Towards an Ethics of Flow; Design as an Anticipatory System

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Abstract

This paper raises some provocative issues about the ethics of global consumerism, and the environmental damage that it causes. In calling for a deeper understanding, it takes as its starting point the consumer's experience of motion, reminding us that technological consumerism itself is now 'designed' as a system of flow, with hopes and desires becoming regularized as an anticipation for product innovation. This routine tends to impede the way we notice and appreciate what we already have. In this respect, designers, producers, and consumers can therefore be understood collectively as an anticipatory system.

Many responsible designers welcome the advent of a 'post-industrial' society in which we focus on services, rather than upon material products. However, the paper suggests that this approach may be counterproductive. In taking a phenomenological perspective, it reminds us that the consumer's anticipation is manipulated to induce faster economic growth. Unfortunately, virtual products are almost always used to promote products that are more material.

In addressing these issues, the paper argues that our culture assumes that 'ends' justify the 'means' and reminds us that the teleological mindset of classical science helped to deliver both the beneficial, and the damaging consequences of the technological society. In seeking to address these issues, the paper recommends that design practitioners challenge the strongly instrumentalist, teleological, and therefore anticipatory understanding of design itself. It therefore explores contradictions in the way we understand temporality, especially in discrepancies between categorical logic, and the heuristics of flow. Several alternative suggestions are offered as a way to reframe these problems.

KEYWORDS: consumerism, design, ethics, categorical logic, logic of flow, teleology

1 INTRODUCTION: The 'present' does not exist

The main context of my paper is the design professional's role in the damaging effects of consumerism. However, I will first talk about 'quickness' and 'anticipation' because they are part of the everyday experience of being a consumer. The paper's central metaphor will be the temporal experience of flow, as in running, walking, or playing a musical instrument. However, in a world of quantification, the paper will argue that what we know as the 'present' does not exist. It is always construed from contingent probabilities that may be a combination of anticipatory and backwardly referred tenses. We may speculate that, long before alphabetical writing and clocks became so important to the networked world economy, there may have been only an immediate, 'future' tense that related to imminent dangers, and our plans to deal with them. This tense is now called the 'present'. It is a mode of anticipation that promises two simultaneous temporal states:

1) An attention to events that continue to directly emerge from the situated present. This includes the surprising ideas, plans, and images that may form themselves in the mind of the designer.
2) An anticipatory present (or 'presence'). This includes possible conditional actions that are outside the immediate horizon of current tasks and conditions of the designer.

I will illustrate this idea by reminding us of the experience of driving a car through traffic lights. A car travels at a constant speed (say, X kilometres per hour) and the driver sees that the traffic light has changed to red. At a certain distance (d) away from the traffic light, the driver reduces her speed at a regular rate and her vehicle comes to a halt (zero kilometres per hour). How would science help us to understand this? Reductive arguments of Galileo and Newton proposed a simple linear calculation which assumes that engines, brakes, driver, and road comprise a closed system in which the car's velocity can be measured against a 'stationary' world.

In practical terms, however, the problem seems vastly more complex. You are driving along the road and thinking about something else. You are looking at the lights, but they change sooner than you had hoped. You must decide whether to apply the brake, or to accelerate. At the mechanistic level, we know that most traffic lights are regulated by clock cycles that, in theory, could make them entirely predictable to any anticipatory organism to which they are 'structurally coupled'. However, we all know that you cannot permanently synchronize yourself to one particular rhythm, because all waves become inter-modulated with other waves. Hence, the speed of your car is a combination of many time-scales that are co-created by many factors and attractors.

How quickly do we react? The phenomenological aspect of the way we experience, interpret, and act upon what we see ahead of us is far from simple. You may be anxious to get to an appointment. In a stressful world of deadlines and schedules, you may even find yourself accelerating, after you have seen a red light, or traffic queue ahead of you.

(See below) When we do these things as a matter of habit, it can be understood as a form of 'alienation' (Wood, 1998).

$$\text{temporal alienation} = \frac{\text{cognitive time}}{\text{metabolic time}}$$

Alienation damages human beings. Indirectly, it also damages the environment. In a technologically deterministic society, we always expect better, cleaner, safer products that will save the world. Cars must become ever bigger, smoother, faster and exciting. Advertising assures us that it is permissible to want to be somewhere other than where we are now. Hollywood films show us how to drive in a way that uses maximum fuel in return for a temporary feeling of exhilaration.

