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CREATIONAL CHANGE AND THE MANAGEMENT OF HUMAN SYSTEM

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The nature of change, especially creational change, is vital to the management of all types of human systems.

KEY WORDS: Creational change, management.

1. INTRODUCTION

Management involves change. The aim of this paper is to introduce a threefold classification of change with the purpose of making clear how the third type, creational change, is distinctive compared to the other two types. Four types of management situation are introduced, based on the type of change involved in the managed domain and in the management system. The role of creational change in management is discussed and a number of guidelines or suggestions relevant to this sort of management are outlined.

One feature of the notion of creational change is the conjecture that such change is not amenable to normal scientific accounting. Once creational change has produced whatever it does produce then that product may be amenable to scientific investigation and understanding but the actual unique and open process of its production will not be. This is not to say that we can never learn how to construct (or perhaps more appropriately, initiate the growth of) entities that have the capacity for creational change, or that we shall not be able to make very good use of such things. And it is not to say we can establish no guidelines or understanding at all of the conditions likely to initiate and support creational change.

One of the aims of this paper is to heighten our general awareness of creational change as different from other sorts of change. In doing this we may then see where such change is appropriate rather than other forms of change. In particular, recognition of the role of creational change in the management of human systems provides a counterbalance to more rigid styles of management.

2. A CLASSIFICATION OF CHANGE

The aim of this section is to briefly introduce the classification of change that will be used in this paper. An attempt is made to give a broad conceptual account of the classification, and although no originality is claimed for the basic categories some of the ideas used to clarify what is meant by type 3 change are not commonly made explicit.

The classification is presented because it is a way of focusing attention on various forms of management activity – from the very mechanical to the highly creational. The classification is a

convenient way of highlighting certain points; it has heuristic value. It is a common sense classification that should be easily understood by reference to ordinary experience. To make the classification conceptually watertight would be a difficult task and is not attempted here.

The classification is as follows. Type 1 is the change shown by the nature existents have while still remaining the existents they are. Type 2 is change involving the regular transformation of existents. Type 3 is change involving the creation of existents. An example will keep the distinction clear: living organisms have natures that they display in type 1 change; they undergo development (ontogenesis) which is a regular transformation of their existence and type 2 change; and finally species undergo the changes of biological evolution which is type 3 change. This paper is particularly concerned with type 3 change which we shall also refer to as creational change.

2.1. Type 1 and Type 2 Change

Type 1 change is displayed by the nature of an existent through its properties (which reveal themselves in interactions with other things) and through how it behaves. Type 1 change is change involving an existent but which does not lead to the destruction or transformation of the existent. Type 1 change serves to identify, or give identity to, an existent.

A point that is important later, is that the identity of a thing, as given by how it affects other things and is itself affected, depends upon the context, environment or relationship the thing is in. Put briefly, type 1 change is context dependent and so therefore is the nature of a thing. For example, the electrical properties of a material exhibit themselves only in electrical contexts, so it is only in such a context that its electrical nature exists; or, in the human realm, the way a person reacts to a life-threatening situation may not be revealed until such a situation arises. This means that we can be surprised by a thing, whose nature we believe we know, when it is in an unfamiliar context since it may then reveal properties and behaviour that were non-existent before. It is important to appreciate that we are saying that the properties were non-existent rather than just non-apparent since the stance we are taking is that if a property does not make itself manifest and cannot do so within the context it is in, then the property does not exist within that context. Therefore, we are not assuming that the properties of a thing are somehow pre-ordained, rather that properties belong not to a thing in isolation but to the relationship between a thing and other things or context. It follows from this that our knowledge of things is partially bound by the contexts in which we know the things. Of course, for the natures of much of the ordinary physical stuff of the world, we have good reason to believe that we have very full and complete knowledge, but for things in the human realm this is not so often the case and our knowledge is much less complete.

Type 2 change, which is change involving a regular transformation of an existent, may be seen as an extension of type 1 change with the difference that the changes the existent undergoes leads to a change of nature of the existent so that its identity, and therefore to some extent what it is as an existent, changes. For example, water freezes, and when it does so it has a different nature than that which it has when it is a fluid.

Type 2 changes are those changes of nature, or transformation of existents, that are regular. The notion of regularity implied by this is not simply that of being seen or judged regular by some observer but rather regular in a more absolute sense. The idea is that a transformation of existents is regular if there are present in existence things that will interact to produce the transformation. For example, phase changes in nature are type 2 changes since the precursors of the phase change are in existence prior to the change and they have interactions among themselves that produce the characteristic outcome of the phase change. For instance, when water freezes it changes its state through the emergence of a new set of relationships between the water molecules; the water molecules were there prior to the phase change and were in such a condition that they would interact to form the relationships that characterise frozen water. Atomic and molecular reactions leading to the creation and destruction of chemical existents is another example of type 2 change. The precursor chemical components in the appropriate states and contact conditions are able to

interact and form the product existents. Again, the existents and their ways of interacting determine the outcome of the change. Ontogenesis provides another example of type 2 change – the change is founded on and regulated by established existents: it is not an open-ended change.

