external realm or agency to determine its ends, freedom implies *an equal moral status* for everyone. *Everyone* has, in principle, the freedom to determine the destiny of the commodity she possesses (Pashukanis, 1978). For the individual capitalist, who owns the means of production, this amounts to the prerogative of deciding what to produce, how to produce and how much; for the worker, who owns nothing but her capacity to labour, it amounts to the freedom of deciding whom to sell that capacity to. Freedom, therefore, unlike in feudalism, has a universal character under capitalism and *serves as a ground of moral equality*.

This universality is expressed in the intimate relation between freedom and reason. Freedom, under capitalism, is not subordinate or instrumental to the exercise of reason. Freedom and reason are coextensive; *being free* and *being rational* are two aspects of the same thing. The following considerations are significant in this respect. First, reason has a *this-worldly* character under capitalism (Novack, 1971). Its *basic* role lies in the apprehension of the phenomenal world.

Freedom to choose between different material ends presupposes *the capacity to know the specific nature of those ends and how to pursue them*. Without such apprehension, freedom would not be a possibility. This also means, further, that like freedom, *reason too* is conceived as a universal attribute of individuals, and is, therefore, foundational to moral equality (Marx, 1927/1977).

Second, while providing knowledge of the nature of material ends, reason *cannot* adjudicate *between* such ends. Production under capitalism being fundamentally unyoked to the satisfaction of social needs, specific properties of products – specific inherent abilities to satisfy needs – can have no *rational implications in terms of obligatory activity*. Reason, therefore, must necessarily be *neutral* between material ends. Another way to state this is the following. Had reason not been neutral, it would have been a constraint on freedom. But such a constraint by particular material ends would amount to a negation of freedom as conceived under capitalism. Thus, *neutral reason* and *materially unconstrained freedom* are two sides of the same coin under capitalist social relations.

We are now in a position to appreciate the roots of the particular character of disenchantment under capitalist conditions. On the one hand, reason turns its gaze downwards to the phenomenal world, and knowledge of material, natural necessity becomes its central preoccupation. Nature, as a domain of specific material processes, acquires dignity as an object of knowledge. It does not need to be seen as *derivative* of ultimate extra-material entities; it now has causal efficacy *of its own*. But at the same time, reason is unable to translate this knowledge of the earthly domain into knowledge of what earthly activities *should* be carried out. No amount of knowledge of nature can tell us *what we should do with that knowledge.*

As should be clear by now, this peculiarity of disenchantment under capitalism is an expression of the contradiction of capitalism itself. On the hand, the dynamic of capitalist production requires a growing knowledge of natural processes. It requires an ever deepening grasp of material necessity and causation; science itself becomes a direct factor in expanding productive capacities. On the other hand, however, the *same* dynamic prevents the direct utilisation of this knowledge and productive capacities for the fulfilment of social needs. Knowledge of material processes, therefore, while itself recognised as a legitimate endeavour, *is stripped of all ethical implication*. Knowledge of *what should be done* has to be sought outside of *how the world is.*

1.7.4 *Kantian Morality and its Contradictions*

Now, if one assumes that the development of knowledge of the material world can take place *only* under capitalist social relations, then there would *seem* to be an *inherent relationship* between the advance of science, on the one hand, and draining nature of all ethical content, on the other. Science, by its very nature, then, would be incapable of providing any ethical guidance. It is precisely such an understanding that seems be at the heart of both Weber's characterisation of the relationship between science and disenchantment, and his own commitment to the is-ought distinction.

Alternatively, if one assumes that the legal, ethical and philosophical categories expressing capitalist relations have transhistorical validity, then again one may be led to think that the nature-value gulf is an intrinsic one. A classic example of such a view and its contradictions is Kant's ethical philosophy. For Kant, it is free will which is the seat of moral value. For the will to be free, it must be undetermined by *extrinsic* ends, ends external to it. Prime among such extrinsic ends are natural, material ends (Uleman, 2010). Determination of the will by natural objects and processes is the *definitional* negation of freedom for Kant. Natural causation is fundamentally *alien* to the will. The will, as free will, is an *uncaused* cause. It can choose, therefore, *absolutely any* material end. There is no external constraint that operates upon it.

It is the faculty of *reason*, for Kant, which enables the will to exercise such unconstrained freedom. The will is inherently rational and can, therefore, freely *give itself* ends and objectives. Such ends, because given by the will to itself, are *intrinsic* or *self-legislated* ends (Walker, 1978). But even such freely chosen material ends are not morally valuable in themselves. Each such end is necessarily particular, specific; while, for Kant, the moral good is universal. The argument can be put in explicitly Kantian terms in the following way. In pursuing the particular material end that we have chosen, we have to carry out particular activities. But these activities, if they are to be effective in achieving the desired end, will have to conform to particular laws of nature. *While these laws of nature are universal in their application*, we give ourselves these laws – choose to follow them – only to the extent that we have chosen the particular goal in question. The laws become for us *hypothetical* or *conditional* in nature. A moral law, however, needs to be *categorical* or *unconditional*; it needs to bind everyone and on all occasions, regardless of what their particular

and contingent ends happen to be. But what kind of an intrinsic end would be *both* freely *and* universally chosen? It would be the end of free choosing *itself*. Therefore, the free will is an *end in itself*, and unlike all natural, material ends, it is morally valuable (Kerstein, 2002). Treating ourselves and all other human beings as *ends in themselves*, rather than as *means to ends*, for Kant, therefore, is a *categorical imperative*, a law of *reason*, unlike every law of *nature* which is only a *hypothetical imperative*. This categorical imperative is a constraint the free will imposes upon itself in accordance with its own inherent, irreducible interests. In the words of Hegel, it is "the free will willing itself" (Uleman, 2010: 59).

The contradictions of this account must be noted. It is reason *in the first place* that makes the will free in a fundamentally unconstrained way. Reason, which enables cognition of material necessity, allows the will to be completely unconstrained by it. Indeed, the very cognition of specific material processes disallows them from being sources of either natural or ethical constraint. Reason then goes on to find the source of ethical value in itself, in complete abstraction from all material specificity. This value, finally, is supposed to act as a constraint on the freedom of the will which reason itself has liberated from all constraint! This contradiction reveals the fundamental inadequacies of any ethical theory which draws its basic categories uncritically from the ethical norms governing capitalist social relations. The Kantian theory captures the essence of disenchantment under capitalist conditions. Debarring the natural, material world as a source of ethical value, it begins with abstract reason and unconstrained freedom and *ends up with just the same*.

1.8 *Kantian Will, Evolution and Dualism*

Coming back to the problems of contemporary re-enchantment, if the materially unconstrained Kantian will is invoked to establish the equal moral agency and intrinsic value of all organisms, as it is by a range of environmental and social theorists[1], certain obvious problems arise. Historical change in organic life is premised on the material determination of goal-directed behavior in organisms. Natural selection, by far the most significant mechanism of long term evolutionary change in the organic world, crucially depends on physiological, structural and behavioral goals of the individual organism being determined by its genetic programme *which is completely*

[1] For example, Rolston III (1975, 1988, 1994), Taylor (1986), Regan (1983), Fox (1990), Mathews (1991, 2005).

material in nature (Mayr, 1988, 1992). It is variation in physiological, structural and behavioral traits across individuals of a species population, *expressing variation in genetic programmes of the individuals*, which allows natural selection to select and amplify certain traits across generations, producing changes in the population over time (Gould, 1977).

The replacement of this genetic programme with a Kantian will amounts to a severing of the relationship between the material constitution of the organism and its *ends*. The ends would now be determined by a completely unconstrained *ideal* purpose – Kant's uncaused cause. Such unconstrained goal determination would obviously mean a cessation of the operation of natural selection and, therefore, of evolution. Organic life would cease to be conceived as a domain of historical change. The inherent historicity of nature would give way to stasis.

Now, the cessation of evolutionary change should not pose too much of a problem to environmental theorists if immaculate preservation of nature is what they are concerned about in any case. Another problem arises, however. The ends determined by the genetic programme are the ones that give organisms their *species character*. This includes behavioural goals like specific niche utilisation and other ecosystemic relations (Mayr, 1988). If these relatively stable, materially determined goals are taken away, one would have to forsake biologically and ecologically pivotal concepts like species and ecosystems, something that theorists cannot do without giving up their environmental project altogether. Further, even if one were to hypothetically ignore the species question, a materially unconstrained will in every organism would still rule out the possibility of even remotely stable ecosystemic functioning. The organic world would be reduced to a chaotic, formless jumble.

We find frequently, therefore, in the project of environmental re-enchantment a *simultaneous* invocation of a modern, individual Kantian will *and* an organicism or holism, traceable to early modern or pre-modern philosophical systems, which reduces the individual or the part to being merely a *logical component* of the whole (for example, Homes III, 1975, 1994; Fox, 1990, Mathews, 1991). This holism ensures that each component of the re-enchanted natural world – every individual, every species, every ecosystem – stays in its proper place. This place cannot change as it is a part of the logical structure of the whole; it is *logically reducible* to the whole.

This holism has a specific implication for human practice. If each part of nature, no matter what its character or quality, is logically reducible to the whole, then human material practice, if it is to

be environmentally attuned at all, must be *static*. The change or expansion of human productive activity necessarily brings about changes in that part of the natural world which was hitherto uninfluenced directly by human practice. But if each part of nature is logically reducible to nature as a whole, *one forecloses the relevance of investigation and assessment of the specific causal implications of any particular change*. One acre of a secondary forest and a thousand acres of an old-growth forest *both* become *equally* irreplaceable as *logical expressions* of the integrity of nature.

A normative division, thus, emerges between those social formations or historical periods where material practice was relatively stable, and such practice is seen as *natural*, and those where stability or fixity of practice has been the exception, practice therein being seen as *transgressive* of nature (Biro, 2005). Typically, this maps onto a pre-modern/modern divide, with industrial production being seen as almost emblematic of *unnatural* practice.

This natural/unnatural distinction, it must be emphasised, has nothing to do with either the *artifactual status* or the *environmental implications* of the products of practice themselves. As Raymond Williams has pointed out, very often artifacts belonging to a past age, *which is imagined to be slow and idyllic in its rhythms,* are seen as natural, while artifacts of the present are seen as impositions upon nature (Williams, 1980/2005). The "natural" artifact could well be a steam-powered railway carriage, and the "idyllic" age, the industrial revolution; it is the imagined history of stasis and change which matters. At the other end of the spectrum, Steven Vogel points out that the artificial restoration of ecosystems by ecologists has often been perceived as unnatural and *inauthentic* (Vogel, 2015). On many such accounts, science and technology being inextricably linked with industrial production cannot be a source of authentic *natural-ness* (for example, Katz, 1997).

The distance travelled by such a natural/unnatural distinction from the original task of overcoming dualism must be clear. The reversal of dualism, as we saw earlier, would require a conception of the historical transformation or development of material practice *the context for which* is set by the material, natural world itself. It would require an understanding of human material practice as encompassed within *natural historicity.* But the normative division of natural and unnatural practice does nothing of the sort. In fact, it makes material practice completely dependent on the moral orientation to nature and thus produces a full-blooded dualism of its own. If a society is

moved by *ideas* of respect for nature, it will engage in natural production, if not, it will engage in unnatural production.

1.9 *Specific Causation, Historicity and Universality*

Where then could a resolution lie? It might be useful here to look at the *philosophical* innovations Darwinian theory made in the study of organic change that enabled it to *historicise* nature. The innovations were three-fold. First, as against every other theory of organic change in the nineteenth century, Darwin proposed the *same* source for the *stability* and *change* of species. The genetic constitution or *germplasm*, as it was called then, of the organism endowed it with *species characteristics*; at the same time, it was variation, through reproduction, in the genetic constitution *itself* which was responsible for *changes* in species characteristics. Thus, the source of *identity* of the species was the same as that of *change* in that identity. This *dialectical* unity of continuity and change, of *being* and *becoming*, enabled Darwin to see nature as inherently historical without any recourse extra-natural entities.

Second, Darwin sought specific causal processes as explanations of specific changes. Unlike creationists, natural theologians, catastrophists, Lamarckians and orthogeneticists, all of whom sought a *general* cause to explain diverse and different kinds of organic change, for Darwin each transformation in species was driven by a specific causal process (Mayr, 1991; Bowler, 1983). The nature of this process depended on the specific environmental and adaptive context within which the species population was placed, and the various genetic characteristics of the species. This specificity gave the evolutionary process a *historical continuity*. The genetic constitution of any species reflected its entire evolutionary history. Its future evolutionary possibilities, too, were influenced and constrained by this evolutionary past.

Third, Darwin broke from tradition by turning his gaze from *taxa* to *populations* as the locus of mechanisms of change. Most other nineteenth century theories of organic change, on account of their ontological assumptions, saw species and other taxa as the relevant level at which they should look for evolutionary mechanisms. They saw in these categories *universals*, which centuries of philosophy had taught them is the domain where new qualities are created. Individual organisms, or *particulars*, were too insignificant to play a substantial role in such momentous transformation. Darwin, by identifying the operation of natural selection at the level of individual members of a species population, dealt a blow to this assumption (Mayr, 1988, 1991; Gould, 2002). It was at the

level of the individual, the particular, that change took place. And this change produced new universal characteristics. The imagined gulf between universals and particulars, therefore, was mistaken; no *real historical movement* would take place if such a gulf existed.

Now, have we encountered these ideas before in our deliberations so far? We have, albeit in a different form. When Hegel says that a qualitatively determined object is also quantitatively determined, his grounds for saying so reflect the kind of philosophical innovations that Darwin would later make in his scientific practice. It would be recalled that for Hegel, the quality of a phenomenon depends on the specific process generating it, which itself is quantitatively determined. But the production of the quality of a thing by specific causal processes means that the quality *reflects this causal history*. Further, future transformations of the object, since they would partly depend on its quality, would also be influenced and constrained by this history. Thus, Hegel, by making quality dependent on specific generative processes, introduces an element of historicity into *all* phenomena.

Hegel expresses this element of continuity in another way. He says quality is a "plurality" (Hegel, 1812/1969: 187). Plurality of what? It is a plurality of *continuous* and *discrete* moments of the process which has produced it. The causal process has taken place over a certain amount of time; this quantum of time consists of moments. But each moment must be conceived as *both* discrete and continuous if *real change* is to be possible (Harris, 1983). If the process only consists of discrete moments, then the causal link from one moment to the next is lost. The object becomes an *assemblage* of different objects in accidentally adjacent discrete moments of time. If, however, the process consists only of continuous moments, no change *over time* would be conceivable. In other words, it would not be a *process* at all. But the conception of moments as both discrete and continuous, also implies a conception of real transformation as a *unity of continuity and change*. Change, therefore, requires the determination, partial or otherwise, of the present by the past; it presupposes, in other words, historicity.

Finally, in saying that quality is determined by the specific process that produces it, Hegel is uniting the particular and the universal. When one says that an object with specific qualities is produced through a specific process, one accounts for *both* the particularity and the universality of the object. The universal for Hegel is, thus, the specific *causal or generative basis* of the particular (Ilyenkov, 1977). As such, it is a *concrete universal;* it consists in the inherent causal connections,

the determinate causal *history* of phenomena. In posing the universal in this way, Hegel broke away from around two millennia of hegemonic philosophical theorisation on universality and particularity. As seen earlier, from Plato onwards, the dominant mode of conceiving the universal was as a transcendental unity of particulars. As such, the universal lacked all sensible content; it was an *abstract universal*. Such a universal could never be a substitute for real causal interconnection, and naturally produced a static picture of the world. Objects were robbed of their inherent principle of movement, their inner historicity.

The theme of specific causation thus seems to unite questions of universality, reality of change, and historicity. Indeed, in the scheme of Hegelian dialectics, these are inextricable and interpenetrating themes. For Marx, *our laboring activity* is the way in which we insert *ourselves* consciously as *specific causal forces* in the natural world (Stanley, 1997/1998). We transform nature in particular ways to satisfy our particular sensuous needs. This concrete intervention *itself,* however, goes through historical transformation. How are we to explain such changes? Explanation in terms of *general* causes, as we have seen, would yield a dualism or idealism. This is straightforwardly the case for explanation in terms of a single governing value or ethic – productivism, Prometheanism, anthropocentrism etc.

But there may be other cases where there is a *false explanatory specificity*. For instance, if our pattern of explanation were -- *x* technological practice emerged because of the emergence of *a* idea, *y* technological practice emerged because of the emergence of *b* idea, and *z* technological practice emerged because of the emergence of *c* idea, despite the *appearance* of specificity, the explanations would still be general *because the specific characteristics of each technology would play no role in them.*

Explanation of changes in material practice in terms of specific causal processes would, in our view, *resolve the problem of dualism*. Specific causal explanation would not be able to cast matter and material processes aside. But where is such explanation to be found? Is it to be found in the historicity of nature the basic shape of which we have just sketched?

1.10 *Questions and Structure of the Study*

We believe it can be found there. While we have tried to briefly sketch *how* later in the study, that is not what we are chiefly concerned with. Our main aim in this study is to *clear the philosophical*

ground for such an affirmative answer to be viable, and we seek to do that through an examination of the philosophical grounds and implications of the project of environmental re-enchantment, and the relationship they bear to the question of dualism. The main questions we engage with are three-fold**. First, what have been the nature, philosophical background and logical structure of arguments made for the re-enchantment of nature in the modern period? Second, what relationship do such arguments bear to questions of stasis and change in nature and human practice? What conceptual implications do the re-enchantment and historicity of nature have for each other? What bearing do these issues have upon the question of dualism? Third, what are the philosophical roots of dualism? How have the questions of universality, change, and causal historicity been dealt with in dominant traditions in western philosophy?**

The structure of the study is as follows. In the second and third chapters, we take a look at the ways in which attempts at re-enchantment were made as part of the Romantic movement. The movement, originating in late eighteenth century Europe and the United States, was a prolonged cultural, philosophical, social and political reaction against the Enlightenment and the Industrial Revolution, and heralded many of the central themes of contemporary environmentalism. The movement made a multi-dimensional criticism of modern science and how it recast the human relationship with nature. We seek to examine these different dimensions, with a focus on the ways in which a re-enchanted unity with nature was sought.

In the fourth chapter, we examine the basic characteristics of evolution as a historical process. We provide a brief historical overview of various non-Darwinian theories of organic change and evolution, and analyse the essential prerequisites of historicity in any account of organic change. We also examine philosophical questions of part-whole relations and how they pertain to questions of historicity.

In the fifth chapter, we seek to understand the basic characteristics of goal-driven processes in the organic world. Through a philosophical exploration of the concept of teleology, we contrast the idea of unconstrained goal determination with materially grounded teleonomic processes. We go on to examine how within ecocentric thought, re-enchantment through the adoption of unconstrained and volitional teleology has resulted in specific kinds of logical problems. We analyse the normative implications of these logical problems for human practice, and end with an examination of what they mean for the question of dualism.

In the sixth, seventh, and eighth chapters, we carry out a study of the way in which change and constancy – *becoming* and *being* have been understood in western philosophy by the Greek materialists, Parmenides, Plato, early modern empiricists and positivists like Locke, Berkeley and Hume, and Russell as a representative of modern positivism. This analysis moves hand in hand with a study of their treatment of the question of universality and particularity, along with their understanding of causation. This entire investigation is centred on examining a particular pivotal reading of Aristotle's law of non-contradiction. Certain parallels are drawn with arguments in Indian philosophy; this is done with the objective of demonstrating how *inexorable* the implications of certain philosophical premises are that they cut across social and historical contexts, rather than with the aim of carrying out a *comparative philosophical analysis* of any sort.

In the ninth or last chapter, we sketch a way in which human material practice can be seen as genuinely historical, and we argue that if such a standpoint is adopted a beginning can be made towards overcoming dualistic schemes of thought.

1.11 *Scope of the Study*

The study being primarily philosophical in character, it does not engage closely with some of the empirical sociological literature which has emerged in recent times with some thematic proximity to the issues discussed here.[2] The study is more directly concerned with the nature and logical structure of arguments in the overall corpus of environmentally oriented social and philosophical theory.

The study also does not address arguments for re-enchantment which have emerged from theoretical interventions which broadly go by the description of post-humanism today[3]. The reasons are two-fold. First, the motivations for such interventions are primarily non-environmental. They would thus be outside the remit of a study focused on environmentally aligned social and philosophical theory. Second, the essential nature of their arguments for re-enchantment are almost identical with those for environmental re-enchantment. Thus, an analysis of the latter can help clarify, even without directly addressing, the former.

[2] For instance, on the question of religious enchantment of nature, environmentalism, and socio-cultural hegemony in the Indian context, see Sharma (2012, 2017).

[3] For instance, Latour (1993, 2005), Bennett (2010), Ferrando (2019), and Holbraad & Pedersen (2017).

Chapter Two: Romanticism, Science and Re-enchantment

2.1 *The Spiritual Experience of Nature*

The discontent with the Enlightenment, and its perceived role in sanctioning and enabling environmental degradation, dates back, in various ways, to the social, political, cultural, artistic and philosophical reaction to the industrial revolution in western Europe and the United States called Romanticism (Pepper, 1996). A phenomenon spanning the late eighteenth and nineteenth centuries, the romantic movement saw in the changed human relations with nature the most important indictment of the emerging modern world. For most romantics, the *perversity* of modern society lay chiefly in the fact that its economic life, fundamentally mediated by scientifically-directed industrial production, had robbed the natural world of all sanctity and moral worth. Reverence for nature, which had acted as a normative guide and restraint in various aspects of life, was being replaced by a relentless drive for material gain at the altar of which both the integrity of the natural world and human dignity could be sacrificed (Dusek, 2006). Central to the artistic and philosophical efforts of the romantics was, therefore, the aim of *reversing* this "disenchantment of the world" – this emptying of nature of moral content. This was attempted in several ways; and they deserve our detailed attention since many of the themes and arguments these efforts generated have become important features of contemporary environmentalism and associated social theory.

The first, and the most prominent way, in which the romantics attempted a re-enchantment of the natural world was by stressing a *spiritualised* mode of *experiencing* nature (Davis, 2018). Such a mode would typically involve overwhelming, all-consuming, intensely emotive, *rationally inexplicable* and *ineffable* encounters with the natural world. This could range from the *sublime*, the aesthetics of which was famously theorised by Irish conservative philosopher and politician Edmund Burke, with its element of stupefaction and awe, to less drastic yet equally overwhelming forms of spiritual and emotive immersion (Brady, 2013). The idea underlying both variants was that nature was sacred and its sanctity expressed itself to human beings *as revelation*. There was, therefore, an element of *visionary* access to divine truth in this spiritual experience. One of the best known instances of the sublime in English poetry is a description by William Wordsworth, the late eighteenth, early nineteenth century romantic poet, in his extended poem, *The Excursion*, of the narrator walking down a mountainside through the mist and suddenly encountering an overwhelming prospect.

"when a step

A single step, that freed me from the skirts

Of the blind vapour, opened to my view

Glory beyond all glory ever seen

By waking sense or by dreaming soul!...

The Appearance, instantaneously disclosed,

Was of a mighty City…

By earthly nature had the effect been wrought

Upon the dark materials of the storm

Now pacified; on them, and on the coves

And mountain-steeps and summits, whereunto

The vapours had receded, taking there

Their station under a cerulean sky.

O, 'twas an unimaginable sight!

Clouds, mists, streams, watery rocks and emerald turf,

Clouds of all tincture, rocks and sapphire sky,

Confused, commingled, mutually inflamed,

Molten together, and composing thus,

Each lost in each, that marvellous array

Of temple, palace, citadel and huge

Fantastic pomp of structure without name,

In fleecy folds voluminous, enwrapp'd." (Wordsworth, 1814/2007: 102)

The sublime moment is an occasion for the individual to connect, however momentarily, with nature's "glory beyond all glory" – its divine, spiritual essence. Among the less spectacular, yet

equally transformative spiritual encounters, one can recall Ralph Waldo Emerson, the nineteenth century romantic American philosopher, claim that there were moments when he could experience

"currents of the Universal Being circulate through me. I am part or parcel of God… The greatest delights which fields and woods minister is the suggestion of an occult relation between man and the vegetable." (Pepper, 1996: 200)

2.2 *The Opposition to Science I: Science as Abstraction from Sensory Richness*

The second way in which the romantics attempted a re-enchantment of nature was to programmatically challenge and oppose the dominance of science as a way of understanding the natural world. The foregrounding of profoundly spiritual encounters can, of course, be seen as a part of this agenda, but their episodic and sporadic character limited the possibilities of their consistent rhetorical use. Two different kinds of arguments were used, instead, to mount this challenge. One was based on (i) a criticism of the nature of mechanics as a scientific enterprise, (ii) criticism of what we referred to as the mechanistic tendency or mechanism earlier, and (iii) discontent with certain conceptions of fundamental attributes of matter widely held in the early modern period. The other was based on a criticism of empirical knowledge being seen as the pre-eminent form of knowledge.

The first kind of romantic objection to modern science was that the latter *abstracted from* the richness of direct sensory experience (Brady, 2013). Science reduced nature in all its sensuous vibrancy – its myriad colours, smells, tastes and textures – to abstract laws which reflected none of this richness. Science, in other words, *deadened* nature, stripped it of its fundamental vitality. A section of the romantics, therefore, called for a shift away from the dead abstractions of science to an immersion in direct, unmediated sensory experience of nature. Further, this immersion was not just sensuous, *it was also emotive and imaginative*. A call was being made, in other words, for a transition from a principally *epistemic* to a principally *aesthetic* relationship with nature. You, thus, have John Keats, the early nineteenth century romantic poet saying, "Beauty is truth, truth beauty, -- that is all ye know on earth and all ye need to know." (Pepper, 1996: 191) *Beauty* in the place *truth*, *art* in the place of *reason*, and the *artist* in the place of the *scientist* – this was the credo of the re-enchantment of nature for a section of the romantics.

But on what grounds were the romantics claiming that science robbed nature of sensuous richness? After all, is not science all about detailing and explaining sensible traits? For instance, does not evolutionary theory, by explaining cycles of coloration of leaves of different plant species add to the richness of our experience of the world? Even if we do not agree, though such a disagreement would seem arbitrary, that such causal explanations enrich experience *in what meaningful sense can they be said to impoverish experience?*

The romantics provided two arguments in response to this question. Both these arguments are significant as they continue to be made, essentially unmodified, in certain strands of environmentally aligned social theory even today. First, they argued that for science, intimately experienced characteristics like smell, colour and taste were *irrelevant* (Jackson, 2008). This perception stemmed partly from the fact that, as indicated earlier, in the early modern period, the quickest progress was registered in the field of mechanics which dealt at the time simply with purely physical interactions between discrete objects. The investigation of such interactions focused on certain characteristics of objects like mass, velocity etc. and *abstracted* from other features like colour, taste, smell and texture (Dugas, 2011). In calculating the gravitational attraction between two objects, for instance, their smell, colour or taste were irrelevant (and still are). What you took into account was simply the mass they possessed and the distance between them.

If this were all there was to science, then it would yield a dismally impoverished view of the world indeed. But science is of course much more than the study of mechanical processes. Not just the future development of science, which increasingly encompassed greater variety and complexity of phenomena, *but even during the romantic movement itself* various developments were taking place in the fields of biology, chemistry, geology, metallurgy etc. which provided a much more complicated picture of both scientific practice as well as scientific knowledge. That the romantics saw mechanics as science *par excellence* partly reflected the sheer prestige enjoyed by mechanics post the development of Newtonian physics, and partly an unwitting acquiescence in the mechanistic claims of those who believed that all of science, regardless of the phenomenon being dealt with, could be modelled on the lines of mechanics. But there was something more. It is widely established now that a number of romantic thinkers were quite intimately familiar with contemporary developments in biology (for example, see McKusick, 2000). Not just that, several

of them, as we shall see, drew insights from such developments to make ontological claims about nature. The irony is a suggestive one but we shall not pursue its implications here.

The second argument which the romantics employed in their claim that science impoverished the sensuous experience of nature was based on a distinction several scientists and philosophers in the Enlightenment period drew between what they called *primary qualities* and *secondary qualities* of objects (Nolan, 2011). Primary qualities were attributes like size and shape which were seen as *inhering* in objects. Secondary qualities were attributes like colour, taste, smell, sound and warmth which required specific mechanisms of perception to be *realised* as such attributes. In other words, these attributes were thought to inhere in objects not *as attributes*, but only as *causal powers* which could produce the relevant perceptions in the subject.

Several of the romantics made the distinction the basis of a claim that science regards qualities like *colour, smell and sound as purely subjective* (Dusek, 2006). It reduces in other words the sensuous richness of nature to a phantom of individual subjectivity and caprice, where obviously nothing noble or sacred can be found. To be sure, the primary-secondary distinction ran into rough weather with later developments in the philosophy of science (for example, Vision, 1982); but to say that it renders secondary attributes purely subjective is completely untenable. While eighteenth century empiricist philosophers like Berkeley did contribute to confusion on this front (for instance, see Dicker, 2001), philosophers and scientists like Galileo, Descartes, Thomas Hobbes, John Locke, and Robert Boyle, all of whom used this distinction, were quite clear that the causal powers which produced the secondary qualities were eminently *real* (Yolton, 1968). The secondary qualities, in other words, told us something real, something substantive about the object. Thus, for Descartes, secondary qualities of objects were "various dispositions of these objects which have the power of moving our nerves in various ways" (Copleston, 1994 a: 124). Similarly, Hobbes, maintained, "As for the objects of hearing, smell, taste and touch, they are not sound, odour, savour, hardness, etc., but the *bodies themselves* from which sound, odour, savour, hardness, etc. proceed." *[emphasis mine]* (Copleston, 1994 b: 26)

2.3 *The Opposition to Science II: Science as Confined to the Empirical*

The second kind of programmatic romantic onslaught on science came from a section of romantics for whom knowledge, or at least a superior form of it, came not from the sensory experience of nature but rather from *intuitive insight* into the spiritual essence of the natural world. Referred to

as “transcendentalism”, this romantic view typically held that science, since it was based on empirical observation of the phenomenal, sensible world, failed to get at the *root* of things, which for them was necessarily spiritual or *ideal* in nature (Pepper, 1996). Thus, while scientific knowledge, which was referred to as *understanding* in this account, merely dealt with the *surface appearances* of the natural world, what was required for a grasp of the true essence of nature was *reason* – a direct, intuitive apprehension of the divine, spiritual source of all material things that populate the natural world. This purely spiritual source of nature was straightforwardly called “God”, “the Universal Being”, “the Invisible” and suchlike by Anglo-American transcendentalists like Emerson, Thomas Carlyle, Samuel Taylor Coleridge and John Ruskin; German transcendentalists like Schelling and Goethe referred to it somewhat more ponderously as the “World Soul” or “the Absolute” (Newman, 2005).

The superiority of reason over understanding for the transcendentalists was, like other epistemic arguments of the romantics, not just a matter of purely philosophical concern. The modern predominance of understanding, the modern preoccupation with investigation of the material world embodied by science, was reflective of a society and an age concerned purely with material ends. Centrality of knowledge of sensuous appearances reflected centrality of *greed*; and marginalisation of knowledge of spiritual essence reflected marginalisation of *morality*. Thus, Carlyle writes:

> “The truth is, men have lost their belief in the Invisible, and believe and hope, and work only in the Visible.. Only the material, the immediate practical, not the divine and spiritual, is important to us. The infinite, absolute character of Virtue has passed into a finite, conditional one; it is no longer a worship of the Beautiful and Good; but a calculation of the profitable.” (Pepper, 1996: 190)

In a certain sense, the transcendentalists argue for a stronger and more unabashed form of re-enchantment than the other romantics. In explicitly arguing for knowledge as access to a purely spiritual essence which manifests itself as nature, their project can be seen as directly linked to medieval theological concepts of knowledge, modifications and innovations notwithstanding. One can perceive, therefore, certain tensions between the two kinds of challenges mounted by the romantics against modern scientific practice. One instance of such tension translating into open disagreement and criticism was John Ruskin’s theory of what he called “the pathetic fallacy” (Bate, 1991). Ruskin, an art critic and philosopher, and an important figure in the romantic tradition,

poses a question in his book *The Modern Painters* which he finds puzzling: why was it that artists and poets of earlier periods, of periods much more dominated by religious and spiritual thought, from Homer to Shakespeare, portrayed nature in a much more realistic fashion, whereas artists in the contemporary period (the 19th century), Wordsworth being a classic example, expressed their spiritual leanings through impressionistic devices which gave their portrayal of nature a thoroughly unrealistic, subjective and vague quality?

Ruskin's answer to this question is that the earlier poets and artists had, in the words of the German poet Schiller, a "naïve" relationship to nature wherein they were secure and assured in their belief that the natural world was of divine origin. This strength and security of belief in divinity, stemming from the entrenchment of religious views in society, meant that no *distortion* was required in the portrayal of nature for the communication of religious themes. If divine entities like angels and gods had to be depicted, they would be depicted *directly*, in as realistic a manner as nature itself was. For modern artists and poets that was not the case. Under pressure from the secular, disenchanting ethos of modernity, even romantic poets who believed that the world was spiritually animated could not directly portray spiritual entities. As a result, modern romantic poets took to expressing their spiritual understanding of nature by focusing on feelings, emotions and sentiments which nature evoked in them. As a result, their art became more *about their own thoughts*, than about nature itself. This distorted portrayal of nature is what Ruskin called "the pathetic fallacy" and, for him, reflected a *compromise* modern poets and artists made with the ruling scientific ethos of the age. Wordsworth was held out as a classic example of the fallacy. Jonathan Bate quotes the romantic William Hazlitt's criticism of Wordsworth's *The Excursion:*

"It is not so much a description of natural objects as of the feelings associated with them; not an account of the manners of rural life, but the result of the poet's reflections on it… his thoughts are his real subjects… He sees all things in himself… The image is lost in the sentiment." (Bate, 1991: 73)

Chapter Three: Natural History, Theology and Varieties of Holism

3.1 *Opposition to Science III: Science as a Fragmented View of the World*

The third way in which the romantics sought a re-enchantment of nature, and which was quite obviously related to the second way, was to propose a *relational* or *holistic ontology* consciously opposed to what was perceived as the ontology underpinning science (Oerlemans, 2002). The latter, which they referred to as mechanism or the mechanical philosophy, was seen as a fragmented view of the world which posited things in isolation rather than in mutual interconnection. Holism, on the other hand, took an *organismic* view of things. Like in an organism, wherein various organs are fundamentally and constitutively linked together in ties of mutual interdependence, things in the natural world are interdependent and cannot be understood in separation from each other. Further, like an organism as a *whole* has a *character* or *quality* which goes beyond the aggregated qualities of its constituent organs, similarly nature too as a whole has a character which goes beyond that of the aggregate of its parts.

The ontological basis of science was thought to be a fragmented view of the world in two related senses. First, since mechanics was seen as science *par excellence* and it dealt centrally with mechanical motion which, until the twentieth century, was conceived as *extrinsic* to the *bodies in motion*, romantics argued that science viewed relations between objects as *external* relations (Hubbell, 2018). The idea that a body at rest would continue to be at rest, and a body in motion would continue in motion, *unless acted upon by an external force*, given its classical formulation by Newton but presaged in the works of Descartes and Hobbes, essentially meant that the body had no *inherent principle of motion.* This essential inertia implied that relations of mechanical motion necessarily originated *outside the object* – i.e. were not *intrinsic* to the latter. This provided the basis of the much-caricatured "billiard-balls" image of the world – of the source of movement in the world essentially being one thing colliding with another (Roux, 2018).

Further, it also did not help matters that two phenomena that physicists of the time were directly interested in, gravitation and magnetism, which could potentially have established relational properties in material entities, had to wait for a long time for any credible explanation (Heilbron, 2016). Gravitation until the twentieth century, and magnetism until the middle of the nineteenth, were explained in terms of a range of speculative hypotheses including corpuscular effluvia,

dynamics of invisible ether, workings of spiritual entities and so on, none of which of course were explanations that could be subjected to empirical corroboration.

The second sense in which the basis of science was seen as non-holistic concerned an explicit ontology shared by some who were either themselves contributors to advances in mechanics, or were *mechanists* in the sense we have mentioned earlier, or both. The essence of this ontological view was the thesis that the diversity of the phenomenal, sensible world was a result of the mechanical movement of invisible, impenetrable and indivisible particles, which some of them referred to as *atoms.* Atoms, in a sense, were the ultimate constituents of the world, patterns in the movement of which produced the variety of things in the visible domain (Kargon, 1966). This philosophy of atomism, as we will see in subsequent chapters, dates back to the ancient period, but in early modern Europe it had a revival in the works of some very prominent scientists and philosophers. Advocates of atomism included Galileo, Francis Bacon, Newton, Descartes, Hobbes, Locke, Boyle, and Pierre Gassendi. For the atomists, the extrinsic character of motion at the macro level *also applied at the micro level*. Thus, the atoms did not have any intrinsic principle of movement. Relations of motion were extrinsic to the atoms – motion was communicated from atom to atom through collisions. The world, in other words, was constituted by entities which bore no inherent relationship to each other.

The idea of inherently inert atoms as the basic constituents of the natural world was bracketed, with due justification, by the romantics and many others ever since, with the notion of all macro-level, perceptible objects also being intrinsically static, and as both constituting a *single* mechanistic or mechanical philosophy (Pepper, 1996). Atomism in particular, since it deals with a fundamental characterisation of the nature of matter, was held responsible by the romantics, and still is by several influential strands of social theory, for reducing nature to "dead matter" (For instance, see Callicott, 1989). The theme of "cold science" dismembering an organic and vibrant nature into "dead atoms" is a theme that runs through the entire history of environmentally motivated opposition to modern science. Val Dusek quotes the late eighteenth century romantic English poet William Blake as an instance of this sentiment:

"The atoms of Democritus

And Newton's particles of light

Are sands upon the Red Sea Shore

Where Israel's tents do shine so bright." (Dusek, 2006: 179)

Some cautionary remarks must be made here. First, it must be remembered that the atomistic view of the world was not a *scientific discovery*. It was a speculative philosophical doctrine about the nature of matter. That atoms are *not* the ultimate constituents of the world has long been scientifically established. The discovery of sub-atomic particles and other forms of matter have clearly demonstrated that atoms are not indivisible. In fact, the scientific consensus today is that the very idea of an "ultimate constituent of matter" is itself an unscientific one (Bigelow & Pargetter, 1991). Despite that, sections of social theory continue to regard seventeenth and eighteenth century atomism as the genuine ontological basis of the contemporary scientific worldview[4] (for example, Merchant, 1992; Callicott, 1989, 1999; Plumwood, 1993).

Second, the view of atoms as lacking any inherent principle of movement has been disproved by contemporary science in multiple ways. The discovery and explanation of a whole variety of intermolecular, interatomic and subatomic forces have established beyond doubt that these entities do not require "a push from the outside", as it were, in order to move. Again, we find in contemporary social theory, particularly of an environmentalist leaning, scarce recognition of these developments. It is almost as if the unfolding of the scientific view of the world somehow *ended* with Newton (for a paradigmatic example, see Merchant, 1992).

Further, even in the seventeenth and eighteenth centuries, it is debatable whether atomism *did indeed* constitute the ontological foundation of scientific practice. For instance, did Galileo's heliocentrism, discovery of Jupiter's moons, discoveries about the frequency of oscillation of a pendulum, or discovery of uniform acceleration of falling bodies of different masses, depend *in any way* on the atomic thesis? The answer, quite clearly, is no.

Fourth, in contemporary social theory there is often an explicit or implicit conflation between mechanism and materialism. This conflation has different variants. Sometimes, any kind of a materialist thesis is dismissed as mechanistic (for example, Mathews, 1991, 2005). This is more of an unreasoned conflation dependent on conjunctural academic and political consensus. An obvious example is Marxist materialism, which, if mentioned at all, could straightaway be called

[4] For a sharp, critical take on this see Hawkins (2006).

mechanistic, no citation required. The second variant is to see mechanism as *exhausting* all possible ontological views of material processes which do not invoke extra-corporeal entities like spirits, incorporeal souls, immaterial energies, gods immanent or otherwise, and such like (for example, Elvey, 2006). Materialism, then, becomes mechanistic *by definition*.

Now, it is true that in the early modern period certain prominent mechanists and atomists were *also* materialists. Hobbes, for instance, was both an atomist and a materialist (Copleston, 1994 b). But the *reasons* for classifying him as an atomist and a materialist *do not coincide*. He was an atomist in so far as he believed that all perceptible phenomena in the world can be explained in terms of the mechanical movement of imperceptible, indivisible atoms. He was a materialist to the extent that he believed that the *human mind and its attributes could be understood as an extension or development of these very same material processes*. *Matter in motion came first; the mind was a form of development of matter in motion.* Many of the other atomists – Descartes, Gassendi, Newton etc. – refused to grant matter this primacy over mind and were therefore decidedly and avowedly not materialists (Kargon, 1966). Thus, while mechanism or atomism is a particular, specific thesis about the nature and composition of matter, materialism is a thesis about the nature of the relationship between mind and matter *in general*. Materialism *is not committed* to any particular account of the nature of matter. A large number of prominent materialist philosophers through the course of the modern period – including Diderot, Feuerbach, Marx, Engels, Dietzgen, and Ilyenkov – were far away from anything even remotely resembling mechanism (Oizerman, 1988). What united them was the basic primacy of matter over mind.

Finally, it must be remembered that scientists and philosophers of the Enlightenment period were in no way *progenitors* of the idea of "dead matter". It was bequeathed to them by an almost unbroken tradition of philosophical and theological conceptualisation of the nature of matter which can be traced back to Plato. The only place where Plato talks about matter *as* matter, i.e. matter without the imprint of incorporeal mental entities, is the dialogue *Timaeus* which involves a cosmological account of the creation of the world by a divine entity – a *demiurge* (Plato, ca. B.C.E. 360/2008). Matter in the world was in formless chaos and disorder; it lacked all qualities before the *demiurge* used it to build the world based on purely extra-material, intellectual archetypes called *forms*. *In itself* matter was nothing, the purely mental forms made it everything. We shall examine the theory of the forms in closer detail in chapter 7.

With Aristotle, this radically impoverished conception of matter became the theory of *materia prima* or "primary matter". This primary matter was essentially attribute-less, quality-less matter which could form the material *substrate* of any substance (Politis, 2004). Or, to put it simply, primary matter was featureless "stuff" which absolutely anything could be made out of; it was simply the passive receptacle of the form and it was the latter which *completely determined* the quality and character of the object. The form, for Aristotle too, was ideal or non-material in character. This theory is developed further by medieval scholastic philosophers like St. Augustine, Simplicius and Thomas Aquinas. Primary matter, on the predominant medieval account, was regarded as "pure potentiality" – i.e. *as representing nothing but the passive ability to receive all forms*. Forms, by a similar logic, were conceived as "pure actuality" (Copleston, 1993).

Thus, in historical terms, the idea that it was the Enlightenment and modern science that introduced the notion of dead and passive matter is not tenable at all. In fact, it can be argued that the mechanists and atomists, *by granting matter and its motion causal efficacy in the generation of perceptible phenomena of nature*, bestowed upon it a dignity which was, historically speaking, radically new. By saying that material processes by themselves, *without the aid of mental forms, spirits and souls*, can generate the flux and ferment of nature, the mechanists were going against at least a millennium and a half of established philosophy. In our view, this dialectical relationship between *salvaging the causal autonomy of material processes*, on the one hand, and the *disenchantment and desacralisation of nature*, on the other, as a part of the Enlightenment, is completely lost sight of by contemporary social theory.