What is the prototype for this feeling? In science fiction, the fantasy of instantaneous acceleration is, perhaps, the ultimate western paradigm of travelling, yet it would be counterproductive in experiential terms. If we were to achieve infinite acceleration, it would be the bodily equivalent to our being ahead of ourselves. If we were able to survive such a dramatic process, we would not be aware of the journey itself. This may remind us of the importance of design in manipulating our experience of flow, and in shaping our experience and understanding of our world. Although it may not be solely responsible for environmental damage, design nevertheless can be understood as a form of rhetoric (Buchanan, 1989) that persuades others to sustain, or to increase, the transactional flow of goods and services. Here, the term 'design' therefore embraces a complex spectrum of approaches, that range from highly ordered (managerial), to what may appear to be quite disordered (creative). It may therefore include technological functionality, rhetorical formgiving, tactical scheduling, human relations, economic strategizing, etc. This does not mean that designers consciously control what they do. Indeed, much of their work leads to unforeseen consequences that emerge from their complexity.

At this point, it may be helpful to return to our traffic lights scenario. Let us assume that you are driving along the road and you approach a 'green' light. Wittgenstein tells us that we perceive 'aspects' of a situation, rather than the totality of data. Hence, you become 'tuned into' the driving situation and perceive a particular aspect without being conscious of the vast world including other 'aspects'. Here, we are accustomed to the logic of categories in which, for example, red is red and not green. In this case, traffic lights fulfil the logic of categories. They are designed to present an unambiguous differentiation between the commands 'stop' and 'go'. Therefore, when we drive, we are pleased to find a clear distinction between 'red', or 'green'. We immediately see something which we 'regard-as' a green light. We may even not 'see' the green light as such, but regard it 'as' a 'GO' sign.

Here, the paper asserts that Wittgenstein's theory of 'aspects' and 'regarding-as", can be applied within a dynamic frame of reference. When we see the green light, we must

decide whether to 'regard-it-as' a 'GO' sign, or whether to anticipate that it will soon change to red. In order to be safe, if we approach traffic lights when they begin to change, we must take into account the speed at which we are travelling, and estimate how quickly we could stop, before we can safely decide whether to accelerate, or brake. Such decisions must always, therefore, be a matter of situated judgement, rather than that in which simple algorithms may safely assist us. If we reflect upon this mode of logic, it may become clear that, if we always drive very fast, we become accustomed to the possibility of seeing 'red-as-green' or 'green-as-red'. Here, we may note that the logic of categories can be apparently countermanded by the logic of flow.

2 Ethics and Design

2.1 What are the ethics of design?

What role does design play in facilitating flow? If a car driver crashes when driving through a red traffic light, can we blame any of the designers of the traffic lights, road markings, motor car, etc.? Ralph Nader (1965) is famous for introducing this concept into the ethics of road safety. After his pioneering book "Unsafe at Any Speed", it was recognized that road accidents cannot simply be attributed to fate, because designers are employed to implement the values and standards of their employers, within the limits of technological expediency. Nader is also well known for his lobbying that led to the dominant politics of a strident 'consumer rights' culture that, arguably, has shifted the public attention from over-consumption to corporate greed. Today, we increasingly speak of 'consumer rights' but seldom, if ever, about 'consumer responsibilities'. Designers therefore find it difficult to know how best to intervene. As well as working for the client, designers indirectly work to please the end-users (consumers) of their products and systems. Implicitly, responsible designers also work for all world citizens and creatures. They know that if they concentrate on the short-term interests of an irresponsible client, they may add to existing problems of global warming, resource depletion, pollution, etc. In this context, the designer may need to satisfy many parameters of a large system that is already dangerously unbalanced, ethically speaking.

Before the advent of mass-production, designers were only needed to take responsibility for the completion of one, or more batch-produced products. After Fordism, designers also came to design systems of flow. Within a consumer-oriented society, the job of the designer is, increasingly, to make products and services more appealing. Some engineers and technologists find this difficult to accept. Theirs is a highly pragmatic world in which the notion of 'functionality' is defined in a narrow spectrum of technological purpose. Without an appropriately applied product aesthetic, people would consume less. In a world of consumption and use, most designers therefore facilitate the increased throughput of materials and energy in the transactional system. Although their role may seem subordinate, their net effect may be equally instrumental to the maintenance of consumerist flow.