Not all transformations of existents are regular yet we would want to include them within the type 2 category. For example, chaotic transformations are not [regular,] as when a pane of glass breaks. These transformations are characterised by extreme sensitivity to initial conditions so that the outcomes of transformations with initial conditions that are very similar may be very dissimilar. Gleick provides a good account of the recent developments of our understanding of chaotic change (Gleic, 1987). Chaotic change, although in some cases on the borderline between type 2 and type 3 change, is classified as type 2 change if the outcomes, although indeterminate in detail, do belong to a regular class – for example glass breaks into fragments of glass rather than turning into an irregular something else.

Because type 2 change is regular, to a greater or lesser extent, its characteristics are open to scientific investigation, descriptions, and accounting. Again, we know a good deal about the transformational character of much of the ordinary physical world, but, as with type 1 change, unfortunately a good less about type 2 change in the human world.

The boundary between type 2 and type 3 change, rather like that between type 1 and type 2, is not sharp. Our aim in the next section is to develop the notion of type 3 change.

2.2 Creational, or Type 3 Change

The term creational change has been used for type 3 change, rather than creative change, simply to minimise the associations the term is likely to have. The adjective “creative” is in much more common use than “creational” and had “creative” been used it would have made it would have made it more difficult to establish the idea of type 3 change. This is an example of “neutral naming” – a way of encouraging unprejudiced thinking about an idea or issue.

The key idea about type 3 change is that it produces unexpected existents, that is existents that are not a consequence of the existents and interactions current prior to the onset of type 3 change. This in in contrast to the notion of type 2 change where the products of the change are a consequence of what is in existence prior to the type 2 change. What we are not saying by making this statement is that the eventual results of the creational change come out of nothing. But what we are saying, is that prior to the creational change and even knowing creational change is to commence, the results of the creational change are not determinate and are genuinely unexpected. To see the force of this, think of what happens with type 1 and regular type 2 change. In both cases the current existents, their relationships, and the change do determine the outcomes. For case of chaotic type 2 change, although the precise products of the change are not determined at least the kind of product, within fairly tight bounds, is determined.

Let us accept that creational change is such that the consequences are not determined and ask how this might occur. The key to the answer rests on a point made earlier. This is that the nature of an existent depends upon its context or its relationship to other existents. Hence, an existent may show new capacities and character if it is in a new relationship or context. In showing this new character it in turn is providing something new which can itself be part of new relationships. We can see from this that the trigger for creational change is a new relationship that generates new products which then interact with one another, and perhaps already established existents, to generate further products until a mutually supportive network of relationships is established forming new stable existents. This sort of change is not determined by the state of existence prior to the change since the mutually supportive network of new relationships and existents is reflexively produced. That is, the stable network of new existents generates itself by turning its products and properties back on itself to provide the relationships and existents which go to form the stable network. The diagram below may help illustrate the notion of the reflexive process of creational change.

Stable Creational products composed of meso-forms

HHAAAAADDDAA GGFDDDDKKAA

Created Meso-forms, unstable in isolation

AADDDAA CCEEEECC GGFDD

HHAAA HHHHBBBB DDKKKAA

Current existents, relationships, and interactions.

AA B CC DDD AA A EEEE F HH BB

DD BBBB GG C D HHHH F KKK AAA E CC

A F AAA D CCC BB CCC DD EE FFF H DD D

This diagram indicates the process of reflexive creational change in which meso-forms produced via the creational change and unstable in isolation are able to link into stable creational products.

A couple of further points about the process of creational change should be made. First, although we presented the process as generating itself from its own product – that is newness begetting newness – there is of course no reason why it is only new existents or relationships that should participate. What is important is not what stuff participates in what is new but simply that there is something new; and all that may be required for this is some seeding by new relationships to initiate a new mutually supporting system of existents, relationships and interactions.