3.2 *Natural History and the "Balance of Nature"*

Back to holism then. The holistic or organismic ontological views of the romantics had two variants. The first was based on developments in the biological sciences or "natural history" as they were known at the time. From the seventeenth century, certain key changes began to take place in both how the nature of the individual organism was understood, and how the relationship between the organism and biotic and abiotic elements of its environment were conceived. Some of these developments foregrounded strong elements of interdependence and cyclicality to be found in certain natural processes. In 1628, the anatomist William Harvey discovered and demonstrated the mechanism of the flow of blood in the human body and the role of the heart therein (Katz, 1957). It was also found that similar mechanisms operated in a large number of other

organisms as well. This ran counter to, and helped dislodge, the then hegemonic notion of blood circulation which could in its essentials be traced back to the second century Roman surgeon and philosopher Galen. The Galenic view was essentially speculative and did not see the flow of blood as *circular* i.e. the understanding had not emerged that the blood being pumped out by the heart is the *same* blood which it receives back. For Harvey, this circularity was key: "…it is absolutely necessary to conclude that the blood in the animal body is impelled in a circle, and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of the pulse and that it is the sole and only end of the motion and contraction of the heart." (Katz, 1957: 733)

The intertwining of cyclicality and interdependence must be noted here. The phenomenon of blood flowing in the organism *in a circle* was obviously intimately linked to the fact of nutrients *being shared by different organs* of the organism. With the extension of knowledge of blood circulation to the microscopic capillary level half a century later, by the Dutch anatomist Anton Van Leeuwenhoek, the mutual dependence of various parts of the body received even greater recognition (Serafini, 1993). The theme of cyclical interdependence in nature comes into sharp relief with the work of a number of natural historians working around the middle of the eighteenth century, but most notably that of the Swedish professor of natural history, Carl Linnaeus, one of the founders of ecology as a discipline. Apart from developing an extremely influential scheme for classifying organisms, elements of which are still in use today, Linnaeus arrived at an understanding of ecological niche or the role played by an organism or species in a particular biotic habitat. Very significantly, he saw such roles as mutually complementary and constituting a *system* which he referred to as the "economy of nature" (Farber, 2000). This "economy of nature" consisted of cyclical, recurrent organic processes, in which every species had a specific kind of participation, which ensured the survival of all species. The natural world was marked by exquisite adaptation between each of its elements and it was the task of the natural historian to study these myriad linkages.

One major consequence of such a conception of interdependence and specific mutual contribution was that it led to the realization that even those species *which seemed insignificant or noxious to human beings could serve vital ecological functions*. For instance, Linnaeus investigated and highlighted the role of maggots in the consumption of dead organic matter and thereby in the containment of disease. (Farber, 2000) Isaac Biberg, a disciple of Linnaeus, in an essay titled the

Oeconomy of Nature (1751), presented an elaborate theory of predators and preys being linked together through food chains and how every link in the chain, no matter how seemingly inconsequential, was vital to the sustenance of the entire process (McKusick, 2000). These insights contributed to an emerging understanding of the natural world as characterised by complex biological interconnections and processes, where the significance of an entity could far surpass its apparent or immediate importance to human beings. Thus, Gilbert White, eighteenth century English naturalist and ornithologist wrote:

"The most insignificant insects and reptiles are of much more consequence, and have much more influence in the economy of nature, than the incurious are aware of; and are mighty in their effect, from their minuteness, which renders them less an object of attention, and from their numbers and fecundity. Earthworms, though small in appearance and a small and despicable link in the chain of nature, yet, if lost, would make a lamentable chasm." (Worster, 1977: 7)

There was a problem, however. To say that various phenomena in nature are inherently interconnected is one thing, *but it is quite another* to say that such phenomena, or such connections, remain *the same over time*. No matter how well certain things may be adapted to one another at a given point in time, one cannot, on that basis, go on to say that such adaptation has always been or will always be there. It is illegitimate to infer the *permanence* of interdependence from the *fact* of interdependence. This, inference, however, was widely made in the seventeenth century by natural historians, and was articulated in ideas of an inherent "harmony" or "balance" in nature (Kricher, 2009). There was, on such accounts, a tendency for the roles and functions of all species to harmonise in nature. Each species had its "allotted place" (Worster, 1977: 35), and it occupied that place in perpetuity. This idea of a "balance of nature", as Edgerton and others have pointed out, was to have a long career in the future development of ecological thought (Egerton, 1973; Kricher 2009). In contemporary ecology, however, it has become clear that any such assumption of a global balance would be fundamentally misplaced. In fact, the emerging metaphor in the ecological sciences has been of a "flux of nature", in recognition of the constancy of change and dynamism in the natural world (Simberloff, 2014). The "balance of nature" assumption still wields considerable influence, however, over the contemporary environmental imagination.

How did eighteenth century natural historians explain the "balance of nature"? How did they account for the inherent harmony they posited? Here, most of them were absolutely blunt. The

answer could only be God or the Creator. Thus, Linnaeus wrote: "By the [Economy] of Nature, we understand the all-wise disposition of the Creator in relation to natural things, by which they are fitted to produce general ends, and reciprocal uses… [Natural things] are so connected, so chained together, that they all aim at the same end and to this end a vast number of intermediate ends are subservient." (Worster, 1977: 37) The economy of nature, therefore, is a divine economy in which the functional roles of all species – their "intermediate ends" – are harmonized by divine agency. There is, in other words, a cosmic teleology operational in nature. A cosmic *telos* or *end*, as we will see, need not involve directionality. It need not be directed towards an eventual goal or culmination. Even the cyclical execution of a divine plan is a teleological or finalistic process (Bowler, 1983). It was this cosmic teleology that united all species and produced the harmony of nature.

This understanding was endorsed particularly strongly by a number of individuals in late seventeenth and eighteenth century England who were clerics by profession and had a serious interest in natural history. Referred to as natural theologians or "parson-naturalists", they played a significant role in shaping philosophical understanding of emerging biological discoveries. A towering figure amongst them was John Ray, who delivered both lectures in natural history and sermons, at Cambridge, in the second half of the seventeenth century. His theological interpretation of the fledging sciences of botany and zoology, exemplified in his *The Wisdom of God Manifested in the Works of the Creation*, published in 1691, is seen as the foundational text of natural theology (Raven, 2009). The essence of Ray's argument in the book is that the harmonious adaptations to be found in nature are testament to the existence of a provident and beneficent God. Without the active dominion of a Deity, such adaptations are impossible. Matter cannot *by itself* produce such harmony. Those who think otherwise, are buying into the "grand subterfuge of Atheists" (Willey, 1950: 38). Taking the example of the harmony between different parts of the human body, Ray says:

"it seems to me impossible that Matter divided into as minute and subtle Parts as you will or can imagine, and those moved according to what Catholick laws soever can be devised, should without the Presidency and Direction of some intelligent Agent, by the mere agitation of a gentle Heat, run itself into such a curious Machine, as the Body of Man is." (Willey, 1950:38)

3.3. *Paley's Argument*

The same argument was later reformulated by the English cleric and philosopher William Paley in a way that had philosophical consequences for a long time to come. In 1802, in a tract called *Natural Theology or Evidences of the Existence and Attributes of the Deity*, Paley provides what is probably the best known version of the "argument from design" for the existence of God (Gould, 1993). Paley argues, by way of an example, that when we come across a watch we always assume that it is the product of a watchmaker's artifice rather than of the spontaneous operation of natural forces. But on what basis do we make this assumption? According to Paley, it is the *designed nature* of the watch. The watch serves a particular *function* or *purpose* – it keeps the time. Further, it can do so because its structural components -- its levers, springs and wheels have been arranged in a particular way. Thus, a watch is characterized by design insofar as it presents two essential and related features: first, *functional fit*, or the fact that it fits or serves a particular purpose; and second, *subordination of structure or form to function*, or the alignment of the structure of the watch to the requirements of its function.

On Paley's view, it is these two characteristics of the watch, which we are ordinarily aware of, which makes us assume that it must have been *made* by someone – that it must be the result of intelligent creation. He agrees with the logic of the assumption; for him, design – i.e. functional fit and subordination of structure to function – cannot be the result of purely material processes. It can only result from the intervention of *intelligence* and *purpose*. A watch, in other words, *logically implies*, a watchmaker. (It may be noted that this logical implication can be seen to be implicit in the word "design" itself. There is an unmistakable tendentiousness, therefore, in the use of the word. This, however, is not attributable to Paley alone but to the entire tradition of natural theology).

Paley then goes on to argue that organisms are exemplars of design (Gould, 1993; Mayr, 1982). An organism has certain needs which it must fulfil through its interaction with its environment. The fact that it does fulfil these needs means that it is *adapted* to its environment. In other words, there is a *functional fit* between the organism and its environment. Further, the various parts of the organism – sensory structures, internal organs, external physiognomy etc. – are formed and arranged in such a way that they contribute to the fulfilment of the organism's needs on a continuous basis. Thus, the organism is also characterized by *subordination of form to function*. It,

therefore, fulfils both the criteria of design. Furthermore, this design is of a much *higher order* than that displayed by a watch. In the case of a bird, for instance, the functions of flight, flocking, procurement of food, avoidance of predators, nest building, reproduction etc. are far more elaborate and require far greater structural complexity than the simple function of keeping time. If a watch, therefore, logically implies a watchmaker, organisms, given their higher order of design, logically imply a *maker of a higher order* who, of course, can only be God.

Now, *if all species display design, and Paley assumes that they do*, it would mean that all species are adapted to their environment. Paley's argument then amounts to the following: Adaptation is a universal and ever-present feature of the natural world (Gould, 1993). *Every* species is *always* adapted to its environment. Therefore, the natural world *as a whole*, with all its species and their activities and interconnections, must be a product of divine agency and benevolence. In other words, from the assumed *universal adaptedness, harmony, balance and stasis* of nature, Paley infers its divine origin. Balance and stasis are the premise; God is the conclusion. We think, however, that the matter is a little more complicated. There seems to be an *unstated* relationship as well between premise and conclusion. God can turn very easily from being an *inference from* universal adaptedness to being the basis for *belief in* universal adaptedness. The argument then becomes, not quite a tautology, but a self-reinforcing closed circle. From the supposedly perfect harmony of nature, we infer the divine creation and sustenance of nature; and God being perfect, nature must necessarily exhibit perfect harmony. The premise of harmony and balance can then be protected against contrary evidence.

The evidence for long-term fundamental changes in the organic world was gradually mounting through the course of the eighteenth century (Larson, 2004). Paleontology as an incipient science took root in this period. Towards the beginning of the century itself, English scientist Robert Hooke, based on his observations of fossil foraminifera, conjectured that fossils were remains of species now long extinct. The towering French anatomist Georges Cuvier began his detailed comparative study of fossils in the second half of the century, and produced decisive findings like the extinct status of the mammoth as a species. Towards the end the century, English geologist William Smith discovered that different strata of sedimentary rocks consistently corresponded to different fossil species of flora and fauna, thereby creating a firm scientific basis for the idea of long term organic succession, the idea that over time some species had disappeared and others had

appeared. Through the course of the eighteenth century, several philosophers and natural historians like Charles Bonnet, J.B. Robinet and Comte de Buffon speculated on the mechanism of organic change. Paley's self-reinforcing closed circle could provide the assumption of perfect harmony and stasis in nature added protection against this growing body of evidence, argument and speculation.

3.4 *The Great Chain of Being*

The second variant of the holistic ontological view adopted by the romantics had a much more directly traditional provenance. It was a view of the unity of nature that had dominated western thought for more than a millennium and a half, and was integrally linked to almost every aspect of European social, cultural, political and economic life in the medieval period. A vital part of Christian dogma, it survived the Reformation and continued to be influential well into the middle of the nineteenth century. The essence of the view was that all created entities, which included both natural *and* supernatural entities, had a fixed, divinely ordained place in a linear hierarchy of perfection. (Lovejoy, 1936; Willey, 1950; Tillyard, 1942). At the bottom of this hierarchy – this *chain of being* or *scala naturae* as it was called – were inorganic entities like minerals, which displayed the least amount of perfection. At the top of the chain sat the most perfect being – God or the Creator himself

Between these two ends, the precise arrangement of beings varied historically and across regional contexts. One obvious reason for this was the sheer vagueness, if not emptiness, of the idea of perfection. Another straightforward source of variation was knowledge of the organic world which in turn depended on a variety of factors ranging from geography and climate to the development of natural history as a scientific endeavor. But, additionally, with the knowledge of modern evolutionary biology we can say today in hindsight that a hierarchical linear arrangement of species on the basis of any meaningfully normative and comprehensive criterion is impossible (Mayr, 2001). Evolutionary theory pictures the organic world as a tree or a bush, with different lineages branching out in uneven ways in different directions. The organic world, in other words, is *constitutively non-hierarchical* and therefore cannot be arranged in a neat order of perfection. Any linear chain of being, therefore, would have arbitrariness built into it.

Having said that, however, it must also be pointed out that the overall evolutionary development of organic life has been a *cumulative* process. In other words, species in their evolutionary development often build on past evolutionary gains (Zimmer, 1998). For instance, the evolutionary rise of the central nervous system built on the evolutionary gains made in the acquisition of neurons. A species, therefore, can be said to be a bearer of its evolutionary history – its members carry within themselves many of the evolutionary achievements of its predecessors. An *analogous* notion of *successive containment* was held by Aristotle, in a strictly non-evolutionary, even non-temporal sense, which had a strong and lasting impact on the arrangement of species in the *scala naturae* across contexts. In his *De anima*, Aristotle talks about "soul" being a basic and distinguishing property of organic life: "the ensouled is distinguished from the unsouled by its being alive" (Goetz & Taliaferro, 2011: 19). The soul, for Aristotle, is a special kind of *form*, which, it must be remembered, is the source of all specific attributes of material entities on his view. Based on such attributes, Aristotle divides souls of all organic entities into three hierarchically arranged categories. The lowest kind of soul is a *nutritive* soul, which is possessed by plants and confers basic organic functions of birth, nutrition, growth, reproduction, decay etc. Above the nutritive soul is the *sensitive* soul, which characterises animals and endows them with sensory capacities. The highest kind of soul is the *rational soul*, which is possessed by human beings alone in the natural world and makes them capable of thought and knowledge. Each kind of soul subsumes the attributes of the kinds inferior to it. Thus, a sensitive soul enables animals to perform nutritive functions as well. Animals do not just perceive, they live and grow too. Similarly, the rational soul also endows human beings with nutritive and sensitive powers.

This theory of hierarchy between inorganic things, plants, animals and human beings, only in its aspect of hierarchy – not in its aspect of *subsumption of lower by higher*, was incorporated almost universally into the *scala naturae.* The chain of being, as far as the natural world was concerned, would inevitably begin from inorganic entities like minerals, pass through plants, ascend the animal kingdom, and then reach human beings as the pinnacle (Willey, 1950). Of course, there were supposed to be numberless supernatural, extra-corporeal beings -- an elaborate hierarchy of angels, archangels, seraphim etc. – above human beings, but in the visible, material world the latter occupied centrality. Thus, human beings held a special place in the chain of being; they were, in a sense, the *transition point* in the chain – *the only material beings* endowed with reason (Tillyard, 1942). All other beings possessed of reason, all of them located higher than human beings in the

scala naturae, were reason in *pure* form – i.e. without any material, bodily encumbrances. Thus, human beings had a fundamentally *split* character – in so far as they were physical beings, they had one leg in the corporeal world, and in so far as they were rational beings, they had the other leg in the incorporeal world. Human beings, therefore, were special in being a distillation of the basic dualism that informs the cosmology of the *scala naturae* as a whole. Like the cosmos is divided into God, who is pure mind, and *material prima*, which is pure formless matter out of which he constructs the chain of being, the human being too is split into rational and bodily existence.

But *why* does God create the chain of being? A persuasive analysis of this question and its implications has been provided by Lovejoy in his classic study of the origin and evolution of the *scala naturae* (Lovejoy, 1936). According to him, all *otherworldly* philosophical systems, Plato's philosophy being a classic example, suffer from a basic problem. For Plato, as we have mentioned before, objects in the visible, phenomenal world are inferior, ephemeral copies of ideal, timeless mental archetypes or forms. All particular, corporeal objects that we see around us – all particular trees, for instance – are imperfect and changeful imitations of a perfect, unchanging and universal form of tree-*ness* which is completely incorporeal. But despite being universal it still has a taint of particularity; being a form of trees, *as against* a form of dogs or snakes or mountains, it is a form of a *particular kind of thing.* Thus, forms themselves must have an ultimate, universal form which Plato refers to as "the Good". The Good is pure universality unblemished by any particularity whatsoever. For Plato, the highest conceivable human activity, in fact the only activity that is *rational* in a true sense, is to immerse oneself in contemplation of the Good. In the achievement of this direct immersive union with the eternal Good, affairs of the material world – this world of imperfect, *fallen* things which constantly arise, change and decay – can only be obstacles. Thus, the pursuit of the Good requires a *turn away from* the rough and tumble of the temporal realm. It is in this sense that Plato's philosophy is an otherworldly philosophy.

Now, the word "good", Lovejoy points out, was employed by Plato in a very specific sense which was a standard part of Greek usage at the time. The *goodness* or perfection of the Good was due to the fact that it did not *need anything else* for its being or identity. Each particular object was dependent on its form to give it attributes. Each form of a particular kind of thing was dependent on the form of forms for its existence as a form. But the latter, i.e. the Good, was not dependent

on anything *beyond itself* for its existence. It was, in other words, *completely self-sufficient*. It was this self-sufficiency which made the Good unqualifiedly perfect.

On various academic interpretations of Plato's philosophy, in Plato's own indications in dialogues like the *Timaeus*, and most importantly on interpretations accorded to Platonic philosophy in Neoplatonism and the subsequent evolution of Christian dogma, the Good is identical with God or the Absolute. Thus, the *summum bonum* of human reason is to spurn the physical world and gaze upon the perfection of God. So far so good. But why does such an inferior, imperfect physical world exist at all? Because God, in the form of the *demiurge* created it, is the answer Plato gives in the *Timaeus.* And therein lies the rub. If God is perfect, i.e. if he is completely self-sufficient, why would he *need* to create the physical world at all? One is either perfect or imperfect; how does the creation of the natural world, the chain of being, *add* to God's perfection? According to Lovejoy, this question has been the source of a central tension in early and medieval Christian theology. Plato himself answers this question in the *Timaeus* in the following way:

"…let us state the cause wherefor he who constructed it *did* construct Becoming and the universe. [The reason is that] he was good and in one that is good no envy of anything else ever arises. Being devoid of envy, then, he desired that everything should be so far as possible like himself. This, then, we shall be wholly right in accepting from wise men as being above all the sovereign originating principle of Becoming and of the cosmos." (Plato, ca. B.C.E. 360/2008: 53)

Thus, Plato reverts to the other meaning of the word "good" in order to resolve this problem. God being good, must also be beneficent. A beneficent God *would not grudge existence to anything*; God, therefore, would be inherently productive. This double connotation, and manifestly stretched argument, allows Plato, and then the Neoplatonists, to convert the Good from a principle of "self-sufficing perfection" to one of "self-transcending fecundity" (Lovejoy, 1936: 65). The fifth century Neoplatonist and Christian theologian, Dionysius the Pseudo-Areopagite says:

"Love which works good to all things, pre-existing overflowingly in the Good, … moved itself to creation, as befits the superabundance by which all things are generated.… The Good by being extends its goodness to all things. For as our sun, not by choosing or taking thought but my merely being, enlightens all things, so the Good… by its mere existence sends forth upon all things the beams of its goodness." (Lovejoy, 1936: 68)

Thus, God became, in the Neoplatonic account, an entity which is creative *of necessity*. Creating the natural world belongs to the essence of God's perfection, like emitting light belongs to the essence of the sun. The creation of the chain of being flows necessarily from the inherent nature of God. It must be noted that the word "love" here has not been used in its customary psychological sense. Love or beneficence of God, on this view, refers to the necessary generative activity or fecundity of God. This account of God's goodness, love and creation consolidates further through the medieval period in Christian theology. It is elaborately developed by varied scholastic philosophers and finds expression in notions such as Thomas Aquinas' *bonum diffusivum sui* or the idea that the good is necessarily self-diffusive (Wippel, 1993).

The following ontological implications of the chain of being must be noted in the light of the above discussion. First, the unity of entities constituting the chain of being is *completely* derived from the idea of the perfection of God. There is no other basis *whatsoever* to the unity of nature. The nature of every species and its location in the chain is simply an expression of divine will. If you remove God from the picture, you remove the only thing that connects all the various species in the chain. There is nothing in the *species themselves* that would connect them to each other. The *whole* here is *nothing but* the generative perfection of God. As Macrobius, a fifth century Neoplatonist, wrote, God "illumines all and is reflected in each, as a single face might be reflected in many mirrors placed in a series." (Lovejoy, 1936: 63)

Second, the chain of being is completely *static*. Given the premises of its creation, there cannot logically be any movement or evolution of the chain of being. The natural world does not emerge, evolve or change over time. God being perfect, must be perfect *at every moment*. Therefore, at no moment can he withhold existence from any kind of entity or creature. All that *can* exist *must always* exist. There cannot be a *late arrival* or an *exit* – such a gap or breach would amount to a logical hole in the order of perfection and make the whole chain collapse. This idea is famously captured in the following lines of Alexander Pope from his *Essay on Man:*

"Vast chain of being! Which from God began,

Natures aetheral, human, angel, man,

Beast, bird, fish, insect, what no eye can see,

No glass can reach; from Infinite to thee,

From thee to nothing. – On superior pow'rs

Were we to press, inferior might on ours;

Or in the full creation leave a void,

Where, one step broken, the great scale's destroy'd;

From Nature's chain whatever link you strike,

Tenth, or ten thousandth, breaks the chain alike." (Pope, 1733: 1965: 13)

3.5 *Natura's Secret: Which Nature?*

Third, the idea of the *scala naturae* being an expression of divine fecundity lends a *dual existence* to the natural world. Of course, any idealist philosophy, since it would regard the material world as an expression of the mind, would in the last analysis "double" nature. But the *sheer lack of causal autonomy* of entities in the chain of being enables the doubling of nature *as an explicit category*. Thus, two separate yet linked concepts for nature gain currency in early medieval Christian dogma. Nature begins to be seen as, on the one hand, *natura naturans* or the creative principle, i.e. God, which expresses itself in the chain of being; and, on the other, as *natura naturata* or the chain of being itself – i.e. the *manifestion* of the creative principle (Collingwood, 1945). In literal terms, the expression *natura naturans* means "nature natur*ing*", implying nature in its active *form-giving* mode. *Natura naturata*, on the other hand, means "nature natur*ed*", referring to the perceptible natural world as the *passive product* or expression of divine creativity. The relationship between *natura naturans* and *natura naturata* was, of course, purely hierarchical with the former completely determining the latter.

The term "nature", therefore, began to refer to two very different things, as part of what Raymond Williams calls the historical emergence and consolidation of the idea of "singular, abstracted and personified" nature (Williams, 2005). "Nature" now is, on the one hand, the chain of being, and, on the other, the God who created the chain. "Nature" in "nature's providence", "nature's beneficence", "nature's design", "nature's infinite wisdom" etc. was God, the divine maker. "Nature" in "nature's variety", "nature's fullness", "nature's remedies" etc. referred to the natural world as crafted by the maker.

There was, however, a complication that we need to note. In the entire account sketched above, a basic question has not been broached. If God as a perfect being is self-diffusive, why does he not create a natural world which is perfect itself? Why is the visible world, and all entities therein, an *inferior* copy of the perfect majesty of the world of forms? Why is inherently productive perfection, not productive *of perfection*? It is important to understand that this question is not coextensive with the question of theodicy – i.e. the question of why evil or suffering exists in the world. If the created world were perfect as the creator is perfect, then the question of theodicy would not even arise.

Plato answers this question by saying that since the phenomenal world is made by the admixture of pure forms with matter, and matter is by its very nature inferior and imperfect, the phenomenal world too must be imperfect (Plato, ca. B.C.E. 360/1914). Matter is fundamentally "recalcitrant" and therefore incapable of absorbing the perfection of the forms. Through the entire history of Christian theology and apologetics, this remains the basic approach to the question. The material world *being material* can only be an imperfect mirror of the divine light (Dilman, 1999).

As far as Plato's specific answer is concerned, however, variations were required from time to time. What if, for instance, unlike Plato, one does not believe that God created the world out of primeval matter but believes instead that he created it *ex nihilo* – out of nothing? Many significant scholastic philosophers, like St. Augustine, for instance, did have such a position (Mathews, 2005). How is the lack of perfection in creation to be explained then? A prominent way of answering this was to *create a distance between God and the actual execution of creation.* In the theory of Plotinus, for instance, the act of creation takes place through a succession of logical steps or *hypostases* (Bussanich, 1996). God or the One is the first principle of creation, who retains supremacy through the entire process. The realm of Intellect or *nous*, encompassing all the forms, emerges from the Absolute. It is these forms that will serve as the archetypal bases for the creation of material entities. From the Intellect emerges the Soul, the actual and immediate agency of creation. Soul is the domain of *desire*, the object of which lies outside of itself. This desire is constantly fulfilled through the act of creation of the visible natural world. But, in the process, this ever-present need and desire is imparted to that which has been created. The natural, material world, therefore, and all its organisms and entities, are buffeted by constant need and *impoverishment* which they must continually seek to overcome. This is what fundamentally

accounts for the changefulness and imperfection of the material world, as against the immutable perfection and self-sufficiency of the One and the forms.

Now, the Soul, referred to sometimes as *anima mundi* or the *world soul*, often took the form of subordinate personified deities in later Christian theology and dogma. One such particularly common and widespread form in medieval Europe was the female deity *Natura. Natura* had a somewhat peculiar character. As Williams points out, her relationship with God or the One was marked by a certain tension (Williams, 2005). Ordinarily, *Natura* acted simply as God's deputy and carried out his orders in complete obedience. Sometimes, however, she could rebel and refuse to execute his fiat. Such acts of defiance have been construed by a section of contemporary social theorists as testimony to pre-modern notions of the "autonomy" of nature which were subsequently quelled and erased by the Enlightenment and the hegemony of science (for instance, and most significantly, see Merchant, 1982). We find such an interpretation to be unpersuasive. Why would a completely idealist philosophy, enjoying thoroughgoing and seemingly unshakeable social and political hegemony, grant autonomy to the visible, natural world? Such a concession would dismantle the entire theoretical edifice of traditional Christian dogma which was premised, as we have seen, on the world being nothing but an emanation of God's perfection. The reason for the peculiar status of *Natura*, therefore, must be sought elsewhere.

In our view, the *dual* status of *Natura* was a reflection of the contradictions involved in explaining the creation of an imperfect world by a perfect creator. In the Platonic resolution of the problem things are simple: there is a perfect God and there is imperfect matter; God has to make nature out of imperfect matter, and therefore nature is imperfect. Plotinus, who believes in creation *ex nihilo*, adopts the same fundamental logic and *yet builds Plato's hierarchy into the structure of divine agency itself*. The succession of the hypostases represents a split in the nature of divinity: *divinity in its perfect self-sufficiency*, becomes God or the One, along with the Intellect which is clearly God's intellect; *divinity in its productiveness,* becomes the Soul which produces the world because it is characterized by desire.

Now, the Soul must produce nature on the basis of the forms of the Intellect – it has nothing else to go by; and to that extent it must share in the perfection of the One. Thus, in one respect, the Soul must have the character of *natura naturans*, the ultimate divine origin of nature. But being characterized by desire, it must also share in the imperfection of the world it creates. Thus, in

another respect, the Soul must also have the quality of *natura naturata*, the imperfect physical world. This, in our view, is the secret of the duality of *Natura* – she is *both natura naturans* and *natura naturata* at the same time. As the former, she is God's trusted aide; as the latter she is rebellious and unpredictable.

It needs to be emphasized, against the grain of much contemporary theorization, therefore, that the rebelliousness or recalcitrance of nature, as registered in themes of medieval or ancient thought, cannot be unproblematically construed as the inherent creativity or causal autonomy of the natural world. Indeed, much of the dominant philosophical treatment of matter in the pre-modern world points in exactly opposite direction. For Plato, in the *Timaeus*, the *chaotic* character of primeval matter and its *formlessness* are one and same thing (Plato, ca. B.C.E. 360/2008). *Materia prima* is chaotic and recalcitrant not because it has causal autonomy *but precisely because it has absolutely none.* Matter is unruly because it is intrinsically bereft of quality and *order*, which in any idealist philosophy, and *all* theological systems are idealist, must be imparted to matter by the mind. *Natura's* rebellion reflects her *powerlessness* in her role as matter, *not* her liberation.

One of the most striking instances of this dynamic is Plato's famous analogy of the chariot in the *Phaedrus* (Plato, ca. B.C.E 370/1914). Plato conceives of the human soul as consisting of three distinct parts or faculties which can be hierarchically arranged in terms of the part's role and relevance in the pursuit of the Good. The highest faculty is that of Reason which enables the soul to acquire knowledge. Knowledge, of course, is by definition knowledge of the immutable forms and the Good. Reason has the added role of harmonizing of the functioning of the other parts of the soul towards its own ends. Immediately below Reason, in terms of the hierarchy, is Spirit. It is the faculty of the will or volition, its essential function being the translation of the dictates of Reason into action. The lowest faculty is Appetite, which is the faculty of earthly need and desire. It operates to draw the soul towards the blandishments of the material world and therefore plays a negative role as far as the ends of Reason are concerned.

In the analogy of the chariot, Plato imagines Reason as the charioteer, and Spirit and Appetite as the horses drawing the chariot. Spirit is the obedient horse, subservient to the directions of the charioteer: "he needs no touch of the whip, but is guided by word and admonition only" (Plato, ca. B.C.E. 370/1914: 527). Spirit aids the smooth journey of the soul. Appetite, on the other hand, given its inherent alignment with the material world, is thoroughly intransigent: "heedless of the

pricks and of the blows of the whip, [he] plunges and runs away, giving all manner of trouble to his companion and charioteer…" (Plato, ca. B.C.E./1914: 543) Finally, in the parable, the smooth resumption of the journey requires the subjugation of Appetite by the charioteer through the administration of brutal punishment. The rebelliousness of Appetite, as a faculty, in this analogy is very obviously not an indication of its creative autonomy within Platonic thought but of its inferiority. Order has to be *imposed* by Reason on Appetite, and by extension on the material world, for the latter to have any form, quality or direction whatsoever.

3.6 *Holism and the Romantics*

Thus, both the variants of holistic ontology found, in different ways, the unity of nature in divine agency. And both were adopted quite consciously by the romantics in forging their view of the world. McKusick, for instance, points out that Coleridge was deeply familiar with both Linnaeus' notions of economy of nature and late medieval theological ideas (McKusic, 2000). And he drew on both to develop a kind of pantheism which was amply reflected in his poetry. For instance, in a poem called the *Eolian Harp*, composed in 1795, he writes the following lines:

"And what if all of animated nature

Be but organic Harps diversely fram'd

That tremble into thought, as o'er them sweeps

Plastic and vast, one intellectual breeze,

At once the Soul of each, and God of all?" (McKusick, 2000: 37)

At another point in the poem he refers to this "God of all" as the "the one Life within us and abroad, /Which meets all motion and becomes its soul" (McKusick, 2000: 38). On the other side of the Atlantic too, balance of nature and divine spiritual unity became a foundation for holistic ontological claims about nature. David Thoreau, the nineteenth century American romantic thinker, for instance, writes in 1851: "The earth I tread on is not a dead, inert mass; it is a body, has a spirit, is organic, and fluid to the influence of its spirit, and to whatever particle of that spirit is in me" (Worster, 1977: 79). On another occasion, he says, "[nature is] not a fossil earth, but a living earth, compared with whose great central life all animal and vegetable life is merely parasitic." (Worster, 1977: 80) One observes here, again, the theme we noted above. The earth is

"alive" (non-dead, non-inert) *not because it has causal autonomy as a material entity*, but because there is a spirit to whose influence it is "fluid" or amenable. Similarly, in the second quote, perceptible material entities like animals and vegetables are seen as derivative from, or at least dependent on, the abstraction of the "great central life".

Another way in which these themes of holism influenced the romantic world view was to produce or strengthen notions of nature as the domain of *stasis*. As discussed above, the idea of the natural world being changeless was central to both the concept of universal harmony of nature and that of the chain of being. The perfect Creator must be equally perfect at every moment. The divine plan and its components cannot change; it must be executed in its entirety continually. The forms never change. Kingdoms can fall. Lovers may betray. Nature never will. This belief in the constancy of nature is poignantly brought out in the following lines of the nineteenth century English romantic poet, John Clare:

"Leaves from eternity are simple things

To the world's gaze – whereto a spirit clings

Sublime and lasting – trampled underfoot

The daisy lives and strikes its little root

Into the lap of time – centurys may come

And pass away into the silent tomb

And still the child hid in the womb of time

Shall smile and pluck them when this simple rhyme

Shall be forgotten like a church-yard stone

Or lingering lie unnoticed and alone

When eighteen hundred years our common date

Grows many thousands in their marching state

Aye still the child with pleasure in his eye

Shall cry – 'The daisy!' – a familiar cry –

And run to pluck it." (Bate, 1991: 54)

3.7. *Chain of Being, Theodicy, Ideology*

Our discussion of dominant medieval and early modern holism would be incomplete without a comment on its social function. It has been recognized, for quite some time, that a major ideological role of the chain of being had been to rationalize and prop up existent social hierarchies. One way to conceive this role, and the more accepted way ever since it was articulated by certain key Enlightenment figures, was to see the hierarchical chain as *directly* a reflection of the elaborate social, political and ecclesiastical hierarchies in feudal Europe. The chain of being mirrored, in a straightforward and unmediated way, the supremacy of the clergy and aristocracy. The following comments by Voltaire are a typical example of such criticism:

"When I first read Plato and came upon this gradation of beings which rises from the lightest atom to the Supreme Being, I was struck with admiration. But when I looked at it closely, the great phantom vanished, as in former times all apparitions were wont to vanish at cock-crow. At first the imagination takes a pleasure in seeing the imperceptible transition from inanimate to organic matter, from plants to zoophytes, from these to animals, from these to *genii*, from these *genii* endued with a small aerial body to immaterial substances; and finally angels, and different orders of such substances, ascending beauties and perfections up to God himself. This hierarchy pleases those good folk who fancy they see in it the Pope and his cardinals followed by archbishops and bishops; after whom come the curates, the vicars, the simple priests, the deacons, the subdeacons; then the monks appear, and the line is ended by the Capuchins." (Lovejoy, 1936: 252)

We do not quite agree with this mode of criticism of religious dogma. As Marx had pointed out, the religious and philosophical reflection of the world in social consciousness does not take place in such a direct way (Marx, 1927/1977). Of central importance are social activity and the social forms or relations within which such activity is carried out. A more nuanced conception of the ideological function of the chain of being would, therefore, have to be sought.

In view of this, we believe a crucial concept is that of "destiny" (Lovejoy, 1936). As part of the idea of the chain of being, it logically follows from the divine determination of the hierarchy of perfection. The chain of being is completely static and so is the place of every being or entity in the chain. No species or object can climb up or down the scale. The reason for this is that every link in the chain, every entity, has a divinely ordained and therefore eternally fixed level of

perfection. This logically amounts to every member of the chain having its own unvarying and preordained "destiny" – i.e. there are certain things which it is capable of doing, and certain things which it is not capable of doing. In other words, each entity would operate within a *bounded, finite and eternally fixed* domain. If this were not so – if each entity were capable of an unbounded, infinite horizon of activities, no basis for occupancy of fixed places would remain. The very idea of a hierarchical chain of being would collapse.

There is another way in which we can understand the logical basis of the idea of destiny. In the course of the historical development of our knowledge of the natural world, *at any given point in time* our idea or concept of a particular object or phenomenon is necessarily *limited or finite*; whereas the object or phenomenon itself – its traits, attributes, qualities, relations under varying conditions – is *inexhaustible* or *infinite*. Our ideas would remain finite or limited *no matter how far our knowledge has developed*. Now, if one were to *reverse* this relationship – of finite idea being a reflection of an infinite object, and say that the object is a reflection of the idea, as idealism does, then essentially one would reduce the object to *finitude*. Like the idea, the object too would now be confined to a finite set of attributes and relations – that is, in other words, a "destiny". Thus, the idealist logic of the chain of being itself, the creation of the natural world on the basis of divine immutable forms or ideas, serves as a ground for the concept of destiny.

Now, as far as non-human natural species and other entities are concerned, destiny would imply a purely constitutive or *physical* finitude. A particular species of animal, for instance, would physically be capable of demonstrating only a particular, finite and fixed set of attributes and relations. In the case of human beings, apart from restriction of attributes of the human body to a fixed, finite set, destiny would also mean a *normative* restriction of *human activities* to a limited range. There would be a normative *freezing*, in other words, of social activity as it exists at that point in time. But social activity always takes place within determinate social relations. Therefore, a normative freezing of social activity would also amount to a *normative freezing of extant social relations*. Destiny would then amount to a divine, cosmic endorsement of the main features of the existing society no matter how egregious.

It is in this sense that social relations in feudal Europe were reflected in and justified by the concept of the chain of being. Social production under European feudalism was by and large stagnant in terms of both the variety of produce and the technical basis of production. This fixity was also to

be seen in the social relations within which production was carried out with hereditary and profoundly unequal forms of division of labour. The rule of the feudal lord over the unfree peasant household constituted the basic form of exploitation or surplus extraction. This exploitation formed the foundation of a gigantic edifice of aristocratic and princely rule supported ideologically and politically by an equally behemothic clergy. It was this social and political structure, with brute exploitation and inequality at its heart, which was reflected and rationalized in the *scala naturae.* Inequality and suffering were a part of the divinely ordained fabric of the world. The feudal order was a "natural" order. To question its glaring injustice was to question the perfect wisdom of God, and was therefore immoral. An act of *rebellion* against the social order was *doubly* immoral – it was both an impugning of divine wisdom, *as also an attempt to take on the creative role of God*. To attempt to transform society was *to attempt to transform the chain of being* – sacrilegious in both being a challenge to and an arrogant assumption of divine agency.

While the rhetorical edge of the reaction to the first aspect of the sacrilege blunted with the onset of modernity, the reaction to the second aspect – "humans playing God" – got transformed into a general pessimism about the possibility of social change. Willey calls this attitude "cosmic Toryism", and discusses a 1757 tract called *Free Enquiry into the Nature and Origin of Evil*, written by English politician and writer Soame Jenyns, as exemplifying the same (Willey, 1950). The essence of Jenyns' argument is that while the existence of want and misery in society may seem unnecessary, from the point of the *cosmic whole* – i.e. the entire chain of being and the divine intention underpinning it, it is unavoidable. Social misery is as important to the integrity of the chain – to the integrity of the whole – as everything else is. Jenyns says: "the beauty and happiness of the whole depend altogether on the just inferiority of the parts". (Willey, 1950: 49). Jenyns then goes on to argue, based on these cosmological premises, that while objectives of modern reform – universal education, removal of poverty, alleviation of mass hunger etc. – may be commendable in intention, their implementation would lead to social collapse. If social order is to survive, a part of society must remain sunk in misery. He expresses the point in a characteristically holistic metaphor. He says that if egalitarian reforms proceed too far,

"no national government or national religion can long stand their ground; for it is with old establishments as with old houses, their deformities are commonly their support, and these can never be removed without endangering the whole fabric". (Willey, 1950: 55)

But why must the whole depend on the misery of some of the parts? Why must the cosmic fabric depend on "deformities" for its existence? Not just Jenyns, but the entire tradition of Christian theodicy has no plausible answer to this question. The typical answer, of course, as Lovejoy points out, was to say that *variety* itself is an expression of the perfection and beneficence of God. God's mind or the divine Intellect contains numberless *kinds* of forms. And whatever is *conceived*, must *be*. The self-diffusiveness of the *Good*, therefore, is expressed not just in the *fact* of creation but also in the *diversity* of creation. Thomas Aquinas put this in the following striking way:

"Although an angel, considered absolutely, is better than a stone, nevertheless two natures are better than one only; and therefore a universe containing angels and other things is better than one containing angels only; since the perfection of the universe is attained essentially in proportion to the diversity of natures in it… and not in proportion to the multiplication of individuals of a single nature". (Lovejoy, 1936: 77)

This, however, cannot be a convincing explanation of the inevitability of misery in the world. For even if one grants the necessity of diversity given the perfection of God, why must this array of diverse things include features which require lifetimes of pain, impoverishment or drudgery? Or to put the matter a little more fundamentally, even if we assume that all the various forms in the divine Intellect must necessarily manifest themselves in the world, *why are there a particular set of forms in the Intellect rather than another?* This is a question which theodicy simply was unable to answer or even raise meaningfully (Israel, 2011). Thus, Samuel Johnson, the eighteenth century English essayist, in a criticism of the theodician nature of Jenyns' argument, writes:

"[this] is given as a satisfactory account of the Origin of moral Evil, which amounts only to this, that God created beings whose guilt he foreknew, in order that he might have proper objects of pain, because the pain of part is, no man knows how or why, necessary to the felicity of the whole." (Willey, 54)

We would argue that the crux of the problem lies in the *mysterious* nature of the relationship between the part and the "felicity of the whole". The social order, seen as an expression of immutable divine will, can *only* be explained in terms of that fundamentally opaque will itself. What else can one possibly explain it in terms of? For any *specific* explanation of particular societies or social structures, one would have to enquire into the *historical processes* through which such societies came about. But history or change is strictly and emphatically alien to the concept of the chain of being. The same is true for non-human entities as well. The particular features and properties of a species can only be explained with reference to its evolutionary history.

But evolutionary change, again, is not compatible with the static *scala naturae*. Any explanation of biological characteristics in the natural world must, therefore, resort again to invocation of divine will. The mystifying nature of the part-whole relationship in the concept of the chain of being lies precisely in this *preemption* of historical, causal analysis of phenomena, and the *reduction* of each *specific* phenomenon to the *same* general cause. We now turn to certain issues involved in the rise of modern evolutionary theory to further examine some of these questions.

Chapter Four: The Evolutionary Outlook, Historicity, and Stasis

4.1 *Essential Characteristics of Natural Selection*

The emergence of modern evolutionary theory with the publication of Darwin's *On the Origin of Species* in 1859 marked one of the most significant events in the history of modern science. Not only did it foundationally transform the field of biology, it also had major implications in terms of philosophical worldview. To understand and engage with these implications, however, we need to make certain distinctions at the very beginning itself, as a lot of confusion often surrounds even the most fundamental concepts of Darwinian theory in public discussions. Three terms must be clearly distinguished – organic change, evolution, and natural selection (Mayr, 2001). *Organic change* refers to the emergence and extinction of species through the various geological periods since the appearance of life on the planet. It refers to the basic fact that new species have arisen and older species have passed away in the history of the organic world. *Evolution* is the phenomenon of one species *changing into* another. In other words, it refers to the emergence of new species through a *transformation* of existing species. *Natural selection* is the *mechanism* through which species change or evolution occurs. It is a *specific* kind of mechanism; other kinds of mechanisms have been proposed both before and after Darwin as we will presently see.

Thus, commitment to organic change does not logically entail commitment to evolution. One can believe that the record of life on earth has been marked by change as a basic feature, that species have arisen and gone extinct at various points in time, and *yet not believe* that new species have emerged through *transformation* of existing species. Similarly, commitment to evolution need not mean commitment to natural selection. One can believe that new species evolved from older ones, and yet maintain that the causal mechanism through which evolution takes place is not natural selection. A Darwinian, however, would be committed to all three.