2.2 What are the anticipatory features of design?

That design is an anticipatory practice may be obvious from its history within the teleological cast of western thought. Here, the word 'perfect' may remind us of the craft origins of the design process, in that it derives from an old word meaning 'completed'. It therefore points to our long standing teleological conviction that outcome is more important than process. The longstanding importance of teleology sustains a popular belief in a linear kind of 'progress' and, perhaps, even normalizes the important role of desire, within the economics of consumption. Designers in the commercial advertising industry, for example, will often work to produce a priori models of the experience of consumption, in which actors simulate enjoyment as a simultaneous exemplar of 'having' and 'being'. In this respect, they could be said to design 'models of consciousness' that both anticipate, and guide, the consumer's subsequent experience of consumption.

Importantly, we should remember that this mode of anticipation does not equate with a classical, linear mode of temporality. In a sense, time only comes to seem linear in the presence of clocks, and other mechanical devices of timing. Arguably, this also is a matter of design because, over the last five hundred years or so, clocks became commodities that denote status and glamour. Designers are not alone in using clock time within this power system. However, in a professional context, they are likely to become exhilarated by the creative elements of what they do, and for the outcome of the task in hand. As such, they habitually combine an idealized 'present-in-future' with an actually situated 'future-in-present'.

The idea of anticipation may be categorised into 'short-term' and 'long-term' modes. This is helpful if Kant's anticipatory mechanism of perception (Warnock, 1976) relates to ideas that are abductively derived from the situation in which it is located. In this case, it could be seen as a short-term mode of anticipation. Longer-term anticipation may require reflecting upon more distant memories that may relate little to the current moment. Using the discourse of design, Suchman (1987) makes a useful distinction between what she calls 'planned actions' and 'situated actions'. Situated actions incorporate logic of thinking that is inextricably embedded within the actions themselves. In 'plans', on the other hand, the logic used to anticipate a large event may be meticulously linear and analytical. The planning of a route by using road maps etc. is typical of this kind of logic, which include tasks such as looking to see which roads appear to represent the shortest distance between a given starting point and an agreed destination. In defining the strongly teleological aspects of design, we may helpfully make contrast with related activities in which the anticipatory components are less important than the situated features.

2.3 How can designers flow?

If we are to achieve a more harmonious balance between productivity and well being, we may have to develop a more playful society in which work is seen as a pleasure for its own purpose. Perhaps we can all become designers, artists, or scientists. How do

designers experience flow in their own practice? Citing observations from quantum mechanics, Bohm (1980) claimed that experience and knowledge are part of an indivisible process. This is a beautiful idea, but how true would this seem to practicing designers? We may, at least, admit that it could be irresponsible to be so fully engaged in a flow of activities that we have no need to interrupt them for reflection. Paradoxically, a positive feature of the culture of design practice is the celebration of situated creativity, rather than, say, detached scepticism and objectivity. When this is so, the experiential present may become inseparable from an actual (i.e. actative) future when, and where, each of their products is imagined in a future state of perfection.

According to Schön (1985), in professional design practice, there is little time for the kind of sustained, detached, and interrupted thinking that usually accompanies critical or analytical writing. Schön claims that designers use what he calls 'reflection-in-action' because, practically speaking, they have no time to distance themselves - either temporally or spatially - from the immediate tasks and sub-tasks that will ensure the job's successful completion within an agreed deadline. How can designers challenge the assumptions of linearity in time?

2.4 Do we need a flow-ethics of design?

How do designers intervene in the existing flow of things? Despite the current rhetoric of consumerism in which they are understood to design a user's 'experience', in reality they are only able to provide for the user what certain cognitive psychologists (e.g. Norman, 1998) call 'affordances'. This term accounts for accepted codes of meaning that objects seem to have, at the same time that we put these readings to use within a situated and opportunistic logic of action. Hence, designers may use many semiotic techniques to design, and to guide affordances. Such techniques may include the use of linguistic terms. In the laws relating to road safety, terms such as 'car', pedestrian', 'passenger', etc. are used to refer to a system of fairly fixed boundaries within language.