The second point about creational change, which makes it very rare in the physical rather than the human world (and relatively rare in the biological realm), is that new relationships that are productive in the generative and mutually supporting way that is required, are rarely formed because there are not the orchestrating or controlling influences available to establish and maintain the new relationships that are required. There are in current existence all sort of orchestrating and controlling existents, but these are serving the survival and persistence of the current existents and not the emergence of new ones. Indeed, they tend to operate in such a way as to deny existence to novel emergent existents, hence making creational change very rare. The sort of existents that do appear naturally in the physical world are those that form into families that strongly mutually support one another and self-organise and self-regulate themselves: they form networks of tight existence. Atoms, molecules, crystals, and other common forms of nature illustrate this point.

We know from our success from manipulating, crafting and engineering the physical world that an enormous range of stable physical existents with significant properties are possible – think of the products of modern technology. But these existents do not have inherent tendencies to form – their parts do not have natures that naturally attract one another into the relationships that form the existent. We have to engineer the relationships – we use our creational capacities to learn how to do this. Furthermore, we very often have to be the regulators, protectors and preservers of these entities since their continued existence and their significant natures usually depend upon the maintenance of very special conditions which are not necessarily self-maintained by the existents. For example, think of an electric light bulb and the conditions that must be met for its useful functioning.

We now need to turn our attention to a critical feature of change if it is to be classified as creational change. This is that creational change must have the capacity to produce significant products. This is another feature that makes it relatively rare as a type of change. By significant products we mean that the change produces existents that make a difference; that have a distinctive presence in existence; that make existence different because they are present.

The very process of creational change demands that the intermediate products of the change be significant in this sense just so that they can have productive effect in contributing to and generating new existents. But more than this, creational change must end up creating something which is other than just ephemeral – hence the emphasis on creational change leading to a stable network of mutually supportive relationships and existents. Of course, the processes of creational change will almost certainly include the production of ephemeral existents, meso-forms, and fragments that

eventually find no permanent place in existence, yet nonetheless participate in an important way in the creational process and its significant outcomes.

The ephemeral and unstable nature of the meso-forms of creational change are yet another reason for the rarity of production of significant novel outcomes and why these outcome do not exist, and are not a consequence of the happening in the domain prior to the creational change. The process of creational change carries with it some sort of orchestrating framework (which may itself undergo creational change) that provides support for unstable meso-forms so that there is a chance for these to gain stable existence in interaction with one another. Without such a framework, significant creational outcomes would be extremely rare. Unfortunately, we have almost no clear idea about the nature of such frameworks.

Creational change is rather special. It is easy to form new relationships – it happens everywhere all the time in unquantifiable abundance. The trouble is that the vast majority of these relationships are entirely unproductive – they simply have no influence on anything and therefore might as well not exist. For example, take any three things – my left thumbnail, the word at the top of this page, and the sun. These three things form a relationship but one with no influence on anything. But this is not entirely correct. I have now mentioned this relationship and brought it to your attention so it has become a real relationship in the world; it makes a difference and has become significant. This is an example of how an existent (a latent existent in this case) can reveal properties depending upon its interactions and context. If this example is too far-fetched, think of something much more concrete: an electric wall socket and a plug that fits it. The relationship between the terminal holes in the socket has no particular significance except for something like a plug that has its terminals in a matching relationship so that it and the socket can join in making a sound electrical connection. Seen in this light, creational change involves the linking up of latent relationships and unexploited potentials to produce consequences that become significant simply because they are placed in a context or network of existents that give them significance.

Creational change, although feeding on other types of change and on chance relationships and events, is not generally produced just be this sort of interaction alone although it may on very rare occasions happen like this. Creational change requires more than just bare luck. Monkeys working a typewriter won't ever produce the works (or even a page) of Shakespeare. Humans, and human systems, are able to act as agents of creational change and, to a much more limited extent, perhaps also some of the higher animals are able to act in this way. Creational change, we believe, occurs through evolution by reproduction and natural selection of living organisms, but certainly its most spectacular manifestation is in the human realm. We know little about what underlies the human capacity for creational change, and discussion of this area is not the subject of the present paper. We turn now to considering types of management and the relevance of creational change to management.

3. TYPE 3 CHANGE AND ITS RELEVANCE TO MANAGEMENT

Human individuals have the capacity for creational change and to a greater or lesser extent use this capacity in their lives. A great deal has been written about individual creativity and most of it is relevant to what we have been discussing. However, our main concern is with creational change within human systems regarded as systems, and we shall not be specifically concerned with individual human creativity even though this capacity is at the heart of creational change in human systems.

Managers are involved with change. They make interventions in order to achieve certain results which are more or less clearly specified. At the low end of management, results are often well specified but at the top end the specification is generally very broad. We can get some feel for different kinds of management by considering how various kinds of management can be brought to bear on various types of domain. Type 1,2 management action involves type 1 and type 2 change. This implies that the management action is a consequence of the current nature of the managing

entity (person, program, or machine) and does not involve creational change. A type 1,2 domain is one in which the primary types of change are type 1 and type 2, with no significant type 3 change. Type 3 management action involves some creational change, and a type 3 domain is one in which creational change can take place (e.g. one that contains people). The table below summarises the types of management situation that we shall consider.