Darwin's key contribution, therefore, lay in *explaining* how evolutionary change could viably take place (Gould, 2002). Of course, the sheer strength and philosophical novelty of this explanation – of natural selection – was such that it also contributed immensely to establishing the *fact* of evolution and scientifically recasting the concept of the phenomenon. So, what is the theory of natural selection? It is difficult to better the characterization offered by evolutionary biologist and

philosopher of science, Ernst Mayr, both in terms of brevity and accuracy. We will, therefore, quote it in full:

> "1) Species of plants and animals consist of populations which, from generation to generation, maintain approximately the same size. In spite of the fact that each pair of parents produces hundreds, thousands, or even millions of offspring, on the average, always only two of these will make a contribution to the next generation.
>
> 2) Genetic variation in nature is so inexhaustible that there are never two individuals that are completely identical and equally well adapted to the momentary environmental constellation.
>
> 3) Those that are best adapted have the greatest probability to survive, to reproduce, and to transmit their attributes to the next generation.
>
> 4) In this manner, populations can continuously adjust to the changes in their environments; and it is this which explains the never-ending diversity of adaptations of animals and plants to each other and to inanimate nature." (Mayr, 1991:125)

Thus, the mechanism is a startlingly simple one. Genetic variation ensures that attributes or traits vary across individuals of a species population. Some of these traits make it easier for individuals to survive in a given environment – i.e. they are *adaptive*. Therefore, those individuals which have these traits will have a greater chance of survival than those which do not. Survival, of course, also means reproduction and passing on the adaptive traits to the subsequent generation, which will now have a greater proportion of individuals with the adaptive traits. This process can repeat itself over generations till the adaptive features becomes a *constitutive part* of the species. This, in essence, is how natural selection operates to bring about evolutionary change in species.

Some key features of the theory of natural selection need to be noted. First, the theory assumes that genetic variation is *random.* This randomness, however, is not of a *stochastic* kind; it essentially means that the variation is *undirected*, that it is *not related to the direction of adaptive or evolutionary change* (Gould, 2002). For instance, imagine a population of a particular animal species in an environment which is growing colder. Let us assume that the animal has a coat of fur. One conceivable adaptive response to the cooling climate would be a thickening of the coat. If over time we do indeed observe thickening of the coat in the population (though such changes may take place over timeframes too long for the same people to observe them), what kind of an explanation would we offer? Would we say that genetic variation has *specifically responded to* environmental cooling by producing certain individuals in the population with thicker coats, whose

greater reproductive success has in the long term given the entire population a thicker coat? Would such an explanation be consistent with Darwinism or natural selectionism? Absolutely not. The theory of natural selection does not see the process of genetic variation across individuals *as predisposed in any way towards adaptive or evolutionary outcomes.* Thus, in our example, the thickening of the coat across the population must indeed be attributed to the initial production of thicker coats in certain individuals through genetic variation; but this variation must be seen as random recombination of parental genetic material and *not* as a process that is somehow *aiming* for adaptation. Adaptation in Darwinian theory, therefore, is purely an *a posteriori* result of natural selection (Mayr, 1988). The enormous implications of this will become clear as we proceed.

Second, for the theory of natural selection, as for modern genetics, the causal relation between the genetic structure of an individual organism and its physiological, anatomical, behavioural, and developmental attributes is a *one-way street*: the former determines the latter, *with no causation in the opposite direction* in the vast majority of cases (Bowler, 1983). The genetic constitution of the individual organism, or *genotype*, expresses itself as the observable traits of the individual as the latter develops in constant interaction with its environment. This set of traits of the individual organism -- its structure, physiology, behavior etc. – is referred to as the *phenotype.* It must be emphasized here that the expression of a genotype as a phenotype *presupposes a particular set of environmental conditions* (Zimmer & Emlen, 2016). The *same* genotype can express itself in phenotypically different ways under different environmental conditions. Examples of such phenotypical differences abound. For instance, the snail species *Nucella lamellosa* has a spinier structure in settled, deeper waters than it does in rougher waters near the surface. Individuals of certain plant species can attain much greater height in regions with greater sunlight. These phenotypical changes *do not* represent a change in underlying genotypes but simply a change in the environmental conditions the genotypes are being expressed in. Similar is the case with more specific and limited kinds of changes in immediate environmental factors: a blow to the arm causing a fracture, a cut causing a severance of the tail, a learnt route of escape from predators because of a new forest clearing, a weakened digestive system because of internal parasites. In all such cases, the purely phenotypical character of the changes is reflected in the fact *that they are not passed on to the next generation*; which is to say that in the absence of the specific environmental causes, the individuals in the next generation will not exhibit the concerned traits. The successors of the tailless individual organism will not be *born* tailless; the individual with the

fracture arm will not produce offspring with fractured arms. The production of the genotypes of the next generation will be *independent of the phenotypical development of the parents.* The importance of this one-way relation between genotype and phenotype for natural selection theory cannot be overstated, as will presently be seen.

Third, since genotypes, and therefore phenotypical traits, vary across *individuals* of a species, and it is individuals that either survive or die in a given environment, natural selection as a process operates at the level of the *individual organism* (Larson, 2003). Evolution, on the other hand, operates at the level of the species. It is species which go through evolutionary transformations as a result of natural selection. This distinction is important to remember since it was one of Darwin's greatest contributions to locate the *mechanism* of evolutionary change at the level of the individual organism rather than at the level of species or other taxa. Much confusion has been caused, and is still caused, by oversight or obfuscation of this distinction.

Fourth, it must be emphasised that the two expressions popularly associated with Darwinian theory -- "survival of the fittest" and "struggle for existence" – have been subjected to monumental misinterpretation and distortion. The first expression was borrowed by Darwin from Herbert Spencer as an alternative to the term "natural selection" on the suggestion of Alfred Russell Wallace, a naturalist and geographer, who had independently arrived at the idea of natural selection at about the same time as Darwin. Wallace's basic concern was that the words "natural selection" might convey to some the mistaken notion that Darwin was invoking an anthropomorphic idea of nature as a "person" consciously "selecting" certain traits and leaving out others (Hutcheon, 1996). The decision was, however, unfortunate as the resulting misunderstanding, inadvertent or otherwise, far outweighed the intended clarification.

There were essentially two kinds of misinterpretation of "survival of the fittest", both revolving around the meaning of the word "fit". It was argued by some contemporary opponents of Darwin's theory, an argument that continued to be made through the course of the twentieth century from time to time, that the expression was tautological in nature. If by *fitness* is meant the ability of some individuals in a population to survive, then "survival of the fittest" simply amounts to saying that those with the greatest ability to survive will survive. Thus, Darwinian theory, the critics went on to say, since it does not have any conception or criterion of fitness *that is independent of survival*, is reduced to either triviality or logical absurdity.

The main problem with this argument, as Gould points out, is that the greater ability of certain individuals in a population to survive, in Darwinian theory, is *an expression* of specific traits they possess that enable them to adapt to a given environment better than other individuals. Fitness, therefore, while it *results in* a greater chance of survival, *itself consists in* the possession of genetic attributes that are adaptive in a particular environment. To put it in Gould's words, "Local environments change constantly: they get colder or hotter, wetter or drier, more grassy or more forested. Evolution by natural selection is no more than a tracking of these changing environments by differential preservation of organisms better designed to live in them…" (Gould, 1984: 35).

The second kind of misinterpretation involved the ascription of some *absolute* and *normative* meaning to fitness. The latter was often thought to imply a general set of valued characteristics like strength, swiftness, and predatory skill, *without any reference to the requirements of adaption to specific environments*. In Social Darwinist distortions of Darwinian theory, fitness would be equated with a range of ideologically lionized attributes, usually seen as racially or genetically determined, – from "entrepreneurial spirit" to "martial qualities" (Hofstadter, 1992). While Social Darwinism, of course, represents a different order of misinterpretation of Darwinism altogether, any characterization of fitness which is independent of specific adaptive requirements would be a mistaken one on the Darwinian view. As we saw above, the notion of fitness is intrinsically relative to the "momentary environmental constellation" (Mayr, 1991).

The expression "struggle for existence" has been equally misconstrued ever since the publication of the *Origin*. It has served as the foundation for the claim that on the Darwinian view, nature is characterized *only* by conflict and competition between various organic entities. This view of the natural world has often been referred to as nature "red in tooth and claw" (Williams, 2005). This interpretation of "struggle for existence", and thus of Darwinism, has received endorsement from various quarters. It has been consistently used by religious opponents of Darwinism to show that any alternative to an account of nature as divinely created, particularly a materialist one, would inevitably degenerate into a vision of soulless violence and evil (Larson, 2003). The interpretation has been employed by Social Darwinists, on the other hand, to rationalize capitalist exploitation, imperialist aggression and racial oppression (Hofstadter, 1992). It has also, incidentally, been used by sections of contemporary social theory to reduce Darwinism to the logic of capitalism and

liberal individualism, and thereby portray it as a characteristic product of what is seen as the inherent violence of modernity. (Rachels, 1990)

The term "struggle for existence" was borrowed by Darwin from the work of the late eighteenth century, early nineteenth century English cleric and economist Thomas Robert Malthus (Mayr, 1988). It is undeniably true that for Malthus the idea of a constant struggle for existence among human beings, given a supposedly constant and unlimited propensity to procreate and an assumption of fixed, scarce resources, was part of an ideological project to counter egalitarian currents of social and political opinion (Harvey, 1974). If there is an ever-present tendency among people to procreate till the pressure of the population itself reduces them to poverty and hunger, the egalitarian goal of material prosperity for all must be an inherently unachievable one. Reform measures like pro-poor, pro-worker laws etc., therefore, while conceivably commendable in intent, are foredoomed to failure as they do not reckon with inescapable facts of "nature".

Darwin, however, is led *indirectly*, by this Malthusian analysis of the relationship between population and resources, to an insight of a *qualitatively different* kind. For Darwin, the "struggle for existence" comes to mean essentially what Mayr specifies as the first point in his characterization of natural selection quoted earlier: the fact that across the organic world, in every new generation of individuals born in a species population, only relatively few survive (Mayr, 1991). This fact, which Gould refers to as the "hecatomb" of natural selection, for Darwin, is the basic reason *why genetic variation can translate into evolutionary change* (Gould, 2002). As pointed out earlier, the individuals who survive and those who do not are not differentiated by any absolute standard of fitness, but by genetically produced traits, the adaptiveness of which is relative to the particular environment the population is interacting with.

In many cases, the concerned adaptive trait may indeed have to do with the increased ability of individuals to secure food from particular sources; sharper beaks and talons in birds, greater running speed in terrestrial predators, special predatory adaptations like aggressive mimicry etc. Such traits may create a superficial impression that adaptiveness is inherently about success in competition and conflict. But there are as many other cases, where the key adaptive trait that drives natural selection has nothing to do with conflict. In the hypothetical example we discussed earlier, the possession of a thicker coat by certain individuals in a cooling environment has no conceivable element of conflict or combat involved. Adaptive traits like large root systems that lie close to the

surface in plants in arid areas, needle-shaped leaves in pine trees, the ability of mangrove trees to survive in anoxic soil etc. are in no way reflective of a Malthusian world of eternal strife. In fact, in many cases, the adaptive traits in question involve *cooperative* behavior among individuals in the population (Gould, 1991). The evolution of social behavior among a wide range of animal species, including human beings, are a consequence of the selection of such traits. Thus, for Darwin, the "struggle for existence" is a *metaphorical way of emphasizing* the role which differential adaptive abilities play in driving evolutionary processes, rather than a sweeping characterization of behavior in the organic world.

4.2 *Non-Darwinian Theories of Organic Change and Evolution: An Overview*

But why did Darwin have to emphasise the different ability of individuals to adapt and survive so strikingly? Apart, of course, from the pivotal role it played in his theory, the idea of the "hecatomb" of nature also went against the prevailing consensus in the natural history of his day dominated as it was by natural theology, particularly in England. As Mayr notes, such was the hegemony enjoyed by natural theology at the time that some of Darwin's closest teachers and peers, including Adam Sedgwick and Charles Lyell, founders of modern geology, and botanist John Stevens Henslow, were "confirmed natural theologians" (Mayr, 1988: 237). The idea that the rates of reproduction of various species could be independent of, *indeed could be far in excess of*, the requirements of the supposedly static "economy of nature" was one which did not sit well with natural theology. Individuals of a species were mere executioners of a divine plan; their arrival and departure must, therefore, be in harmony with the rhythms of the plan. This attitude is captured well in the following observation by Linnaeus:

"To perpetuate the established course of nature in a continued series, the divine wisdom has thought fit, that all living creatures should constantly be employed in producing individuals, that all natural things should contribute and lend a helping hand towards preserving every species, *and lastly that the death and destruction of one thing should always be subservient to the restitution of another.* [emphasis mine]" (Egerton, 1970: 336).

Thus, for natural theology birth and death of individuals simply maintained the *stasis* of nature, whereas with Darwin they became a central part of processes of *change*. From being marionettes in the eternally recurrent divine drama, birth and death became creative forces of transformation. This contrast between stasis and change operated at multiple levels, and constituted the core of the

difference between the Darwinian view and *every* other generalised account of the organic world in the period. Let us take the case of Paleyan natural theology as an example. Both Paley and Darwin begin with the *fact* that there are adaptations in nature. In fact, as Gould points out, Darwin was deeply familiar with Paley's *Natural Theology* and can be said to have been influenced by him in his initial years. Even in 1859, just a week before the publication of the *Origin*, he is said to have remarked to a friend: "I do not think I hardly ever admired a book more…. I could almost formerly have said it by heart." (Gould, 2002: 116). But while Paley inferred the existence and benevolence of God from facts of adaptation, and then, through the self-reinforcing closed circle we saw earlier, invoked divine agency to assert perfect harmony and balance in nature, Darwin took a different route altogether. For Darwin, adaptations in nature were things that needed to be *explained*; their existence could not simply be taken for granted. And he was convinced, over the years of his youth, that such explanation could not be in terms of divine agency.

Two basic features of the organic world were crucial in determining Darwin's eventual approach (Mayr, 1988). First was the fact of species extinction which was widely established by Darwin's time. If divine agency ensured perfect harmony and balance in nature, how was it that a large number of species were driven to extinction in the past? How was it that design – i.e. functional fit and subordination of form to function – was achieved and sustained in some cases, and in others it was not? Second, subordination of form to function itself was not a universal phenomenon even amongst *extant* species. The human body, for instance, has structural features like muscles in the ear and wisdom teeth which do not contribute in any way to the overall functions of the body. Whales have leg and hip bones which play no role in their physiology; duck-billed platypuses have teeth which they lose early on and never use; certain asexually reproducing plants have flowers and produce pollen. The existence of such *vestigial* features across species could not be accounted for if all of nature had been designed by a divine artificer.

Darwin, therefore, required an explanatory framework which had two basic and related features. First, the framework would have to allow an examination of the causal processes responsible for both the adaption and non-adaptation of species. It is not just how species come to adapt to the environment that needs to be explained, but also how they *fail to adapt*. It would also have to explain other deviations from design like vestigial organs. Second, such causal explanations, if they were to be meaningful explanations at all, would have to be *specific* in character. Why are

some species able to adapt to certain geographical settings and environments, while others are not? Why is the same species able to adapt to one kind of environmental change, but not to another? Why does a species have one kind of vestigial feature rather than another? Why do we have vestigial third molars instead of vestigial wings like emus do? Thus, Darwin required a theoretical framework which would allow him to *explain the diversity of the organic world in terms of specific causal processes*. In other words, he required a *historical* framework to understand organic phenomena. The theory of natural selection answered specifically to this need; it enabled Darwin to *historicise* nature.

To appreciate this point further, let us take a brief, broad-brush look at some of the key non-Darwinian theories of organic change and evolution from the eighteenth century to the first few decades of the twentieth. The first significant attempts to systematically describe and explain organic change usually took the form of what several commentators have referred to as the "temporalization of the chain of being". This, as the expression suggests, was nothing but an interpretation of the appearance of the created world as *spread out* over the dimension of time (Bowler, 1983; Lovejoy, 1936). The divine plan was manifested *incrementally*; different links in the chain of being emerged in the world at different times and announced afresh the majesty of God's creativity. In many such accounts, the order of appearance of the links coincided with their place in the chain, organic change thus becoming a temporal ascent through the chain of being. Less perfect beings appeared earlier; more perfect beings appeared later. The succession of species was marked by *progress*. Lovejoy quotes Mark Akenside, eighteenth century English poet and physician, to illustrate this view:

"beholding in the sacred light

Of his essential reason, all the shapes

Of swift contingence, all successive ties

Of action propagated through the sum

Of possible existence, he at once,

Down the long series of eventful time,

So fix'd the dates of being, so dispos'd

To every living soul of every kind

The field of motion and the hour of rest,

That all conspir'd to his supreme design,

To universal good: with full accord

Answering the mighty model he had chose,

The best and fairest of unnumber'd worlds,

That lay from everlasting in the store

Of his divine conceptions. Not content

By one exertion of creative power

His goodness to reveal to every age,

Through every moment up the tract of time

His parent hand with every new increase

Of happiness and virtue has adorn'd

The vast harmonious frame: his parent hand,

From the mute shell-fish gasping on the shore,

To men, to angels, to celestial minds,

Forever leads the generations on

To higher scenes of being…

So all things which have life aspire to God,

The sun of being, boundless, unimpair'd

Centre of souls!" (Lovejoy, 1936: 265)

It must be noted here that this kind of succession through "higher scenes of being" did not involve *transformation of one species into another*; it was therefore not evolutionary in any sense of the word. The temporalized chain of being was a theory of *organic change*, as we defined it earlier, which saw new species emerge *fully formed* and as a result of divine fiat. It was, thus, as Platonic

in character as the static chain of being, the obvious difference being that it viewed the forms or the "divine conceptions" as being manifested in the visible world sequentially.

A particularly popular theory belonging to this category was proposed by eighteenth century Genevan naturalist and philosopher Charles Bonnet (Bowler, 1983; Larson, 2004; Lovejoy, 1936). Bonnet believed that all beings that would ever inhabit the earth, every individual of every kind, were all created at the same time by God *as potential beings*. Each individual was created primarily as a soul, but it was also endowed with a body or material substrate. This body was in the form of an organic particle or "germ", something Bonnet referred to as *petite corps organique*. The germ had the capacity to develop into an actual organic body capable of growth, reproduction, decay etc. Both the soul and the germ were indestructible.

According to Bonnet, at any point in the history of the created world, only a certain number of these individual souls and their germs existed as actual organisms. These existing organisms would range from the lowest end on the chain of being up to a certain point up the scale. But with the occurrence of periodic global catastrophes, or "revolutions" as Bonnet called them, these organisms would be wiped off the face of the earth. Their souls and accompanying germs, however, would survive. In the changed geographical and climatic conditions *post* the catastrophe, the possibility of the physical existence of higher or more perfect species in the chain of being would arise. The germs of those souls which were lower organisms earlier would now develop into bodies of higher organisms. Further, a number of those souls and accompanying germs which were earlier *unrealized* as actual organisms would now develop into lower organisms. This process would be repeated with every subsequent global catastrophe. Thus, the process of organic change, for Bonnet, was an ascent up the chain of being both for *organic life as a whole* as also for each individual soul.

A word on the idea of catastrophes is in order here. By the late seventeenth and early eighteenth century, it had become clear that the earth had gone through significant changes in the past (O'Hara, 2018). The most telling evidence of this were fossils of aquatic creatures found consistently in strata of terrestrial sedimentary rocks. This obviously meant that a part of the formation of these rocks took place under water. This would mean, in turn, that at a certain point a big part of what is now land was covered in water. To get from there to the current configuration of the earth would clearly involve a rather substantial change. The problem, however, was that the

Biblical account of creation, which still enjoyed significant sway at the time, posited a young earth which was only a few thousands of years old. Geological processes of change which people had witnessed and were familiar with, from slow processes like evaporation, erosion and silt deposition to more extreme events like earthquakes and floods, were clearly not impactful enough to create the kind of change the sedimentary rocks testified to within the timeframe the Biblical view allowed.

The solution was to invoke a series of global cataclysms since creation which were so large in scale and powerful in impact that they resulted in massive changes in the organisation of the planet (Bowler, 1983). The unusual scale and power of these events resulted from the operation of a *different set of natural laws altogether*, which did not operate in non-catastrophic times and therefore could not be observed or discovered in the contemporary period. Advocates of the thesis sought to draw support from emerging speculation about the origin of the solar system. German philosopher Gottfried Leibniz in the seventeenth century and French naturalist Comte de Buffon in the eighteenth century, among others, had speculated on the formation of planets through a process of cooling of originally intensely hot matter. The introduction of what was called the "nebular hypothesis" by Immanuel Kant in 1755 and French astronomer Pierre-Simon Laplace in 1796 further strengthened this idea. One of the direct corollaries of this notion was the "cooling earth" theory – the idea that the earth had been very hot in the beginning, and has been continually cooling ever since. This enabled proponents of the catastrophe theory to say that it was *because of higher temperatures earlier that extreme events like earthquakes and floods had greater intensity and power*. Different natural laws applied as the earth, in effect, was a *different* earth. Further, and this was of direct relevance to those like Bonnet who were trying to explain organic change using catastrophes, a cooling earth could also be seen as a progressively more *habitable* earth. Lower temperatures over time meant that more complex forms of life could increasingly be supported.

Returning to Bonnet's theory, an obvious question which arises is the following. Even if we assume that after each catastrophe the earth does become more habitable, and that a germ indeed has the *capacity* to develop into an organism, higher in the chain of being, which can be adapted to these new conditions, *what is the mechanism or process* through which such development takes place? This question, obviously, contains many others. Why does the germ develop into a particular kind of organism *rather than another*? Why does the germ grow into an adapted

organism rather than a maladapted one? Why does it develop into an organism at all rather than remaining a germ? Such questions can be multiplied. Bonnet's only answer is that it is the Deity who has created *both* the germs and the earth in such a way that the development of the former coincides with catastrophes in the latter (Lovejoy, 1936). There is a fundamental *coordinatio*n, in other words, *written* into the constitution of both each individual germ and the earth. It is this divinely orchestrated coordination which both explains organic change and makes it, for Bonnet, a harmonious and perpetually adaptive process.

The invocation of catastrophes to explain organic change outlasted the "temporalized chain of being" and became a full-blown approach to the question of development of life within paleontology, geology and natural history towards the end of the eighteenth century and came to be known as *catastrophism* (Mayr, 1982; Larson, 2004). The foremost exponent of this approach was French anatomist and paleontologist Georges Cuvier. While Cuvier's contributions to comparative anatomy and the study of extinct species was pioneering and enormously influential, he was a staunch opponent of the idea of evolution or "transmutation of species" as it was known then. Cuvier's argument against evolutionism was a significant one and was based on his interpretation of his anatomical studies. He pointed out that subordination of form to function in an organism meant that there was an *irreducible integrity* between its various parts such that they could be *inferred* from each other. He provided an example: "If an animal's teeth are such as they must be in order for it to nourish itself with flesh, we can be sure without further examination that the whole system of its digestive organs is appropriate for that kind of food; and that its whole skeleton and locomotive organs, and even its sense organs, are arranged in such a way as to make it skillful at pursuing and catching its prey." (Larson, 2004: 59)

This possibility of mutual logical inference means that every part is *strictly indispensable* for the existence of the organism. If any particular part of the organism is removed or modified, while other parts remain the same, its very existence as a species would be impossible. If the other parts change as well and at the same time, and there is a new viable structural integrity serving a new set of functions, it would be a different species altogether. Cuvier refers to this as "the doctrine of correlation of parts". He says: "Every organized being forms a whole, a unique and closed system, in which all the parts correspond mutually, and contribute to the same definitive action by a reciprocal reaction… None of its parts can change without the others changing too; and

consequently each of them, taken separately, indicates and gives all the others." (Larson, 2004: 62)

Thus, evolution becomes an impossibility. For evolution, or the transformation of one species into another, to happen, species must have the ability of going through a series of *partial* or *incremental* changes. Such changes would involve transformation of some parts, while other organs, anatomical features etc. would stay the same. For instance, the evolution of the erect posture or bipedalism in early hominins, one of the most significant steps in the evolution of the homo genus, involved important anatomical changes in the spine including a repositioning of the foramen magnum, the point where the spine leaves the cranium, but it left many other structural features of the body unaltered. A species *both* acquires new features *and retains old features* in the course of evolution. A denial of this combination of change and continuity, which the doctrine of correlation of parts amounts to, would imply that species are completely fixed and immutable.

How, then, did Cuvier explain organic change? Cuvier speculated that the history of the earth was interspersed with massive floods, some of them local and some global in scope. These floods submerged large amounts of land and all life forms that inhabited it. When this land resurfaced later, newer kinds of species would emerge on it (Larson, 2004). Cuvier seemed deliberately vague on the mechanism of this emergence. At certain points, he said that these species were migrants from other areas. On other occasions, he hinted at divine creation. Wary of explicit use of theological explanations, divine agency for him was largely a door left open.

Later catastrophists, however, walked through that door with aplomb. Geologist Adam Sedgwick, for instance, who was once Darwin's teacher and mentor, unabashedly saw organic change as a joint endeavor of catastrophes and direct divine creation (Bowler, 1983). On the one hand, a cooling earth was periodically populated by the Creator with progressively more complex species, with the emergence of human beings being the predetermined ultimate end. On the other, catastrophes wiped out older species which could not adapt to the cooling planet. Working through a good part of the nineteenth century, Sedgwick's chief rhetorical target was evolutionism. His basic argument was a familiar one. Evolutionary theory, by saying that new species arise through transformation of older species, confers an amount of causal efficacy on matter which the latter simply does not possess. Something as complex as the creation of new species can only be created

through the operation of *extra-material* forces, namely God. Further, the perfect adaptedness of new species is clear proof that there is divine agency at work behind their creation.

Was all invocation of divine agency in opposition to evolutionism? No. By around the middle of the nineteenth century, certain views began to emerge which saw God as a creative force in the process of evolution itself. This was no doubt partly a reflection of the increasing prevalence, even if officially unacknowledged, of evolutionary views. Bowler refers to this trend as *theistic evolutionism*, and identifies two basic types within it (Bowler, 1983). The first type of theistic evolutionism perceived divine agency in what was seen as the "orderly" character of evolution – a serial and linear unfolding of increasing complexity over time. This understanding of orderly evolution was based on a widespread misinterpretation of the fossil record; evolution has a branching and haphazard character, with phyletic lines moving in various directions. Robert Chambers, Scottish geologist, anonymously published a tract called *Vestiges of the Natural History of Creation* in 1844, with this misinterpretation at the heart of his theory of evolution.

According to Chambers, evolution follows a "law of progressive development": species from time to time change into species characterized by greater complexity. This takes place through periodic changes in processes of embryological development; at certain junctures elements of greater development are added to the growth of the embryo resulting in the emergence of a more complex organism. But what is the mechanism behind such periodic changes in embryo growth? Chambers' answer is that all such transformations are built or *programmed* into the very constitution of organisms by God. God, in crafting the material constitution of a species, predetermines the nature and timing of all its subsequent transformations. It is also God who ensures that these evolutionary changes follow a sequentially "progressive" path (Ruse, 2008).

In a sense, this type of theistic evolutionism presaged a kind of evolutionary thinking which came to be known as *orthogenesis*. Chambers, in focusing on the ordered development of greater complexity, had not attached much importance to adaptation which had been a central traditional concern within various theories of organic change. Orthogenesis, originating and initially developing in Switzerland and Germany in the later decades of the nineteenth century, took forward this theoretical prioritization on the basis of a specific philosophical view. The process of adaptation requires subordination of form to function. Function, however, is simply material needs of the organism. Such a purely material factor, the ontogeneticists argued, was too coarse and

contingent a basis for the supposedly ordered and sequential development of species. The focus must, instead, be on the *form* which, at the most fundamental level, was non-material or *vital* in character. The form did not follow function; it had an inner dynamism of its own which drove the evolutionary process forward and often manifested itself as successively varying structural features which could be arranged in rectilinear series in terms of their geometry (Mayr, 1988). The increasing horn or antler sizes of certain species of deer and elk were commonly cited as examples. Swiss Botanist Carl Nageli referred to this inner force as *Vervollkommnungskraft* or "the perfecting principle". Theodor Eimer, the most prominent German orthogeneticist, called it *innere Bildungsgesetze* or "inner laws of formation". The operation of this inner dynamism takes place without much reference to the environment and, therefore, produces non-adaptive changes on a regular basis. British marine biologist Joseph T. Cunningham, an important exponent of orthogenesis in the Anglophone world at the end of the nineteenth century, sums up this evolutionary approach by saying that in all organic life there is

> "a tendency to definite variation, or growth in different directions, leading to a manifold variety of regular, definite symmetrical forms. This tendency can only be regarded as internal to the organism, as connected with the tendency to growth and multiplication inherent in organic units…. Whatever the causes of non-adaptive variation, the resulting structural features are the regular "geometrical" forms and characters which the multitude of different organic forms present in such marvelous diversity." (Bowler, 1983: 154)

The second type of theistic evolutionism continued the natural theology tradition of focusing on adaptation and seeing in it proof of divine agency. But now adaptation was seen as a *process* -- as something *achieved over time* – and one that drove evolution forward. When a species faced new environmental conditions, the divine "parent hand" would ensure adaptive modifications. These modifications would produce a new harmonious fit, and, if substantial enough, give rise to a new species. The immediacy of involvement of the "parent hand" varied from theory to theory. So did the details of the way in which the new environment affected the species. An example of this kind of an approach to explaining evolutionary phenomena is provided by Darwin himself when he was still under the influence of natural theology. Mayr, based on an interpretation of Darwin's early notebooks, describes the crux of his pre- natural selection conception of evolution: "these [new] environmental influences induced the generative system to produce appropriate responses. This implied that God quite directly was involved in adaptation because only God could have made the

generative system in such a way that changes in the environment would induce it to come up with an adequate response." (Mayr, 1988: 239)

An interesting version of theistic evolution was put forward by the nineteenth century American botanist Asa Gray, a firm public supporter of Darwin against attacks from the myriad contemporary opponents of natural selection (Gould, 1977). While Gray never flinched from his open support to Darwinism, in his own theories he added a theological twist to natural selection which went against the very essence of the latter. He agreed with Darwin that variation across individuals in a species population plays a central role in evolution. The differential possession of adaptive traits by individuals would lead to differential chances of survival which would eventually push the entire population in the direction of adaptation. So far so good. But *he also added* that genetic variation itself was *guided by divine providence in an adaptive direction*. And this made all the difference, since the random or non-directed nature of genetic variation is a part of the core of Darwinian theory. On Gray's view, the production of adaptive traits in certain individuals was not just a result of random genetic recombination, but *a direct response of the mechanism of genetic variation, mediated by divine agency*, to the environmental situation.

Possibly the most important kind of non-Darwinian evolutionism in the history of evolutionary thought has been what is known as *Lamarckism*, associated originally with the work of the late eighteenth century, early nineteenth century French naturalist Jean-Baptiste Lamarck. An accomplished zoologist, Lamarck was in charge of the invertebrate collection at the Museum d'histoire naturelle (Museum of natural history) in post-revolutionary France. He is regarded as one of the founders of invertebrate taxonomy. In 1809, he published his *Philosophie Zoologique* where he put forward his evolutionary views in detail. For Lamarck, evolution had two basic aspects (Packard, 2007). The first aspect, which was primary for him, involved a linear and sequential development of progressively more complex organic forms over time. The mechanism through which this happened was the activity of a material substance in the bodies of organisms which he referred to as a "nervous fluid". The activity of this fluid resembled that of electricity and carved out new channels in the tissues of organisms, resulting in the creation of new and more complex organs and parts over time. Each successive generation, therefore, was a little more complex than the previous generation. Evolution was, therefore, a constant linear ascent towards greater complexity.

As a practicing taxonomist, however, Lamarck was alive to the fact that a linear arrangement of organisms on any criterion of complexity is far from possible (Hutcheon, 1996). There were inevitable branchings and deviations that one had to accommodate and reckon with. Thus, while maintaining a conception of overall linearity of evolution, Lamarck introduced the effects of the environment as a secondary factor in evolutionary development. Changes in the environmental settings of an organism created challenges of adaptation which the organism responded to through behavioral and structural changes. These changes were then transmitted to subsequent generations, a process referred to as "inheritance of acquired characteristics" (Gould, 2002). This sequence of events repeated over long periods of time would lead to substantial evolutionary change. It is this aspect of Lamarck's evolutionary theory, which was secondary for him -- the adaptive response of organisms to environmental change and the "inheritance of acquired characteristics" – which has come to be known as Lamarckism.

What was the mechanism through which the organism adaptively responded to environmental challenges? There were two basic kinds of processes (Bowler, 1983). The first was a process where the new needs generated by the environmental situation caused the organism to behave in a new way and exercise some parts of the body more than it did earlier. This greater use would cause the nervous fluid to be directed in a concentrated way to that part, where it would carve out more channels resulting in the part's greater development. This could mean a change in an existing organ or structure or the emergence of a new feature altogether. This transformation as a result of greater use was termed *kinogenesis*, or change caused by *motion*, by the American Lamarckian biologist E.D. Cope (Bowler, 1983). It was also often referred to as "use-inheritance". A famous example provided by Lamarck himself was the evolution of long necks in giraffes. Lamarck said that faced with drying conditions on the African savannah, the short-necked ancestors of the modern giraffe started stretching their necks and reaching out for leaves on progressively higher tree branches. This stretching of the neck would lengthen it and the trait would be passed on to the next generation. The repetition of this process over generations accumulated the incremental length increases and produced the modern giraffe with a much longer neck than its ancestors.

The second kind of process did not involve any behavioral change, but rather a *direct* response of the physiology of the organism to environmental pressures. Given new challenges of adaptation, the normal physiological processes of the organism would react in such a way that the nervous

fluid brings about adaptive transformations. These transformations would then be passed on to subsequent generations. Cope calls this process *physiogenesis,* or change caused directly by the physiology of the organism. For example, in the hypothetical situation we discussed earlier, if the bodies of the animals directly developed thicker coats in response to the cooler climate through the operation of their normal physiological mechanisms, it would be an example of the second kind of Lamarckian adaptation.

Did the will or volition of the animal have any role in the adaptive process for Lamarck, either in kinogenesis or physiogenesis? Here there is a basic ambiguity in his evolutionary theory. By and large, Lamarck seems to be suggesting that the adaptive response of the organism unfolds in a non-volitional way, unmediated by any conscious willing on the part of the organism. This is so even in cases of striking behavioral change as that involved in the case of the giraffe. The new behavior or habit develops as a *spontaneous* or *unwilled* response to the adaptive pressure. However, on certain occasions Lamarck does refer to the "desires" or "internal strivings" of the organisms playing a role in initiating the adaptive response (Rachels, 1990). At no point, though, does he provide any clarification as to the nature of these desires or strivings, leaving the issue fundamentally unresolved.

Lamarck's theory of evolution was not very warmly received. There were several reasons for this. First, for various biographical reasons which need not detain us here, Lamarck lived his later years in financial difficulty and institutional obscurity. At a time when affluence and social standing were vital for one's scientific views to be taken seriously, Lamarck was at a distinct disadvantage. Second, his evolutionism was largely speculative in nature, while trends in natural history had started moving strongly in the direction of empirical rigour. This was the age of Cuvier. Disciplines like comparative anatomy and paleontology were making robust advances. The absence of any significant empirical anchorage may have made his theory out of step with this emerging milieu. Third, and most significantly in our view, evolutionism itself had not emerged as an acceptable alternative to the ruling dogma of fixed and immutable species. Such was the ideological charge the question carried that Darwin himself, separated from Lamarck by more than a generation, waited for more than twenty years to publish his theory of natural selection. The vehemence of the religious and moral criticism that he faced is too well documented to bear repetition. But even Robert Chambers' *Vestiges,* which gave an explicit role to God in the evolutionary process, had to

face a barrage of religiously inspired condemnation. So sharp and bitter was this invective that Chambers maintained the anonymity of its publication till his death. The following words of Adam Sedgwick, who apart from being a geologist was also an Anglican priest, conveys the depth of moral outrage:

"The world cannot bear to be turned upside down and we are ready to wage an internecine war with any violation of our modest principles and social manners… it is our maxim that things must keep their proper places if they are to work together for any good… if our glorious maidens and matrons may not soil their fingers with the dirty knife of the anatomist, neither may they poison the strings of joyous thought and modest feelings by listening to the seductions of this author, who comes before them with… a false philosophy." (Mayr, 1982: 216)

This was in 1845. The scandalous nature of open affirmation of evolutionism in 1809, when Lamarck's *Philosophie Zoologique* saw the light of day, may well be imagined. It is an irony of the history of evolutionary thought that the real development and flowering of Lamarckism, in the sense that we delineated earlier, took place much later. It came into its own in the second half of the nineteenth century, and principally as a theoretical weapon against that particular theory of evolutionary development which afforded the least scope for the intervention of non-material factors in evolutionary processes – i.e. the theory of natural selection. Thus, Lamarckism, from being beyond the pale of even the remotest institutional approval in the beginning of the nineteenth century, and lying in cold storage for a good many decades, by the end of the nineteenth century became the ruling establishment's weapon of choice against the growing threat of Darwinism which was seen as thoroughly materialist and therefore inherently subversive. As Mayr, Bowler, Gould and others have repeatedly pointed out, Darwinism was *far from being dominant* in the biological sciences and evolutionary thought between 1859, the year of publication of the *Origin*, and the 1940s, when what is referred to as the evolutionary synthesis, a synthesis of natural selection and Mendelian genetics, took place. In this period of eighty years, it was Lamarckism of various shades and stripes that loomed large on the horizons of evolutionism.

The name of Herbert Spencer is inseparable from this historical juncture (Hutcheon, 1996). Spencer, a nineteenth century English philosopher and polymath whose speculative interests and interventions ranged over sociology, psychology and biology, had a peculiar relationship with Darwinian theory. He was Darwin's cousin, and his scholarship, all historical evidence suggests,

commanded the latter's respect. As mentioned earlier, the term "survival of the fittest" was his specific contribution to the theory of natural selection. At the same time, his misinterpretation and misapplication of Darwinian theory to the social realm played a key role in the rise of Social Darwinism which, as mentioned earlier, was a noxiously inegalitarian ideology. Finally, and this is what we are directly concerned with here, his specific theory of evolutionary development in the organic world was out and out Lamarckian. These Lamarckian views were expressed over numerous publications spanning four decades – *The Development Hypothesis* (1850), *Principles of Biology* (1864), *The Inadequacy of Natural Selection* (1893) etc. – and some of the later works were direct polemical attacks on Darwinian theory and its supporters.

Spencer believed that there is an *inherent tendency* in every organism to achieve equilibrium with its environment. This tendency ensures that there is a "continuous adjustment of internal relations to external relations". (Hutcheon, 1996: 133) When an environmental pressure affects a part of an organism, a functional change is triggered in that part. Form being subordinate to function, this functional change causes a modification in the structure of that part as well. The entire body being an integrated whole, however, structural and functional changes in one part would cause transformations in other parts too. This entire set of acquired transformations can then be transmitted to subsequent generations. The organism's inherent tendency to equilibrium therefore is the essential motor of the evolutionary process.

Another significant contributor to the strength of the Lamarckian paradigm was the German biologist Ernst Haeckel. Haeckel was initially an ardent supporter of Darwinism, but over time the growing Lamarckism of his thought completely marginalized the vestiges of natural selection in his theory. By the 1870s, Haeckel was writing as a full-blooded Lamarckian with pronounced vitalist overtones (Bowler, 1983). A complete and systematic articulation of this view was made in 1876 in his tract *Perigenesis of the Plastidule*. Haeckel puts forward the view that all organic matter is made up of basic units called "plastidules". These plastidules are endowed with different kinds of wave-like motion. He then says that *memory* is one kind of motion of these plastidules, and corresponds to *heredity*. Organisms can transmit characteristics to the next generation essentially because their constituent particles can *remember* these characteristics. Another kind of motion which the plastidules possess is *comprehension*, which corresponds to *variability*. Organisms can acquire relevant adaptive characteristics because their constituent particles can

understand the external situation and react accordingly. Thus, memory and comprehension of the plastidules can together account for the core Lamarckian processes of direct adaptive responses by organisms to external pressure and their transmission to subsequent generations.

Vitalism of this sort served as an indication to many of the theological potential of Lamarckism. As Bowler points out, since by now governance of evolutionary processes by an external God had fallen out of favour in biological thought, Lamarckism provided a window by which an *internal, immanent* divine agent driving evolution could be brought in (Bowler, 1983). English botanist George Henslow, for instance, argued that a variety of adaptations demonstrated by plants cannot possibly be explained by natural selection, and must be seen as results of the *plants themselves volitionally adapting through an internal adaptive force*. Henslow called this process *self-adaptation.* For instance, he studied the process of how populations of species introduced in arid conditions developed certain characteristic traits over time like a thick external covering, cactus-like bristles etc. Henslow argued that this adaptation could not be a result of natural selection as in such conditions plants typically are widely spaced from each other and therefore not in competition. This, of course, as we noted earlier, is a misinterpretation of the Darwinian "struggle for existence". Based on this misinterpretation, Henslow concludes that the individual plants must have self-adapted to the aridity of the environment by acquiring the traits in question and then passing them on to their successors.

Another figure who gave a significant push to evolutionary thought in this direction, though he was not himself a biologist, was the English novelist and philosopher Samuel Butler (Bowler, 2009). In a series of books through the 1870s and 1880s, he waged war on Darwinism and condemned it for its materialism and godlessness. In an 1887 book *Luck or Cunning* Butler writes: "The theory that luck is the main means of organic modification is the most absolute denial of God which it is possible for the human mind to conceive – while the view that God is in all His creatures, He in them and they in Him, is only expressed in other words by declaring that the main means of organic modification is, not luck, but cunning." (Bowler, 1983: 74) This "cunning", or immanent all-pervasive divine agency, operates in an obviously Lamarckian fashion. The Deity vivifies the world; it expresses itself immanently in the *desires* and *purposes* of organisms. When faced with environmental pressures, the organism, being endowed with desire and purpose, acts in a deliberately adaptive manner. Soon, this purposeful activity becomes habitual and instinctive.

These new instincts may lead to physiological and structural changes in the organism as well. Further, for Butler, memory and heredity operate almost identically. Thus, the modifications are transmitted to the next generation. Immanent cunning, therefore, through the purposive agency of organisms, drives evolutionary development in the world.

4.3 *Evolution, Historicity and Path-Dependence*

Thus, the eighteenth and nineteenth centuries saw a variety of non-Darwinian accounts of transformation in the organic world over time. But can these accounts be characterized as *historical*? In the broadest sense of the term "historical", since these were views of the dynamics of long-term processes, the answer must be in the affirmative. But there is a widespread recognition, both in historical scholarship in general and in the history of science in particular, that it was the Darwinian view of evolution, as opposed to non-Darwinian theories, which, by putting the study of organic change on a sound *scientific* footing, historicized the organic world. Thus, E.H. Carr remarks, "…the real importance of the Darwinian revolution was that Darwin, completing what Lyell had begun in geology, brought history into science." (Carr, 1987: 56) Gould highlighted, on various occasions, the fundamentally historical nature of Darwin's scientific method and its central contribution to the scientific merit of natural selection theory (Gould, 1986; Prindle, 2009). Mayr insists, however, on a more fundamental connection between the *nature of evolutionary causation* and *historicity*. Going beyond questions simply of method, he argues that the very nature of evolutionary processes makes them historical in a *specific* and *comprehensive* way. Darwinism historicized nature by accurately grasping the character of these processes.

For Mayr, at the centre of the relationship between evolutionary causation and historicity is the genotype. He says: "All organisms possess a historically evolved genetic program, coded in the DNA of the nucleus (or RNA in some viruses) ... The presence of this program gives organisms a peculiar duality, consisting of a genotype and a phenotype. The genotype (unchanged in its components except for occasional mutations) is handed on from generation to generation, but, owing to recombination, in ever new variations. In interaction with the environment, the genotype controls the production of the phenotype, that is, the visible organism which we encounter and study. The genotype (genetic program) is the product of a history that goes back to the origin of life, and thus it incorporates the 'experiences' of all ancestors…" (Mayr, 1988: 26)

The genotype, and therefore the phenotype, of a species incorporates the evolutionary transformations of its ancestors in two basic and related ways. First, the genotype is a product of evolutionary change from the genotype of another species through natural selection. This process of natural selection would have involved the selection of *specific* traits under *specific* selection pressures. The latter, in turn, would have emerged within a *specific* environmental context. The genotype of the descendant species, therefore, would reflect both the genotype of the ancestral species and the *particular conditions and circumstances* under which the descent or evolution took place.