Much design involves the fixing of static boundaries by the use of categorical logic. It can be used to rebalance the issues of rights and transactions, but it must be addressed within terms that recognize the rhetorical nature of flow, rather than just the categorical logic of names and objects. Legislative logic can be seen as an important mode of design in which words are used to reduce uncertainties about the fluid nature of agreements, territories, or discrete values. Jeremy Bentham (1748-1832), the English jurist and writer on law and ethics, can be regarded as a designer, in his approach to legislation. He attempted to regulate the ethical flow of a whole society by using precise meanings in language to define boundaries that could not easily be eroded or moved by others. His work with the system of 'Utilitarianism' is an example of this approach, in which legislation is understood to be a kind of design tool that creates affordances for good citizenship.

Ironically, one reason why we have an increasing number of fuel-thirsty, large, four-wheel drive vehicles on our highways is because, under United States law are not

classified as cars. As such, they are not bound by the same environmental legislation as smaller vehicles. This legal loophole helped to create a fashion and a market that now causes larger consumption of fuel, etc. In the logic of categories, all car owners have equal rights, in terms of their ability to move around within an ethics of priority. However, when they sit inside the cabin of their car they will inevitably feel different from how they might feel in a different make of vehicle.

Likewise, although, in theory, the rights of every citizen are equal, whether walking or driving, in practice, pedestrians can easily be intimidated by a large, fast vehicle, rather than something small and slow. In a system of flow, such as on busy high street, the simple logic of fixed boundaries may be seen to favour the pedestrian who reaches a given position in the road before a fast-moving vehicle does. If we extend this kind of static logic in a consequential way, any pedestrian who suddenly runs out in front of a faster moving car would have absolute right of way. In some countries, this kind of categorical logic is sufficiently legally binding to moderate the anticipation of uninhibited flow that is enjoyed by drivers in less rights-conscious nations. Nevertheless, it masks the subtle, flow-based computations by which we regulate our relative speeds when moving in proximity to one another.

3 Science and Ethics

Where art and design often explore things at the local, situated, or subjective levels, science is more likely to search for generalizations that could transcend the immediate presence of the observer. In effect, this means that the perceived importance of epistemological consistency has tended to overshadow what may seem obvious at the experiential level. The success of Newton's laws of motion is probably due to the fact that they ignore recursive aspects of self-agency when bodies travel under their own volition. Similarly, even though Einstein claimed to derive his 'thought experiments' from his own subjective fantasies of falling, (Wood, 1998) he ignored the initial moments of propriocepsis in living bodies that fall.

How has the scientific mindset influenced technology, and the way human society has developed? The history of technology reveals how figures such as Adam Smith and Charles Babbage were excited by the mechanistic claims of science, and wanted to harness its 'laws' to fulfil an economic purpose. In the early twentieth century, F. W. Taylor (1911) extended the idea of scientific 'principles' to a system of management. He believed that science's empirical techniques of observation, measurement, and classification should be applied to all managerial problems. He also believed that workers should be 'scientifically' selected, trained, and developed. Several fields of management evolved from his philosophy, including time and motion study, personnel management, and industrial relations, and the managerial functions of planning and control.

One of Taylor's principles was that, in order to maximize productivity, workers must slavishly follow his instructions about the order and precision by which to perform each

of the smallest tasks on the factory floor. Arguably, notwithstanding its obvious advantages for increasing levels of industrial output, the Taylorist method had arisen from a stridently instrumentalist and rationalistic mindset that had already reached a high point during the Enlightenment era. In terms of its social effects, it is often claimed that these factory systems played a significant role in creating what Marx and others described as 'alienation' and 'self-alienation'. We may find the legacy of this destructive mindset alive and well in the labour policies and industrial practices used by some of the large fast-food corporations. Ecologically speaking, in insisting on the separation of observer from that which is observed, classical science created a dangerous precedent. In this context, James Lovelock's science is unusual, therefore, in that it can be seen as a claim for 'lifeless matter' to be classified and understood as an inseparable part of the living system, of which we are part. This has important ethical implications.