For instance, the flamingo evolved its characteristic features as a result of selection pressures associated with a particular habitat adopted by an ancestral population – shallow, hypersaline lakes (Gould, 1987). The only prey available to the population in those lakes were minute organisms ranging from algae to small mollusks. Selective pressures in such a situation led to the evolution of what is referred to as *filter feeding* – a technique of feeding wherein special filters channel the prey into the predator's mouth along with water; the prey is subsequently retained while the water is filtered out. In the shallow water of the saline lakes, the bird could do this only by feeding with its head positioned *upside down*. This upside down filter feeding eventually led to the selection of the most peculiar feature of flamingos – a complete reversal of the structural and functional features of the upper and lower beaks. While for most birds the upper beak is larger and fixed and the lower beak is smaller and mobile, for flamingos the opposite is true.

Now, the genotype of the flamingo, with its reversed beaks and filtering structures, reflects both the genotype of the ancestral population and the environmental conditions the latter found itself in. The selection pressures driving the evolution of the ancestors arose in the context of the latter's ecological dependence on particular kinds of prey in the lake. The possibility of this ecological dependence, the occupancy of this *niche*, was itself *a phenotypical expression of the ancestor's genotype*. Further, the nature of the selection pressures was obviously a function of the properties of the habitat. If the lakes were not saline and had a wider variety of prey, or if the waters were deeper and permitted other feeding postures, other kinds of selection pressures would have operated resulting in other kinds of evolutionary changes. Thus, if one removes from the flamingo's evolutionary past its ancestor's genotype, and therefore its ancestor's ecological relations and niche utilisation, or if one removes the specific environmental and adaptational

challenges the ancestor faced, the evolution of the flamingo as a species becomes inexplicable. But what can be said about the evolutionary relationship between the flamingo and its immediate ancestor can also be said for the latter and its own ancestor; and so and so forth along *the entire lineage of phylogenetic development*. Thus, if the genotype or the environmental challenges of *any* particular ancestor on the concerned line of descent had been different, *the subsequent trajectory of evolutionary change from that point on may have been a very different one*. The genotype of a species, therefore, reflects *all the specific twists and turns*, all the "experiences" in Mayr's words, in the evolutionary trajectory leading up to it.

Second, evolutionary changes in a species can often provide the context for, and thereby influence, directions of future evolution. In the case of the flamingo, the evolution of upside down filter feeding provided the context for the evolution of the structural and function reversal of beaks. The adaptational problem of beak form and function *would not have arisen at all* if upside down feeding had not evolved. Further, if the upper and lower beaks of certain individual flamingos interchanged structure and function *in the absence of upside down feeding as a behavioral pattern*, such individuals would be *unviable* organisms and would be eliminated by natural selection. Thus, here, a *prior* evolutionary change creates both *the need for and possibility of a future transformation*. Similarly, on a more macro-evolutionary scale, the evolution of flight provided the context for a vast variety of subsequent evolutionary changes in birds: a keeled sternum for the attachment of flight muscles, modification of wrist bones for reduced flexion and stronger strokes, fusion and reduction of phalanges of the wing, disappearance of the tail etc. The fact of flight lay at the origin of the selective pressures resulting in these adaptions. In the absence of the context of flight, the *vast majority of these evolutionary changes would be unviable* except in some very specific niches as is the case with flightless birds.

Past evolution also exerts a *constraining* influence on future evolution. Specific earlier evolutionary gains may foreclose specific future evolutionary possibilities. For instance, species belonging to the phylum arthropoda, which includes various taxa of invertebrates from insects to crustaceans, are characterized by hard external skeletons or *exoskeletons*. These exoskeletons represent an evolutionary gain for arthropods; they provide support to the musculature and internal organs, afford protection against predators and other elements of the environment, prevent excessive loss of water through evaporation, aid in locomotion etc. They have, however, a certain

implication for the growth patterns of individual organisms. A rigid and hard external shell means that in order to grow in size the organism has to periodically shed its exoskeleton and acquire a new one. This process is referred to as *molting*, and is found in some arthropods in the earlier stages of their lives and in others through their entire lifespan. Since the exoskeleton provides support to the musculature, molting involves a temporary distortion in the structure of the organism under the pressure of its own weight. Now, the larger and heavier the organism, the greater would this distortion be; beyond a certain weight or mass it would difficult for the organism to survive the structural collapse involved in the molting process. Thus, even if, hypothetically, there were strong selective pressures on arthropods in favour of expanded size, evolutionary change in that direction would not be a possibility. A large arthropod is not a viable organism. The prior evolutionary acquisition of the exoskeleton, therefore, *precludes* the future evolutionary acquisition of greater size. This is one of the major reasons why, unlike mammals and reptiles which have grown to gargantuan proportions in the history of life on earth, insects and other arthropods have always remained small.

Thus, evolution is a fundamentally *path-dependent* process. Any given species and its genotype is a product of all the specific transformations that constitute its evolutionary lineage. And this specific background of the genotype also frames, influences and constrains the future evolutionary needs and possibilities of the species. The future of the species depends partly on *where it stands* and *how specifically it has happened to get there*. It is precisely this path-dependence of the evolutionary process which makes it a historical one. The past in all its *specificity*, all the specific causal processes of change which have led to the current genotype, leaves its imprint on the future. This is the essence, for Mayr, of the inherent historicity of the evolutionary process (Mayr, 1988). Darwinism or natural selection theory, being the theory that enables us to grasp this historicity of evolution is, therefore, a fundamentally historical theory.

Are the non-Darwinian theories of organic change mentioned earlier historical by the standard of path-dependence? The answer would seem to us to be quite clearly in the negative. For instance, for the various versions of the temporalized chain of being, the specific trajectory of the actual appearance of species till any point in the history of life on earth would be *completely irrelevant* to the subsequent course of organic change. The order of appearance of species is already *predetermined* in the chain of being which is an expression of divine design. The path of organic

change, therefore, being a manifestation of divine agency *cannot itself have any causal efficacy*. The actual historical path is secondary; the *scala naturae* as divine conception is primary. What matters is not where a species is placed in the real development of organic life, but where it is located in the ideal scheme of the chain of being.

A similar argument can be made about all views of organic change or evolution which invoke direct divine agency. In catastrophism, for instance, the nature of species populating the earth between two successive global catastrophes did not have any implications for the nature of the species in the next inter-catastrophic period. For Sedgwick, as we have seen, what determines the nature of the new species is the cooling environment and divine will. The actual history of organic change is meaningless to its future. There is no path-dependence whatsoever.

Orthogenesis presents a similar problem in a different guise. For orthogeneticists, as we have seen, intrinsic drives of development propel the evolutionary process in such a way as to produce ordered rectilinear series of attributes in successive products of evolution. This could be a supposedly rectilinear increase in the size of horns of elks over time, or successive patterns of coloration in butterflies. Does the serial character of evolutionary change in orthogenetic theory imply path-dependence? It does not. In the orthogenetic view, the series is an *unfolding* of forms already innate at the beginning of the evolutionary process. Thus, the actual emergence of a particular structure or member of the series – antlers of a particular size in a species of deer, a mollusk shell of a particular curvature etc. – is simply a manifestation of the *internal logic* of the series, and is not dependent in any way on prior evolutionary development. The particular antler size or shell curvature may have appeared historically, on the orthogenetic account, only after the appearance of various other sizes and curvatures in the series, but the latter as *specific, historical phenomena* have no bearing on the former. Like in the case of creationist views like the temporalized chain of being, it is ideal conception which has primary causal efficacy, *not the real historical process*.

What about Lamarckism and its numerous variants around the end of the nineteenth century and the beginning of the twentieth? One can add to this those versions of theistic evolution like the pre-1838 Darwinian view which attach importance to adaptation as a factor in the evolutionary process. All these views present a common added complexity: they see specific environmental pressures as significant in shaping the course of evolution. In Lamarck's account of the evolution of the modern giraffe, for instance, the drying up of the African Savannah did play an important

role. Can these evolutionary views, therefore, on account of this recognition of specific environmental factors, be characterized as historical in the sense we have discussed above?

4.3.1 *Lankester's Objection: Darwin and the Question of Change and Continuity*

To answer this question, we will revisit a theoretical objection to Lamarckism made by the English evolutionary biologist Edwin Ray Lankester in a brief letter to the journal *Nature* in 1894 (Lankester, 1894). In historical accounts of evolutionary thought, this objection, if mentioned at all, is regarded strictly as a specific argument against Lamarckian views. We believe, however, that the argument has general and significant implications for the nature of change involved in evolutionary processes. In the following treatment, we will try to answer the question posed above by sketching our understanding of these implications.

Lamarck had formulated his mechanism of use-inheritance or *kinogenesis* in the form of two "laws". These laws, in Lamarck's own words, were as follows:

"(1) In every animal which has not arrived at maturity, the increased and continued employment of any organ strengthens that organ gradually, develops it, enlarges it, and gives it a power proportional to the duration of its employment: on the other hand, the continued disuse of any organ gradually weakens it, deteriorates it, progressively diminishes its faculties, and finally causes it to disappear.

(2) Every feature which, under natural conditions, individuals have gained or lost by the action of circumstances to which their race has for some time been exposed – as, for instance, the results of excessive use or disuse of an organ – is preserved in reproduction and transmitted to the offspring, provided that the acquired changes were present in both parents." (Lankester, 1889: 428)

Lankester argues that there is a contradiction between the two laws. If the genetic constitution of an organism or species is so *pliable* as to get transformed by the exercise of an organ, then how can the transformation *itself* be passed intact to subsequent generations over time? For instance, in the case of the giraffe, if the genetic makeup of the giraffe is so *susceptible to change* that a simple exertion of the neck can modify it, how can the modified genetic makeup be passed on from generation to generation as it would also, by extension, be *unstable*? Or to look at the matter from a different chronological angle, how was it that the genetic constitution of the ancestral giraffe, which remained stable across thousands of generations, suddenly went through a change through simple exertions of the neck?

Lankester leaves matters here, but we believe that this objection points to a deeper problem with non-Darwinian theories of organic change we have discussed till now. If one looks closely at Lamarck's laws, and the fact that they have been posited as invariant "laws", one notices immediately that the impact of use-disuse on the genetic constitution of the organism *does not depend in any way on the specific nature of the genetic constitution*. Whatever the genetic makeup of the organism, the excessive use or disuse of an organ will induce a heritable (i.e. genetic) strengthening or weakening in the latter. To put it in modern language, for Lamarck, the way in which use-disuse modifies the genotype is *completely independent of the genotype*. The genotype of the species, in other words, *does not influence or affect* in any manner the way in which the species changes in the course of evolution.

But this means that environmental and adaptational pressures *also* can play no role in the process of evolutionary change. The reason is the following. The use or disuse of particular organs, if they are to be responses to particular environmental stimuli at all (and therefore contribute to adaptation), *must themselves be an expression of the genotype*. But if no role is granted to the genotype in the process of evolutionary change, then even the use or disuse of relevant organs cannot take place. For instance, when the Savannah begins to dry up and leaves remain only on the higher branches, the behavioral response of the ancestral giraffes of stretching their necks higher *itself must be governed by the genotype*. But if the genotype is not given any causal efficacy in the process of change, this behavioral transformation cannot come about.

This problem becomes even more severe in the case of *physiogenesis* where no behavioral change in the organism is involved. While this kind of Lamarckian adaptation obviously does not fall within the remit of the use-inheritance laws, its logical structure is essentially the same. The hypothetical example we discussed of the organism developing a thicker coat in direct response to a cooling environment brings out this characteristic structural similarity. The development of the thicker coat is a heritable or genetic change and therefore a change in the genotype. But this adaptive change in the genotype *happens regardless of what the nature of the genotype of the organism is*. The trouble, however, is that this adaptive response of the organism to environmental change has to be *at least initiated based on the genotype of the organism*. If the original genotype is removed from the causal picture, on what conceivable basis can the process of physiogenesis even begin?

It is in all likelihood because of this basic contradiction that the actual process and mechanism of evolutionary change becomes, for Lamarck, *generalised* and mysterious in character. This is also the probable reason for his occasional invocation of categories like "inner sense" and "internal striving". The essence of the problem seems to be the following. For Lamarck, the *specific character* of a species, its genetic constitution, belongs strictly to the domain of stability and stasis. In so far as a species has a *determinate nature*, it is fixed and unchanging. Transformation, on the other hand, does not partake of the specificity of the species; *it is purely general in nature*. There is a fundamental *divide*, therefore, between *continuity and change* in the evolutionary process for Lamarck. A species, *in so far as it is stable and continuous*, has specific attributes; in so far as it is an entity *going through transformation* it lacks all specificity. The genotype determines only fixed, stable attributes; it is irrelevant to the process of change.

An expression of this divide between continuity and change in Lamarck's theory is that he rules out all possibility of extinction of species (Larson, 2004). Since the specific character of the species is completely irrelevant to the process of change, *any species* can adapt to *any environmental* or *adaptational challenge*. The *same* species can, on the logic of Lamarck's theory, develop thick furry coats when the climate cools, longer necks when low hanging leaves become sparse, tremendous sprinting ability when a fast predator species emerges on the scene, the capacity to swim when flooding becomes a frequent occurrence etc. The completely general character of the evolutionary mechanism, unconstrained and uninfluenced in any way by the specific genotype of the ancestral species, makes sure that the latter can successfully respond to any demand of adaptation whatsoever.

The product of evolution, therefore, does not reflect the ancestral genotype in any way. The latter does not play any role in the emergence of the former. The ancestral genotype does not influence the possibility/impossibility, mode, manner, or extent of adaptation. Lamarckian evolution, therefore, is not path-dependent at all. Past evolution is irrelevant to future evolution; it is, therefore, a fundamentally ahistorical process. And the same can be said for evolution both in the later variants of Lamarck's theory that went by the name of Lamarckism as also in the adaptationist versions of theistic evolutionism. For Samuel Butler, for instance, and as we have seen, immanent divine agency in the form of desires and purposes of organisms drove the evolutionary process (Bowler, 1983). These desires and purposes, being completely ideal in character, were not

influenced at all by the genotype of the organism. Evolutionary change, therefore, was completely unaffected by the specific genetic constitution of the ancestral species. In Haeckel's vitalism, the manner in which the *plastidules* could comprehend and react to an external situation was independent of the specific nature of the organism. In various accounts of theistic evolution, the guiding hand of Providence could produce perfectly harmonious adaptation regardless of the nature of the organism and the specific environmental situation precisely because such a hand could never be tied down by specificities.

The gulf between the *specific, particular* nature of species and the *general* nature of the mechanism of change essentially implies that species are fixed and immutable. If evolution is inherently non-path dependent and ahistorical, if the descendant species' genotype does not reflect that of the ancestral species, it means *in essence* that the new species has emerged *fully formed*, with no real causal connections with its antecedents. That would mean that Lamarckism, at a very fundamental level, is of a piece with creationist and other obviously idealist views of organic change. In the accounts of the adherents of both the temporalized chain of being and catastrophism, for instance, we see the gulf between the particular and the general play out very obviously. Each species has a particular character which remains unchanged through its existence on earth; new species come about through a *single general* mechanism – divine creation – which is not dependent in any way on the particular features of extant life. The static, fixed links in the journey of organic life on earth are the various species; what drives this journey forward is divine will.

Darwin historicises nature by essentially *bridging this gulf between continuity and change*. He locates in the genotype of the species the sources of *both stability and transformation*. The genotype, in interaction with the environment, gives the species a set of structural, functional and behavioral attributes. These phenotypical traits enjoy a certain degree of stability at least within a particular population of the species. At the same time, genetic recombination through sexual reproduction produces variation across individuals in a species population thereby enabling natural selection to create changes in the genotype over time. Thus, on the Darwinian account, *what accounts for the specific, historically enduring qualities of a species, also accounts for how those qualities change*. It is this understanding of the connection between continuity and change which enabled Darwin to see the causal connections between the evolutionary past and the evolutionary

future. It enabled him to see that the record of organic life on earth was not just an *arbitrary succession* of entities but a process of historical change.

It bears emphasis again that succession without historical *transformation* is essentially a situation of *stasis*. Temporalization of the chain of being, for instance, did not mean that the links in the chain became dynamic and changing – they remained fixed and immutable. No matter how cataclysmic and sweeping Sedgwick's catastrophes, the new species that arose after each remained unchanged till the next. There was nothing in the *nature* of the organic world, in the nature of species, that would make them change into other species; the agent of change would have to be *radically external*. This external agent could be divine will, it could be the "perfecting principle" of orthogenesis, Lamarck's "internal striving", or Butler's "cunning". The agent or principle of change had nothing to do with the actual material constitution of organisms. The essence of Darwin's historicisation of nature lay in the fact that he was able to show that *it was the material constitution of species itself* which was responsible for their specific modes of transformation into other species, thereby removing any need for the invocation of external agencies and principles.

4.4 *Evolution, Specific Causation and the Part-Whole Question*

The relationship between stasis and the absence of specific historical causation can also be understood through the lens of the *part-whole* question which we encountered earlier in Cuvier's arguments against evolutionism. Cuvier had claimed that each part of a particular organism could be logically inferred from every other. The part, therefore, was *logically reducible* to the whole. A *particular feature* of a species, as a result, could not change without the species changing altogether. We had seen that this naturally ruled out the possibility of evolution.

This logical reduction of the part to the whole is a characteristic feature of organicism or holism and marks, to varying degrees, every version of it. In the concept of the chain of being, for instance, and as we indicated in the previous chapter, the logical reduction of the part to the whole operates at multiple levels. First, the existence of a particular entity – a particular link in the chain – is nothing but an expression of divine reason. A species as a *part* of the chain has no existence or causal efficacy independent of such reason which also manifests itself as the chain as a *whole.* Second, the specific characteristics of a link in the chain, all the formal and functional attributes of a species for instance, are an expression of divine conception. Third, the *evaluation* of such characteristics in terms of perfection, which decides the place of the being in the chain, is also

completely a preserve of divine judgment. It is God's assessment that determines the order of the *scala naturae*, from top to bottom. Fourth, in the case of each species, each particular attribute is an *indispensable part* of a fixed set of unchanging attributes that belong to the species. In the case of human beings, we saw earlier, this also means normative indispensability of every aspect of the extant social order.

We have already seen that for many towering natural historians throughout the early modern period, the concept of the "balance of nature" was central and implied a complete subordination of "specific ends", i.e. the ends of parts – functions of particular species, to "general ends", i.e. the ends of the Creator which pervaded nature as a whole. It was these general ends that accounted for the harmonious adaptations of nature. This logical reduction of part to whole also meant that within an organism or species, each feature was reduced to the whole. Paley's divine artificer, for instance, crafted each organ in such a way that it was perfectly attuned to serving the needs of the entire organism.

But as Egerton, Simberloff and several others have pointed out, *even in contemporary ecological and environmental thought*, the "balance of nature" concept enjoys substantial currency (Egerton, 1973; Simberloff, 2014). While the ecological sciences themselves have moved towards increasingly dynamic concepts of ecological relations, *philosophical interpretations* of such relations have tended to veer back to notions of inherent balance. These interpretations have often selectively picked conceptual innovations within biological and environmental sciences, abstracted them from their context, and pressed them in service of their "balance of nature" arguments.

4.4.1 *Homeostasis*

One such concept is that of *homeostasis*. Drawn from fields like cybernetics and systems theory, which saw their first phase of rapid development in the middle of the twentieth century, the idea of homeostasis has been important in understanding how biological systems are able to maintain some of their key variables within stable ranges over extended periods of time. Key to such homeostatic maintenance is the concept of the *negative feedback loop*. For instance, in the human body, the regulation of body temperature takes place through a homeostatic mechanism. The hypothalamus of the brain sets a normal range for the core temperature of the body, and coordinates feedback processes to correct deviations from this range. When the ambient temperature rises and

the body temperature responds by rising beyond its normal range, sweat glands increase their activity to cool the body down through evaporation. There is also a dilation of blood vessels near the surface of the body to increase the release of heat to the environment. The body temperature, as a result of these feedback processes, comes down to the normal range. On the other hand, when the ambient temperature falls and the body temperature begins to dip in response, the body begins to shiver to generate heat. Sweat glands reduce their levels of activity to minimize evaporation. Blood vessels near the surface, now, constrict to prevent heat loss. These changes make the body temperature climb back to the normal range again. Homeostasis, therefore, enables the body to maintain its temperature, a very important variable for the body's proper functioning, within a stable range.

Homeostatic processes operate in other kinds of biological systems like ecosystems as well. In such systems, however, there is obviously no central coordinating organ and therefore homeostatic processes necessarily have a looser and more variable character. Further, in a large number of such systems homeostasis may not obtain at all. In those ecosystems where homeostatic processes do operate, *resource constraints* are often an important regulatory factor. For instance, in a hypothetical and simplified ecosystem of a single predator species (tiger) and a single prey species (deer), an initial surge in the deer population would increase food availability for tigers and rapidly increase their population as well. But this latter increase would mean an increased death rate for the deer which would drive their number down. A decline in deer number would mean a decline in food availability for tigers, and their population would come down too. Thus, the dynamics of resource limitation would ensure that the initial population configuration is maintained. This kind of a constraint-driven homeostatic process can be seen operating in more complicated scenarios of environmental change as well. For instance, desert ecosystems, when introduced to greater irrigation or rainfall, can initially have increased plant productivity, but scarcity of other nutrients like nitrogen can soon restore stability.

It must be immediately noted that the kind of stability that homeostasis involves is fundamentally *relative*. This is so in multiple ways. First, the variables that homeostasis controls, even when they stay within the normal range, can exhibit constant fluctuation. All key variables within the human body, for instance, are known to be constantly fluctuating. Second, homeostatic regulation can coexist with evolutionary change. In an individual organism or species population, homeostatic

control of a particular variable does not by itself mean adaptation. Adaptation also involves an environmental context. Thus, the combination of genetic variation and selection pressures would continue to bring about changes despite homeostasis. One expression of this is that *normal ranges* in homeostasis themselves can go through various kinds of changes. The range of normal core temperature, for instance, is known to have varied over time for several warm blooded species. In an ecosystem, where homeostatic processes tend to be much more contingent, evolutionary modifications in various species in the community can lead to frequent changes in the equilibrium population levels.

Third, homeostasis does not imply *stasis* or *permanence* of any kind; it is a mode of *channeling* organic development and change rather than *halting* it. In individual organisms, homeostatic processes are a part of regular developmental processes of birth, growth, reproduction and death. There are usually specific points and conditions in the life of an organism when homeostatic process arise and when they stop operating. *Both* the operation and cessation of homeostatic mechanisms are important in organic processes. Further, like any other physiological process, homeostatic processes consume resources of the organism and operate within limits; they are not infinitely serviceable. For instance, while homeostatic mechanisms exist to maintain body temperature in cold ambient weather, continued exposure of the organism to extreme cold temperatures puts undue strain on those mechanisms and can result in the death of the organism. In ecosystems, certain kinds of environmental change can simply halt the operation of homeostasis. Disease in the tiger population in our example, for instance, which independently increases the death rates amongst tigers, could potentially derail the homeostatic mechanism.

Fourth, each element or component of the homeostatic process has a relatively independent causal efficacy. As a result, the *specific causal contribution* of part to whole can, in principle, be investigated and understood. For instance, the failure of the homeostatic temperature regulation process in human bodies can have multiple causes. It could result from a dysfunction of the sweat glands, a condition known as anhidrosis. It could be a consequence of the inability of the body to effectively constrict or dilate blood vessels near the skin as a part of a cardiovascular disorder. It could also be a result of a dysfunction of the hypothalamus, which itself can have multiple causes. In the case of ecosystems too, the specific contributions of various biotic and abiotic components can in principle be investigated. In marine ecosystems, for instance, there is in general a

homeostatic regulation between populations of phytoplankton, the primary producers, and zooplankton, which feed on them. Cases of what are referred to as *algal bloom* represent in essence a derailment of this homeostatic control. In this failure of homeostasis, the introduction of excess nutrients like nitrogen and phosphorus, water temperature, water turbidity, availability of sunlight, factors affecting zooplankton population etc. can play relatively independent causal roles.

Thus, within the biological and environmental sciences, concepts such as homeostasis have served to better understand how biological entities and systems operate, how they change, and what specific roles their various elements play in these processes. This is a world apart from *logically reducing* the part to the whole – from reducing the elements being governed by the homeostatic process to a single, abstract principle. The relationship of each element to the *systemic* properties of regulation – to the whole – needs to be *investigated empirically* and cannot be judged *a priori.*

4.4.2 *Holism and the Logical Reduction of Part to Whole*

Yet, in environmental philosophy and social theory, one finds ideas such as homeostasis being widely used to posit a "balance of nature" holism which has no room whatsoever for the relative causal independence and efficacy of parts. Thus, Holmes Rolston III, widely regarded as the founder of environmental ethics, argues that it is the concept of homeostasis, which by valuing balance and stasis, gives ecological science a normative character (Rolston III, 1975). Environmental philosopher Freya Mathews, while discussing cybernetic mechanisms of regulation in organisms, says: "On this account, the nature of the parts is not independent of the nature of the whole: parts and whole logically codetermine each other. This holism is the broadest characteristic which can be used to distinguish systemic from aggregative unities." (Mathews, 1991: 65) J. Baird Callicott, one of the staunchest advocates of the moral standing of ecosystemic wholes within environmental philosophy, echoes this when he says, "from an ecological perspective, relations are 'prior to' the things related, and the systemic wholes woven from these relations are prior to their component parts. Ecosystemic whole are logically prior to their component species because the nature of the part is determined by its relationship to the whole." (Callicott, 1989: 110) Even Lewis and Lewontin, evolutionary biologists who have fought many a battle against obscurantism in the name of science, concede ground on the part-whole question: "The first principle of a dialectical view, then, is that a whole is a relation of heterogeneous parts that have no prior independent existence as parts. The second principle, which flows from the first, is that, in general,

the properties of parts have no prior alienated existence but are acquired by being parts of a particular whole." (Levins & Lewontin, 2009: 273).

This logical reduction of the part to the whole is, of course, a part of a larger problem in mainstream philosophy wherein the part-whole question is viewed as a purely logical issue. Termed *mereology*, the study of the relationship between part and whole, particularly within analytical philosophy, has been bracketed off as a branch of formal logic (for instance, Lando, 2017). This logical, formal posing of the part-whole question is at the root of the dichotomous and abstract "mechanical versus organic" framing of the issue which informs even basic pedagogy on the part-whole question today across a range of disciplines. On this account, a whole is either mechanical or organic; if it is the former, it will have a certain kind of relations with its parts, if it is organic it will have another kind of relations. In either case, if told beforehand what kind of whole an entity is, we can know *a priori*, without any empirical investigation, the character of the part-whole relations.

What is essentially missing in such a purely formal characterization is *history*. The Marxist philosopher Lucien Seve points out that every part-whole relationship is an *achieved result* of specific causal, historical processes, and its nature depends on those processes (Seve, 2008). For Seve, the dialectical view of the part-whole relation implies seeing the *wholeness* of phenomena and their historicity as two sides of the same coin. The way the parts of an entity are related to each other, and to the entity as a whole, depends on the specific causal processes through which the entity came about. Thus, sodium and chlorine by themselves have properties which are very different from those of their simplest compound sodium chloride. But the properties of sodium chloride can only be explained in terms of the specific process through which sodium and chlorine atoms combine to form the compound. Similarly, the relationship of particular organs to each other, and to the systemic properties of the organism, can only be explained in terms of the specific evolutionary history of the organism. Homeostatic mechanisms, for instance, were acquired by species in the course of natural selection. All structural, physiological and behavioral features, were acquired by every species across numerous specific points in the evolutionary history and in specific adaptive contexts. The richness of that entire history is reflected in the part-whole relationship in an organism at any given point.

If such historical processes of change are lost sight of, then the part-whole relationship must eventually be conceived in a purely logical way. Why must this be so? For shorter periods over

which phenomena remain stable, the absence or denial of a historical view may not pose much of a problem in empirical investigation of the relations between various parts of the phenomena. For instance, even without any knowledge of evolutionary processes one can extensively study a species as a relatively stable phenomenon. The difficulty arises when historical change enters the picture. Any such change, *if it is to be a genuine change in the species*, must proceed in parts. There must initially be certain changes in the species, *which do not amount to a transformation into another species*. But to recognise this requires one to understand that the part-whole relations in a species are determined by the specific causal processes it is going through. In the absence of this recognition, which must be the case if evolution is beyond one's field of vision, the only way one can go about deliberating on the implications of the partial changes for the status of the partially changed species – is it the old species with changes or a new species altogether? – is through logical analysis. In the absence of causal history, formal logic can be the only anchorage for the part-whole relation.

For instance, for the natural theologians, a partially changed species posed a fundamental problem. A species whose basic character had been partly changed, whose *essence* had been partly changed, went against their theological, Platonic conceptions of *eternal and immutable essences* (Mayr, 1991). Platonic stasis ruled out historical development of the essential features of things. Thus, most natural theologians either denied such change in species, or saw such change as mere superficial modification, or saw the partially changed species as a fully formed new species altogether. Thus, their denial of the possibility of specific historical change, stemming from their theological premises, led them to an organicism where the part was in complete logical subordination to the whole. A part of a species could change only when the *species as a whole* changed. We have here, readers would notice, the converse of the Cuvierian reasoning we encountered earlier. For Cuvier, organicism implied no evolution (Larson, 2004). Here, no evolution implies organicism.

To end this section, let us offer a set of speculative questions. One of Paley's premises in his argument from design is that organisms display a *higher order* of design than watches do. As a result, the artificer of organisms must be *superior in kind* to the artificer of the watch. Strangely, in the literature we surveyed on Paley's argument this particular premise has not been subjected to much scrutiny. Watch, in the argument, clearly, can be replaced by any other artifact. The essence

of the premise, then, is the following. Artifacts *necessarily* are characterized by a lower order of design – functional fit and subordination of form to function – than organisms. But why should this be the case? After all, both are material entities. Both can have extremely complicated structural and functional attributes. Why would there be a difference of *order* when it comes to design? Could the reason be that while in the case of artifacts it is clear that they are products of particular causal processes i.e. particular processes of labour, in the case of organisms such causally specific background is not obvious? -- Thus, while for artifacts production processes can be seen as undeniably determining part-whole relations, in the case of organisms there is room for the invocation of an organicism which reduces parts to the whole? The watchmaker needs to *labour* to produce the watch, but God can produce a species *fully formed and as a whole*. We shall revisit these questions presently.

Chapter Five: Goal-Directed Processes and Re-enchantment

5.1 *Genetic Programmes and Teleonomy*

We are now in a position to pose the question of ends or goals in organisms, and through that arrive at an assessment of the implications of predominant forms of contemporary re-enchantment. We shall begin by sketching Mayr's understanding of goal oriented processes in organisms and their relationship with teleology, as that would aid our analysis of re-enchantment. According to Mayr, what gives organic life a goal oriented character is the fact that each individual organism is possessed of a *genetic programme* which governs every aspect of the path of its development from the zygotic stage to death (Mayr 1964, 1992, 1998). This genetic programme is essentially the genotype of the individual organism conceived as a *blueprint* for the development of the organism, which also contains instructions on *how* the blueprint will be converted into actual changes. The genetic programme orients the organism towards particular goals or ends which could be structural, functional or behavioral. These could be short term, repetitive goals like satiating hunger, or long term goals like reaching puberty. Following Pittendrigh (1958), Mayr calls such processes, which are goal directed as a result of a programme, *teleonomic* processes. It is the teleonomic character of the life of an individual organism that makes it *purposive.*

A few basic characteristics of teleonomic processes, on Mayr's account, must be noted here. First, a teleonomic process is completely *material* in character. The genetic programme contains the goals of the organism, and instructions to reach them, in its molecular constitution. The constant *translation* of the programme into the ongoing development of the organism is a purely material process. The nature of the goals themselves are a result of prior processes of natural selection.

Further, the teleonomic process is *path-dependent*. The nature of the genetic programme is such that its translation at any point depends on its prior translation. For instance, if there is an external factor which causes a temporary derailment of the growth process, the subsequent translation of the genetic programme can set in motion corrective or homeostatic mechanisms which get the organism back on the original developmental track. The specific nature of the corrective mechanism will depend on the specific nature of the genetic programme and that of the setback. This kind of path-dependence, as we have seen earlier, is possible only when specific causal continuity is maintained, something incompatible with the notion of change driven by ideal causes.

Second, and this is another implication of the material nature of teleonomy, the goals of the genetic programme *do not lie in the future*. They exist in the programme even before its translation into development begins. This, Mayr believes, has been a source of significant confusion about teleonomic processes. It is the *achievement* of the goals by the organism that lies in the future; the goals themselves are a part of programme (Mayr, 1992). To believe otherwise would essentially amount to a *dissociation* of the programme and the goals, thereby removing the causal connections between the development of the organism – structural, functional, behavioral – and its genetic constitution.

Third, programmes can be closed or open. Closed programmes are those which stipulate goals with a relatively high degree of specificity in terms of what they require. Open programmes, on the other hand, allow for a fair amount of flexibility. Mayr provides the following example of closed-ness and openness with respect to the single behavioral goal of species recognition (Mayr, 1964). A cowbird egg is laid in the nest of other bird species such as yellow warblers, song sparrows etc. Once the young cowbird is able to fly, it leaves the nest and joins a flock of other cowbirds, a species it may never have seen in its life. The new flock from then on becomes the source of nurture for the young bird. Cowbirds, therefore, have a very specific requirement of species recognition in their genetic programme. Young geese or ducklings, on the other hand, on hatching from the egg will adopt as parent almost any organism they find moving. If a parental relationship does indeed develop, say between a human caretaker and a gosling, the relationship will generally survive exposure of the latter to other geese. Thus, in terms of species recognition, the genetic programme of the goose is much more open than that of the cowbird.

Programmes which are *generally* more open, i.e. which are open across a *wider range* of goals and to a greater *extent*, allow for greater *learning*. Experiences of the organism can in such cases *supplement* or *mediate* the goals in the genetic programme through *additional* goals. For instance, prey avoidance could be a behavioral goal in the genetic programme of an organism. It could be associated in the programme with particular sensory stimuli like certain kinds of smell, certain kinds of visual perceptions etc. Based on this programmed goal and its associations, *and on its experience in its habitat*, the organism can acquire the learnt or additional goal of avoiding certain parts of the habitat as "danger zones". Prey avoidance thus gets supplemented by the goal of geographical avoidance. Similarly, a predator organism can learn multiple things about prey

species in the course of pursuing prey. These learnings, if incorporated into the pursuit as manoeuvres, skills, routes etc., become goals in their own right apart from the programmed goals of pursuing, catching and feeding on the prey.

Two things must be remembered about the open genetic programme. While the source or *causal origin* of the additional goals lies in the experiences of the organism, in the interaction of the organism with the environment, the basis or *causal ground* of the goals lies in the programme itself. *The programme determines the nature of its own openness*; the program determines what kind of additional goals can be formed, and what kind of goals cannot. A lion in pursuit of a deer can intercept it using a new route; it cannot make booby traps to capture the deer. There is, therefore, a direct and specific *material* connection between the genetic programme and the nature of the additional goals. Second, while the additional goals supplement the programme, they do not become a part of the genotype. Learnt goals of an individual organism will not be genetically transmitted to the programme of its offspring. The next generation will have to acquire the additional goals anew.

Of all species that have ever existed on earth, human beings have by far the most open genetic programmes. This enables them to have a wide-ranging socio-historical development of goals, ends and needs. Indeed, it enables them to adopt the creation of new goals *itself* as a goal. Developing newer ways of fulfilling needs, *which itself creates new needs*, is a characteristic feature of human historical development. These newer needs may be directly physical – pertaining directly to the interaction between human beings and their physical environment; or they may be mental – pertaining to the development of mental faculties like cognition, creativity, emotional reflexivity, morality and aesthetics. What is important to note, for our immediate purposes, is that *even this vast array of historically developing needs and goals is materially connected to the genetic programme*. While the source or origin of the new needs -- the causal dynamics which generate the production of new goals – may lie elsewhere, the *causal ground* of the new needs is the genetic programme. This is so in two senses. First, it is only because of the nature of their genetic programme that human beings have the capacity to historically develop their goals and needs. Second, the programme determines the *ways* in which something can be a goal or need for human beings, and the ways in which it cannot. For instance, mercury can be a need as far as it is an input in the production of thermometers, thermostats, barometers, fluorescent lamps etc. But

mercury, as something directly ingested above a certain amount, cannot be a need as it would lead to poisoning.

Is this a biologically determinist account of the historical development of human needs and ends? We do not think so at all, and the basic reason is the following. The account of historical development sketched here is not an account of the *causes which drive such development*. Such causal factors propelling historical development among human beings are *irreducibly social*; trajectories of socio-historical development cannot be *explained* in terms of the genetic programme. What we are arguing is that the human genetic programme is the *condition of possibility* both of the socio-historical development of goals *in general* and of *specific goals*. And, on the basis of this, like we said for organisms in general, we are saying that even for human beings, there is a *material* connection between the genetic programme and additional goals. Even for humans, in other words, the programme determines the nature of its openness.

5.2 *Teleology, Material Causation and the Ideal Telos*

Mayr's basic concern in developing the concept of teleonomy was to clarify the nature of goal or end directed processes in the organic world. The essential merit of the idea of teleonomy, for Mayr, was that it enabled the biologist to study, understand and think about such goal directed processes in a consistently materialist way i.e. without recourse to what he refers to as "cosmic teleology" or "finalism" which had traditionally been the main mode of explaining goal oriented behavior in organisms. We shall proceed in our analysis from this point of departure with two qualifications. First, we shall try to avoid the hint of ambiguity in Mayr's use of the term *teleology*. On several occasions, Mayr uses the term teleological without qualification to mean cosmic teleology or finalism, which is more consistent with conventional usage. Occasionally, however, he uses the word to refer to any kind of a goal directed process. This, of course, does not reflect any conceptual inconsistency on Mayr's part, only a terminological one. We shall discuss and use the term only in the first sense. Second, Mayr *assumes* an irreconcilable contradiction between teleology in this sense and the scientific, materialist understanding of teleonomic processes. We shall try to flesh out the precise nature of this contradiction based on Mayr's core understanding of teleonomy that we have sketched above. We shall do so through a direct comparison, and an analysis of what teleology would mean for evolutionary processes.

Common to teleonomy and teleology is the Greek root *telos* which designates purpose or goal. Teleology involves purpose of a particular kind; it is purpose that is *self-generating*, or is *radically disconnected in its origin from material causation of any kind*. The systematic exposition of teleology in western philosophy begins from Aristotle, and his treatment of the matter defines the basic approach to the subject for more than the next two millennia. A brief look at Aristotle's theory of teleology, and some of its later historical modifications, is, therefore, in order.

We have seen earlier that for Aristotle, as for Plato, matter *by itself* is formless. It is the *immaterial* form that confers quality and attributes upon matter. Aristotle, therefore, like his mentor, was fundamentally opposed to the materialists who believed that all phenomena of the natural world could be explained in terms of material necessity. The concept of teleological or *final causation* was a part of his philosophical response to the materialists; its essential purpose was to establish that *even if one assumed that matter intrinsically had attributes, i.e. there was indeed such a thing as material necessity*, it was not enough to explain a vast majority of natural phenomena (Gotthelf, 2012).

A major portion of Aristotle's arguments on teleology were made in the context of organic life, though he did not confine the concept to biological phenomena. He observed that each species in its fully grown form had certain overall characteristic *functions or activities*, which, for him, defined the form or essence of the species. The essence of fish, for instance, for Aristotle, was that they could swim. The developmental process of every individual of the species -- the development over time of specific parts, their functions etc. -- was driven by the *purpose* or *end* of the attainment of the fully grown *essential* form of the organism. In individual fish, the formation of fins, scales, tail, gills etc. was propelled by the final cause or *telos* of being able to swim. The final cause or purpose, for Aristotle, therefore, *was contained* in the immaterial form of a species. Further, this form was *immanent* in each individual organism; unlike Plato's forms, Aristotle's forms did not lie in an otherworldly domain. Both these ideas together made Aristotle refer to the final cause of organisms as their *formal nature.* It was in the formal nature of individual fish to become swimming creatures.

But why could not material processes cause these kind of goal directed phenomena? There is a famous passage from Aristotle's *Physics* which sharply brings out his response to this question. Aristotle in this passage is having an imaginary conversation with a hypothetical materialist

philosopher. The latter raises an objection to Aristotle's notion of final causation, and Aristotle answers. It is worthwhile quoting the passage in full. First, the objection:

"There is a difficulty: what prevents nature not to act for the sake of something or because it is better, but in the way Zeus rains, not in order to make the crops grow, but of necessity (for it is necessary that that which has gone up cools down, and what cools down becomes water and falls down: when this has happened, it turns out that crops grow), and in the same way also that if someone's crops are ruined on the threshing floor, it does not rain for the sake of this, in order that they be spoiled, but that it happened to come about. So prevents also parts in nature from being this way, for example, that teeth shoot up from necessity, the ones in the front sharp, with a fitness for tearing, the molars broad and useful for grinding down food – not because they came to be for the sake of this, but because they turned out that way. And similarly about the other parts, in as many as 'that for the sake of something' seems to be present. Wherever then all [the parts] turned out in a way they would also [have done] if they had come to be for the sake of something, those survived, having been organized in a fitting way by spontaneity. As many as did not [turn out] in such a way perished and continue to perish, as Empedocles says about the man-faced ox progeny. This then is the argument about which one might be puzzled, and there may be others like it." (Leunissen, 2020: 45)

Aristotle's answer to his imaginary interlocutor is the following:

"It is impossible that things are that way. For those things, and all things that are by nature, come to be that way either always or for the most part, and none of them belongs to things that are due to luck or spontaneity. For it does not seem to be due to luck or spontaneity that it rains often in wintertime, but [it does] when [it rains] during the dog days. Nor do heatwaves [seem that way] during the dog days, but [they do] when they occur in winter. If, then, it seems that [these things] are either by accident or for the sake of something, [and] if it is not possible that these things are by accident or by spontaneity, they are for the sake of something. But *that* such things are by nature, even the people who make this argument would claim this. There is thus that for the sake of something among the things that come to be and are by nature." (Leunissen, 2020: 47)

"For the sake of something", in the passage, means "for a *telos* or a final cause". The essence of Aristotle's argument is the following. There are a vast number of phenomena in nature which show a *uniformity of type* – i.e. which display a regularity of characteristics. Such phenomena cannot be results of material causation as such causation *can only produce accidental or random results.* Any kind of *order* in phenomena, therefore, must be a consequence of non-material *purpose,* i.e. final cause, at work. Material processes can never account for the goal directed nature of organic life

which, of course, has striking regularity for a particular species generation after generation; they can at best explain variation in individuals which, on the Aristotelian account, can never belong to the essence of the species. Thus, the very idea of telos, purpose or final cause is developed by Aristotle in opposition to the potential explanatory power of material causation. In his account, *telos* is causally empowered *to the extent* that matter is causally impoverished.

The Platonic provenance of this impoverishment of matter is particularly clear when Aristotle talks about the reason for the ability and tendency to reproduce in organisms. He says:

"For the most natural among the functions for the living beings – for as many as are perfect and not deformed or whose generation is spontaneous – is to produce another one like oneself, an animal [producing] an animal, a plant a plant, such that they can participate in the eternal and divine to the extent that is possible. For everything desires this and does whatever it does in accordance with nature for the sake of this…. Since then it cannot take part in the eternal and the divine with an uninterrupted continuation, for the reason that nothing among the perishables can remain the same and one in number, each – to the extent that it can take part in it – participates in it, some more and some less, and it remains not as oneself but as something like oneself, as not one in number, but as one in form." (Leunissen, 2020: 50)

For Plato as we have seen, objects in the material, phenomenal world *participate* in, i.e. partake of, the characteristics of eternal immutable forms, while they themselves are transient and changeful. Aristotle, in the passage above, keeps this basic relationship intact; he simply adds that organisms have a *double* participation in the forms – they both directly express the form of their species (in their essential features) *and* they perpetuate that form through reproduction. As material, sensible objects, *this continuity which the unchanging form bestows on them is the only kind of continuity they can have*. In both cases, i.e. both in the case of the development of the individual organism and in the case of reproduction and perpetuation of the species, participation in the form is at the same time governance by a *telos*.

The causal priority of *telos* or purpose can be further understood in the context of Aristotle's overall scheme of causation in processes of change. To elucidate this scheme, Aristotle would most often rely on examples drawn from the production of artifacts, the most recurring one being a bed (Johnson, 2005). There is a particularly telling passage from his *Parts of Animals*, about what causes or explains the characteristic features of a bed, which would be useful to quote. Again, the polemical opponents being addressed are the materialists.

"Those who account for nature speak about the generation and the explanation of the shape in this way: by what powers it was manufactured. But in fact, the artist says 'by an axe' or 'by a drill', while they say 'by air' or 'by earth', except what the artist says is better. For it is not sufficient for him to say just this, that when the tool hits, one thing becomes hollow, another flat, but he also provides the *reason* for the blow, and *what it is for the sake of*: he states the explanation – in order that it becomes this or that shape. [*emphasis mine*]" (Johnson, 2005: 179)

The process of change or production, therefore, *begins* with the *telos* or the final cause. It is the *purpose* – that of having furniture on which one can sleep or recline – that determines everything else in the process. Thus, the *form* or shape of the bed, as a *type* of furniture, will depend on the purpose it is supposed to serve. This form, as *formal cause*, will then determine the *technique* of production, i.e. *the efficient cause*, and the material on which this technique will be applied, i.e. *the material cause*. The final cause, therefore, governs or shapes the entire context within which the other three causes operate.

In natural entities, the form of the entity *combines* final, formal and efficient causes, while the material cause lies in matter which, for Aristotle, is nothing but a receptacle of form. The final cause or purpose retains its primacy. In organisms. for instance, the overall functions of the fully grown organism, its *purpose*, determines the parts it should have. The growth of these parts in the individual organism is brought about by the form in a process of efficient causation out of the material available to it. Flaws in this material might result in variations, but the overall invariance of essential species characteristics is guaranteed by the invariance of the *telos* or the final cause.

What is very interesting is that despite depending heavily on examples from the production of artifacts to explain the primacy of *telos*, for Aristotle, *natural objects are far more teleological in character than artificially produced ones*. (Johnson, 2005) What is even more interesting is that this has hardly received any comment or treatment in the literature we have surveyed. In the absence of any justification offered by Aristotle himself, we are led to two speculative reasons given the idealistic nature of his treatment of *telos*. First, artifact production may be insufficiently teleological for Aristotle in so far as its *telos* or purpose *may stem from a material need.* The purpose or goal of bed production eventually stems from the material, bodily need of rest and sleep. For Aristotle, however, final cause, being essential in character, cannot possibly be material

in origin. The foundational premise of his theory of final causation is that material processes cannot account, in any way, for goal directed behavior.

Second, artifact production can also be potentially inconvenient for Aristotle as it demonstrates that specific causal processes – specific processes of labour applied to specific objects – are sufficient to explain the creation of entities of a determinate *type*. In other words, artifact production can potentially establish that material processes are sufficient for the production of what he refers to as *substantial being*, rather than merely accidental or random features. In the case of natural entities like organisms, since we do not *produce* them, and hence do not engage in specific kinds of labour, Aristotle can, with greater safety, accord a *completely general* role to the form in the efficient causation of organic growth. *Processual specificity – how* the form of the fish *translates* into the pectoral fin, or the dorsal fin, or the spine – is a complete non-question for Aristotle, as it was for his mentor.

One final point must be made about Aristotle's teleology before we proceed. Whatever the ultimate origin of the non-material *telos* or the form, and Aristotle does not discuss this at all, it does not have a *psychological* character. The purpose or goal is not arrived at after deliberation; it is intrinsic to the nature or identity of the form. For Aristotle, it might be recalled, plants and animals are endowed with souls; plants have *nutritive* souls and animals have *sentient* souls. The soul is the self-same entity as the form. Aristotle does not think that plants and animals, even the most complex non-human animals, *arrive* at their goals through choice or deliberation; goals are intrinsic to their formal natures. As for human beings, who have *rational* souls and are therefore capable of deliberation, he does not discuss their ends in the context of ontology and causation, but within that of ethics and politics where of course the nature of discussion is altogether different.

The conversion of the *telos* into a psychological category happened decisively with the philosophy of Avicenna or Ibn Sina, the eleventh century Persian philosopher, astronomer, and physician. Avicenna consistently championed Aristotelian ideas in his large corpus of philosophical work, which was widely influential at the time and played a significant role in the revival of the Greek philosopher's ideas within Christian theology. According to him, like for Aristotle, every natural entity is governed by a non-material *principle* which causes it "to move toward some definite terminus according to a natural intention belonging to [the nature]." (Richardson, 2020: 75). This "natural intention" was the final cause and it determined the functioning of all the other causes.

But Avicenna, unlike Aristotle, wanted to give *telos* a *normative* content; he wanted to establish that the ends in nature are *good* ends. In order to do this, he introduced two changes in the Aristotelian scheme of causation (Richardson, 2020). First, he gave God a more active role in constituting the essential or formal powers and capacities of natural beings. Second, he argued that for certain categories of organisms, these powers included the capacity to ascertain goals. While plants had a non-psychological *telos*, animals and humans were capable of voluntary action and, therefore, of apprehending their ends. Animals had cognitive powers of estimation and imagination which, while being "lower" than reason, since they were of divine provenance, led them to form purposes and ends which would result in their perfection. Of course, these purposes were already independently *determined* by divine conception. Human beings, since they were capable of rational deliberation, could form ends which were morally good in so far as they were rational.

As we proceed through the later medieval period, we find that the emphasis shifts in favour of God actively determining the *telos* of natural entities. This culminates, in a sense, in the work of Thomas Aquinas, by which time Aristotelian philosophy has officially been entrenched and sanctified as a key part of Church dogma. Aquinas remains loyal to the overall Aristotelian framework on causation; like Aristotle he maintains that "the final cause is the first among all causes." (Pasnau, 2020: 91). He also agrees that all of nature is teleological. But on the question of the *immanence* of the final cause in non-rational natural entities, Aquinas emphatically disagrees. The ground of disagreement is a decidedly psychological notion of purpose. Purposive behavior, for Aquinas, requires *reason*; in its absence, the pursuit of purpose *must be induced from the outside* . He says:

"Those that lack reason tend toward an end on account of natural inclination, as if moved by another rather than by themselves. For they do not grasp the concept (*ratio*) of an end, and so they cannot *order* anything toward an end, but are only *ordered* toward an end, by something else. *And so all of nonrational nature is compared to God like an instrument to a principal agent*. [emphasis mine]" (Pasnau, 2020: 94)

Thus, Aquinas maintains that for all inanimate objects, plants and animals, *telos* must be actively introduced and implemented by God. The divine *implementation* of *telos*, in particular, means that the goal directed behavior of every *individual* organism is *directly* governed by God. Purpose, therefore, becomes psychological, extrinsic and particular. As for human beings, since they possess reason, an exercise of the same can lead them to morally just goals, and can also tell them how such goals can be pursued. *In a sense*, as far as non-human entities of the natural world are

concerned, the psychological *telos* of Avicenna and Aquinas was a logical conclusion of the purely *ideal* character of form and *telos* in Aristotle. An ideal purpose is, in the last analysis, a *mental* category; it is a short step from there to purpose in a full-blown psychological sense.

Aquinas' notion of God actively introducing and executing *telos* in the organic world remains influential till the Enlightenment. In the Enlightenment period, both in the Paleyan or Linnaean kind of natural theology, as also in the temporalized scale of being, catastrophism, and other theologically inflected views of organic change and evolution, a genuine preoccupation with the *empirical investigation* of characteristics of species shifted back the arena of divine *telos* to the creation of the species or the *type* (Mayr, 1991). Divine purpose created a harmonious world by designing the "specific ends" of each species in a particular way; these ends were immanent in each individual organism of a species; their fulfilment did not require divine supervision. Thus, while *telos* still remained distinctly non-material, belonging to the ideal essence of a species, it became intrinsic to the individual organism again. Thus, teleology in natural theology and other such idealist trends in the Enlightenment period, saw a revival, in some respects, of a quasi-Aristotelianism or quasi-Platonism.

5.3 *Teleology, Teleonomy and Evolution*

What are the ways in which teleology contrasts with teleonomy as a concept of goal directed behavior in organisms? First, and this is the key difference, while in teleonomy the nature of the purpose or goals of the organism stem, in ways we have discussed earlier, from the material constitution of the genetic programme, in teleology the purpose has no material basis whatsoever. Whether extrinsic or intrinsic, psychological or non-psychological, goals in a teleological account can only have a purely non-material foundation. This foundation could be divine agency of varying degrees of immediacy, it could be immanent mental faculties like "imagination", it could an intrinsic *sui generis* Aristotelian essence, or it could be a logical hierarchy of forms conceived in a Platonic or Plotinian sense; for purpose to be teleological, its basis must have nothing to do with material causation.

All the other significant differences stem from this basic difference. The material character of the programme in teleonomy implies that the translation of the programme into each specific goal *proceeds through a specific causal process*. There are specific causal routes and pathways through which each of the structural, functional and behavioral ends are achieved. For teleology, as we

mentioned earlier, the basis of the goals being non-material, processual specificity in goal achievement is inconceivable. Or, to put it differently, an essence without any material specification can be translated into goals *in any which way; it really does not matter*.

Third, as was indicated earlier, in teleonomy, the goals exist in the material constitution of the programme even before the teleonomic process begins. In teleology, the goals exist in material form *only when they are achieved*. Before that, they exist only in purely ideal or non-material form. It could be as divine purpose yet to be realised, immanent essential *telos* in an organism yet to be transformed into actual features, or intentions residing in the human soul. But can such purely non-material things be genuinely said to exist? Averroes, a twelfth century Andalusian philosopher, physician and astronomer, otherwise strongly Aristotelian in his ontological views, posed this question in a now famous passage from his *Long Commentary on the Metaphysics*:

"The hammam, for example, has two forms, a form in the soul and a form outside the soul. If the form that is in the soul arises in us, then we desire the hammam and move toward it – that is, toward the form that exists outside the soul – that is, toward entering the hammam. The form of the hammam, then, with respect to its being in the soul, becomes an agent (*fa'ila)* for the desire and the motion, whereas with respect to its being outside the soul it becomes an end for the motion and not an agent." [Pasnau, 2020: 98]

What Averroes is essentially claiming here is that the *telos* or the final cause, which *initiates* and governs the entire process of causation even for him, *exists only at the end of the causal process* when the result is reached. *Entering the hammam* is the final cause; our intention to enter it is only the efficient cause which drives us towards it. The problem with such a view, however, is that it results in the absurdity of "backward causation" – about something in the future causing something in the present. This logical difficulty, of being caught between the immateriality of the final cause and the absurdity of backward causation, is essentially an expression of the idealistic character of teleology. For teleonomy, no such problem arises. Because the goal is present in *material* form right at the beginning, *its realization as material achievements* does not cause logical tangles.

What implications does teleology have in terms of evolution? In the case of teleonomy, it is fairly straightforward. The genetic programme *is* the genotype; its character is therefore a consequence of evolution. Reproduction would cause variations in the genetic programme, through recombination, across individuals in a generation. These variations in the programme would include variations, however slight, in structural, functional and behavioral goals and how they are

pursued. The differential programmes across individuals, therefore, would translate phenotypically into differential traits. Natural selection could operate upon such differential traits and, over generations, produce evolutionary change.

For teleology, however, evolution poses problems. To appreciate this, let us take two kinds of *telos* separately – an Aristotelian *telos* where the essence of the species has predetermined the goals of the organism even before the process of growth has begun; and a non-Aristotelian *telos* where the goals are *arrived at* by the organism in a psychological manner, with their being no *predisposition* in the organism towards any goal. In the Aristotelian case, the basic problem would be that of *invariance*. Since the goals of each individual member of a species are an expression of an eternal and unchanging essence, there would not be the kind of inter-specific variation needed for the operation of natural selection. Thus, evolution would be ruled out, and each species would be fixed and immutable. The organic world would be a domain of stasis. As Mayr, Gould and several others have pointed out, the influence of this kind of essentialist thought was a major factor in the scientific predecessors of Darwin not being able to grasp the significance of individual variation. The individual for them was merely a manifestation of an unvarying *type*; all variation in the individual was insignificant and accidental and could not exert any causal influence on the type itself.

The case of the non-Aristotelian *telos* is more complicated. Natural selection for its operation depends on the genotype-phenotype connection. The traits chosen by natural selection can gradually dominate the gene pool of a population *because* those traits reflect the genetic programme and can therefore be passed on from one generation to the next. But if the goals of the organism arise in a completely *spontaneous* manner i.e. in complete *abstraction* from any prior predisposition, a genotype-phenotype relationship is naturally ruled out. If the organism determines its goals or ends in a *purely voluntary* manner, these ends by definition will not have a basis in the genetic programme. Traits produced by the realization of those ends, therefore, even if chosen by a *single step of* natural selection, will have no bearing on subsequent generations. There will be no overall change in the gene pool of the population; evolution will be ruled out. Thus, if the material rootedness of the goals of the organism in the genetic programme is dropped from the picture, and ends are set by pure unconstrained volition, evolution becomes an impossibility and stasis in the natural world results.

But, at the same time, as we have seen earlier, the genotype-phenotype relationship *is also a source of stability*. It is the genotype or the genetic programme which gives the individual organism its species attributes – the structural, functional, behavioral features characteristic of the species. As Mayr points out, in his characterization of what he calls the biological definition of species, this also includes specific niche utilization (Mayr, 1988). Of course, as the genotype of the species population changes over time and space through processes of natural selection, so does niche utilization. Yet, the *relative* stability of the genotype or programme also means relative stability of niche occupancy. Thus, in other words, the programme also specifies the *ecosystemic* roles and functions of individual members of a species. But if goals are purely voluntary, and the phenotype is severed from the programme, the individual organism can have *absolutely any set of attributes*. This would, naturally, destabilize all ecosystemic relations and render meaningless the concept of *species* itself. The dynamism of individual organisms would become completely *arbitrary*. Instead of stasis, nature would be in a state of perpetual *random succession.*

Thus, in the case of non-Aristotelian teleology, two kinds of *ahistorical* scenarios might follow. In the first, the blocking of genetic transmission of naturally selected traits results in the impossibility of evolution and a situation of stasis in nature emerges. In the second, the absence of any constraint on the phenotype results in completely arbitrary organic development and a scenario of *absolute* randomness in nature obtains. Both these scenarios are fundamentally bereft of any historical movement. While in the first, there is no change at all, in the second, the change is radically devoid of any path dependence – the organism's changes are not in any way constrained by its past changes or those of its genetic predecessors.

5.4 *Unconstrained Telos and Re-enchantment*

It is the case of non-Aristotelian teleology, in the sense we have just discussed, which becomes important when we look at contemporary forms of theoretical re-enchantment. As we have mentioned earlier, the central feature of the contemporary re-enchantment of nature is to invest the natural world with *moral entitlement*. But the idea of moral agency which underpins this moral entitlement usually operates with a concept of *free* determination of ends or goals unconstrained by material causation or, indeed, by any kind of predisposition. It is only through the exercise of such agency that the organism can have autonomous *moral worth*.

An example would be the work of Holmes Rolston III, a theorist who has decisively contributed to shaping the field of environmental ethics. For Rolston, the question of moral worth is articulated in the form of the *intrinsic value* of various forms of non-human organic life (Rolston III, 1975, 1988, 1994). He believes, like ecocentric thinkers in general, that all forms of organic life have intrinsic moral worth. He argues that this intrinsic worth is premised on the fact that there are objects, processes, activities and functions which are *objectively* of value to all organisms. As *value-ers, regardless of whether they do this valuing in a psychologically cognizant way or not,* they are moral agents and possess moral worth. Now, this does not seem like a teleological argument at all; he is after all talking about materially grounded objective requirements of organisms. But appearances can be deceptive. In a now famous article (Rolston III, 1994), Rolston tries to demonstrate the intrinsic moral worth of organisms using what is called an "open question" argument. An "open question" argument tries to establish the validity or otherwise of a premise-conclusion relationship by testing the coherence of a question where both the propositions are combined. For instance, if proposition P is "X has a 104 degree Fahrenheit fever" and proposition Q is "X is unwell", logically Q follows from P. One way to test this logical relationship is to ask the question: "X has a 104 degree Fahrenheit fever, but is she unwell?" This question is an obviously *incoherent* one; and the reason is that X's being unwell *does indeed* logically follow from her having a fever of 104 degrees. If Q *did not* follow from P, the question would have been a coherent one. Thus, the incoherence of an open question establishes the logical validity of a premise-conclusion relationship.

Rolston concludes that all organisms value things from the premise that all organisms depend on certain things for their existence. He puts this in the form of several open questions, one of them being: "The tree is benefitting from the sun and the nutrients, but are those valuable to it?" (Rolston, 1994: 18) Rolston finds the question incoherent, and adduces this incoherence as logical support for his conclusion. But why should such a question be incoherent? On *any* account of the concept of *valuing*, is not at least a *minimal subjective involvement* of the *value-er* required? There are two possibilities here. It is possible, though in a purely hypothetical way, that Rolston is using the word *value* in its completely trivial sense. On such a reading, his open question would not be very different from the following question: "The computer is benefitting from regular servicing, but is it valuable to it?" But such a reading is not tenable at all. First, Rolston is specifically talking

about organic life; that specificity would surely reflect in his use of the word *value*. Second, value, in such a trivial sense, can never carry the weight of any kind of moral entitlement.

The other possibility, which we believe to be indeed the case, is that Rolston *implicitly assumes* that the tree is capable of being subjectively involved in valuing things. And if that is true, then the capacity in question must indeed be unconstrained by any kind of material causation as, of course, trees are not genetically equipped to have such subjectivity. The ability to value things, and therefore *to value ends*, must, in other words, be teleological. This is confirmed when Rolston says:

"A plant like any other organism, sentient or not, is a spontaneous, self-maintaining system, sustaining and reproducing itself, executing its program, making a way through the world, checking against performance by means of responsive capacities with which to measure success. Something more than physical causes, even when less than sentience, is operating; there is *information* superintending the causes; without it the organism would collapse into a sand heap. The information is used to preserve the plant identity.

All this cargo is carried by the DNA, essentially a *linguistic* molecule. The genetic set is really a *propositional set* – to choose a provocative term – recalling how the Latin *propositum* is an assertion, a set task, a theme, a plan, a proposal, a project, as well as a cognitive statement. These molecules are set to drive the movement from genotypic potential to phenotypic expression. Given a chance, these molecules seek self-expression." (Rolston, 1994: 17)

Several things must be noted here. First, Rolston is clearly giving the genetic programme a purely ideal character. "Something more than physical causes" does not mean *additional complexity* of material causation; it means *transcendence* of material causation altogether. Thus, goal directed or end seeking behavior in organisms, for Rolston, is clearly teleological in character. Second, he says that "information superintends the causes". Given his idealist reading of the programme, this statement amounts to the classical-medieval claim about the causal priority of the teleological final cause. Third, Rolston stresses the "linguistic" character of the programme as a part of his teleological understanding. This is clearly meant to buttress the claim of the programme being an ideal phenomenon. The characterization is inaccurate. Language is symbolic in nature; its symbolism is *an operational part of the way it works*. A genetic programme, on the other hand, is converted into structures, functions and behavior through purely biochemical processes. *We* seek to understand genetic structures and processes by using scientific symbolism of different kinds;

but these structures and processes themselves are non-symbolic. Fourth, characterizing the conversion of the genotype into the phenotype as gene molecules seeking "self-expression" suggests that for Rolston the ideal *telos* of the programme is *psychological*. Even if the programme were conceived as a linguistic entity, it still would not constitute a *self.* A text is not a self. By calling the gene molecules *selves*, Rolston is going a step beyond saying that the *telos* is ideal – he is saying that it is volitional. And if it is volitional, then the conversion of genotype to phenotype would indeed be a *creative*, *self-expressive* process. We arrive, in other words, at an unconstrained *telos*.

We see a similar logic operate in the concept of *autopoiesis* or "self-regeneration" as adopted in environmental ethics and social theory. Initially proposed by biologists Humberto Maturana and Francisco Varela, it was popularized in environmental thought by ethicist Warwick Fox and others, and has become widely influential over the last few decades (Maturana & Varela, 1980; Fox, 1990). Fox, following the original thesis of Maturana and Varela, claims that organisms are distinct from all other entities because they are *self-renewing* or *self-regenerating*. All the physiological processes and structures of an organism are geared to the maintenance of the organism itself. The *goal* of the organism, therefore, does not lie outside itself; self-regeneration is an *internal* or *circular* goal. This, Fox believes, is what makes organisms different *from all kinds of non-organic entities*. Mechanical devices, for instance, which are goal oriented – devices like thermostats which have homeostatic mechanisms to ensure that certain variables stay within a specific range, can only have *external* goals; they *cannot* have the maintenance of their own internal structures and functions as a goal. Thus, organisms, for Fox, since they strive for self-regeneration, are not just *means-to-ends* but *ends-in-themselves*; and, as such, they are by definition possessors of moral entitlement.

But do organisms have self-regeneration as a genuine goal at all? The genetic programme which governs the goal directed development of individual organisms has *specific ends*; these ends involve the growth, maintenance and decline of specific structures, functions and behaviors. The achievement of each of these goals takes place through very specific causal processes. It is true that a large number of these goals *do contribute* to the survival of the organism, but does that mean that there is a goal of self-maintenance *over and above* these specific goals? There is not. To posit

the existence of such a goal would be to posit a goal without any material basis – i.e. it would be to posit a teleology; and that is precisely what Fox is doing.

The basic problem is that, as opposed to what Fox, Maturana, and Varela assume, no goal is *purely intrinsic* to an organism. As we mentioned earlier, the genetic programme and its goals are a product of the entire history of phylogenetic development. Various specific goals, various features, various homeostatic mechanisms etc. of the organism advance its survival *because they have happened to have been selected at different points in the evolution of the species*. It is this evolutionary history which gives the various goals of the organism the kind of coherence they have. If one removes this history, then the coordinated nature of the goals will seem *consciously orchestrated*. And if goals can be consciously orchestrated and subordinated to self-renewal, then the teleology is also *psychological and volitional*.

In the theory of autopoiesis, this removal of evolutionary history is done quite directly through a further claim about the status of reproduction in the concept of an organism. Fox quotes Maturana and Varela: "reproduction does not enter as a requisite feature for the living organization. In fact for reproduction to take place there must be unity to be reproduced: the establishment of the unity is logically and operationally antecedent to its reproduction." (Fox, 1990: 171) But the unity itself is a product of evolutionary history, where reproduction plays a key role! Further, reproductive functions *themselves* are a part of this historically evolving unity. To assume there is a "logically antecedent" unity, therefore, is to assume a completely unconstrained teleology.

The evasion of evolutionary history is tied up directly with the *radical difference* that is drawn by autopoiesis theorists between organisms and mechanical devices. By *mechanical devices*, quite clearly, Fox and others mean artifacts, given the sheer heterogeneity of examples used -- from thermostats to homing missiles to servo motors. Artifacts are very obviously products of specific causal processes – i.e. specific kinds of labour. Unlike species, their production does not take place over thousands or millions of years rendering unobservable in a direct way. *If one concedes that artifacts can show self-regenerating behavior*, one would also have to concede that specific causal processes can produce such properties. And if that were the case, the fact of self-maintenance could be explained simply in terms of the material constitution of the genetic programme, and would not require a conscious, ideal *telos*.

Freya Mathews, a theorist who operates squarely within the autopoiesis paradigm, has made this argument in an explicit and striking way. Discussing the possibility of a self-maintaining artifact, she says:

"Could such a 'machine' in fact exist? Could it in principle be designed and built by us? I think not. The level of interconnectedness of parts required for its self-monitoring function would presumably require structural holism, and holism entails that the parts cannot be given independently of the whole, since the nature of the whole conditions the parts. In this case, we cannot start with an assemblage of parts and piece them together to construct the whole. The whole must be created whole." (Mathews, 1991: 71)

The requirement that "wholes be created whole" rules out, not just "piecing together" of parts, but any kind of specific, causal, historical process of formation. By saying that self-monitoring, or what she otherwise calls "self-realization", is a holistic feature, Mathews is essentially saying that self-monitoring is a materially unconstrained teleological goal.

The volitional teleology of autopoiesis also comes out starkly in its claim that since organisms seek self-maintenance they are ends-in-themselves. The Kantian notion of end-in-oneself, as we have seen, *is dependent on one's status as a free judge of one's own goals* (Uleman, 2010). Without this capacity for the free ascertainment of ends, one cannot, as a *type of entity*, be a possessor of moral entitlement. Thus, Fox and others, in claiming that *all organisms* are ends-in-themselves, are clearly saying that end directed behavior in organisms is irreducibly ideal and volitional.

As we have seen earlier, the adoption of a non-Aristotelian volitional teleology has contradictory consequences. On the one hand, it may logically result in a scenario of complete stasis. Given the near-total imperviousness to evolutionary change in this mode of environmental theorization, this would not pose much of a problem. But, on the other hand, it could also lead to an implosion of the species concept itself, thereby hurling into conceptual chaos all kinds of environmental and ecosystemic relations. This, of course, would render any kind of environmental theorization or environmentalism meaningless. Thus, we find in the moral entitlement mode of re-enchantment, along with the volitional and unconstrained telos of the individual organism, various ways of posing a *supra-organismal teleology* that would keep the various individual organism *tethered* to their ecosystemic roles and functions.

Thus, Fox in his analysis of the ramifications of autopoiesis goes on to claim that even larger biological entities than organisms – species, gene pools, ecosystems, even the entire biosphere –

can be regarded as systems that aim at self-maintenance. Thus, there is a *larger* teleology which can rein in, as it were, the individual volitions of organisms if they were to go astray. For Rolston, the American naturalist Aldo Leopold's concept of the "land ethic" holds out special promise. The "land ethic" sees the ecosystem, the biogeographical region, or even the entire earth, as a *community* of natural entities tied together in moral bonds. The component organisms do enjoy moral entitlement but *as derivative from* the moral entitlement of the community as a whole. This ethical holism, for Leopold, goes hand in hand with an ontological holism. He says:

"It is at least not impossible to regard the earth's parts – soil, mountains, rivers, atmosphere, etc. – as organs or parts of organs, of *a coordinated whole*, each part with a definite function. And if we could see *this whole, as a whole,* through a great period of time, we might perceive not only organs with coordinated functions, but possibly also that process of consumption and replacement which in biology we call metabolism, or growth. In such a case we would have all the visible attributes of a living thing, which we do not realise to be such because it is too big, and its life processes too slow. And there would also follow that invisible attribute – a soul or consciousness – which…many philosophers of all ages ascribe to all living things and aggregates thereof, including the "dead" earth." (Callicott, 1989: 88)

5.5. *Re-enchantment, Material Practice, and Dualism*

What does this holistic conception of the natural world mean for human material practice? It would imply a complete *stasis*. The reason is the following. Holism or organicism, as we saw earlier, implies a logical reduction of the part to the whole. This makes the part, *any part*, completely irreplaceable. If any part changes, the logical integrity of the whole is lost – the basic character of the whole changes altogether. Because holism conceives the part-whole relationship in a completely logical or ideal manner, and ignores the historical, causal processes which have led to its formation, *it cannot distinguish between different kind of changes*. *Any kind* of partial change is a fundamental threat to the identity or essence of the whole.

Human material practice takes place in interaction with the natural world. Changes in such practice would, therefore, affect, in however minor or major a way, the state of a part of the natural world. These effects would be specific and causal in nature, and would need to be determined through investigation. A holistic approach to the natural world, however, would in an *a priori* way regard the change as fundamentally disruptive in character. No matter what the specific causal implications, what matters for holism is the *logical integrity* of nature. Further, since this holism

is of a normative character, since it contributes to the moral entitlement of nature, the assessment of practical change as disruptive of logical integrity would be of a moral kind. Holism about the natural world, in other words, would serve as a *moral constraint* on any kind of change in material practice.

Modern industrial development, with its ever changing products, techniques and methods of productions, then becomes definitionally *transgressive* of the moral boundaries set by nature. It becomes "unnatural"; while social systems perceived to have static material practice – indigenous groups, agricultural communities, or, as Raymond Williams points out simply *the past* in general, are seen as stamped with the authenticity of "natural-ness". Explanations for this unnatural character of modern development abound. The most characteristic, as we have seen, is the supposed *Prometheanism* associated with the Enlightenment and the scientific revolution. The disenchantment of the world that the scientific enterprise involved ideologically and morally sanctioned endless exploitation of the earth. Advances in technology, based on this science, enabled the process.

On many accounts, this growth in the technologically intensive exploitation of natural resources is constitutively linked with capitalism. One cannot exist without the other. Capitalism exploits nature and human beings for individual gain. Technological development is nothing but a process geared to that end. Another way of saying the same thing is to say that the science and technology led disenchantment process left people with no ideals apart individual material advancement. And capitalism, as a social system, institutionalizes that goal.

None of these explanations, however, involve the natural world in any way. All of them have to do with purely ideological developments; they are changes at the level of *weltanschauung*. It would seem that nature plays absolutely no role whatsoever in the development of material culture. Therefore, if you have people who are Promethean or profit-minded, you will have material practice changing rapidly. But if you have people whose values cohere with the moral boundaries of nature, material culture will remain constant. What drives material culture, therefore, is essentially the *mind.* Matter or nature play a fundamentally passive role. This perception of the development of human material culture, which stems from the dynamic interaction between human beings and nature, as being driven exclusively by the human mind, and where nature is almost nothing more than *putty* waiting to be modified, is a glaring form of dualism.

We have, therefore, come a full circle. The main objective of re-enchantment was to overcome dualism, Cartesian and otherwise. And it has ended up producing a fairly comprehensive and striking form of dualism itself; where it is philosophies, worldviews, orientations and values which exhaustively determine the dynamics through which the human-nature relationship changes. Nature, for whose re-instatement the project of re-enchantment was undertaken, is pushed to the periphery of causation, which we have seen again and again to be a hallmark of dualism.

Chapter Six: The Problem of Change, Parmenides and the Pre-Socratics

6.1 *Change, Continuity and the Law of Non-Contradiction*

In the world around us we constantly see processes of change. Day turns into night. The weather changes from one day to the next. One season gives way to another. The cycle of seasons itself, along with the climate system as a whole, goes through all manner of fluctuation and change. Plants, animals and human beings emerge, mature, age and die. Each individual life form has a history – it appears, evolves and passes away. Our own activity involves various kinds of transformation. The seeds we plant become crops. Raw ingredients become edible food in the process of cooking. Clay is baked into bricks. Bricks are arranged and cemented together into houses. Timber is crafted into furniture. Our activity itself is subject to regular change. New methods of production supplant or transform the old. New products, tools, implements, machines, and raw materials emerge on the horizon from time to time, along with new and deeper knowledge of the workings of the world. The organisational forms within which these varied activities are carried out – our social relations – are equally changeful. Our modes of economic, political, legal and cultural organisation have gone through transformations, at times gradual, at times drastic, from the very beginning.

The ever-present and pervasive nature of change has been consciously recognised in philosophical thought across the ages. The idea of universal flux – the idea that everything is in perpetual flow or movement - has not been uncommon. Heraclitus, the ancient Greek philosopher from fifth century BCE Ionia, believed that "all things pass and nothing stays". In a striking and well-known analogy, he compared existence to the flow of a river, saying that "you could not step twice into the same river" (Wheelwright, 1959). Like the water in a river is constantly renewed, everything that exists constantly changes. A number of other Greek philosophers, particularly the early materialists like Thales, Anaximander and Anaximenes, individuals who were also directly involved in the scientific investigation of the natural world, held change to be a constant feature of reality. The essence of this idea of universal change is captured by Frederick Engels in his *Dialectics of Nature* in the following words: "…the view that the whole of nature, from the smallest element to the greatest, from grains of sand to suns, from protista to men, has its existence in eternal coming into being and passing away, in ceaseless flux…" (Engels, 1925/2021)

Even in Indian philosophy, the idea of ceaseless change has found expression in several schools and traditions. In the *Caraka-samhita*, a major ancient source-book on Ayurveda, we find the idea of the human body as constantly changing. The *Caraka-samhita* says: "Nothing about the body remains the same. Everything in it is in a state of ceaseless change. Although in fact the body is produced anew every moment, the similarity between the old body and the new body gives the apparent impression of the persistence of the same body." (Chattopadyaya, 1964: 65) A much more systematic and generalised version of this view of endless flux is to be found in the Samkhya and early Buddhist schools of philosophy. Debiprasad Chattopadhyaya, in his *What is Living and What is Dead in Indian Philosophy*, sees in the Buddha's views on change and causation, a direct parallel of the Heraclitean idea of universal flux (Chattopadhyaya, 1976). The Buddha holds that nothing that exists in the world is *simply* present, simply *there.* Everything that exists is always in a state of coming to be or passing away. A flower emerges from the bud and passes into the fruit. Youth emerges from infancy and passes into old age. Reality, therefore, is always a combination of existence and non-existence – a combination of *being* and *non-being*. Chattopadhyaya provides the following quotation from the Buddha on this point:

"This world, O Kaccanna, generally proceeds on a duality, on the 'it is' and 'it is not'. But O Kaccanna, whoever perceives in truth and wisdom how things originate in this world, in his eyes there is no 'it is not' in this world. Whoever, Kaccanna, in truth and wisdom perceives how things pass away in this world, in his eyes there is no 'it is' in this world… 'Everything is', this is the one extreme, O Kaccanna. 'Everything is not', this is the other extreme. The Perfect One, O Kaccanna, remaining far from both these extremes, proclaims the truth in the middle." (Chattopadhyaya, 1976: 233)

This combination of existence and non-existence, however, has posed a fundamental problem for the philosophical understanding of change. This problem can be grasped in many ways. Most fundamentally, the problem is about the relationship between change and continuity. When we say that an object changes, for the statement to be meaningful there needs to be something about the object which changes *and something which remains the same*. For instance, when we say that "an apple has gone bad", we mean that while the apple was not rotting earlier now it is. Here, the change consists in the transition from one quality (i.e. of not rotting) to another (i.e. of rotting). But the "bad" or rotting apple continues to be an apple. Or, in other words, it is the *same* apple which earlier was good and has now gone bad. Thus, there is something which persists, which remains the same, in the course of the process of change. To take another example, one we have

already encountered in the statement from the *Caraka-samhita*, our body despite going through continuous change remains the same body. When we say "X has fallen ill", we mean X's body which was earlier in a state of health is now in a state of ill-health. This transition does not mean that X has acquired a completely new and different body. The same body which was healthy earlier is now unhealthy.

This co-existence of change and continuity also implies that when things emerge *they emerge from other things*, and when they pass away *they pass away into other things.* For instance, in describing the process of emergence of a butterfly we say that a caterpillar *turns into* a butterfly. Similarly, in describing the process of curdling we say milk turns into curd. Or, to phrase the same thing differently, we could say that the butterfly emerges from the caterpillar and curd emerges from milk. Now, in what sense does a caterpillar turn into a butterfly? What does it mean when we say something *turns into* something else? Most fundamentally, it means that it is *in the nature of the former* to give rise to the latter. It is in the nature of the butterfly to give rise, under certain conditions, to the caterpillar. It is in the nature of milk to curdle under certain circumstances. The caterpillar cannot turn into a hedgehog. Milk cannot become honey. Thus, change is not simply an *arbitrary succession* of one thing by a different thing. The emergence of the latter depends on and reflects the nature of the former. The caterpillar does not simply disappear without a trace. Its nature is reflected in the butterfly that emerges from it. Again we see that change and continuity go hand in hand.

If change is not arbitrary succession and things emerge from other things an important implication follows. When an object goes through a change, at any point in the process the object will both be itself *and not be itself*. Why should this be so? Take the process of milk changing into curd. Now, imagine this process to be temporally broken up into a succession of an infinite number of constituent moments. In each of these moments, would the milk be static, unchanging, a frozen "snapshot", or would it be changing? At first glance, the former may seem more plausible. But it leads to unacceptable consequences. If the milk is unchanging in every single moment of the process of change, it would mean that there is no change at all! After all, if the change is not to be found in any of its constituent moments in time, where could it be found? Denial that every given moment in time the milk is changing rather than unchanging, moving rather than static, would mean, therefore, that no change in any meaningful sense takes place. It would mean that the initial

object (the completely uncurdled milk) is abruptly replaced by the final object (the completely curdled milk). In other words, arbitrary succession instead of a process of change.

This idea of an object being both itself and not itself at any moment has been expressed in the history of philosophy through numerous dazzling metaphors. We have already come across Heraclitus' metaphor of the river. A river, at any given moment, is flowing – i.e. old water is being replaced by new. If this constant change or renewal were to stop, the river would cease to be a river. Being a river, in other words, means that in any given instant the river *is becoming a different river*. In another equally striking metaphor, Heraclitus likens existence to a burning flame. He says that a flame at any given moment has a *contradictory* existence – it is both in a state of satisfaction and in a state of need. To the extent that the flame is still lit, to the extent it has not gone out yet, it is in a state of satisfaction. If the flame had not been satisfied, had it been deprived of fuel, it would have been extinguished – it would not have been there. But the fact that it is lit, the fact that it is still there, also means that it is in need of further fuel. Thus, at any moment, the flame combines within itself two mutually contrary attributes – need and satisfaction. Remove either of the two and the existence of the flame becomes inconceivable. Heraclitus called this the inherent "unity of opposites" in things.

Similar ideas are to be found in the works of Zeno, the fifth century BCE Greek philosopher belonging to the Eleatic school (Salmon, 2001). Zeno is credited with the formulation of a number of well-known paradoxes, some of which directly involve questions about the fundamental nature of change. As an example, we can take up what is called the Paradox of the Flying Arrow. Imagine, as the name suggests, an arrow in motion. At any given instant, the arrow occupies a specific location. That would mean that at any given moment the arrow *is at rest*. But if it is at rest at all moments, the arrow must not be moving at all. The flying arrow, it turns out, does not fly. While Zeno does not provide any explicit solution to this paradox, what he is driving at seems to be clear. In order to conceive of the motion of the arrow as *real motion*, we must recognise that at any given moment the arrow must be *both in one place and in another*. Deny this and you deny the reality of motion. As seen in the example of the curdling of milk, this can be generalised to all processes of change. To see change as real change, the object must be seen as combining within itself mutually opposed characteristics.

As we mentioned earlier, these implications of the reality of change – the co-existence of change and continuity, things emerging from other things, the unity of opposites – have persistently posed problems for philosophers through the ages. So much so, that a number of influential philosophers have declared, with far reaching consequences, that all change is fundamentally illusory. What was it that led them in this direction? What was the basic problem they perceived in the notion of change? The answer lies in what have been regarded as the fundamental laws of formal logic – basic laws or rules which are said to underpin all rational thought. While these laws have been assumed and invoked in varying forms since the beginning of philosophy, they received their first conscious and systematic elaboration in the works of Aristotle. One of these laws, the so-called law of non-contradiction, is held to be primary as the others either directly or indirectly derive from it. The law states, in the words of Aristotle, that "the same attribute cannot at the same time belong and not belong to the same subject in the same respect." (Novack, 1971: 57) For instance, if a leaf is green it cannot at the same time be brown. If the sky is blue, it cannot at the same time be black. A bud cannot at the same time be a flower. The basic underlying idea is that a thing is always identical with itself, and therefore cannot be both itself and another at the same time.

The problem this poses to the idea of change should be clear. As we just saw, for change to be real the changing object cannot simply be identical with itself. Change is possible only if at any given moment the same attribute both does and does not belong, in the same respect, to the changing object. A flying arrow is both in one place and in another at the same time. A green leaf that is turning brown must, at any given instant, be both green and brown. For change to take place, in other words, phenomena have to fall afoul of the law of non-contradiction. This has led many to hold that change is something inherently unreal. Cratylus, a fifth century BCE Greek philosopher and disciple of Heraclitus, for instance, declared that since all things in the world are changing, everything – the world as a whole – must be illusory. Aristotle claims that Cratylus took the Heraclitean philosophy of flux to its logical conclusion and believed that one cannot step into a river even once, since the river as something that is ever-changing is fundamentally unreal (Collingwood, 1945). On the basis of such a view, if one were to believe Aristotle's account, Cratylus held that nothing meaningful can be said about anything in the world as that which is unreal must also be indescribable. Thus, after a point he stopped talking altogether and would communicate only by wagging his finger.

6.2 *Parmenides and the Split between the Many and the One*

The thesis of the unreality of change, however, is most widely associated with the work of Parmenides, an ancient Greek philosopher from the late sixth to mid fifth century BCE and seen as the preeminent member of Eleatic school of Greek philosophy. Parmenides lays out a complicated argument for the unreality of change in the only written work he is credited with, a poem in Homeric hexameter titled *On Nature* only fragments of which survive. His main thesis is that there is an *absolute* separation between existence or being and non-existence or non-being. A thing which exists – which is real – *must always* exist, must always be (Thanassas, 2008; Miller, 2011). A thing which does not exist *can never* exist, can never be. Nothing in this world, therefore, can come into being or pass away. This argument can be understood in several ways. One way is to put the matter in terms of what a thing comes or emerges from. Parmenides says that a thing which comes to be can either come from being or non-being – i.e. it can either emerge from something which exists or something which does not exist. If it comes from something that exists, it must already have been there – i.e. it must already have been there in the thing that gave rise to it – and therefore there is no change. If, on the other hand, it comes from something which does not exist, then emerging from *nothing*, it must itself *be nothing.* In either case, there is no real change, there is nothing that comes into being. Gorgias, the fourth century BCE Greek philosopher, paraphrases Parmenides on this point in the following way:

> "What is cannot have come into being. If it did, it came either from what is or what is not. But it did not come from what is, since if it is existent it did not come to be but already is; nor from what is not, for the non-existent cannot generate anything." (Miller, 2011: 44)

Incidentally, similar arguments have been used by the idealist tradition in Indian philosophy – from Nagarjuna, a second century CE philosopher associated with the Madhamaka school of Mahayana Buddhist philosophy, to Samkara, the eighth century CE philosopher seen as the chief proponent and systematiser of Advaita Vedanta – to deny the reality of causality and change. In Chattopdhyaya's works, we find detailed discussion of Nagarjuna's views on change (Chattopadyaya, 1976). Nagarjuna says that of a thing that is coming into being only of four possible things can be said: A. That a thing comes into being from itself. B. That a thing comes

into being from something else altogether. C. That a thing comes into being both from itself and something else. D. That a thing comes into being neither from itself nor from something else.

Nagarjuna goes on to argue that each of these options is fundamentally illogical. If a thing emerges from itself, then in no way can it be regarded as "coming into being". A thing cannot meaningfully be said to produce itself. For instance, in the case of a jar being produced from clay, there is no sense in saying that the jar already exists in the clay. A thing cannot be born repeatedly. In Nagarjuna's own words, "An entity does not require a second production. Because it exists. Just as a jar. Whatever exists does not require to be produced once more".