3.2 What are the anticipatory features of science?

As we have said, because science anticipates and speculates results and outcomes, it places itself outside the immediate 'present' of flow (nature). Arguably, at the cognitive level, when we engage in actions, what we understand to be the 'present' is really a combination of past and future tenses, held within a loose cybernetic continuum. Newton's claim to 'absolute, true, and mathematical time' represented a belief in something beyond human experience. For reasons of methodological expediency, this observational perspective incorporated the idea of the 'instant' as a prototype of the 'present'.

Nevertheless, Newton's approach to the temporality of observable events poses a conflict with the nature of human cognition. In understanding ballistic events using his own model, Newton would have had to rely upon a post hoc frame of reference in which he would have had to visualise actions by re-running them in the imagination, before, or after, they may have taken place. Similarly, but inspired by Kant's epistemological agenda, Einstein dared to incorporate intuitive, proprioceptive reflections into his published ideas of 'observation'. In so doing, he reconciled both subjective and astronomical modes of temporality in his 'thought experiments'. More recent work with quantum effects has incorporated the role of the observer within the methodological approach itself. (E.g. Wheeler, 1983).

3.3 How do scientists understand flow?

In the accelerating flow of technological society, we seem to trust clocks in preference to our own sense of time. Has this tendency been inspired by the refinement of mechanical regulators, rather than subjective time-referents that scientists use to regulate, or to measure events in the laboratory. What does it mean? One explanation is that clocks are observer-independent arbitrators of flow. They offer a common external reference to which our different subjective times can be related. This is because they are machines designed to be isolated from our metabolic and political temporalities.

Clock time is an extremely detached and reductive referent to the idea of flow. It seems probable that Aristotle developed his theory of time by gazing, unaided, at stars in the sky. This activity can be convenient and satisfying. Because of our nervous system's pace and structure, looking at a flow of stars is easier than trying to catch the movements in fire or water, because stars seem to have a fixed and eternal relationship to one another. However, when we observe things at the slower pace, we are tempted to develop logic of categories. Coupled with an extreme form of scepticism, this language-based approach has tended to dominate the agenda of science. In looking for an unassailable basis for a durable epistemology, it is possible that we have distanced ourselves from Nature.

In reflecting upon this possibility, we may be reminded of the ancient propositions of Heraclitus and Cratylus, which tell us of the laminar and recursive relationship between ontology and epistemology. Perhaps it is science's subsequent fascination with measurement and quantification that caused it to overlook Zeno's joke about flow. As Zeno's famous stories about relative motion implied, when you attribute a zero velocity to something that moves, you deny its motion in order to imagine its location. Yet, this proposition is what scientists such as Newton and Heisenberg were unable to resist, several thousand years later. Arguably, the paradox is always produced when we decide to measure flow using a categorical logic such as discrete numbers on a fixed scale. Zeno's tutor, Parmenides, had used categorical reasoning to deduce that, since the term 'nothing' did not really describe anything, then 'space' itself could not exist. As such, the universe must be totally rigid.

Many leading thinkers have followed Parmenides' dubious assumption. Notably, Descartes seized upon the metaphor of 'rigour' with a particular fanaticism. Indeed, logically speaking, his acceptance of the idea of absolute location would have been unsustainable unless we accept that the world is rigid (Wood, 2000:1). More importantly, Descartes used this idea as a metaphor for his own style of epistemological reductionism. Galileo used similar reasoning to generalise the relationships between moving objects. From his observations he deduced that there were "unchanging laws" of time and space. Newton used Galileo's findings to conclude that 'mathematical time' was an absolute ontological reality. As we have already described, this kind of rationality reached a high point in the Enlightenment, when Newton's laws of motion, led to the popularization of terms such as 'speed', derived from abstract idealizations of 'space' rather than actual references to 'place'.

3.4 Do we need a flow-ethics of science?

Laplace (1749-1827) was so convinced by the Parmenidean-Newtonian system that he believed that if ever we could devise omniscient instruments of measurement we could anticipate everything in the future. He confidently declared that "nothing need be uncertain: past, present, or future." This view was dissolved, in the 20th century, by a number of thinkers such as Gödel, and Heisenberg.

Feminist theory (e.g. Harding, 1986) has called for a 'Successor Science' that would challenge, or dissolve, the orthodox, Baconian values of science and produce a more 'embodied knowledge' that is more reflexive, localised, and partial. Such a development would be likely to embrace subjective judgement within an epistemology that is more fluent and polysemic. This may well have the effect of reducing our anticipation - perhaps even our rapacious quest - for totalizing truths.