But, can a thing come into being from something else? No, says Nagarjuna. Because if a thing could emerge from something other than itself, it could emerge from absolutely *anything*. All things that are not the jar, that are different from the jar, are all *equally* different from it. Clay is different from the jar. But so is any other object which is not the jar – birds, trees, paper and so on. According to Nagarjuna, there is no way one can distinguish between the clay's difference from the jar and the bird's difference from the jar. Difference is difference, and that is all there is to it. Thus, if the jar could come into being from clay, it could also come into being from a bird or a tree or an elephant. Nagarjuna puts the argument in the following way: "If, to be sure, a thing were other in regard to causes, deep darkness would then be produced from light. Then surely, everything could be produced from anything since the otherness is just the same in causes as well as non-causes." This, he says, it patently absurd. Therefore, a thing cannot come into being from something other than itself.

What about the third and fourth options? Of the third, that a thing can come both from itself and another, Nagarjuna says that it is simply a combination of the first two options and therefore a combination of their absurdities. The last option, of a thing emerging neither from itself nor from something else, simply means, according to him, that it emerges from nothing. And, like Parmenides, he held that something which emerges from nothing must itself be nothing. Thus, the third and fourth options too are absurd. Having exhausted all the four possible ways in which a thing can come into being, Nagarjuna concludes that "coming into being" or change must be fundamentally unreal or illusory. And since the world consists only of changing things, the world as a whole must be illusory. He says:

"Nothing at all could we perceive

In a universe devoid of causes

It would be like the colour and the scent

Of a lotus growing in the sky." (Chattopadhyaya, 1976: 232)

Like the "lotus growing in the sky" is imaginary, all the flux and change that characterise the world are also imaginary and unreal. Now, what does this kind of an argument have to do with the law of non-contradiction? The law of non-contradiction, as we have seen, says that a subject cannot both have and not have an attribute in the same respect at the same time. If the attributes of an object change, it becomes a different object altogether. No object can both be itself and a different object at the same time. It must be noted here that the law assumes that the *identity* of the object – what the object *is* – lies in its attributes at any given moment. Whatever attributes, characteristics, properties the object has at any given instant *constitute* that object in that instant. This means that the *momentary* attributes of the object *exhaust* the identity of the object – there is *nothing more* to the identity of the object than its attributes in any given moment.

Now, it may be recalled that the emergence of an object from another object, if it is to be meaningful at all, would necessarily imply that it is in the *nature* of the latter to give rise to the former. Thus, the emergence of curd from milk implies that it is in the nature of milk to curdle. A bud becoming a flower means that it is in the nature of the bud to give rise to the flower. But the *nature* of the object is nothing other than the *identity* of the object. That being the case, the law of non-contradiction, with its confinement of identity to momentary attributes, would mean that it *is impossible for the nature of the object to entail anything about the transformation of the object*. For instance, if the identity of a green leaf in a given moment were to consist *exclusively* in its properties *at that moment* – in its colour, texture, size etc., its nature could not legitimately include *anything* about its future properties. Thus, it would not be legitimate to say that it is in the nature of the green leaf that it can turn brown. The identity of the green leaf *would have nothing to do* with its future brown-ness. The identity of the brown leaf would have nothing to do with its past green-ness. The green leaf turning brown would then simply be arbitrary succession – the green leaf disappearing and the brown leaf appearing without there being any connection between the two. There would not be a process of *change* in any meaningful sense of the term.

It is precisely this implication of the law of non-contradiction which is reflected in the arguments of Parmenides and the Indian idealists. The law poses, in essence, a complete *separation* between the ideas of identity and difference. Two things can either be *completely* identical or *completely* different. There can be nothing in between. Thus, an object can be related to another object in only two possible ways – by either being absolutely identical with it, in which case it would be the *same* object as the latter, or by being absolutely different from it, in which case *it would have nothing to do with the latter*. The coming into being of an object, therefore, can only mean one of two things – that it emerges from itself, or that it does not emerge from anything at all. In either case, there is no *transformation* whatsoever. For instance, a bud and a flower, on this view, are either the same thing or absolutely different. If it is the former, there is obviously no change involved when the bud flowers. If it is the latter, and the bud has nothing to do with the flower, the process of flowering simply amounts to arbitrary temporal succession. In either case, considered as a process of change, the flowering of the bud is illusory.

There is another way in which the illusoriness of change can be derived from the law of non-contradiction. This argument begins from the implications of the law we just discussed and arrives at conclusions patently contrary to the same. It is an irony of the history and development of philosophy that Parmenides, along with a host of other philosophers, adopt both these approaches at one and the same time to deny the reality of change (Miller, 2011). The argument is the following. We have seen how a process of genuine change involves a combination of transformation and continuity. When an apple goes bad, when it begins to decompose, the bad apple still remains an apple. But if we were to go by the law of non-contradiction, and see the identity of an object exclusively in its momentary properties, the good apple (being red, firm, not fowl smelling, good to taste etc.) would be *absolutely different* from the bad apple (being discoloured, soft, foul smelling, repulsive to taste etc.). If that were the case, however, if the good apple had absolutely nothing to do with the bad apple, in what sense would the apple continue to be an apple? If the good and bad apples have nothing in common, in what conceivable sense are they apples?

One must pause and note here that the denial of the reality of change, *by itself*, does not require or commit one to confront this question. For Cratylus, for instance, the question does not even arise. For him the illusory nature of change meant, and he was being consistent here, that the world as a

whole, being subject to constant change, was *totally unintelligible*. Since the world was illusory, one could not have any knowledge of it. If apples were constantly changing, one could not possibly grasp their essential nature. In other words, for Cratylus skepticism about change also meant skepticism about knowledge (Collingwood, 1945). Parmenides, however, did not want to deny the possibility of knowledge. He wanted to establish that the world was knowable *despite all change being illusory* (Grondin, 2004). Therefore, for Parmenides, the persistence of *apple-ness,* despite the transformation from good to bad apple, was a real question.

Parmenides answers this question in a way that would go on to become a common feature of philosophical thought right up to the present day. He says, in essence, that if a thing or entity persists despite a change in its attributes, then such attributes must be accidental to the nature or identity of the thing. If an apple despite going bad continues to be an apple, then it must be because the nature of an apple, what an *apple fundamentally is*, its apple-ness, is independent of whether the apple is good or bad. Thus, the *perceptible properties* of the apple at any moment – its shape, colour, smell, taste etc. – have nothing whatsoever to do with the nature or essence of an apple. Whether the apple is red or black, hard or soft, tasteful or unpalatable, is totally irrelevant to what an apple *is.*

But if that is the case, *nothing* that we can say about real, perceptible apples has any bearing on the nature or essence of an apple. This would include not just things like colour, shape, size etc. *but also when the apple comes into being and when it passes away.* Thus, whether an apple existed ten thousand years ago or exists now, whether an apple lasts for a week or for months, none of this would be relevant to the fundamental nature of apples. *Indeed, even if at a certain point no actual, perceptible, tangible apples were to exist*, it would be a matter of indifference to the essence of apples. It was on the basis of such considerations that Parmenides concluded that the essential reality of apples – the reality of apples as objects having a specific, determinate identity – does not depend at all on whether individual apples exist or not. In other words, if a thing exists at all – if it has a determinate nature or essence – *it must exist always*. Hence, whatever is real or has *being*, must always *be.* Whatever comes into being and passes away, whatever *becomes*, must be unreal or illusory.

Parmenides thus divides up the real world as we know it into absolutely opposed domains. On the one hand, is the world of perceptible particular objects which come into being and pass away. As

belonging to the domain of *becoming*, of change, they appear and disappear from time to time – their existence, in other words, is *not necessary*. All their perceptible attributes are changing and therefore *accidental*. As such, the objects of this domain are unreal, non-essential. Nothing real can ever come into being. What *is not*, can *never be.* On the other hand, is the domain of the essential nature of things. Being independent of all perceptible attributes, being free of all properties that can change, this domain is changeless, unmoving. It neither comes into being nor does it pass away. It necessary *is*.

The nature of these two domains also determines the method of apprehending them. Since, the unreal domain of becoming is the realm of particular perceptible things, we apprehend it through our senses. Our senses tell us about the coming into being and passing away of objects, of the constant flux and variation of attributes. This flux being fundamentally illusory, being a passing "show" of non-essential particulars, our senses are fundamentally misleading. The domain of real essential being can be grasped only through pure rational thought. It is only in thought that we can apprehend the true nature of things. We can think and speak of objects even when such objects do not perceptibly exist in that moment. For instance, we can think of the night even when its day. We can think of oranges even when there are none around. The object of such thought, Parmenides says, are not sensible particulars – a particular night, a particular orange – they cannot be because they are not there at that moment; the object can only be real non-perceptible essence. It is only essence which always, of necessity, exists. For Parmenides, therefore, the gulf between the domain of passing particulars and the domain of essence is paralleled by the gulf between sensory perception and rational thought. The senses can only lead us to "belief", whereas pure reason is the only route to the "truth". The following two fragments from Parmenides' poem capture the essence of this view:

"Come now, and I will tell you, and you, hearing, preserve the story,

the only routes of inquiry there are for thinking;

the one that it is and that it cannot not be

is the path of Persuasion (for it attends upon truth)

the other, that it is not and that it is right that it not be,

this I point out to you is a path wholly inscrutable

for you could not know what is not (for it is not to be accomplished)

nor could you point it out.. For the same thing is for thinking and for being.

For never shall this be forced through: that things that are not are;

but restrain your thought from this route of inquiry,

nor let much experienced habit force you along this path, to ply an aimless eye and resounding ear

and tongue, but judge by reasoning the much-battled testing

spoken by me." (Miller, 2011: 62)

Another important difference between the domains of becoming and being, according to Parmenides, is that the former is a realm of multiplicity and the latter of unity (Grondin, 2004). Particular, perceptible things can be many, but the identity of the thing – its nature or essence – can only be one. Why should this be so? Number or quantitative determinacy can only belong to things with sensible attributes. "How many", as a question, can only be asked about particular things. It cannot be asked about the general essence of those particulars. Thus, "how many trees?" is a legitimate question. But "how many tree-nesses" is not. The very recognition of particular trees as trees requires a stable and single notion of what a tree is. Thus, in the perceptual, phenomenal world of becoming, there can be multiplicity, but in the domain of being there can only be unity. It must be noted that the unity of being, for Parmenides, is not compromised by the existence of multiple *kinds* of things or genera. The fact that trees are just one particular kind of plant life, and plant life itself is only one kind of organic life, and that, therefore, there must be multiple essences and identities, does not take away from the one-ness of being. The reason is that being deprived of all sensible attributes, all perceptible features, these different essences – these different kinds – would be *absolutely identical*. Thus, being, for Parmenides, unlike perceptible objects which are Many, is necessarily One. This One is changeless, featureless, and indivisible. Parmenides describes the One in the following way:

"… a single account still

remains of the route that it is; and on this route there are

very many signs, that what-is is ungenerable and imperishable,

a whole of a single kind, and unshaking and complete;

nor was it, nor will it be, since it is now altogether

one, cohesive." (Thanassas, 2008: 77)

This division of the phenomenal world into a domain of change and a domain of constancy will have vital consequences for the future development of philosophical thought which we will come to later. We will see how with Plato, this view of the perceptible world as an unreal realm of flux, and of fixed, unmoving essence as the only thing that is real, will become the starting point for a full blown and elaborate philosophical account of the world. For the moment, let us turn to the way in which the absolute separation of change and continuity influences even those ancient philosophers who take change seriously. Parmenides, by separating change from continuity, by divorcing difference from identity, had argued for the unreality of change. He severed *change* in a phenomenon from the *essence* of the phenomenon, severed the Many from the One, and concluded that whatever changes, whatever is Many, must be fundamentally illusory. There were other philosophers, however, who accepted the separation of the One and the Many, of being and becoming, and yet saw change and the changing, phenomenal world as real. In fact, they used such separation to provide rational *explanation* of change.

6.3 *The Greek Materialists and The Arche*

These were the ancient Greek materialists. Most of them lived and worked in the period from the late seventh century to the late fifth century BCE. Many of the them were from Greek settlements in Ionia on the western coast of present-day Turkey. As materialists, these philosophers sought, by and large, to explain phenomena of nature in terms of natural processes without recourse to the intervention of gods, spirits and other super-natural entities. With a number of them being actual practitioners of the emerging natural sciences, which at that historical juncture had not yet separated completely from philosophy as a specific branch of enquiry, they were interested in the causal factors that drove the world of phenomena (Novack, 1965). Their naturalistic explanations, however, had a peculiar common feature. For them, the task of explaining the varied phenomena of nature *was the same as* identifying the common substance, element or material out of which all phenomena emerged. To explain the manifold objects and processes that constitute the world was,

on this view, to search for the *primary stuff*, the ultimate constituent, from which all things came. In the words of Aristotle, the main question the Greek materialists addressed themselves to was: "What is the original, unchanging substance, which underlies all the changes of the natural world with which we are acquainted?" (Collingwood, 1945: 52) Theirs was a search, in other words, for the *first cause* or *first principle* of things. It was a quest for the *arche*, a Greek word designating both "origin" and "principle", of all phenomena.

An approach followed by some of the materialists was to identify one particular perceptible substance or material as the primordial substance. For Thales, said to be first philosopher in the history of western philosophy, for instance, the ultimate substance was water. Thales believed that all objects and phenomena that we witness in the world are essentially products of the modification of water – *different forms* taken by water (Couprie, 2011). While at first sight, and from the standpoint of modern scientific knowledge, such a claim may seem absurd, what Thales was essentially attempting to do was to derive the common material cause of things through observation. The ability of water to take different forms, even at the level of direct sensory experience, is striking. We are familiar on a day to day basis with myriad such transformations – water evaporating to form water vapour, water turning to steam when boiled, water turning to ice when cooled, vapour condensing into liquid water and so on and so forth. We are also familiar with the vital dependence of all life forms, including ourselves, on water. As Aristotle points out, Thales' argument about water as *arche* was possibly a generalisation of such commonly perceived phenomena. Aristotle says, "…[Thales got] the notion perhaps from seeing that the nutriment of all things is moist, and that heat itself is generated from the moist and kept alive by it (and that from which they come to be is a principle of all things). He got his notion from this fact, and from the fact that seeds of all things have a moist nature, and water is the origin of the nature of moist things." (Collingwood, 1945: 56)

Anaximenes, another philosopher in the Ionian materialist tradition, claimed that it was air, and not water, which was the primordial substance. The various things of the world are modifications of air – they come about and pass away through the rarefaction and condensation of air (Lloyd, 1974). Anaximenes cites the following famous example as empirical support for his thesis. He says that when we narrow our lips and blow air out we find the air to cold. When we open our mouth wide instead and blow, the air is hot. Thus, the same air, depending on whether its tight or

loose, whether it is compressed or distended, can take on opposite qualities. Therefore, air has the capacity, through quantitative changes in its density, to produce all the variegated qualities and objects of the world. Similarly, for Heraclitus, whom we have already encountered, the primordial substance was fire. Fire was the essence of all things. The world was an eternal flame; all phenomena emerged from and passed away into this flame. Heraclitus used a striking analogy to express this point: "All things are exchanged for fire, and fire for all things, just as goods for gold and gold for goods" (Wheelwright, 1959: 34). Like the value of all commodities in the market can be expressed in terms of a common equivalent like gold, all phenomena of the world are effluences, expressions of fire.

There is, however, a basic problem which such accounts face. All such theories see the arche and its movements as the cause of all the diverse, particular phenomena that we see around us. But substances like water, air or fire *themselves exist as particular perceptible phenomena*. They exist as objects which emerge and pass away. Rivers form, change course and run dry. Puddles of water can quickly appear and disappear. A gust of wind blows for some time and then subsides. Fires are lit and put out on countless occasions every day. Thus, very clearly water, air and fire exist as transient phenomena, and as such are constantly in a state of becoming. Further, as perceptible phenomena they have *specific* sensible attributes or qualities. A fire, being hot and dry, is possessed of perceptible qualities which other phenomena are not. A gust of air, in sensible attributes, is very different from a blade of grass. Water perceptibly differs from rock. Thus, if the *arche* is supposed to be the *unity* which underlies the transient and diverse qualities of the phenomenal world, particular substances like water, air or fire clearly cannot serve the purpose.

It was these considerations that made some of the materialists chose a slightly different path. Anaximander, who is seen by many as a direct disciple of Thales, said that the primary substance cannot itself have any specific, determinate qualities. The ultimate element, the first principle of all things, must be totally bereft of any attributes. He called this primordial substance the *apeiron* or the "boundless" (Kahn, 1960). This primary material is boundless in the sense of not being limited to specific qualities, of being capable of generating an infinite variety of things. In terms somewhat similar to the commodity metaphor of Heraclitus, Anaximander says that all things can exchange for the *apeiron*, and the *apeiron* for all things. Simplicius paraphrases this metaphor in the following way:

"Anaximander named the *arche* and element of existing things 'the boundless', being the first to introduce this name for the *arche*. He says that it is neither water nor any other of the so-called elements, but a different substance which is boundless, from which there come into being all the heavens and the worlds within them. Things perish into those things out of which they have their being, as is due; for they make just recompense to one another for their injustice according to the ordinance of time – so he puts in somewhat poetical terms." (Kahn, 1960: 51)

This "transaction" between the phenomenal world of becoming and the *apeiron* takes place in the following way. The indeterminate substrate, the *arche*, is in constant motion. In the process of this movement, specific qualities like heat and cold separate from the *apeiron.* These qualities then combine to form all the particular perceptible objects of the world. These objects eventually resolve again into their constituent qualities which merge back with the *apeiron*. It is through this process that all things emerge from and pass into the *arche.*

The idea of an indeterminate primordial substance producing the perceptible diversity of the world was taken forward in the theories of many other subsequent ancient Greek materialists. Empedocles, a fifth century Greek philosopher from Acagras in present day Sicily, saw fire, water, earth and air as the basic elements of the world. But each of these elements was itself composed of minute, imperceptible, indestructible and unchanging particles (Novack, 1965). The particles of each element were qualitatively different from the particles of others. The ultimate substratum, on this view, is an undifferentiated mixture of the particles of all the elements. Being an undifferentiated mix, it is indeterminate; it does not have any particular attribute. Through the incessant operation of certain forces, particles of each element separate out of the mix. The elements, having separated, go on to combine in varying proportions and measures to form the phenomenal world. When phenomena pass away, the reverse process takes place.

Anaxagoras, another fifth century philosopher, proposed a similar mechanism of first cause, except for him the basic elements were not just four but many. While the particles of every element are present in every object – "in everything there is a portion of everything" in Anaxagoras' words, the sensible attributes of any particular object depend on which element predominates its composition (Cleve, 1974: 18). In Anaxagoras, again, we find a single undifferentiated mixture separating into elements which combine to produce phenomenal diversity. Similarly, in the work of the Greek atomists like Democritus and Leucippus, the world of becoming is explained in terms

of the movement and arrangement of atoms (Novack, 1965). The word *atom* in Greek means "indivisible". Thus, the philosophers understood atoms in a way fundamentally different from the modern scientific conception of the same. Democritus and others saw atoms as indivisible and not subject to creation, change or destruction, whereas we now recognise atoms to be fundamentally divisible and transient phenomena. For Democritus and other atomists, all objects and phenomena consisted of atoms, and the way in which these constituent atoms moved in the void – moved in empty space – determined the sensible attributes or features of the object. If the basic pattern and arrangement of this atomic movement were to change, the object itself would change into a different object.

In ancient Indian philosophy also, incidentally, we encounter the notion of a primordial *arche* producing the diversity of the world. In Samkhya philosophy, a philosophical tradition that some claim goes back to Upanishadic times, for instance, the phenomenal world emerges from an undifferentiated, featureless and imperceptible material called *pradhana* or *prakriti*. Lacking any attribute, being *avyakta* or unmanifest, it was the source of all attributes (Chattopadhyaya, 1964). It is from the movement of the *pradhana* that the five basic elements in ancient Indian philosophy, the *mahabhutas* – fire, water, earth, air and sky, emerge. These elements then go on to constitute all perceptible phenomena. Again, in Nyaya-Vaisesika, another major school in Indian philosophy, the ultimate material constituent was the atom or *paramanu*. Like their counterpart in Greek philosophy, these *paramanus* were indivisible, imperceptible, immutable and eternal. The *paramanus* of the different *mahabhutas* were qualitatively different, and the patterns and measures in which they combined determined the character of perceptible objects. Thus, again we find the same idea – an imperceptible *arche* producing all perceptible phenomena.

It must be noted here that all naturalistic explanations of the phenomenal world in ancient Greek philosophy – from that of Thales to that of Democritus – suffer from one basic problem. All the different kinds of *arche* that these theories propose – from water to the *apeiron* to atoms -- are supposed to be *inherently mobile* or auto-dynamic. The nature of this inherent movement must be understood. It basically means that while the motion and modification of the primordial substance can explain all the phenomena of the world, *this motion itself cannot be explained*. Thus, we can say that air expanding can become hot and produce fire and contracting can become cold and produce the earth. Or, we can say that the *apeiron* can in one instance manifest itself as a pond,

and in another instance as dry land. But why does air expand in one instance and contract in another? Or why does the *apeiron* become a pond when it does and not else? What makes atoms arrange themselves in one instance to produce a tree and in another instance to produce an animal? In short, why does the *arche* behave in the way it does? The ancient Greek materialists had no answer to this question. Moreover, it was a question which they could not have legitimately posed. The arche, in their scheme of things was a *first cause*; it was meant to be the *ultimate* explanation of all things. If the *arche*'s own movements were to be subject to an explanatory "how?", it would cease to be the first principle.

But the theoretical exclusion of this question, did not mean that the question itself disappeared. The basic problem seems to be this. If the *arche* is to provide a genuine and meaningful explanation of specific phenomena, such explanation must have an element of *specificity*. We must be able to point out what are the *specific* ways in which the arche gives rise to particular phenomena. In the absence of such specificity the designation of the *arche* as the ultimate cause becomes completely *arbitrary*. To say water is the cause of phenomena like ice and steam is one thing. Here we have a fair understanding of the way heating or cooling transforms water and the state it is in. But to say that *everything* – from all planets to all stars, from all inorganic to organic substances – are products of the modification of water, without specifying *how* that happens in particular cases, is to make a necessarily arbitrary leap of faith.

This question therefore poses insurmountable problems for all theories involving an *arche*. One manifestation of this is that despite the overall character of their theories being naturalistic, a number of the materialist philosophers smuggle super-natural or divine entities into their views of causation. Thales, for instance, is said by Aristotle to have claimed that all things are full of gods (Collingwood, 1945). The immediate alleged context for the statement was the attraction of iron objects by a magnet, which led Thales to assert that the magnet must have a soul. For Empedocles, the separation and combination of the elements took place as a result of the operation of forces like "Love" and "Strife", which clearly cannot be purely material forces (Novack, 1965). Anaxogoras, when he has to explain why different qualities and elements separate out of the undifferentiated mass of particles, invokes the principle of *Nous* or Mind as the ultimate source of movement or change. According to him, "*Nous* has power over all things that have life, both greater and smaller… And *Nous* set in order all things that were to be, and all things that were and

are now and that will be, and this revolution in which now revolve the starts and the sun and moon and the air and the aether which are separated off." (Cleve, 1974: 35)

Even in ancient Indian philosophy, this kind of a belated and "backdoor" introduction of extra-material, super-natural elements into systems which are otherwise materialistic is visible. In Samkhya philosophy, the primacy of the purely material *pradhana* or *prakriti* eventually gives way to the centrality of *purusa* or pure consciousness which animates *prakriti* and is therefore the ultimate source of all movement. Chattopadhyaya argues that over time the Samkhya view of *prakriti* practically blends into the mainstream idealistic notion of *prakriti* as illusion (Chattopadhyaya, 1964). Again, in the Nyaya Vaisesika, while Kanada, who many believed to be the progenitor of the philosophical school, consistently eschewed divinity of all sorts, many of his followers introduced an omnipotent God into the system. On this latter view, it was God's fiat which explained all the conjunctions and disjunctions of the *paramanus* which produced the diversity of the phenomenal world.

What is at the root of this basic problem with the notion of a single *arche* producing all phenomena? The essence of the issue seems to be that while the ancient materialists reject the Parmenidean view of change as illusory, they accept the Parmenidean separation between being and becoming, between the One and the Many. We have seen that for Parmenides a green leaf could not possibly *turn* brown as the two had different perceptible attributes and were, therefore, *absolutely different*. The nature of the green leaf *had nothing to do* with that of the brown leaf, and therefore there could not be any relationship of transformation between the two. The domain of change and *becoming*, the domain of the Many, was thus an illusory domain. Leaf-ness, on the other hand, was devoid of all perceptible attributes and was therefore eternal and unchangeable. The domain of *being*, the domain of the One, therefore, was the only thing that was real.

The Greek materialists borrowed the premises of Parmenides' theory but rejected its conclusion. They agreed that particular perceptible things, having specific attributes and qualities, were absolutely different from each other. They also agreed that only that which is eternal and changeless is truly real. Thus, they agreed that the Many and One are fundamentally separate, distinct domains. However, *despite these fundamental agreements, they also held that change and becoming are real*. On what basis did they say that? Essentially, they maintained that the domain of the Many is *an expression, a manifestation* of the domain of the One and this is what makes the

former real. Thus, the green leaf may be absolutely different from the brown leaf, but the two are *united* in the sense that they are both expressions of a *common third*. The caterpillar may be absolutely distinct from the butterfly, but metamorphosis is a real process in so far as both the caterpillar and the butterfly are manifestations of the same *underlying substrate*.

Three things must be noted about this common third or underlying substrate. First, the substrate must lack all phenomenal specificity. If it were to have specific attributes, it would be absolutely different from its own manifestations. One would then have to look for a *common fourth* that could act as a substrate. If this common fourth itself had specific attributes, one would have to look for a common fifth. And so on and so forth *ad infinitum*. Second, the substrate must be eternal and unchanging. To change is to go from having one set of attributes to another. To change, is, therefore, to have specificity. Third, phenomenal, perceptible things being expressions of the substrate, the latter must be the *cause* of the former.

This underlying substrate is, of course, none other than the *arche*. The *arche*, for the Greek materialists, therefore, is a way of uniting perceptible phenomena which they otherwise believe, like Parmenides, are absolutely different. In other words, the *arche* is the One *manifesting itself* as the Many. And, as such, it is the universal or ultimate cause of things. It is, essentially, the means adopted by the Greek materialist, and possibly the only way of asserting the reality of change and causation, while also subscribing to notions of absolute difference and identity that follow from the law of non-contradiction. Parmenides accepts the law of non-contradiction and consistently draws out its implications. The Greek materialists accept the law of non-contradiction and shy away from where it leads. This inconsistency is the basic root of all the intractable problems that attend the notion of the *arche*.

Like the smuggling in of super-natural and divine entities, there was another ironic feature which this inconsistency imposed on some of the Greek materialists. As we noted above, an explanation lacking all specificity cannot be a genuine explanation of any specific phenomenon. Thus, to present the *arche* as underlying cause amounts to offering no explanation at all. But this, in turn, means that we *deny* any *necessary connection* between phenomena. For example, and as we have seen earlier, we can say that milk *becomes* curd only because it is in the nature of milk to become curd. But to say this implies *that there is some specific causal mechanism which makes sure that under certain conditions milk will become curd.* Modern science has revealed that milk curdles

because of the clumping together of protein molecules in the milk under conditions of increased acidity. This is a specific, particular causal mechanism. If we were to preclude any such specificity, as the use of the *arche* by Greek materialists does, it would essentially become *impossible* to say that it is in the nature of milk to curdle. We would then have to say that even when requisite conditions are present milk *may not* curdle. Or for that matter, instead of turning into curd, the milk could, with equal probability, turn into wine or nectar or whatever suits one's imagination.

Thus, in the last instance, the use of the *arche* as cause or explanation logically and inevitably leads to a denial of the reality of becoming or change. And, corresponding to this denial, at the level of knowledge or epistemology, it logically leads to a Parmenidean dismissal of sensory or perceptual knowledge as false or illusory. If there is no necessary connection between perceptible phenomena they cannot be proper objects of knowledge. If milk need not curdle, and may in fact become *absolutely anything else*, then we cannot say in any meaningful sense that we *know* that milk curdles. Thus, our sensory organs, through which we perceive milk curdling, the green leaf turning brown, fruits going bad, and caterpillars becoming butterflies, must be inherently misleading. It was this that led of number of ancient Greek materialists, who were otherwise keen and studious observers of natural phenomena, to slight sensory apprehension as a path to knowledge. This dismissal of the epistemic value of perception is best captured in the following words of Democritus, who was otherwise exemplarily consistent in his naturalism: "There are two forms of knowledge, the trueborn and the bastard. To the bastard belong all these: sight, hearing, smell, taste, touch. The trueborn is quite apart from these." (Novack: 1965: 79)

Chapter Seven: Plato and the Abstract Universal

7.1 *Plato and the Theory of Forms: The Particular and the Universal*

The Parmenidean devaluation of perceptual apprehension is developed by Plato, in the fourth century BCE, into a full-blown idealist theory of the nature of reality and knowledge. While Parmenides consistently pursues the logical implications of the law of non-contradiction and asserts that the phenomenal world of change is illusory, and the materialists attempt to side-step these implications to assert that phenomena are real, Plato takes a somewhat intermediate position and holds that the world of becoming is *less real* than the eternal world of being (Mohr, 2005). The phenomenal world is real to the extent that it is an expression or manifestation of being, and it is unreal to the extent that it is in constant flux. Thus, it occupies a position between being completely illusory, on the hand, and being completely real, on the other.

Plato argues for such intermediate status of phenomena by posing the relationship between being and becoming, between the One and the Many, as the relationship between universals and particulars. He holds that particular perceptible objects are manifestations of non-perceptible universals (Merlan, 1953). For instance, individual horses have varying perceptible characteristics. Particular horses could be short or tall, black or brown or white, fast or slow, weak or strong, young or old, healthy or ailing. They could differ in breed and pedigree. But despite this wide variety of perceptible qualities, each individual horse is nevertheless a *horse*. Like Parmenides, and in consonance with the law of non-contradiction, Plato argues that this is possible only if the essence of being a horse, *horse-ness*, is completely independent of the sensible attributes and characteristics of particular horses. The law of non-contradiction tells us that individual particular horses, having specific sensible properties, must be absolutely different from each other. But if they belong to the same genus "horse" despite such absolute difference, it means that the essence of being a horse, what a horse is *in general*, must be *beyond* all sensible attributes.

Plato calls such universal essences *Forms* or *Ideas*. All particular things in so far as they are things of a *determinate kind*, in so far as they are particular instances of a certain *kind of thing in general*, have corresponding Forms. Unlike sensible particulars, Forms do not have any perceptible features *whatsoever*. Thus, the Forms are not only devoid of attributes like shape, size, colour, texture, sound, taste and smell, they are also bereft of all spatial and temporal determinacy. Questions of

"here" and "there", "now" and "then", are inapplicable to the Forms. In other words, Forms exist outside of space and time. Thus, unlike particular perceptible objects which are characterized by movement and change, emergence and death, forms are fixed and unchanging. Plato makes the character of Socrates in his dialogue *Phaedo* say that forms are "divine, deathless, intelligible, uniform, indissoluble". Thus, while individual horses come and go, are born, age and die, horse-ness itself is eternal and imperishable. Particular trees may flourish and decline, but tree-ness, as a universal, can never change.

It must be pointed out here, again, that the notion of Forms serves a specific purpose for Plato. Like Parmenides, he could simply have said that all becoming is illusory, and it is only of the undifferentiated One that one can have true knowledge. But Plato recognizes, unlike Parmenides, that knowledge always involves specificity (Grabowski, 2008). Individual perceptible things being sensible particulars cannot be proper objects of knowledge, but their *specific, determinate essence* can be an object of knowledge. Particular apples may not be known, but apple-ness, the *nature or essence of the apple as a specific kind of thing*, can be known. Plato believes that denial of the existence of such specific essences or universals would make knowledge, or for that matter any meaningful communication, impossible. In one his dialogues, he says:

"If one does not allow Forms of things in view of all the present difficulties and others like them, and does not distinguish some single Form in each case, one will have nothing on which to fix one's thought, since one is not allowing that in each case there is an idea that is always the same, and so one will utterly remove the possibility of discourse." (Grabowski, 2008: 54)

Thus, Forms or universals give us stable objects or referents of knowledge which connect the different "cases" together. Without the notion of universal horse-ness, there would be nothing connecting particular horses, and that would render all talk of horses meaningless and nonsensical. In other words, to talk of particulars, while denying the existence of universals, is absurd. Particular sensible objects, things of the phenomenal world, must be seen, for Plato, as manifestations of universal Forms. In the language adopted by Plato in his dialogues, particular things *participate in* or *imitate* their Forms. The Form is the perfect essence of a thing, whereas individual things are inferior copies or images of the Form. The Form of circularity or circle-ness is the essence of circles, while individual, empirical circles are imperfect manifestations of this circularity. Individual, particular, perceptible circles are always approximations of circularity; there is no

existing circle which perfectly fulfills the definitional requirements of being a circle – for instance, the requirement that all points on the circle be equidistant from the centre.

The Form, therefore, serves as the universal *paradigm* for particular objects. Particular, individual objects are real to the extent they imitate this paradigm. Individual circles are *real circles* to the extent they imitate the form of circularity. Particular horses, trees and apples are real horses, trees and apples to the extent they imitate the universal Forms of horse-ness, tree-ness and apple-ness respectively. By the same token, to the extent particular objects are only *imperfect* imitations of Forms, they are imperfectly real. Thus, the world of particular, sensible phenomena *derives* its reality from the world of Forms. The particular object *depends*, for its reality, on the universal Form. This dependent, derivative character of the reality of particular phenomena makes them unfit to be objects of knowledge. Because a particular circle only imitates the Form of the circle, to *know circles* is to know the Form of circularity, not the attributes of particular circles. To *know trees* is not to know the perceptible qualities of particular trees, but to know the Form of tree-ness. For Plato, one can only have *belief* about particular objects; *knowledge* can only be knowledge of universal Forms.

This understanding of the relationship between the universal and the particular as a relationship between paradigm and imitation poses certain fundamental problems. If the particular object is to be an imitation, in any meaningful sense, of the Form, the latter must necessarily be possessed of certain specific qualities. In fact, as *paradigm* or *perfect exemplar*, the form needs to possess those qualities or attributes perfectly, as against particular objects which can possess those qualities only imperfectly or partially. Thus, if we say that particular red objects are red because they imitate the Form of red-ness, the Form itself as a paradigm of red objects must be *perfectly red*. If particular things are beautiful because they imitate the Form of beauty, beauty itself must be perfectly beautiful. Circularity itself must be perfectly circular. And so on and so forth. This characteristic of the universal Form, of possessing the very qualities of which it is the paradigm, is called self-predication (Merlan, 1953). It follows logically from the idea of the particular being an imitation of the universal. Without self-predication, without the Form *sharing* in the attributes of its particular manifestations, it cannot be a Form of any *determinate* thing. If the Form of a tree is to be the Form *specifically of a tree* as against that of an animal or a microbe, it needs to have attributes which are specific to trees.

But, as we just saw, the forms cannot possibly possess any sensible qualities or attributes. They are necessarily bereft of all specificity. The forms are, in Plato's words, "without colour, without shape and without solidity". At another point he says that they are "absolute, pure, unmixed, not polluted by human flesh or colours or any other great nonsense of mortality". As pointed out earlier, this indeterminacy follows from the law of non-contradiction itself. Individual fruits have specific sensible characteristics. Since the perceptible attributes of every individual fruit would differ, in some respect or the other, from every other individual fruit, the relation between them is one of absolute difference. Fruit-ness, therefore, as something which connects all these individual fruits which are absolutely different from each other, cannot itself have perceptible characteristics. *If fruit-ness, as the universal Form, had specific sensible features, it would itself be absolutely different from every individual fruit*. In that case, in order to unify these absolutely different entities, which now include the Form fruit-ness, one would require a *second* Form of fruit-ness. But if this Form too had sensible, specific features, one would need a third Form. And so on and so forth *ad infinitum*.

This problem of infinite regress has been referred as the "problem of the Third Man" of the "largeness regress". It is explicitly discussed by Plato in one his later dialogues called *Parmenides*. The dialogue is a fictional account between Parmenides and Socrates, where the former interrogates the latter on various aspects of the theory of the Forms. The largeness regress is articulated in the following way by the character of Parmenides:

"I suppose you think each Form is one on the following ground: whenever some number of things seem to you to be large, perhaps there seems to be some one character, the same as you look at them all, and from that you conclude that the large is one.

That's true, he said.

What about the large itself and the other large things? If you look at them all in the same way with the mind's eye, again won't some one thing appear large, by which all these appear large?

It seems so.

So another Form of largeness will make its appearance, which has emerged alongside largeness itself and the things that partake of it, and in turn another over all these, by which all of them will be large. Each of your Forms will no longer be one, but unlimited in multitude." (Grabowski, 2008: 83)

The Form of largeness, thus, if it is large itself, will set one on the path of infinite regress without one ever finding a Form which unifies all the individual large things. This is the irresolvable contradiction which attends the idea of the self-predication of forms. It is for this reason that Forms, as universals, as things which unite particular, individual objects or phenomena, cannot themselves have any particularity. This is the reason that Plato consistently insists, all through his body of work, that Forms are beyond all sensible, perceptible specificity. But, of course, as we just saw, if they are indeed bereft of all specific attributes they cannot possible serve as universal paradigms or exemplars of particular kinds of things. Individual objects of a particular kind can be imitations of the universal only if the latter itself possesses some particularity. Otherwise, there would be nothing to distinguish the Form of circles from the Form of trees, the Form of horses from the Form of dogs.

There is another intractable problem that plagues the Platonic theory of Forms. If the universal Forms manifest themselves as particular phenomena, then the former must also be seen as the *cause* or explanation of the latter. Plato, indeed, beginning from the *Phaedo*, takes Forms or universals to be the *aitia* or cause of particulars. But this makes a demand of the universal Forms which they cannot possibly fulfil. Or, at any rate, Forms cannot serve this function without giving rise to irresolvable contradictions. As we saw earlier, an explanation of a particular phenomenon is meaningful only when it is of a specific nature. But explanation in terms of forms cannot have such a specific character. This can be understood in several ways. Consider a particular, individual tree. As a particular object, it must be seen as a manifestation of the universal Form of tree-ness. Or, to put the matter in terms of causation, its appearance, its existence, must be attributed to the Form of tree-ness manifesting itself. But why is it that at this particular time and place, it is the Form of tree-ness which manifests itself and not any other Form? Why is it that we have a tree in particular at this time and place, and not a hill or a pond or a swamp? Why is it that on one occasion it is the Form of x-ness which manifests itself, and on another y-ness?

Plato cannot possibly answer that question. Any viable answer would require one to say something *spatio-temporally determinate* about specific Forms, but forms are by definition outside of space and time. Questions of "when" are "where" do not apply to Forms at all. Thus, all we can say is that a particular object comes to be when it so happens that its corresponding Form expresses itself. A tree comes into being simply because the Form of tree-ness *happens* to manifest itself; a fire

starts because the Form of fire-ness happens to take perceptible shape. Explanation of specific phenomena in terms of Forms, therefore, is essentially *arbitrary*.

Another way in which this arbitrariness can be understood is to look not at *which* Form manifests itself at a given time and place, but at *what kind of individual objects* a particular Form manifests itself as. For instance, the Form of tree-ness can manifest itself as a young tree i.e. a young plant or sapling, as a fully grown living tree, or as a dead tree or snag, among other things (Blackson, 1995). But why is it that on one occasion tree-ness manifests itself as one rather than the other? Why is it that one tree at any given time exists as a sapling and another as a snag? Such questions, again, cannot be answered by the theory of the Forms. A Form, lacking all qualities and determinacy, cannot possibly account for the determinate characteristics of its particular manifestations. The Form of tree-ness, being "absolute", "pure" and changeless, has nothing whatsoever to do with youth, adulthood or death as the latter belong to the changeful world of perceptible attributes. Thus, the manifestation of the universal Form as a sapling in one case and a snag in another must be a purely arbitrary thing.

Of course, there is a *pseudo* resolution of this problem which Plato employs on certain occasions. A particular young tree can be seen as a *simultaneous* manifestation of the Forms of tree-ness *and* young-ness. An answer then to the question "why is this tree young?" could simply be that it is an expression of both these Forms together (Blackson, 1995). But this is merely a displacement of the question, not an answer to it. Because now the same problem can be restated as why it is that in one case the manifestation of the Form of tree-ness is accompanied by the manifestation of the Form of young-ness but not in another. Again, Plato cannot possibly answer this question.

Thirdly, the problem can also be understood at the level of *change from one kind of thing to another*. Consider a bud which changes into a flower. If one were to explain this phenomenon in terms of Forms, all one would be able to say is that the Form of bud-ness expressing itself as a particular bud, is being temporally succeeded by the Form of flower-ness expressing itself as a particular flower. But why does this particular succession happen? Why does the Form of bud-ness stop manifesting itself at a certain point? Why does the Form of flower-ness start expressing itself at a certain point? Why is it that it is flower-ness in particular, as against all other possible Forms, which manifests itself? Why cannot the bud become a fruit or a beetle or a snake; why must it become a flower? These questions, again, are unanswerable within the Platonic scheme of

things. The Form of bud-ness cannot have anything whatsoever to do with particular buds turning into particular flowers as the latter process belongs to the domain of perceptible phenomena. Similarly, the Form of flower-ness cannot have anything to do flowers emerging from buds. Thus, there can be no *necessary relationship* between the forms of bud-ness and flower-ness and how they manifest themselves. The manifestation, therefore, of bud-ness as an individual bud can as easily be succeeded by *absolutely any other Form manifesting itself* as it can be by flower-ness manifesting itself as a flower. Thus, the emergence of the flower from the bud must be essentially arbitrary. The explanation of phenomena of change in terms of Forms, in other words, amounts to no explanation at all.

An expression of these insoluble problems that inform the idea of Forms as cause of things is that Plato, in the last analysis, is forced to bring in a divine entity, a veritable *deus ex machina,* to explain phenomena. In his dialogue titled *Timaues*, Plato explicitly says that a universal Craftsman, a *Demiurge,* fashions the phenomenal world on the model of the Forms. It is divine will, in other words, which creates perceptible things; it is divine will which determines which particular Form manifests itself, and in what way, and which form does not. Thus, while Forms are the *exemplary* cause of the world, the universal, ideal models on the basis of which the phenomenal world is created, it is God who is the *efficient* cause, the actual motive force which makes the Forms manifest themselves. This can quite plausibly be interpreted, and has been interpreted, as Forms being *God's ideas* on the basis of which he creates the world. While this was never explicitly stated by Plato, it became a central feature of the theories of neo-platonist philosophers like Plotinus. The influence of the neo-platonists also made sure that the theory of Forms as God's ideas becomes a mainstay of Catholic theology over much of the medieval period. But does the introduction of the Demiurge rid us of the problems we sketched above? Certainly not. It merely amounts, again, to a displacement of the problem. Instead of why particular Forms are manifested in particular circumstances, the question now becomes why the Demiurge *chooses to* manifest particular Forms under particular circumstances. There, of course, cannot be any meaningful answer to this question beyond invoking inscrutable divine decision. The fundamental arbitrariness of the explanation remains undiminished.