4 Anticipation and Consumption

4.1 What are the ethics of consumption?

Because we use the term so frequently, it is easy to forget that the term 'consumption' carries highly destructive overtones. Indeed, it incorporates the idea of a one-way flow of services and goods from (an active) producer to (a passive) customer. This may be seen as a myth of a closed economic system in which a given product becomes 'used up' to ensure the recipient's satisfaction. This idea is implicit within a current politics of strident consumer rights in which governments assume that we must achieve 100% employment. Ecologically speaking, this model makes no sense. Nevertheless, within the orthodoxy of global capital, we are all expected to sustain such a system. Implicit within the ethics of consumerism is the expectation that all citizens must aspire to owning, or using these products in the future. This is the painful paradox of globalisation. In other words, what is seen to be good for the economy is likely to be disastrous for the ecosystem.

4.2 What are the anticipatory features of consumption?

If we accept the assumptions of western teleology, all human beings have an inescapable role in designing futures, irrespective of their social status or professional position, yet this is seldom acknowledged. What role does anticipation play in the creation of the consumerist ecology? Briefly, it is the temporal component of desire for that which is yet to become available. Without anticipation, there would be no gap between disappointment and satisfaction. Desire is, in a sense, monitored, designed, regulated, and sustained by professional agencies within the market system. It therefore becomes the prime mover for transactional flow.

4.3 How does consumption flow?

An example of short-term management focus is in the manufacturing industries where 'JIT' ("Just In Time") methods of component ordering and delivery are commonly used to feed the immediate needs of the production line at just above the minimum quantities required, whilst keeping stock and storage costs to a minimum. This development derives from a perceived imperative of economic growth in which capital must be made to flow as much as possible at all levels. The current transition from an economics of durable goods, to that of a post-industrial society implies that products will 'de-materialize', in favour of customer services and experiences. In practice, there is a limit to the attraction of virtual products. They are therefore used to promote or accompany material artifacts that must be transported to the customer, often over large distances.

We can see this process in much of the ebusiness marketing, whereby it is possible to buy items such as perishable foodstuffs from the other side of world.

4.4 Do we need a flow-ethics of consumption?

There is a tendency for humans to risk the damaging consequences of actions that may be rewarding in the present. Festinger (1957) argues that we are always striving for 'consistency' between our desires and the conflicting evidence that we encounter in satisfying them. An example of this 'cognitive dissonance' can be found in the common struggle between healthy and unhealthy lifestyles. We may be convinced that certain habits are threatening to our personal well being yet we carry on anyway. Using a Marxist perspective, both Sloterdijk (1988) and Zizek (1996) use the term 'cynicism' to describe the modern process of rationalisation - or 'enlightened false consciousness' - used to achieve gratification in the present, and the negative consequences that seem likely to result from the action in question (Wood, 2000:2).

5 Ethics and Flow

5.1 How can we define an ethics of embodied action?

An interesting counterpoint to the theories and practices of Descartes, Newton, Babbage, and Taylor is the work of Rudolf Laban (1879-1958), who worked with F. C. Lawrence to introduce the Laban-Lawrence Industrial Rhythm to British factories after the second world war. (See Newlove, 1993) Laban is famous for devising the first dance notation, and for taking some part in the long process of loosening classical dance from the rationalistic and mechanical tyranny of western ballet. With Lawrence, he worked at Dunlop Tyres, Mars Confectionery, Pilkington's Tiles and the Saw Mills at Darlington Hall in the UK.

In his analysis of why workers become less productive, Laban applied his critical understanding of movement. He was aware, for example, that workflow was usually influenced by how safe or difficult individual factory workers regarded the task in hand. Rather than describing the stage location of the dancer within a Cartesian grid system (i.e. map-reference'), Laban's notation represents the individual dancer's solar plexus as the permanent centre of the notation diagrams themselves. His actor-centred emphasis on flow can be associated with the emergence of feelings which, according to the interaction with self and/or others, binds or frees the continuity of movement and gives a dance either a controlled and careful or exuberant and outgoing progression.

Laban spoke of a 'free flow' of movement, and reflected that this usually occurs when a task is difficult to stop suddenly, or when the operative is not expecting errors or dangers. If a job becomes a routine, then free flow is likely. (Maletic, 1987) However, as we know, when a task becomes an effortless routine, it is likely to be boredom and alienation that produces a reduction in safety or manufacturing output. Laban worked closely with individual production line workers to look for personal interests, and characteristic bodily movements, that might be adapted to the tasks required in production. Unlike Newton's or Einstein's descriptions of bodily motion, Laban

recognized the fundamental concept of mental or inner attitudes of resisting or accepting the physical conditions influencing movement or fighting against or contending with the motion factors of space, weight, time, and flow in both a qualitative and quantitative manner. These choices create a polarity of opposing Effort elements of direct versus flexible and indirect, strong versus light, sudden versus sustained, and bound versus free.

5.2 What part does anticipation play in embodied action?

It has been argued that our ability to think - i.e. to solve problems and to plan actions, etc. - evolved from our experience in managing bodily movements. As Calvin (1998) suggests, perhaps more than a million years ago, the brain's capabilities for thinking may have evolved from the necessity to marshal ballistic movements of the body. Newton's first law of motion is helpful in reminding us that, because our muscular powers are limited, many such movements cannot be fully countermanded, once they have been initiated. From an early age, we learn to manage our own body mass using muscle systems that are integrated with a network of proprioceptors and other feedback mechanisms. Often, we must also cope with the parameters of our own body mass and velocity in addition to those of other moving bodies with whom we come into contact.

When we lift an object slowly, we can modify our muscular efforts throughout the action. This may be important, for example, when we lift a heavy weight, and need to anticipate the effort needed to move it, and then to modify the anticipated parameters whilst the action is taking place. However, this is not always possible when faster movements are entailed. Ballistic movements require quite a lot of planning, especially when they last less than a fifth of a second (Calvin, 1998), because they may take place too quickly for effective reaction and compensation. Such continuous 'computations' are not trivial. It is been likely that many team sports involving ballistic objects, such as tennis and cricket, involve skills of anticipation, rather than reactive adjustments. Because of our relatively slow response times, a good batsman, for example, will make intelligent responses to the actions of the bowler while he is running up to bowl, rather than waiting to see the way the ball bounces, just prior to reaching his bat.

5.3 How can we understand the flow of embodied action?

Because driving in busy traffic entails the reading of a continuous flow of information; the process is somewhat similar to verbal discourse, in which the reader anticipates what is likely to be said based heavily upon the context of the discussion. As Wittgenstein said:

> "Conversation flows on, the application and interpretation of words, and only in its course do words have their meaning."

Arguably, there is an important differences between the way we deal with fast flowing situations, and others that are slow enough to read as static. I once heard a taxi driver

commenting on an articulated lorry driver's loss of nerve when trying to steer his way out of a congested narrow road:

> "He shouldn't have stopped, it's much harder to get your bearings when you're standing still.....he should have kept on moving and he would have had no trouble".

Pascal (1670) raised doubts about the assumed importance of rational consciousness in how we compute numbers and make professional judgements. Freud was only eleven years old when the Helmholtz proposed (1867) that perception was dependent on the process of "unconscious inference". A hundred years later, the cognitive psychologist, Benjamin Libet (1993, 1996) discovered that the brains of human subjects indicated their conscious intentions to move, around 200 ms before they actually did so. A further difference of about 350 ms took place between the preparation to act and the conscious intention of acting. Altogether, Libet found that motor potentials occurred up to 550 ms before an action took place.

These findings suggest that our perceived 'present' is around half a second after what we assume to be 'real-time'. Libet argues that we do not notice the delay, as it is an inescapable feature of the way we function. Specifically, this is because our pathology has evolved together with a neural mechanism for "backward referral in time" that enables us to subjectively compensate for the cognitive time lag. If we accept that this process also takes place in manifold times, places, and forms, at different levels of the human body, we may understand why it has been described variously as being largely 'implicit', 'unconscious', or 'tacit' (Ryle, 1949; Polanyi, 1969; Dreyfus & Dreyfus, 1986).