What if we said that the bud changes into the flower because the latter is contained as a *potential* or *possibility* in the former? Or that the snag is contained as a potential in the adult fully-grown

tree? Would this enable Platonic theory to get out of the problem of arbitrary explanation? The answer is no. This was precisely the solution proffered by Aristotle. In his famous example of the acorn becoming an oak tree, he held that the oak tree existed as a potentiality, or *dunamis*, in the acorn. The process of change involves this *dunamis* becoming an actuality or *entelecheia*. Aristotle, however, does not let go of the essentials of the theory of Forms. The acorn continues to be a manifestation of the universal Form of acorn-ness; the oak is a manifestation of the Form of oak-ness. As a result, apart from a mere *assertion* that the oak exists as a potentiality in the acorn, there is nothing *specific* that Aristotle can say about the cause of the phenomenon. Operating within the confines of the theory of Forms, he *cannot admit of any explanation that is specific to the phenomenon of an acorn becoming an oak tree*. Thus, the *same* explanation is offered for every phenomenon. Why does a caterpillar become a butterfly? Because the caterpillar contains the potential to become a butterfly. Why does ice melt into liquid water? Because ice contains the potential to do so.

Of course, such non-specific explanation does not amount to any explanation at all. Why does the caterpillar contain the potential of becoming a butterfly *as against* simply becoming an older caterpillar? Why does ice have the potential of becoming liquid water *as against* becoming chalk or cheese? These questions cannot be answered meaningfully while adhering to the theory of Forms. Thus, Aristotle, in the last instance, has to resort to posing potentiality as *conscious purpose* or *telos.* Thus, the acorn becomes an oak tree because its end or purpose is to become an oak tree. Of course, even such a teleological rendering of the notion of potentiality does not enable Aristotle to resolve the problem. Even if one concedes, as fantastic as such a concession would be, that an acorn has a conscious purpose to become an oak tree, that still would not answer the question of why the acorn aims *specifically* to become an oak tree as against anything else.

7.2 *Empty Connections – The Abstract Universal*

What is at the root of these problems faced by the theory of Forms? The fundamental problem, underlying the various intractable issues discussed above, seems to be that Plato, following the law of non-contradiction, *reduces* the identity or nature of an object to its sensible features at any given moment. This reduction *necessarily involves stripping the object of its inherent connections with other objects*. Unity between these objects can then only be an *empty* unity – it cannot have any kind of specificity or determinacy. In other words, Plato first radically separates objects or

phenomena – denies their objective interrelations -- and then tries to *impose* connections on such radically disjointed things, an attempt which must necessarily fail.

Imagine a piece of iron. Let us assume that it has not undergone any corrosion. If exposed to water over a length of time, the piece of iron will get corroded – it will rust. The original piece of iron and the same piece after rusting will necessary have different sensible properties – rusted iron will have a reddish-brownish coloration, a flaky texture, and reduced tensile strength. The original iron, with its specific properties, and the rusted iron, with its own, are *inherently* interconnected. This connection lies in the specific causal process that underlies the change in attributes. We know, today, that rusting occurs because iron, in the presence of moisture, reacts with water and oxygen to form iron oxide. It is this specific chemical reaction that produces the distinct coloration and other features of rusted iron. Thus, the original, un-rusted iron and the rusted iron are linked together in a *necessary* relation. It is in the nature of iron to rust under certain circumstances. If certain specific conditions obtain – the presence of water and oxygen, for instance, the iron *will rust*.

Thus, in certain respects, the un-rusted iron and the rusted iron *mutually constitute* each other. To say that it is in the nature of iron to rust under certain conditions is also to say that the ability to rust is a part of what un-rusted iron *is.* Thus, in a fundamental sense, the rusted piece of iron *reflects* the nature of un-rusted iron. Similarly, if we say that it is in the nature of rusted iron to be produced by the corrosion of un-rusted iron, the original piece of iron reflects the nature of the piece of rusted iron. Therefore, to say that two things are inherently connected is also to say that they constitute each other. The nature or identity of each is a part of the nature or identity of the other.

Further, if it is in the nature of iron to rust under certain conditions, *there must be an inherent connection between iron and those conditions*. Thus, if the ability to rust is a part of what the piece of iron is, then its interaction with water which produces the rusting must also be a part of its nature. Similarly, the ability of water to interact with iron and make it rust must also be a part of the nature of water – it must be a part of what water *is.* Thus, the mutual constitution of un-rusted iron and the rusted iron, the inherent interrelation between the two, also involves the mutual constitution of un-rusted iron and water. The underlying causal process which unites the different states of iron *also unites iron with water*. The change in the sensible attributes of iron can only be understood if we understand the interaction between iron and water.

To put the point more generally, to say that a thing objectively changes is also to say that it objectively interacts with another thing (Ilyenkov, 1982). An apple goes bad, changes in attributes, because of an underlying process of decomposition wherein the apple is consumed by microbial organisms present in the air. Thus, while this underlying causal mechanism implies an inherent, necessary relationship between the good apple and bad apple, on the one hand, it also implies a necessary relationship between the apple and air. To understand *how* the apple goes from good to bad is also to understand how the apple interacts with air. To take another example, to understand how a plant changes from being a sapling to being a fully grown adult tree is also to understand how the plant interacts with various elements of its environment – how it exchanges energy and materials with things around it. Thus, to say that there is an inherent interlinkage between the sapling and the adult tree is also to say that there is an inherent connection between the plant and its environment. *The transformation and movement of a thing cannot be divorced from its interaction with other things*.

Finally, the inherent interconnections between the un-rusted and rusted iron, the good apple and the bad apple, the sapling and the tree, are *universal* interconnections. The universality consists essentially in the fact that given certain conditions, these changes *will always* take place. This is, of course, implied in the idea of inherent or necessary connection itself. To say that it is in the nature of iron to rust under certain circumstances, is to say something which holds for *all* iron under those specific circumstances. But this also means that *particularity* is integrally connected with *universality*. An un-rusted piece of iron is a particular form of iron *because*, among other things, of its ability to rust under certain circumstances. A rusted piece of iron is a particular form of iron because it emerges from un-rusted iron through a process of rusting. In other words, the *iron-ness* of the un-rusted iron consists in the fact that when exposed to water it undergoes a process of corrosion; the iron-ness of the rusted iron consists in the fact that it comes into being through such a process.

The particular forms of iron with their respective attributes, therefore, are connected by a universal which is *nothing but a specific process of change*. The universal and particular here are inseparable. If you were to remove the universal from the picture, if, for instance, there was no reaction which produced iron oxide, there would be nothing connecting the attributes of the un-rusted iron with those of the rusted iron. The two would cease to be particular instances of a

common thing. Similarly, if there were no particulars, if there were no objects with specific, particular attributes, there would no question of an underlying process of change connecting them. Or if the particular attributes were different, if, say, a piece of metal on exposure to water turned bluish-green rather than reddish-brown, one would not be able posit the production of iron oxide as the underlying process of change. The universal, then, would not be iron at all; it would be copper. And the metal in its un-corroded and corroded states would be particular forms of copper. The universal, therefore, *consists in the inherent interconnections of the particular; it consists in the specific ways in which the particular changes.*

By the same logic, the universal can also be understood as the specific way in which the particular object interacts with other objects (Harris, 1983). The un-rusted iron, as a particular form of iron, interacts with water in a specific way to undergo corrosion. Thus, the iron-ness of un-rusted iron can also be said to consist in this specific interaction between iron and water. If this interaction were removed from the picture, there would be nothing connecting the un-rusted iron with the rusted iron. Similarly, if one were to completely disregard the specific interactions between a plant and its environment, if one were to ignore the material exchanges the plant has with its surroundings and which contribute to its growth, there would be nothing connecting the sapling and the fully grown adult plant as particular forms or phases of the tree. Tree-ness, as the determinate way in which a particular tree changes can, therefore, also be understood as the determinate way in which it interacts with elements of its environment. To put it more generally, *the universal consists in the specific ways in which the particular interacts with other particulars.*

For Plato, however, this idea of the universal as specific, inherent interconnection and interaction is not a permissible one. Operating as he does within the boundaries set by the law of non-contradiction, for him the nature or identity of any particular object is *exhausted* by its sensible attributes at any given moment (Merlan, 1953). That being the case, changes in the object, transformations in its attributes, *cannot be a part of its nature*. In other words, when the perceptible attributes of the object change, it must become *absolutely different* from what it was. The product of change *cannot have anything to do with* the object that changes. Thus, the rusted iron cannot have anything to do with the un-rusted iron; the fully grown tree cannot have anything to do with the sapling; the bad apple cannot have anything to do with the good apple. Similarly, if an object is reduced to its sensible attributes at a given moment, its nature cannot possibly include its

interactions with other objects. In other words, there cannot be *any relation whatsoever* between an object and other objects. Thus, the iron cannot have any relation with the water that makes it rust; the plant cannot have any relation with its environment; the apple cannot have any relation with the air it is exposed to. The law of non-contradiction, therefore, forces Plato to strip each object of its interconnections and interactions. He drives an absolute wedge between the nature of a particular thing and that of others. In so far as an object is a particular thing with particular attributes it must be absolutely different from every other particular object.

Having thus robbed all particular phenomena of their specific interconnections, having thus radically *isolated* them from each other, Plato *then* attempts to find a common factor – a universal – which can unite them. Can such a universal, once particular objects have *already* been reduced to their momentary perceptible features, have a specific, determinate character? Clearly not. Because if the universal were indeed a specific causal process, the nature or identity of the particular *would have to be extended to include its transformations, something that we have already strictly precluded*.

For instance, imagine that like Plato we have said that the nature of un-rusted and rusted iron have absolutely nothing to do with each other. If we were to then pose a universal iron-ness to unite the un-rusted and the rusted iron, and we were to say that this iron-ness consists in the fact that when iron is exposed to water it will always, given certain conditions, react with it to form iron oxide, we would essentially be saying that there is an inherent, necessary link which connects the un-rusted and rusted iron and *thereby directly contradicting the premise of absolute difference that we began from.* Either the two objects are absolutely different and there cannot be any specific underlying process connecting them, or there is such a process and the two are inherently, by their very nature, connected. This is the essence of the various problems that Plato faces with his theory of the Forms. Because he denies all inherent connection between particular phenomena, any universal which he poses in order to connect these phenomena must necessarily be *empty* i.e. devoid of all specificity or determinacy. Iron-ness, tree-ness and apple-ness, as universals, cannot possibly have, given Plato's assumptions, any determinacy whatsoever.

Such an empty indeterminate universal, following Hegel, can be called an *abstract* universal (Ilyenkov, 1977). It is abstract in so far as its indeterminacy stems from the radical separation of particular phenomena from each other – stems from the *abstraction* of particular objects from their

interconnections and interactions. The idea of the abstract universal necessarily involves an unbridgeable ontological gulf – or *chorismos* – between universals and particulars (Blackson, 1995). Despite Plato's conception of particular objects being expressions or manifestations of universal Forms, the attributes and qualities of particular objects have absolutely nothing to do with the Form. The Form being completely indeterminate *cannot play any role* in determining what specific characteristics a particular object will have. Thus, iron-ness, conceived as an abstract Platonic Form, cannot play any role in determining the reddish-brown colour of rusted iron or the greater tensile strength of un-rusted iron. Similarly, tree-ness as a Form cannot determine in any way the specific properties of particular trees. It has no role to play in a particular tree being young or old, tall or short, green or leaf-less, dead or alive. In fact, even if the universal Form manifesting itself as particulars was completely different, it would not make any difference to the properties of particulars. Thus, the attributes of a rusted piece of iron could as well be produced by an underlying Form of copper-ness as it could by an underlying Form of iron-ness. Or, to put the matter the other way around, if it so happened that the corrosion of a piece of metal gave it a bluish-green rather than reddish-brown coloration, we could as legitimately see it as a particular instance of iron-ness as we could see it as an instance of copper-ness. Thus, the abstract universal tells us nothing about particulars, and particulars tell us nothing about the abstract universal.

There is another way in which this ontological gap can be understood. If the nature or identity of a particular object is reduced to its momentary perceptible attributes, then the search for the abstract universal which unites particular objects can be understood as the *search for those perceptible features which are common to all of them*. But such a search must necessarily yield *nothing* – i.e. there can be no perceptible attributes that are common to all particulars. Let us take the case of iron again. What are the sensible features common to a rusted and an un-rusted piece of iron? They have different colours, textures and strength; so those attributes cannot be common attributes. Both the pieces are, however, solid. Could solidity be the sensible property uniting all particular forms of iron? No. Molten iron is obviously liquid. So is iron when it is dissolved in water. Further, if one heated molten iron to 2,862 degrees Celsius, it would turn into gas. Thus, solidity too is ruled out as a common feature. The search for the abstract universal would be equally unsuccessful when applied to other kinds of objects. What are the perceptible features common to a sapling, a fully grown tree, a tree in frost, a flowering tree, a felled tree, an uprooted tree, and a fossilised tree? What are the sensible properties common to an apple on a tree, a rotting apple, a

peeled apple, an apple cut into slices, and a juiced apple? Absolutely none. Thus, the abstract universal understood as a bundle of common properties must necessarily be empty or property-less i.e. lacking all particularity and determinacy.

The abstract universal reflects the radical separation of particulars in another way. As we have already seen, the abstraction or separation of a particular object from its changes also implies its separation from the things it interacts with. Thus, to radically separate iron from its ability to rust is also to radically separate iron from its ability to interact with water in a way that produces rusting. But the ability of *water* to interact with iron and make it rust is also a part of the nature of water – part of what water *is*. Therefore, a denial of the mutual constitution of rusted and un-rusted iron is also a denial of mutual constitution of iron and water. The ontological gap, thus, between iron-ness as an abstract universal and its particular manifestations also implies an ontological gap between iron-ness and water-ness. *An abstract universal is not just completely indeterminate, it also completely unconnected with other abstract universals*. The Form of iron-ness has absolutely nothing to do with the Form of water-ness. The Form of tree-ness has nothing to do with the Forms of the objects a tree interacts with – water-ness, air-ness and so on.

7.3 *Implications of the Abstract Universal for Plato's Epistemology*

These ontological gaps have specific epistemic implications. As pointed out earlier, for Plato, genuine knowledge is knowledge of universals. If the attributes of a particular object have no relationship whatsoever with the universal – i.e. with the essence of the object, if they are fundamentally *arbitrary*, our knowledge of the object cannot be based on such attributes. In fact, such attributes would be *irrelevant* to any enterprise of knowing the object. The redness of rusted iron would *tell us nothing* about universal iron-ness. The solidity of ice, fluidity of liquid water, and gaseousness of water vapour would tell us nothing about universal water-ness. Sensation, therefore, would not be a source of genuine knowledge at all. Perceptually grasping a particular object would amount to grasping nothing essential about the object. The *chorismos,* thus, necessarily entails a fundamental rejection of the epistemic value of sensory experience (Mohr, 2005).

But if sensation cannot be the foundation of knowledge, what can? This is where the difficulties posed by the *chorismos* to Plato's theory show most sharply. For Plato, knowledge can only be acquired by directly grasping the universal Form. But since the Form exists outside of time and

space, outside the bounds of the perceptible world, it cannot be apprehended by the sensory organs. What apprehends the Form then? "The soul", answers Plato. For him, the soul, unlike the sense organs, can transcend the limits of the perceptible world and directly access Forms. In fact, Plato says, the soul apprehends Forms by *remembrance* – it recalls the Forms from a time when, unencumbered by the earthly body and by the sensory organs, it had direct communion with the world of Forms. Thus, for Plato, the epistemic relation takes the form of *anamnesis* where the eternal soul recalls what it knew from a previous life.

Plato illustrates this knowledge by remembrance in a well-known scene from his dialogue *Meno* (Grabowski, 2008). The character of Socrates through a series of carefully crafted questions elicits from a mathematically untrained slave the geometrical result that the area of a square drawn on the diagonal of another square is double the area of the latter. Through this demonstration, Socrates seeks to establish that genuine knowledge is something that the mind or the soul *already* possesses. It need not be sought in the *external world;* all one has to do is to access one's inner resources. The immortal soul has to look *within* and reconnect with the world of Forms in order to gain knowledge.

This has several consequences. First, if knowledge of a particular object lies in the grasping of its Form, then our idea or concept of the object – the way we conceive of the object – must *coincide* with the Form. Why should this be so? To acquire knowledge of an object, regardless of the epistemology one subscribes to, is to arrive at an idea or concept of the object. Since for Plato, to gain knowledge is to arrive at the Form of the object, the idea of the object must be the same as its Form. The conception of a thing must be identical with its Form. It is no coincidence, therefore, that Plato, and subsequent philosophers in the Platonic tradition, have used the terms 'Form' and 'Idea' interchangeably. Given this identity, *our ideas and conceptions must themselves be abstract universals*. They must be completely bereft of any sensible particularity. The idea of the horse must have nothing whatsoever to do with the perceptible attributes of individual horses. The idea of the tree must have nothing to do with the qualities of individual trees. Thus, in other words, the ontological gap between particulars and universals also implies an epistemic gap between the idea of a particular object and the particular object itself.

Further, since abstract universals are not just indeterminate but also *radically separate from each other,* ideas and conceptions must also be radically separate or isolated. The idea of a tree must be

radically separate from – have nothing to do with – the idea of the water which sustains it. The idea of an animal must be radically separate from the idea of the air it breathes. Platonic philosophers have tried to get around this problem by proposing *logical* connections between ideas. This can be understood in the following way. For Plato, forms are *hierarchical.* The general or universal Form of dog-ness, despite being a universal, would be a universal of *a particular kind* as dogs are a particular *species* of animals. Thus, while the Form would manifest itself as particular, individual dogs, it would itself be a particular expression of a *higher* Form of animal-ness. Animal-ness would, in turn, would be a particular expression of the Form of organic life. And so on and so forth till one arrives at the ultimate Form – the Forms of Forms, or *Form-ness.* Plato refers to this ultimate Form as "the Good" (Miller, 2011). The ultimate aim of knowledge is to grasp or apprehend the Good. Thus, Forms constitute a hierarchy various components or levels of which are linked, according to Plato, through purely *logical* connections. But can there indeed be any logical connections between the Forms? As we have already seen, quite clearly not. The Form of animal-ness, being completely indeterminate, cannot in any meaningful sense *logically contain* the lower Forms it expresses itself as – say the Forms of dog-ness or cat-ness. Thus, there can be no conceivable logical link between the Forms of the various particular kinds of animals. Therefore, ideas or conceptions, being identical with abstract universal Forms, must also be radically disconnected. Our knowledge of one particular kind object can have *absolutely nothing* to do with our knowledge of other kinds of objects. Knowing an x has nothing to do with knowing a y.

This also implies that knowledge is a fundamentally individual affair. If ideas are fundamentally disconnected, they cannot serve as *premises* for each other. Knowledge of a particular phenomenon would not require knowledge of any other phenomenon. For instance, one could have knowledge of a particular life form or species completely independently of knowledge of any other species. One could have knowledge of a particular chemical element without having knowledge of any other chemical element. Knowledge a particular organ in the human body would not depend on knowledge of any other organ in the body. There would be a radical disjunct, in other words, between any particular piece of knowledge and *prior* knowledge. Knowledge need not have any *social* or *historical* premises and preconditions. The knowledge of one individual has no dependence whatsoever on that of other individuals. The soul can access the world of the Forms

alone. It does not require any other soul in the inward process of remembrance. The philosopher apprehends the ultimate Form of the Good, if at all she apprehends it, *alone*.

Another related consequence of knowledge by anamnesis is that there cannot be a *movement from ignorance to knowledge*. Or, to put it differently, there cannot be any *new* knowledge. This problem is most strikingly expressed in what has come to be known as Meno's paradox, named obviously after Plato's dialogue in which the paradox is explicitly discussed. The essence of the paradox is that something *is either known or is completely unknowable*. The character of Socrates, addressing Meno, his interlocutor who raises the problem first, phrases the paradox in the following way:

"Do you see what a contentious debater's argument you're bringing up – that it seems impossible for a person to seek either what he knows or what he doesn't know? He couldn't seek what he knows, because he knows it, and there's no need for him to seek it. Nor could he seek what he doesn't know, because he doesn't know what to look for." (Miller, 2011: 45)

Socrates in this dialogue does not take this challenge very seriously. But it is indeed a serious problem for the account of knowledge which he presents. If the process of enquiry is a purely inward process, if knowledge is purely *innate*, then all knowledge must already be in the possession of the enquirer. If the enquirer does not already possess a piece of knowledge it cannot in any meaningful sense be innate. Thus, there is logically no possibility of the acquisition of new knowledge; *unacquired knowledge which is also innate would be a contradiction in terms*. The soul either knows something or it does not *and cannot.* Knowledge acquisition as a process, in other words, is ruled out. There is nothing about the world that we can *learn*.

These consequences of the theory of knowledge by anamnesis contributed to the striking contempt that Plato and Platonic philosophy had for bodily, sensory experience. Not only is perceptual experience irrelevant to the acquisition of knowledge on Plato's account, it constitutes an obstruction to it. The body and the senses weigh the soul down in its pursuit of pure knowledge of the Forms. By presenting to the mind's eye cheap imitations of the Form, rather than the Form itself, the senses constantly threaten to derail the soul's ascent to the immaterial world of the Good. The enterprise of knowledge then becomes for Plato "a training for death." (Miller, 2011: 92) It is death which finally rids the soul of its earthly encumbrances and prepares it for the final communion with the world of the Forms – for its "intercourse with what really is". Incidentally, Debiprasad Chattopadhyaya notes a striking parallel between such morbid valorisation of death in

Plato and similar recurrent themes in ancient Indian idealism, a philosophical tradition almost unparalleled in its devaluation of sensory, physical experience. He cites two fragments, one from Plato and the other from the *Brihadaranyaka Upanishad*, and remarks their almost identical treatment of death as epistemic liberation from the illusory world of sensation. Plato's fragment is from *Phaedo*:

"As long as we are encumbered with the body, and our soul is contaminated with such an evil, we can never fully attain to what we desire; and this way, we say, is truth. For the body subjects us to innumerable hindrances on account of its necessary support… and it fills us with longings, desires, fears, all kinds of fancies, and a multitude of absurdities, so that, as it is said in real truth, by reason of the body it is never possible for us to make any advances in wisdom… It has then in reality been demonstrated that if we are ever to know anything purely, we must be separated from the body, and contemplate the things themselves by mere soul. And then, as it seems, we shall obtain that which we desire, and which we profess ourselves to be lovers of – namely wisdom – when we are dead, as reason shows, but not while we are alive. For if it is not possible to know anything purely in conjunction with the body, one of these two things must follow: either that we can never acquire knowledge, or only after we are dead, for then the soul will subsist apart by itself, separate from the body, but not before." (Chattopadhyaya, 1976: 217)

The extract from the *Brihadaranyaka Upanishad* is a description by Yagnavalkya, the preeminent Upanishadic philosopher, of the release by stages of a dying man from sensory entrapment:

"He is becoming one, they say, he does not see.

He is becoming one, they say, he does not smell.

He is becoming one, they say, he does not taste.

He is becoming one, they say, he does not speak.

He is becoming one, they say, he does not hear.

He is becoming one, they say, he does not think.

He is becoming one, they say, he does not touch.

He is becoming one, they say, he does not know.

The point of his heart becomes lighted up. By that light the self departs, either by the eye, or by the head, or by other bodily parts. After him, as he goes out, the life goes out. After the life, as it goes out, all the breaths go out. He becomes one with intelligence…" (Chattopadhyaya, 1976: 217)

The irony of this extreme dismissal of the perceptible world must be noted. It is the reduction of the essence or identity of an object to its momentary sensible characteristics, in accordance with the law of non-contradiction, which makes Plato introduce abstract universal Forms in the first place. And it is the introduction of the abstract universal which results in the dismissal of the epistemic worth of sensible attributes and sensory experience. It is, in other words, the reduction of *being* to perceptible quality which results in the *exclusion* of such quality from *being*. The very aggrandisement of the senses leads to their debasement. All the contradictions of Platonic philosophy, in one way or the other, can be traced back to this fundamental irony.

Chapter Eight: Empiricism and its Contradictions

8.1 *Locke and Sensory Experience*

Does the ironic devaluation of sensory experience continue even after Plato? Does the career of the abstract universal extend into the modern times? It does. And not only does it survive, it becomes a consciously recognised cornerstone of modern philosophy. In this chapter, we discuss the role of the abstract universal in precisely that school of modern philosophy that is programmatically most committed to recognising the epistemic worth of sensory experience – namely, empiricism. We will see how even within empiricism, which explicitly operates, so to speak, under the banner of sensation, the law of non-contradiction and the abstract universal wreak philosophical havoc. The latter premises make sure that the centrality of perceptual experience degenerates into its very opposite – the irrelevance of perceptible particulars to the content of knowledge.

Empiricism, as a distinct school within the western philosophical tradition, arose in the seventeenth and eighteenth centuries primarily in the works of British philosophers like John Locke, George Berkeley and David Hume. While elements of empiricism can be traced back to earlier philosophers like William of Ockham (fourteenth century) and Thomas Aquinas (thirteenth century), empiricism comes into its own as a key feature of the Enlightenment. In fact, so central was the rise of empiricism to the Enlightenment process that a number of commentators have seen empiricism as almost synonymous with modernity and the modern outlook (for example, Plumwood, 1993). Empiricism, and its successor positivism, have been held my many, despite strong occasional voices to the contrary, as the defining interpretation of the method of modern science.

The core claim of empiricism is that all our knowledge is based on sensation (Armstrong, 1970). Concepts and ideas, in so far as they constitute genuine knowledge, must be founded on sensory perception. In saying this, empiricists consciously pit themselves against theories of innate knowledge – from Platonism and Neoplatonism to the epistemological accounts of rationalists like Descartes for whom concepts were imprinted on the soul by God and were to be intuitively grasped through inward reflection. For empiricists, knowledge is an *outward looking* process, a process of coming to know *new* things about the phenomenal world through sensory experience. Thus, far

from viewing the perceptual faculty as a devious hindrance to knowledge, empiricism views it as the sole pathway to knowledge.

It is widely recognised that as a systematic school of epistemological reflection, empiricism begins with the work of John Locke, a seventeenth century British philosopher and a key figure of the Enlightenment. His work spanned a range of fundamental themes of modern philosophy – from the nature of knowledge to the moral basis of modern political power. His account of empiricism finds it clearest and most detailed expression in his 1689 treatise *An Essay Concerning Human Understanding*. Locke's fundamental claim in this book is that all our concepts, notions, and ideas are ultimately traceable to sensory experience (Yolton, 1970). Such experience, therefore, is the only foundation of knowledge. Veracity or truth of our conceptions depends on how faithfully they correspond to this experience. Locke says in Book II of the treatise:

"Experience: In that, all our Knowledge is founded; and from that it ultimately derives itself. Our Observation employ'd either about *external, sensible Objects*; *or about the internal Operations of our minds, perceived and reflected on by ourselves, is that, which supplies our Understandings with all the material of thinking*. These two are the Fountains of Knowledge, from whence all the Ideas we have, or can naturally have, do spring." (Yolton, 1970: 41)

Thus, for Locke, all our ideas stem from perception of either the phenomenal world or the internal workings of the mind such as fear, anxiety, happiness and despair. However, he has a very specific notion of the relationship between ideas and perception. For him, ideas are the *same thing* as perception or sensory experience (Ayers, 1991). Thus, an idea of a rose is nothing but the sensation of a rose. An idea of an apple is the sensory perception of an apple. This may seem like a strange usage of the term "idea", since by the word we generally mean our conception of the essence or nature of an object. It is not strange, however, if we understand it as an expression of a deeper premise of Locke's philosophy. For Locke, idea and sensory perception are the same thing because, in line with the law of non-contradiction, he regards the momentary sensory attributes of a thing as its essence. If the nature of an object is exhausted by its perceptual attributes at any moment, then apprehension of the former is the same as apprehension of the latter. Sensory apprehension, in other words, is itself apprehension of the essence of the object. Sense data and idea, therefore, become identical.

This initial premise is not peculiar to Locke; it is shared in varying degrees by Berkeley, Hume and other empiricists as well. In a sense, this identity between idea and sensation is a distinguishing feature of modern empiricism. It expresses the specific approach that empiricism has to the law of non-contradiction – a *direct, wholehearted and conscious* reduction of essence to sensible attributes. While for Plato, this reduction meant a search for the universal outside of sensible qualities, for the empiricists, it amounts to a professed and emphatic rejection of the quest for the universal itself. The phenomenal particular, with its nature exhausted by its perceptible qualities any at given moment, *is all there is*. Thus, Locke says, "All Things, that exist, [are] Particulars". At another point he remarks, "General and Universal, belong not to the real existence of Things; but are the Inventions and Creatures of the Understanding" (Ayers, 1991: 176). This rejection of the objective existence of the universal has led philosophers to characterise empiricists like Locke, Berkeley and Hume as *nominalists* or *particularists* – i.e. as those who see universals as mere *names* that lack any real objective referents. The universal, as Locke explicitly states, is essentially a creation of the mind. Of course, this rejection of universality results in all kinds of contradictions for the empiricists, as we will shortly see in this chapter.

For Locke, ideas are of two fundamental kinds – simple and complex (Lowe, 1995). Simple ideas are, in a sense, the basic units of sensation which cannot be further broken down into simpler sensations. Examples would be sensations of redness, heat, smoothness, fragrance etc. These simple ideas combine to form complex ideas. The idea of a desk, for instance, is a complex idea and can be broken down into simpler ideas of blackness, hardness, smoothness and so on and so forth. Complex ideas can either be found in actual sensory experience or they can be constructed by the imagination. In either case, the fundamental constituents of complex ideas are simple ideas. For example, even purely fictitious complex ideas like "pearly gates" can be broken down into the complex ideas of "gate" and "pearl" which can be further analysed into simpler ideas and so on and so forth till one reaches irreducible simple ideas. For this reason, Locke's conception of ideas has often been termed *atomistic* – a view of perceptions being composed of simpler unanalysable building blocks. Atomism in this sense is, of course, fundamentally different from the atomism of philosophers like Democritus. The former is a thesis about the basic units of sensation, whereas the latter is a thesis about the basic constituents of the phenomenal world – a thesis about the *arche* of the world.

Knowledge for Locke lies in the apprehension of the *relations* between ideas. He says: "Knowledge then seems to me to be nothing but the perception of the connexion and agreement, or disagreement and repugnancy of any of our Ideas. Where this Perception is, there is Knowledge, and where it is not, there, though we may fancy, guess, or believe, yet we always come short of knowledge." (Lowe, 1995: 51) Thus, we know that roses are red when we apprehend that the idea of the rose is always accompanied by the idea of redness. We know that gold is lustrous when we note that the sensation of gold is always accompanied by the sensation of lustre. The same could be said for processes of change. We know that heat melts ice when we grasp the fact that the co-occurrence of the sensations of ice and heat is followed by the sensation of water. We know that iron rusts when we note that the idea of un-rusted iron is succeeded by the idea of rusted iron. Thus, on Locke's account, knowledge consists essentially in noting the patterns, successions and regularities of our ideas. To know is nothing but to observe the coincidences and co-occurences of our sensations.

A peculiarity of this account must be noted here. If knowledge requires one to observe or *perceive* the patterns and regularities of our *ideas*, it must mean that the *object* of perception is perception itself. Locke himself makes this quite clear when he says that an idea is "Whatsoever the Mind perceives in itself, or is the immediate object of Perception, Thought or Understanding." Now, this does not quite accord with our everyday, commonsensical understanding of perception. When we say that we perceive a tree, or hill or house we generally mean that the *objects* of our perception are the said external objects themselves *and not our perceptions*. When I say I see an animal, I usually mean I see an objectively existent, external animal, and not just the *visual image* of an animal. When I say I see a rose, I mean I see something *that exists outside of* me and *not just my own sensation* of a rose. I see things, *not just sights;* I hear things, *not just sounds*. This has often been referred to as the direct realist assumption, namely that what is *given* to us in sensation is the external object; our perceptions give us access to a world outside of us. This assumption underlies our most instinctive and recurrent interpretation of our sensory experience. Locke would not agree. For him, what is given to us in sensation is *sensation itself.* Sensory experience presents us not with external objects like trees, hills and houses but with visual sensations of these objects. I am not, as I write these words, looking at a computer screen *but rather at an image of a computer screen*. The reader is not looking at this text *but rather at the sensation of this text*.

8.2 *The Problem with Sensation as Object of Knowledge*

This view of perception raises all kinds of intractable problems. One issue has been identified in what has come to be known as the "homunculus argument" (Aaron, 1965). The essence of the argument is that if a perception itself needed to be perceived, then the latter perception would also need to be perceived. But so would this third perception and so on and so forth *ad infinitum*. Thus, if the object of perception were perception itself, and not an external object, it would lead us on a path of infinite regress.

The argument takes the form of a thought experiment. Imagine I am looking at an object. If, as Locke would believe, in seeing the object, I actually see an *image* of the object rather than the object itself, the question of *where this image resides* would arise. Let us assume this image is formed on a screen like say the retina of my eye. If this were the case, it would mean that while looking at the object *I am also looking at the image of the object formed on the screen i.e. the retina.* But this means that I am looking at *two objects* at the same time. This is obviously an absurdity. I can either be looking at the external object or be looking at the screen. Thus, there must be *second observer* who is looking at the screen while I am looking at the object. Let us assume this second observer is a miniscule version of myself – a homunculus – who is lodged in my brain and looks at the retinal image from that vantage point. Does the assumption of this homunculus solve the problem? No, it does not. The problem of me looking at two things at the same time would also arise for the homunculus. The homunculus too would have to simultaneously look at the screen and the *image of the screen* formed on his own retina. This being an impossibility again, one would have to assume *a second homunculus* lodged in the brain of the first homunculus. But the problem of simultaneity would arise for this second homunculus as well. One would then have to assume a third homunculus and so on and so forth *ad infinitum.*

The essential problem that the homunculus argument highlights is that if you hold that in seeing an object I am actually seeing a sensation of the object, then in effect you are reducing sensation from *an activity to a thing*. And any further sensation of this thing, must in turn also be a thing, thereby rendering the activity of seeing impossible and meaningless. If in seeing a rose, I see only

an image of the rose, that latter seeing must itself also be an image – *an image of an image*. Seeing the rose, as an activity – *as a process*, would therefore become impossible.

Another related and equally intractable question which arises is that if in perceiving objects I only perceive perceptions, what is the relationship between such perceptions and the objects? (Lowe, 1995) If in looking at the computer screen in front of me I am looking only at an image of the computer screen, what is the relationship between that image and the computer screen? This is a question with serious implications as it pertains to the veridicality of perception. Does looking at the image of the computer screen tell me something about the computer screen itself? Does looking at the image of a tree tell me something about the tree? If yes, then the image has epistemic value – that is to say perception has epistemic value. If no, perception would be epistemically worthless. Worse still, it would call into question whether the external object – the computer screen or the tree – indeed existed at all.

Locke, being an empiricist and programmatically committed to the idea of sensations being the foundation of knowledge, answers this question in the affirmative. He maintains quite unqualifiedly that sensations indeed tell us things about the external world. To make this point, Locke proposes a theory of *resemblance*. He says that the sensation or image of an object *represents* or *resembles* the object. The image, *being a result of the action of the object on the sense organs*, has the same attributes and qualities as the object. The sensation of a ball, being *caused* by the ball, is spherical just like the ball itself is spherical. The visual image of an elephant is large just like the elephant itself is large. Thus, perceiving the image of an object tells us what the object itself is like. This view of perceptions resembling or representing external objects has come to be known as the *representative realist*, as against direct realist, view of perception.

But such a representative realist view immediately runs into problems. We can say that the image of a ball resembles the ball only if we have a way of ascertaining what the ball is like *independent of that image* (Yolton, 1968). To say that my visual image of the computer screen resembles the computer screen I need some way of determining, independently of that image, the attributes of the computer screen. But can there be such a way? Clearly not. If what is given to me in perceptual experience is only perception, and not the external object being perceived, then there can be no possible way in which I can *directly access* the qualities of the said object. Whenever I try to ascertain the properties of an object, I will encounter *only an image of the object*, and never the

object itself. If all one perceives is perceptions, it is logically impossible to reach *beyond them*, so to speak, and apprehend the objects they supposedly represent. Our perceptions, in other words, become a *veil* separating us, closing us off, from external objects. Not only would this mean that we are unable to say whether perceptions resemble external objects, *it would also call into question whether there are any external objects at all.* After all, if it is impossible to determine what external objects are like, how do we even know that they are there?

The problem can be understood in another way. For Locke, as we have seen, perceptions resemble objects because they are caused by the latter's action on the sense organs. But is claiming such causal action permissible at all for him given his view of perception? The answer is no, and for reasons similar to those indicated above. To assert that object x is causing my perception of x requires evidence of such causal action that is itself independent of perception. Any evidence that is of a perceptual nature would raise the question of its own causal origin and would therefore be invalid. But any non-perceptual evidence would also be invalid as for Locke all valid knowledge must originate in perception. For instance, on Locke's view of knowledge to say that visual images are caused by the action of light, reflected off external objects, on the retina of the eye would require one to directly observe or perceive such a process. But even if one were able to perceive this process, far-fetched as such a prospect would seem, the question would arise of *whether it is indeed the said process which is causing one's perception of it*. In other words, the question of the causal origin of perception would also apply to any perception *of such causal origin.* The question, therefore, becomes incapable of resolution.

In essence, the Lockean view of perception makes it fundamentally impossible to assert that there is an *external* world – a world of objects that exist *independently of one's perception of them*. Does the tree exist independently of my perception of it? Will it continue to exist even when I close my eyes or look away? Did it exist before I started looking at it? Will it exist even if there is no one to look at it? These are questions which cannot possibly be answered within Locke's theory. His theory, in other words, casts ineradicable doubt on the *objective* existence – i.e. the reality – of the phenomenal world. The premises of the theory, pursued to their logical end, would mean that an observer can say nothing about what exists beyond the narrow compass of her own sensations. In a sense, therefore, this idea of sensations as a veil, as a barrier, between us and the external world, brings us back to Cratylus' notion of the world as a realm of nothing but illusory becoming. It

brings us back to the view that the phenomenal world is something *about which nothing meaningful can be said*.

Locke himself, of course, steered clear of such radical skepticism about the reality of the external world. For him, as we just indicated above, perceptions do indeed have epistemic value – they do indeed tell us things about external objects. How then does he meet the skeptical challenges thrown up by the implications of his own view that the object of perception is perception itself? He does not, at least not explicitly or with any degree of seriousness. What he does do, however, is to assert the reality or objectivity of the external world by insisting that perceived qualities or attributes are *anchored* or *grounded* in an underlying "substance" or "substratum" (Hoffman & Rosenkrantz, 1997). This substance provides support to the perceived qualities – it "holds them together" in a manner of speaking. Thus, the attributes we perceive when we look at the visual image of an object, are not just free-floating qualities with nothing *underneath* them, so to speak, they are in fact rooted in underlying *stuff* and it is this rootedness which gives these attributes objective existence. Their anchorage in substance ensures, in other words, that perceptible properties have a *mind-independent* existence – that such properties exist independently of the act of perception. The green-ness, brown-ness, and solidity of a tree, for instance, *inhere* in the substance of the tree and, therefore, have objective existence. Even if no one perceived the tree, it would still be qualitatively determinate.

The concept of substance has had a long and complicated career in the history of philosophy. Its meaning, on occasion, has been notoriously elusive. These complexities notwithstanding, there has been a common core to what various philosophers, from Aristotle to Descartes, have meant by the term – a substance is something that can subsist by itself i.e. something which does not require the support of anything else to exist (Woolhouse, 1993). Locke's understanding of substance, therefore, is in line with this tradition. By saying that perceptible qualities are anchored in substance, Locke is essentially trying to establish the independent existence of such qualities. The *substantiality*, in other words, of perceptible phenomena is also their objectivity.

But does the introduction of substance or substratum enable Locke to fend off the challenge of skepticism? It does not. In fact, the thesis of substance is not a permissible one for him. All knowledge, according to Locke, comes from perception. Can we have any perception of substance? We logically cannot within Locke's scheme of things. Since we can only perceive

perceptions, substance, being an *external* support of perceptions, is by definition ruled out as an object of sensory experience. If we can perceive only an image of an object, what holds the image together and gives it substantiality, must necessarily lie outside the domain of perception. Thus, the claim of there being a substance or substratum cannot have any logical foundation for Locke. This can also be understood *in terms of the impossibility of knowing the nature* of substance. Since for Locke, knowledge of an object is knowledge of its sensible attributes, to know the nature of substance would be to know it's sensible attributes. But since substance is by definition the support of sensible attributes in general, something that binds such attributes together *from behind* as it were, it cannot itself possess any attributes. Bereft of sensible qualities, therefore, it's nature can never be known. Locke himself acknowledges this by saying that the essence of the substratum is fundamentally unknowable. Thus, he uses expressions like "pure substance in general", "something we know not what", and "unknown essence" to characterise substance (Lowe, 1995: 102).

Why does Lockean theory land itself in such intractable problems? What is at the root of the irresolvable contradictions it gives rise to? What makes Locke assume that the object of perception is perception itself and not the external object that is being perceived? Fundamentally, the issue can be traced back to the law of non-contradiction. To reduce the identity or essence of an object to its momentary sensible qualities *is to reduce the object to sensation.* If I say that the nature of a tree is exhausted by its perceptible attributes -- *by how the tree appears to me* at any moment, I am essentially saying that there is *nothing more to the identity of the tree than how it affects my sensory organs at that moment*. If I exclude from the nature of the tree its underlying processes of change, if I exclude from its identity its interaction with its environment which determines its qualities from one moment to the next, I am basically *confining* such nature or identity at any moment with the relations the tree has with my sensory organs at that moment. In other words, to strip a perceptible object of its inherent interconnections and interactions, is to reduce the object to perception. The *seen* object becomes reducible to its visual image; the *heard* object becomes reducible to its sound. It is precisely this implication of the law of non-contradiction that is reflected in Locke's premise that what is given to us in perception is perception itself.

But this reduction of the sensible particular to sensation also means a *denial* of its objective mind-independent existence. To say that an object is nothing more than its relations with the sensory

organs of the perceiver is also to say that it has *no existence apart from – i.e. independent of – such relations.* Thus, if there were no perception or perceiver, *the object too would not exist*. In other words, the existence of the object *becomes dependent* on the act of perception. An apple is existent only to the extent it is perceived; unperceived it cannot exist. The phenomenal world exists only *in* perception.

It must be noted here that it was precisely in order to avoid this implication of radical skepticism that earlier philosophers sought for the abstract universal. From the *arche* of the ancient materialists, to the One of Parmenides, to Plato's Forms, *all* were attempts to unite perceptible particulars in such a way that the external world could be affirmed to be objectively existent. They eventually failed as such attempts were framed within the limitations of the law of non-contradiction. What distinguished Locke and modern empiricism from such approaches, as has been pointed out earlier, is a more direct embrace of the law of non-contradiction. In saying that all we can have knowledge of is perception, Locke is affirming in a forthright way that the being of an object is, strictly and without exception, confined to its sensory attributes. What for the earlier philosophers was a *background assumption* the implications of which they sought to *get around*, is for Locke and other empiricists a central and consciously stated premise.

Of course, Locke is himself not comfortable with the denial of the objective world that his theory entails. His proposal of the representative or resemblance theory, along with the notion of substance, amply testify to that discomfort. But these theoretical proposals inevitably fail given his embrace of the law of non-contradiction. If a perception has to resemble an external object, then the latter has to at least exist. But if to exist is to be a perception, then all that the relation of resemblance tells us is that a perception is like another. Thus, there is no way that the theory of resemblance, given Locke's premises, can establish the objective existence of the phenomenal world. The same can be said about the idea of substance. For substance or substratum to exist, it must itself be perception. But in that case, it would cease to be substance as it would itself require external support to "hold it together".

8.3 *Locke and Abstract General Ideas*

Another way in which the reduction of objects to their momentary sensible attributes expresses itself in Locke's philosophy is in his theory of what he calls *abstract general ideas*. In consonance with such reduction, and as we saw earlier, Locke does not believe in the real, objective existence

of universals. He says that universals are essentially inventions of human understanding. Be that as it may, Locke still has to explain *how* such inventions arise in our minds. Or, to put the same thing differently, he has to explain how *general terms*, which are integral to language and discourse, come to be viably used. Locke calls such universals, which for him reside only in our understanding and not in external reality, abstract general ideas. These abstract general ideas are on Locke's account the *nominal essence* of things – i.e. the essence *we* confer upon objects when we attach general names or terms to particular kinds of things. When we call a particular kind of object "a dog", we are essentially invoking or using an abstract general idea of "dog-ness". When we call something "gold", we are using the abstract general idea of "gold-ness". Again, it must be remembered that unlike Plato, for whom having an idea or concept of objects meant connecting with universal Forms which existed independently of the mind of the knower, for Locke abstract general ideas have no objective reference or anchorage whatsoever.

But how do we arrive at these abstract general ideas? According to Locke, this is done through a process of *abstraction* from sensible particulars. We form abstract general ideas by identifying common sensible attributes of individual particular objects. Or, in other words, we *abstract* from the *differences* of individual particulars to arrive at a set of qualities that is common to all the individuals. Locke provides the following example to explain this process:

"[Children], when time and a larger Acquaintance has made them observe, that there are a great many other Things in the World, that in some common agreements of Shape, and several other Qualities, resemble their Father and Mother… frame an Idea, which they find those many Particulars do partake in; and to that they give… the name Man… And thus they come to have a general Name, and a general Idea. Wherein they make nothing new, but only leave out of the complex Idea they had of Peter and James, Mary and Jane, that which is peculiar to each, and retain only what is common to them all." (Lowe, 1995: 156)

There are, however, numerous problems which attend this notion of abstraction. As we have seen before, individual objects of a particular kind – which fall under the same general name – may have absolutely no perceptible attributes in common. For instance, a gold coin and a gold bullion, as particular objects that may be described using the general term "gold", may have certain sensible attributes in common. But what perceptible qualities are common to gold coins, gold bullions, alluvial gold deposits, gold naturally alloyed with copper and palladium, gold dissolved in aqua regia, molten gold, and powdered gold? Absolutely none. What sensible attributes are common to

a green leaf on a tree, a dry leaf that has been shed, a leaf pressed and preserved in wax paper, and a frozen leaf? Again, none whatsoever. But we still do use the general terms "gold" and "leaf" to refer to these individual objects. If these general terms, or the abstract general ideas of gold-ness and leaf-ness, were products of processes of abstraction wherein we search for common sensible properties, they would have *no content whatsoever*.

Another problem with the idea of abstraction concerns the *criteria* used to identify common attributes. When I am trying to abstract the common properties of individual objects, how do I know which properties to choose and which ones to leave out? All individual objects have a large number of sensible attributes; on what basis do I determine which ones are *essential* and which ones are not? For instance, let us assume I have to form an abstract general idea of "a ball" from three particular objects that I am presented with: a red and large spherical object, red and middling-sized spherical object, and a red and small spherical object. We can immediately find two common properties here: red colour and spherical shape. But should both these properties constitute my abstract general idea of a ball? Obviously not. Red colour, we know, is not an essential property of balls at all. But what basis do we have for excluding red-ness as a relevant common property? One answer to this could be that our *future experience* will show that not all balls are red – that we will encounter balls that are blue and green and so on. But this is not a legitimate answer. For my future experience to show what features all balls have, I must be able to *identify* certain objects as balls. But I can do so only on the basis of the attributes I recognise as essential *thus far.* Thus, after having abstracted red colour and spherical shape as the common essential attributes of balls, I will not even recognise green, blue and yellow balls as balls at all.

Thus, there can be no logical basis whatsoever for the process of abstraction to regard some attributes as essential and some as non-essential. Any assumption of essentiality must be fundamentally arbitrary. Indeed, this also means that the process of abstraction can only *find what it has already assumed*. It cannot yield anything *new*. Reminiscent of Meno's paradox, our search for the abstract general idea is either redundant, since we already presuppose what the common attributes in question are, or foredoomed to yield absolutely nothing.

Another equally intractable issue pertains to the idea of *commonality* itself. We have seen earlier that if the identity or nature of objects is reduced to their momentary perceptible attributes, as Locke does as a part of his direct embrace of the law of non-contradiction, objects can either be

absolutely different or *absolutely identical* with each other. Two objects are absolutely different if they are different in even *one* of their attributes. They are identical if *all* their attributes are the same – i.e. if they are the *same* object. The reason for this dichotomous mutual exclusion lies in the law of non-contradiction itself. The law says, on the basis of the idea that an object cannot be both itself and not itself at the same time, that the same attribute cannot both belong and not belong to the same object in the same respect at the same time. We have seen how this fundamentally reduces the being or essence of any object to its momentary attributes. But note here that the law uses the term "attribute" without any qualification whatsoever. It does not say that "some" or "certain" attributes cannot both belong and not belong to the same object at the same time – it says that *no attribute* can both belong and not belong in such manner. This means that *every* attribute is *indispensable* to the identity or essence of the object. Thus, if *even one* attribute is changed it becomes a completely different object altogether.

Thus, even if two objects shared a majority of their attributes, in so far as they were not identical in *every* attribute, they would have no commonality. A large green tree, and a small green tree, despite both being green would have nothing in common. Two green trees planted a meter apart would have nothing in common as their location differed. A red apple and a partly red apple would be absolutely different from each other. Thus, this is another reason why, given Locke's premises, the search for abstract general ideas through abstraction must necessarily yield nothing.

These fundamental problems are reflected in the fact that for Locke the content of abstract general ideas must remain completely indeterminate. For instance, he says that the abstract general idea of a triangle must be completely devoid of any determinate qualities. He says that it "must be neither Oblique, nor Rectangle, neither Equilateral, Epicrural, nor Scalenon; but all or none of these at once" (Yolton, 1968: 93). Thus, the abstract general idea is bereft of all specificity; it cannot have any particularity at all. This, of course, fundamentally runs counter to Locke's account of the need for such ideas. As we have seen, for him, abstract general ideas are nominal essences which are expressed as general terms in language and used to refer to particular classes of individual objects. But if such ideas lack all particularity, they cannot possibly designate particular kinds of things. An indeterminate idea cannot have a determinate referent. If the general term "tree" expresses a completely indeterminate abstract general idea, there is logically no way it can be used to designate individual trees as a particular kind of object.

It must be quite clear by now that the abstract general idea is *nothing but* the abstract universal, and it shares with the latter both its origin as well as its problems. It is precisely because Locke reduces objects to their momentary perceptible attributes – i.e. because he strips them of their inherent interconnections and interactions, that when he attempts to unite them through the abstract general idea the unity is necessarily an *empty* one. It is because perceptible particulars are radically divorced from each other, that there is an unbridgeable epistemic gap between particulars and universals. It is the specific underlying processes of change which explain or unite the perceptible qualities of particulars. Thus, a rotten apple is black and foul-smelling *because* of the underlying process of decomposition the apple goes through. A rusty iron is red and flaky because of the underlying reaction with water and oxygen that iron goes through. If these underlying processes of change are removed from the picture, as must necessarily be the case if the identity of objects is reduced to their momentary attributes, all sensible qualities – blackness, foul smell, redness, flakiness etc. must become necessarily *arbitrary*. If the perceptible qualities of particular objects are fundamentally arbitrary, the universal would logically be qualitatively indeterminate. Thus, if the qualitative attributes of particular forms of iron could be *absolutely anything*, the abstract universal or abstract general idea of iron-ness must necessarily be indeterminate to allow for that arbitrariness. Similarly, the abstract universal apple-ness must be indeterminate since individual, particular apples could have absolutely *any set* of qualities.

We find here, therefore, the fundamental irony of Locke's empiricism. Locke begins from the claim that all knowledge begins from perception. But since he reduces the object of knowledge to perception itself, given his direct embrace of the law of non-contradiction, the epistemic value of perception is completely negated. Perceptible attributes of individual objects of a particular kind *contribute nothing to the abstract general idea of that particular kind of object*. Thus, even if a rotten apple was golden rather than black in colour, it would not change the abstract universal idea of apples in any way as the latter is in any case indeterminate. Even if dogs had wings and were capable of flight it would still not change the general idea of what dogs are. The epistemic gap ensures that sensible qualities of objects are *completely irrelevant* in the process of knowledge formation, in the formation of our general ideas and concepts. Locke sets out under the banner of perception, but ends up emptying out the latter's epistemic worth.

8.4 *George Berkeley and Empiricism: Being as Perception*

Most of subsequent empiricism, including twentieth century empiricism, has been an exercise in "purifying" or cleansing Locke's theory of those elements which directly contradict its skeptical implications. In other words, the thrust of modern empiricism since Locke has been to counter the *realist* aspects of his theory -- claims like external objects causing perceptions, perceptions resembling real, mind-independent entities, substance providing an external support to perception and so on and so forth. Correspondingly, empiricism has also seen a systematic deepening, extension and refinement of the skeptical aspects and implications of Locke's views. The idea that what is given to us in perception is perception itself and not the external world has been raised to the status of dogma. The reduction of external objects to sensation has become an explicit and central component of empiricist epistemology.

Two British philosophers played a key role in empiricist philosophy taking this direction post-Locke. George Berkeley and David Hume, both recognised as foundational figures in the history of empiricism, worked and wrote in the seventeenth century. In several respects, their interventions determined the key features of all future empiricism and positivism. In particular, they stand out for their steadfast insistence that all we can know is the order, sequence, and conjunction of our sensations and nothing more. They explicitly and consciously embrace, in other words, what was only a tendency, a strong one no doubt, in Lockean philosophy.

Berkeley directly and openly reduces external objects to sensations. He refers to them as "collections of ideas", ideas, of course, being synonymous with sensations (Fogelin, 2001). He is aware that such a view runs counter to our most fundamental and intuitive interpretation of our own sensory experience. He says:

"It is indeed an opinion strangely prevailing amongst men, that houses, mountains, rivers, and in a word all sensible objects have an existence natural or real, distinct from their being perceived by the understanding. But with how great an assurance and acquiescence soever this principle may be entertained in the world; yet whoever shall find in his heart to call it in question, may, if I mistake not, perceive it to involve a manifest contradiction. For what are the forementioned objects but the things we perceive by sense, and what do we perceive besides our own ideas or sensations; and is it not plainly repugnant that any one of these or any combination of them should exist unperceived?" (Fogelin, 2001: 31)

Thus, Berkeley affirms explicitly that to assume that perceptible objects have an objective existence, an existence "distinct from them being perceived by the understanding" is fundamentally untenable (Flage, 2014). What we take to be external objects are nothing but our own sensations. Things have no being or identity apart from our perception of them. They exist, in other words, only to the extent we perceive them; they exist only *as* perception:

"Some truths there are so near and obvious to the mind, that a man need only open his eyes to see them. Such I take this important one to be, to wit, that all the choir of heaven and furniture of the earth, in a word all those bodies which compose the mighty frame of the world, have not any subsistence without a mind, that their being (esse) is to be perceived or known." (Flage, 2014: 29)

This principle, *esse est percipi* (to be is to be perceived), is possibly the most forthright formulation in the history of empiricism of the reduction of objects to perception. Once Berkeley formulates and foregrounds this principle, it becomes relatively simple for him to counter both the idea that perceptions represent or resemble external objects as well as the thesis of underlying substance or substratum. Against the first he argues that perceptions cannot resemble anything apart from perceptions. For perceptions to resemble something, the latter must at least exist. But since to exist is *to be a perception*, resemblance can only be a relation obtaining *between* perceptions. Thus, a visual image can resemble or represent only another visual image. It cannot resemble something which is not itself a perception. The externality or objectivity of the sensible object is, therefore, ruled out. Berkeley phrases the argument in the following manner:

"But say you, though the ideas themselves do not exist without the mind, yet there may be things like them whereof they are copies or resemblances, which things exist without the mind, in an unthinking substance. I answer, an idea can be like nothing but an idea; a colour figure can be like nothing but another colour figure. If we look but ever so little into our thoughts, we shall find it impossible for us to conceive a likeness except only between our ideas. Again, I ask whether those supposed originals or external things, of which our ideas are the pictures or representations be themselves perceivable or no? If they are, then they are ideas; and we have gained our point; but if you say they are not, I appeal to anyone whether it be sense, to assert a colour is like something which is invisible; hard or soft, like something which is intangible; and so of the rest." (Fogelin, 2001: 45)

The phenomenal world for Berkeley, therefore, is necessarily *mental* in character. If the being of phenomenal objects is reduced to perception, then to talk of existence that is mind-independent – i.e. independent of the mind of the perceiver, becomes a contradiction in terms. There can be no

such thing as non-mental existence. S*ubstantiality*, in other words, becomes impossible. Underlying substratum, being mind-independent by definition, also becomes contradictory by definition. Berkeley says:

"But it is evident from what we have already shown, that extension, figure and motion, are only ideas existing in the mind, and that an idea can be like nothing but another idea, and that consequently neither they nor their archetypes can exist in an unperceived substance. Hence it is plain, that the very notion of what is called matter, or corporeal substance, involves a contradiction in it." (Fogelin, 2001: 66)

It is interesting to briefly pause here and note that even in Indian philosophy, particularly in schools of Indian idealism, the argument that the perceptible object is nothing more than perception is a familiar one. The most prominent articulation of the argument was by the 6th century CE Buddhist philosopher Dharmakirti who belonged to the *Vijnana-vada* school of Mahayana philosophy. The argument as formulated by him is referred to as *sahopalambha-niyama*, which literally means "simultaneous awareness", and has been widely used across various traditions of Indian idealism (Chattopadhyaya, 1976). The essence of the argument is that since our apprehension of the object is always necessarily accompanied by, is *simultaneous with*, our apprehension *of a perception*, it is illegitimate to say that the object can exist independently of our perception of it. The argument has such striking similarities with Berkeley's argument for the non-substantiality of the phenomenal world, that Debiprasad Chattopadhyaya's description of it is worth quoting in full:

"But, asks Dharmakirti, can one ever jump out the circle of one's own ideas and actually reach the external object, alleged to 'support' or correspond to the ideas? Only on this assumption can there be the direct evidence for the existence of external objects, and hence the admission of their reality. However, this is prima facie impossible. The only evidence one can conceivably mention for the existence of something is one's awareness or knowledge or consciousness itself – the fact of one having a sensation or perception or idea. Nothing beyond this is actually known and hence only this can be accepted as real. It is ordinarily believed of course that this consciousness is consciousness *of something*, supposed to exist outside consciousness in the external world. While having a sensation of blue or yellow, one usually believes that something actually blue or yellow exists in the external world, of which it is the sensation. Philosophically, however, this is only a superstition, i.e. an assumption without any definite evidence. When asked, what is the evidence for the existence of such external things, the only answer that can possibly be offered is that there is a sensation of blue or yellow. What is indisputable is the sensation itself. But a sensation is patently mental. In other words, since the alleged object of knowledge is known invariably in the form of knowledge

itself, only this knowledge is real. That which is known is nothing but this knowledge, or the knowledge is identical with the object known. The forms of the so-called objects – blue, yellow, etc. – are nothing but forms of knowledge. The invariable presentation of the object as mere awareness proves the exclusive reality of the latter." (Chattopadhyaya, 1976: 172)

The inability to "jump out of the circle of one's own ideas" also expresses itself, in Berkeley's philosophy, in a thoroughgoing skepticism about *causation*. The reduction of the phenomenal world to perception stems, as we have seen, from the confinement of the essence of objects to their momentary sensible attributes. Such reduction, therefore, also means a complete denial of any underlying causal processes. The existence of causal processes would mean that the essence of an object goes beyond its sensible qualities at any moment; it would mean that such essence includes how an object changes or is produced. To say *esse est percipi*, therefore, one needs to completely rule out such processes. Berkeley, accordingly, takes a radically skeptical attitude to the objective existence of causation (Rickless, 2013). He makes the point in the following way:

"All our ideas, sensations, or the things which we perceive, by whatsoever names they may be distinguished are visibly inactive; there is nothing of power or agency included in them. So that one idea or object of thought cannot produce, or make any alteration in another. To be satisfied of the truth of this, there is nothing else requisite but a bare observation of our ideas." (Rickless, 2013: 94)

This "inactivity" or absence of "power or agency", it must be noted, is nothing but an expression of the fact that the object has been stripped of its inherent, necessary interconnections and interactions. When underlying causal mechanisms that determine the qualities of the object are removed, the object becomes radically isolated. We have seen before that to strip iron of its underlying process of rusting, is also to separate it from its interaction with water. To abstract a plant from its underlying processes of growth is to separate it from its interaction with its environment. It is precisely in this sense that, for Berkeley, the object of thought is inactive or lacking in power. Remove the necessary interconnections of an object, and you take away its *inherent movement*. This point needs to be remembered because a vast majority of idealist philosophy calls matter or the material world "dead" precisely in this sense and on these grounds. Such "dead" matter is inherently inert, having been robbed of all causal mechanisms of change.

8.5 *David Hume on Causation and Necessity*

It was, of course, left to David Hume to deepen this onslaught on necessity and causality and give it it's most powerful and well-recognised form till date. Both his major works on epistemology – *A Treatise on Human Nature* and *An Enquiry Concerning Human Understanding* – are centrally concerned with limiting the ambit of human knowledge to the patterns and sequences of our sensations. Hume, like Berkeley, holds without hesitation that the object of our knowledge can only be sensory impressions. Perception apprehends only perception, not the external object (Noonan, 1999). He employs an argument which we are familiar with by now:

"It is a question of fact, whether the perceptions of the senses be produced by external objects resembling them: how shall this question be determined? By experience surely; as all other questions of a like nature. But here experience is, and must be entirely silent. The mind has never anything present to it but the perceptions, and cannot possibly reach any experience of their connexion with objects. The supposition of such a connexion is, therefore, without any foundation in reasoning." (Noonan, 1999: 26)

Hume says that despite this lack of foundation in reason, however, people do tend to think that their perceptions have an underlying objective reality. Why should this be so? He provides a fundamentally psychological answer (Beebee, 2006). He says that our sensations are characterized by numerous uniformities and regularities. Different kinds of sensations tend to be associated in stable patterns across space and time, tend to "go together", and it is the stability of these patterns which produces the impression in us that what we perceive have *inherent* connections. Thus, our perception of ice, when accompanied by a sensation of heat, is succeeded by a perception of ice melting. This pattern, Hume argues, recurs on such a regular basis that whenever we have sensations of ice and heat together, we expect *out of habit* to experience subsequent sensations of ice melting. In other words, the pattern occurs so uniformly in our experience that we tend to believe that there is some intrinsic ability or power *underlying* the perception of ice and heat that produces the perception of melting ice. That is to say, we assume that there is some *causal* or *necessary connection* between our perceptions. Hume says:

"'Tis… by experience only that we can infer the existence of one object from that of another. The nature of [the] experience is this. We remember to have had frequent instances of the existence of one species of objects; and also remember, that the individuals of another species of objects have always attended them, and have existed in a regular order of contiguity and succession with regard to them. Thus we remember to

have seen that species of object we *call flame* and to have felt that species of sensation we call *heat*. We likewise call to mind their constant conjunction in all past instances. Without any farther ceremony, we call the one *cause* and the other *effect*, and infer the existence of the one from that of the other." (Noonan, 1999: 65)

But, Hume argues, there is nothing in this experience of "constant conjunction" or "contiguity and succession" which provides a rational basis for the conclusion that there are causal or necessary relations at play (Mounce, 1999). A particular conjunction of perceptions may repeat itself a thousand times, but even then we would not be in a position to say whether that conjunction would recur in the future. The essence of the matter for Hume is that while we perceive the conjunction, *we do not perceive any underlying causal relation.* And since all knowledge must be based on perception, we cannot possess any knowledge of necessity or causation. The latter must, therefore, always be an *arbitrary* supposition. Our sensory experience does not provide any warrant for it. Thus, no matter how many times and how invariably we observe that ice melts on exposure to heat, since we do not perceive any underlying cause or necessity, *any assertion beyond the bare observation of the constant conjunction* must be without foundation.

Hume puts the argument in another way as well. To say that because certain kinds of perceptions have been conjoined in the past they will continue to be so in the future assumes that the future must always be like the past. But do we have any basis for this assumption? For Hume, such basis could only lie in experience. But to say, *on the basis of experience*, that the future would resemblance the past amounts to begging the question. The invocation of experience already *presupposes* the resemblance that it is meant to establish. Thus, we can never find in experience any rational basis to assert that a conjunction would continue to occur in the future.

It must be quite clear that Hume in making these arguments is, in essence, simply drawing out the logical implications of the reduction of perceptible objects to perception. In fact, as we have already seen, such reduction itself *presupposes* stripping the object of its necessary connections. Thus, it is not surprising that Hume, once he has already reduced objects to perceptions, can rally a series of arguments against the real existence of necessity and causation. Indeed, Hume makes this quite explicit when he formulates and foregrounds two principles in defense of his view of necessary connections. He says:

"… that whatever objects are different are distinguishable and that whatever objects are distinguishable are separable by the thought and imagination. And we may here add, that these propositions are equally true in the *inverse*, and that whatever objects are separable are also distinguishable, and that whatever objects are distinguishable are also different." (Mounce, 1999: 104)

The first principle has later been termed the Separability Principle and the second, the "inverse", the Conceivability Principle (Noonan, 1999). The former holds that any object which is *different* – i.e. endowed with a particular and determinate character, can be *conceived in separation from every other object.* The latter holds the converse: that whatever can be conceived separately must also be determinate. Looked at closely, both these principles articulate essentially the same premise: to have determinacy, to have a distinct identity, *is* to be separate from everything else. Thus, the nature or identity of an object must *necessarily* be understood without any reference to other objects. The character of an object is exhausted by its own momentary attributes. To the extent, for instance, that a bud has determinate existence, is an object of a particular kind, its nature or identity cannot have anything to do with its blossoming into a flower. To the extent a cloud has determinate being, its character must exclude the fact that under certain conditions it comes down as rain. The two principles, therefore, are nothing but *restatements of the law of non-contradiction.* A thing cannot be anything apart from its sensible qualities at a given moment in time. Causal connections are ruled out.

In a similar vein, Hume also mobilises these principles against ideas of substance and substantiality. If an object is different and therefore separable, it does not require anything else to exist – it is self-subsisting. Therefore, our perceptions, being different and separable, do not require any external support. They can exist without any grounding in external substance or substratum. My perception of a tree – the visual image of a tree – does not require any anchorage in external, mind-independent reality. Being perception of a determinate character, a visual image of a *tree* as against a visual image of other things, it is different, separable and self-subsisting. But since self-subsistence, as we have seen, has been regarded as a definitional feature of substance itself, this argument enables Hume to make the startling claim that perceptions *themselves* are substances. Every perception, every sensory experience, is a completely independent substance in itself. Hume presents this entire chain of reasoning with his characteristic boldness and clarity:

"For thus I reason. Whatever is clearly conceiv'd may exist, and whatever is clearly conceiv'd after any manner, may exist after the same manner. This is one principle, which has already been acknowledged. Again, everything which is different, is distinguishable and everything which is distinguishable is separable by the imagination. This is another principle. My conclusion from both is, that since all our perceptions are different from each other, and from everything else in the universe they are also distinct and separable, and may be considered as separately existent, and may exist separately, and have no need of anything else to support their existence. They are, therefore, substances, as far as this definition explains a substance." (Russell, 2008: 80)

The irony of this claim must be noted. In asserting the independence or self-subsistence of perceptions, Hume is completely eliminating the *mind-independent* existence of perceptible objects. To say that our perception of an object is perfectly independent of everything else is to deny the specific causal processes that underlie the perceived qualities of the object. But that amounts to separating the object from its necessary connections with other objects, and thus reducing it to its relations with our perceptual or sensory faculties. Thus, an assertion of the independence of perception is necessarily at the same time also a denial of the independent and objective existence of the perceived object.

For instance, the perceptible qualities of a rotten apple – its darkness, softness, foul odour etc. – are products of an underlying process of microbial decomposition of the apple. This causal process also determines the nature of subsequent changes that the apple can go through. Thus, it determines, for instance, the fact that under certain conditions consumption of the rotten apple can lead to sickness. Therefore, to say that the perceived qualities of the rotten apple are independent of everything else is to rob the apple of these various interconnections. But without these interconnections – *how it came about, how it can change* – the rotten apple is nothing apart from its relations with our sense organs in a given moment. To say that the *perception* of the apple is independent is to say that the *apple itself cannot exist independent of perception*.

The claim that perceptions are substances is an example of the relentlessness with the which Hume pursued the logical implications of the contradictions of empiricism to their conclusion. Two more such examples should be noted. For Hume, the inference of necessary connection is unwarranted not only in patterns of perceptible change *but also in those of perceptible constancy*. Even where there is *no change* in the perceived qualities of an object, we cannot say that there is an underlying necessary connection. This means that we have no rational basis for believing that an *object*

perceived at one moment is the same as that perceived in another even if their perceptible attributes are identical. Thus, if during perceiving a tree we close our eyes for a moment and reopen them we have no rational basis for saying that we continue to perceive *the same tree* as before closing our eyes. There are no rational grounds for me to say that the computer screen that I am looking at now is the same computer screen I was looking at two minutes ago. In essence, this is the law of non-contradiction followed consistently to its logical end. If the identity of any object is confined to its momentary sensible attributes, it must be absolutely different *from one moment to the next even if its attributes remain the same*. Hume's treatment, thus, highlights that the law of non-contradiction consistently applied would end up *freezing* objects in *isolated, discrete* moments in time. Continuous existence *over time* would become an impossibility.

Another implication Hume draws out concerns the existence of the mind or the self (Russel, 2008). For Berkeley, we have seen, the phenomenal world was exclusively mental in nature. He did away with the real existence of the external world, but assumed that there was indeed *a perceiving mind*. The existence of the perceiving mind is, for him, a condition of possibility of perception. Without a mind, there can be no perception. Hume disagrees. If perceptions are substances and truly independent, they must be independent of the mind *as well*. In other words, Hume argues, it is wrong to assume that there cannot be any perceptions without a perceiving mind. In fact, the very assumption of a perceiving mind is lacking in rational warrant. In our experience, we encounter only perceptions, we never encounter "ourselves" or our minds. Hume says: "I can never catch myself without a perception, and never can observe anything but the perception". Thus, like our sensory experience provides no basis for the assumption of an objective, external world, it provides no basis for the assumption of a mind or self either. Or, to put it differently, the self or the perceiver is nothing but a "bundle of perceptions".

8.6 *Hume and the Abstract Universal*

These conclusions notwithstanding, Hume does have a serious interest in explaining the nature of knowledge. Despite their denial of an objective, external world, both Hume and Berkeley do believe that knowledge is a legitimate enterprise and consists essentially in apprehension of the patterns and uniformities of our perceptions. Having acknowledged this legitimacy, they, like Locke, have to explain the nature and origin of general ideas and terms considering the important

role they play in knowledge and discourse. Since they both provide similar answers to this question, we shall take Hume's response as representative.

Hume fundamentally rejects Locke's notion of the abstract general idea. For him, an indeterminate idea, an idea bereft of all specificity, is a contradiction in terms (Beebee, 2006). All ideas, Hume argues, must come from sensation. And sensation is necessarily determinate. In Hume's words, "no impression can become present to the mind, without being determined in its degrees both of quantity and quality" (Beebee, 2006: 120). Ideas, therefore, including general ideas, must necessarily be determinate. Thus, to say that the general idea of a triangle lacks all specificity is to say something logically absurd. The general idea of triangle must be a particular kind of triangle.

As part of this argument, Hume also takes issue with the Lockean notion of abstraction. He contends that abstracting common attributes from objects cannot be a legitimate procedure. For Hume, to separate the attributes of an object from the object itself amounts to saying that the former can exist by themselves. He bases this assertion on the Conceivability Principle. But, he goes on to argue, to say that a quality can exist apart from an object is absurd. For example, can the length of a line exist apart from the line? Clearly not. Thus, to abstract qualities from objects they belong to is logically impermissible. Abstract general ideas, products of such abstraction, are therefore an equally illegitimate notion.

But how can a particular triangle represent all triangles? How can an equilateral triangle represent scalene triangles? How can, to put it more generally, a particular object within a class or sort of objects represent all members of that sort? Hume's answer is an essentially *conventionalist* one. He says that ideas become general by being associated with general terms in language. A general term is *customarily* associated with a number of individual, particular objects. When the term is used in discourse it evokes in our minds an idea of *one of these particular objects*. However, the generality of the term ensures that *we are always in readiness* to conjure in our minds other individual objects belonging to the class designated by that term. Thus, when we hear the word "triangle", it evokes the idea of a particular triangle in our minds. This triangle is of a determinate kind – it could be equilateral, scalene, isosceles and so on. But this particular triangle has *general or universal significance* because while we imagine it *we also remain prepared* to imagine *any other* individual, particular triangle. It is in this way that a general idea can be specific and determinate in content. Unlike Locke, for whom the general term was general *because it expressed*

a general idea, for Hume a general idea derived its generality from the customary significance of a general term. Hume describes this process of general signification in the following way:

"the hearing of that name revives the idea of one of these objects… But as the same word is supposed to have been frequently applied to other individuals.. the word not being able to revive the idea of all these individuals only touches the soul.. and revives that custom, which we have acquired by surveying them. They are not really and in fact present to the mind, but only in power; nor do we draw them all out distinctly in the imagination, but keep ourselves in a readiness to survey any of them, as we may be prompted by a present design or necessity. The word raises up an individual idea, along with a certain custom, and that custom produces any other individual one, for which we may have occasion." (Noonan, 1999: 92)

Does this idea of general significance genuinely resolve the problem of the abstract universal which plagues Locke's work? The answer is no. Hume's invocation of customary signification of the general term merely *displaces* the problem; it does not remove it. It enables him to say that the content of the general idea is a particular, determinate object, but it shifts the problem of indeterminacy and the epistemic gap to the domain of the *meaning* or reference of the general term. It is one thing to say that a general term customarily refers to a number of individual, particular objects, but quite another to explain how that customary reference *comes about.*

If the custom has some basis in the qualities of the individual objects a general term refers to, if say the customary meaning of the general term "apple" has something to do with the qualities of the individual objects the term refers to, then we are back to the problem of abstraction and the abstract universal. The problem, then, essentially becomes the same as Locke's intractable problem of uniting, through a universal, particulars he has already radically separated.

If, however, the custom has *no basis* in the qualities or attributes of the individual objects – i.e. if the custom or convention is *completely arbitrary,* and this is what Hume at least implicitly seems to suggest, the problem of the epistemic gap *arises nevertheless.* In fact, if the conventional reference of the general term is arbitrary, then there is *by definition* a gulf between the universal and the particular. If, for instance, the term "apple" arbitrarily refers to a certain set of individual, particular objects, then the qualities and attributes of those individual objects become *irrelevant by definition*. The red-ness of a "good apple" as an individual object, and the blackness of a "bad apple", would have absolutely nothing to do with the boundaries of the class of objects to which the term "apple" applies. An object could, in fact, be golden or magenta and still be regarded as an

apple if custom or convention so decides. This absolute irrelevance of the perceptible qualities of objects in determining the reference of the general term essentially means that the customary universal that the letter represents is *nothing but an abstract universal*. Despite invoking an individual, determinate object in our minds, the content of a general term would still have absolutely nothing to do with the determinate qualities of individual objects. It would, in other words, be empty and indeterminate.

The problem can be understood in another way. The gulf between the universal and the particular entailed by the arbitrariness of the reference of the general term implies *an impossibility of such reference itself.* The customary meaning of a general term, if such a term is to be *general* in any meaningful sense, would encompass not specific individual objects but specific *kinds* of individual objects. But that would mean that the general term refers to things *which are general in nature themselves,* whose content, therefore, *would also need to be conventionally fixed*.

For instance, the general term "apple" cannot refer to just specific individual apples A, B and C. If it just referred to apples A, B and C, it would not be a general term at all. The term, if it is to carry generality, must refer to specific *sorts* or *kinds*: for instance, a ripe apple, an un-ripe apple, a rotten apple, a sliced apple and so on and so forth. But each of these particular kinds is characterized itself by generality. A ripe apple can be of many particular kinds: a large ripe apple, a small ripe apple, a ripe apple that is more sweet, a ripe apple that is less sweet, a plucked ripe apple, an un-plucked ripe apple and so on. Thus, a "ripe apple" is itself a general term, and like other general *terms its content or reference too will have to be fixed by convention.* Further, each kind of ripe apple would be itself also be a general kind. A large ripe apple, for instance, could be a redder large ripe apple or a less red large ripe apple, a sliced large ripe apple or an unsliced large ripe apple, and so on. Thus, the meaning of "large ripe apple" too would have to be fixed by convention. This process would continue *ad infinitum* and we would, as a result, never reach the individual objects which our original general term supposedly designates by convention. The journey from the general term to its customary referents, from the universal to the particular, is a journey of infinite regress.

8.7 *Bertrand Russell and the Removal of all "External Pegs"*

This unbridgeable distance between the universal and particular, this epistemic gap between the idea or concept of an object and the object itself, pervaded every aspect of empiricist or positivist

philosophy in the twentieth century. We will look briefly at certain aspects of the work of Bertrand Russell, a towering twentieth century philosopher and acknowledged by many to be one of the progenitors of positivism in its contemporary form, and note the continuing presence and influence of the assumption of abstract universality in contemporary philosophy. Despite the often ponderous jargon of contemporary positivism, it remains firmly wedded to the essentials of the theory of knowledge articulated by Berkeley and Hume.

Russell, in his treatment of knowledge of the phenomenal world, forthrightly asserts that what is given to us in experience is nothing but "sense-data" or "individual percepts" (Carroll & Markosian, 2010). Thus, it is only of this sense-data or sensation that we can have knowledge. All of our knowledge, therefore, can be logically broken down into statements about sense-data. Anything that cannot be broken down in this manner, cannot legitimately be a part of our knowledge of the phenomenal world. He says: "I think it can be laid down quite generally that in so far as physics or common sense is verifiable it must capable of interpretation in terms of sense-data alone". (Monk & Palmer, 1998: 44)

This means, of course, like it did in the case of Hume and Berkeley, that the sensible, external object is being reduced to sensation. Russell, in fact, almost explicitly states this in multiple ways. One way was to say that the sensible qualities of an object are *aspects* of the object; and that the object is nothing but a "series" of such aspects. All we are concerned about, in the enterprise of knowledge, is to note the nature of this series. Once the object is understood as a series of sensations, the need for the assumption of external, objective existence – the need for the assumption of substantiality – disappears. Thus, Russell says:

"… the task of reconstructing the conception of matter without the a-priori beliefs which historically gave rise to it… For this purpose, it is only necessary to take our ordinary commonsense statements and re-word them without the assumption of permanent substance... A 'thing' will be defined as a certain series of aspects, namely, those which would be commonly said *of* the thing. To say that a certain aspect is an aspect *of* a certain thing will merely mean that it is one of those which, taken serially, *are* the thing." (Monk & Palmer, 1998: 78)

Thus, the external object is nothing but the sum total of its aspects or sensible attributes. There is no reality to the object beyond its perceived qualities. To be is to be perceived. Another way in which Russell articulates and argues for this reduction is to say that the substantial reality of an

object, *what lies behind the immediately perceptible attributes*, can never be known. The idea of an objectively existing entity which *possesses* attributes, as against an entity which is reducible to its attributes, is a result of grammatical convenience and has no logical validity. He argues:

"[A substance] cannot be defined or recognized or known; it is something serving the merely grammatical purpose of providing the subject in a subject-predicate sentence such as 'This is red'. And to allow grammar to dictate our metaphysics is generally now recognized to be dangerous…The notion of a substance as a peg on which to hang predicates is repugnant." (Maclean, 2014: 61)

Thus sensible predicates cannot have any external "peg" – they must be completely "independent" in precisely the sense in which Hume imagined them to be. We have seen how such independence essentially amounts to a negation of the mind-independent existence of the phenomenal world. In other places, in a slightly more cautious mode, Russell claims that sense-data can only give us information about the "spatio-temporal" structure of the external world, nothing more. Thus, when we perceive a leaf, we can only say that the perception corresponds to an external object that has the *size* and *shape* of a leaf and exists at least as long as the perception does. But anything beyond this spatio-temporal pattern, what the external leaf *is*, must remain fundamentally unknown to us. In Russell's own words, "Physical events are known only as regards their space-time structure. The qualities that compose such events are unknown – so completely unknown that we cannot say either that they are, or that they are not, different from the qualities that we know as belonging to mental events".

But this combination of realism and skepticism, wherein sensations are held to represent external objects only in regard to spatio-temporal attributes like shape, size, velocity etc. and nothing more, was quite comprehensively dismissed by Berkeley. He argued that if one were skeptical about the epistemic value of qualities like colour and texture, like Berkeley indeed was, one would also have to be skeptical about attributes like shape and size. The fundamental reason behind this is that there can be no perception of spatio-temporal characteristics without perception of things like colour. We discern various shapes and sizes by discerning differences of colour, shade etc. In fact, had it not been for the apprehension of these latter qualities, we would not have been able to apprehend distinct objects at all. Berkeley argues:

"But I desire anyone to reflect and try, whether he can by any abstraction of thought, conceive the extension and motion of a body, without all other sensible qualities. For my own part, I see evidently that it is not in

my power to frame an idea of a body extended and moved, but I must withal give it some colour or other sensible quality which is acknowledged to exist only in the mind. In short, extension, figure and motion, abstracted from all other qualities, are inconceivable. Where therefore the other sensible qualities are, there must these be also, to wit, in the mind and nowhere else." (Maclean, 2014: 89)

Thus, if the attribute of colour conveys no information about the object, neither can attributes like shape or size. Our perceptions, therefore, do not tell us anything even about the "spatio-temporal" structure of the phenomenal world. To say that physical events are known "only as regards their space-time structure" is to say that such events are not known at all.

How does Russell explain the fact that most people regard their sensations to be of epistemic value and see the phenomenal world as something that exists objectively? He says that such assumptions stem from "animal need". The "postulate" of an objective, external world, the nature of which we can access through our sensations, helps us adapt to our environment and ensures our biological survival. What for Hume was a product of habit was for Russell a matter of biological necessity. But, of course, such an answer is impermissible for Russell. To talk of biological need, adaptation and survival is to necessarily assume the object existence of the biological world. But if the phenomenal world is reducible to series or patterns of sense-data, so are all biological entities. Biology, therefore, cannot be invoked to explain belief in the real existence of the object. To do so would be patently contradictory.

Chapter Nine: Towards a Resolution

The concrete universal, unlike the abstract universal, is not empty. It is the underlying specific causal process creating or transforming the object; it is, in other words, *the generative or transformative basis of the particular object*. But if the universal is conceived in this manner, several implications follow. The *key* consequence would be that the object and its transformation would become *path-dependent* and *historical*. This, as we have seen earlier, in the case of the evolution of organisms, has two particular requirements. First, the object and its qualities must reflect the specific causal trajectory through which it came about. Second, this specific trajectory must influence and constrain its future transformation.

Let us return to the example of our bad apple. Are the qualities of the bad apple reflective of the specific causal trajectories through which it came about? Yes, it does. In an immediate way, its qualities reflect the specific nature of the decomposition process. This process itself was possible because of certain conditions. The apple must have been exposed to oxygen and moisture at a certain temperature for a certain amount of time. Without the presence of these conditions, decomposition would not have happened. Thus, the bad apple reflects these conditions as well. Further, the extent to which the apple decomposed, i.e. responded to the conditions of decomposition, would depend, among other things, on the individual tree it came from and the particularities of the processes through which it produced its fruit. These would depend partly, in turn, on the environmental conditions in which different phases of the organic life of the tree took place. Even further, fruit production, responses to environmental conditions etc. for the tree would depend, partly again, on the particular cultivar of apple it belongs to, and how that cultivar came into being. Finally, the range of possibilities of the cultivars themselves would eventually be framed by the evolutionary history of the apple as a species. Thus, the answer to the question whether the qualities of the bad apple reflect its specific causal trajectory, the answer is strongly in the affirmative.

Does the causal past of the apple influence or constrain its future transformation? It does. For instance, if a person consumes the bad apple, illness may result. This illness would be a result of the past decomposition of the apple. Its nature and severity would partly reflect the nature and extent of the decomposition, which as we have seen reflect an entire causal, historical trajectory. Thus, both the conditions for path-dependence are satisfied: present qualities reflect past change,

and past change constrains future transformation. The historicity that we say in organic transformation earlier, is a characteristic of material processes in general. What makes this recognition possible is the recasting of the universal as a real causal connection between particulars, rather than as an empty unity between particulars that have already been radically separated and frozen in their specificity.

The historicity of material objects and processes also means that they are *infinitely conditional* in nature. The bad apple would not have decomposed if the conditions for its decomposition were not present. But the obtaining of those conditions *themselves* would be conditional on other things. And so on and so forth *ad infinitum*. Or if we go further up the causal chain, the extent of decomposition may have been different if the environmental conditions of the apple tree were different. The apple tree might have been different if the conditions under which the cultivar was developed were different. And so on and so forth. Infinite conditionality, therefore, is a *logical aspect* of historicity.

What happens to our understanding of human material practice when we acknowledge this inherent historicity of objects? First, it would lead to the recognition that material practice, at any point in human history, is *fundamentally social*. If objects reflect their causal history, *then products of individual labour would reflect the labour of other people as well*. For instance, the product of a carpenter's labour – say a chair, would reflect not just the specific labour of the carpenter, but also of those who made the tools of the carpenter, of the lumberjack who extracted the timber, of those who built the shed where the carpenter works, of those who cooked food for the carpenter, and so on. Acknowledging the historicity of material processes, therefore, leads to the recognition that material practice is a *complex of social labour*.

But this complex of social labour is itself characterized by historicity. *As material processes are infinitely conditional, no complex of social labour can remain perfectly stable*. Another way to put this is that material practice is *inherently problematic*. Its fundamentally conditional character will necessarily throw up problems which the complex of labour will have to resolve by *changing*. Often, this may mean an expansion in the ambit of the complex wherein a greater variety of material processes are brought into direct utilization.

For instance, on several historical accounts, the transition from Paleolithic hunting-gathering to Neolithic settled agriculture and stockbreeding was necessitated by a particular problem thrown

up by the practice of Paleolithic hunting. The Paleolithic period had seen several advancements in hunting tools; a variety of new tools from the bow to the trap to the harpoon began to be used. At the same time, various new techniques of tool production had been developed and refined – these included chipping, flaking, polishing and grinding stones. Advances in language were registered; which helped enormously with hunting. As a result of these range of improvements, the ability of hunters to catch game increased manifold. The availability of game, however, was conditional on reproduction rates of game species, and as hunting abilities improved, game populations declined. This crisis eventually led a section of the Paleolithic hunters to transition to settled agriculture and stockbreeding, in both of which the entire life cycles of species were brought within the ambit of conscious practical control.

Is this change in material practice historical in the sense we have been working with? Yes, it is. The nature of the new complex of practice reflects that problems that arose in prior practice and conditions that gave rise to those problems. Agriculture, as we just indicated, does not have the insecurity of hunting precisely because it gives communities control over the entire life cycle over the source of food. Further, the past changes also influence future possibilities of change. The development of newer and more advanced tools required for agriculture took place on the foundation of tool making techniques that had already developed in the Paleolithic period. Thus, both the conditions of path-dependence are satisfied. The development of material practice itself is characterized by historicity.

But this means that specific material trajectories, *which include natural conditions, their operation, complexities and exigencies*, are a central part of the story of material development. It is not just the mind then – ideas, concepts, ingenuity, values, outlook, environmental sensibilities etc. – which *by themselves* drive the process of change in material culture. The natural world, in all its causal, specific, material autonomy plays an equally important role. The recognition of this material efficacy in the development of the mind is surely a minimum condition for combatting dualism as far as human-nature relations are concerned.

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