5.4 Do we need a flow-ethics of embodied action?

In defining a possible ethics of flow that incorporates eudemonic principles such as 'conviviality' (Illich, 1975) or 'festive engagement' (Borgmann, 1987), we may require a system of understanding that relates the individual self to its counterpart as collective self. This paper has suggested that this social process may be understood more readily from the basis of experiential models of flow, rather than as fixed and detached categories of being. Many of the tasks we undertake are a combination of conscious strategies requiring planned actions combined with skilled sub-tasks, many of which are unconscious because they become enacted within a repertoire of other actions. In these processes, we may move frequently from one level of awareness to another.

Arguably, when factory workers attain a blissfully absent-minded process of 'flow', they may lose their sense of nostalgia or anticipation. However, as soon as they daydream, their narrow 'present' may incorporate recollections of previous events. If they notice something about the task-at-hand that needs a moment's reflection or attention, their present will widen to reconcile anticipated problems in the future, with useful experiences drawn from the past. Arguably, even advanced stages of meditation merely

put us in touch with several inner and outer 'present tenses' that may be, according to Libet, nearly half a second out of phase with each other.

How would we challenge the dispossessed linearity of Newtonian dynamics, using Libet and Laban's understanding of the fluent world? We often use the term 'information society' to describe the modern world, but it is worth considering what this actually means in terms of 'pace', or 'flow'. Over the last ten thousand years or so, we have standardised a calendar-based flow of salaries and taxes in place of the more situated rituals of giving and receiving that pre-date writing and counting. In the last fifty years these institutions have become rationalised, accelerated, and distributed across digital networks.

Moreover, despite the advent of high-speed computers, bureaucracy still tends to establish long cycles of action and feedback, usually measurable in days, weeks, or months. Many daily transactions, however, still occur at the pace of the heartbeat or around the breathing rate. This contrasts with the much slower ebb and flow of human rights in book-oriented traditions where legislative, or historical cycles prescribed the frequency of ethical exchange at a written, public level, say, between 'empathy' and 'self-respect'. Used in social groups, it might take place at a frequency relating to one of the human metabolic rates, perhaps synchronised with the heart rate, or at a near sub-harmonic of respiration.

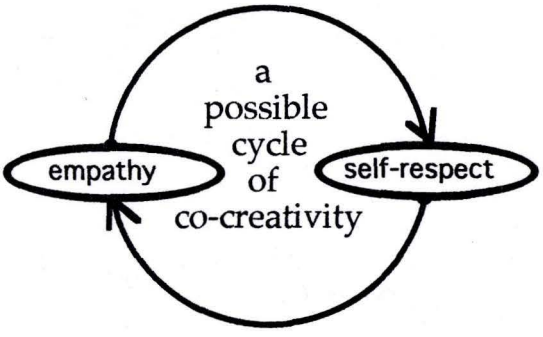

Figure 1 a possible eudemonic cycle of mutual presence

Finally (See figure 1) we may speculate that a more flow-oriented ethics of conviviality may be created from a similarly paced cycle of empathy for others, and respect for oneself. This can be achieved by renewing, and keeping alive the most convivially interactive genres of music and dance that can probably be found in the traditions of all cultures. These recreational forms may then be used to inform the rituals of daily life, and used in other appropriate institutions of work, leisure, and transaction.

Conclusion

The increased rate of economic growth has made it more like a system of flow than a system of categories. This is not all bad, but is likely to attract problems. For example, it has been argued (Vandeman, 1988) that improvements to local traffic flow may alleviate poor fuel consumption in individual cars, but causes a net increase in car usage. How can designers deal with these issues in a helpful way? Should the temporal frame implicit in design practice be re-designed to celebrate the present, rather than the future? If so, design may become identified with more situated activities such as cooking, gardening, or healing. In the 'present-as-future' in which we live, design - say, in the form of fashion, or product design - promises a state of perpetual renewal for every consumer. Unfortunately, this renewal is bound to a process of economic growth that calls upon a consensual, anticipatory sense of reality that is sustained by technology. Deep ecologists (see Naess, 1973; Guignon, 1993) inspired by Buddhism warn that the normalization of desire encourages us to focus on the imagined final outcome of technology, rather than on our actual place in the world of the present. Perhaps, here, the anticipation itself must be reframed as a more interrogative truth, so that the anticipatory "I" can be eclipsed by a more context-oriented sense of "we".

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