		Management Action	
		Type 1,2	Type 3
Domain to be Managed	Type 1,2	A	B
	Type 3	C	D

3.1 Type A Management

In Type A management situations, both the domain and the management action only display type 1 and type 2 change and so a regular coupling can be established between the two. This sort of situation often involves the kind of management intervention that can be automated: for example, either by constructing a special purpose control device such as a thermostat, or through building an appropriate computer control system. The required intervention may also be implemented by a set of situation-response rules to be executed by human operators. This form of management is routine and can be applied to non-human domains (e.g. a chemical process plant), as well as human domains (e.g. managing the seating of people in a theatre according to the tickets they hold).

Type A management occurs, usually with some involvement of other types, when a human manager uses his skills, experience, and general abilities to perform the management task. For example, a yachtsman sailing his boat, or a foreman supervising his gang. The skilled individual in carrying out these sorts of task is involved in little or no creational change, but nonetheless the interactions are complex and difficult to fully analyse and account for. Possessing skills implies that there are existents (e.g. knowledge, experience, expertise) that underlie the management action, which places this this sort of management action in the type 1,2 category. However, there is likely to be some creational change taking place since even the skilled person will usually be exercising, thinking, and talking about their skills and experiences in ways which have some creational component or impact.

3.2 Type B Management

Type B management situations involve some creational change on the part of the managing entity although no creational change is present in the domain to be managed. This sort of management situation is very common: a non-human or human domain which can be characterised as determinate and bounded requires creational management action so that a non-creational type 1,2 management entity can be introduced. For example, a chemical process plant may require the construction of a type A controller and to achieve this, creational action (in analysis, design, knowledge building, etc.) is called for. Or, staying with the example of a process plant and more in the human realm, a set of safety procedures for use in the plant may need to be drawn up, which again may call for some creational action. In most type B management situations, the creational contribution required is supported by principle, knowledge, skills and practices that minimise the amount of actual creation that is required. Of course, with a thoroughly unfamiliar domain considerable creational change may be required on the part of the manager.

A comment on learning is appropriate at this point. Learning almost always involves creational change on the part of the learner. The amount will vary with circumstances and depend upon whether the learning is structured and guided by a teacher (in which case generally less creational change will be required) or is done unguided by the learner himself (in which case usually more creational change will be necessary).

3.3 Type C Management

Type C management situations involve type 1 and type 2 management intervention in a domain containing type 3 change. Usually, the managed domain will be a human one since human systems are potentially always a source of type 3 change. This style of management is essentially unstable since the management action is fixed whereas the managed domain is open because of the actual or potential creational change. Because of its openness the domain has a tendency to produce existents and effects that are outside the control capacity of the closed type 1,2 management action. Without some sort of compensating creational change in the controller, effective management is lost. Although a management situation of this type is fundamentally flawed it is common because it can arise wherever a type A management style is adopted in what is thought to be a type 1,2 domain but which in fact has type 3 potentialities. Often the assumption of type 1,2 change is correct providing certain conditions, not necessarily under the control of the manager, are maintained. The recent change in Eastern Europe illustrates what happens when a type C situation becomes unstable.

Unfortunately, the type C style of management can exist even though the manager has creational capacities. This occurs if the creational capacities of the manager are insufficient to match the creational capacities of the managed domain. For example, a business firm, which has in the past adapted well to its traditional market and to changing needs, may be suddenly faced with competition based on a new technology which the firm is unable to absorb rapidly enough to allow it to survive in the changed market place. Type C management also occurs when managers simply become set in their ways and fail to realise the need for continued creational change. These examples of mismatch between the variety of the manager's actions and the variety of the actions or events in the managed domain exemplify a general principle of control known as the "Law of Requisite Variety" (Ashby, 1958).

3.4 Type D, or Creational Management

Type D management situations involve type 3 management action in type 3 domains – that is, it is the interplay of two creational domains with, for successful outcome, creational change taking place in both. This is the most demanding and least well recognised type of management situation. It is a situation that will undoubtedly include type 1 and type 2 change in both the managed and the manager domains, but will also critically include both type 3 change in both domains. It is the most demanding sort of management situation because it is fundamentally open – it will end up where it will end up and not necessarily where the interested participants want it to end up. Revolutions, large and small, in human systems (e.g. business, political, social, cultural, intellectual, scientific, technological) are prime examples of type D situations.

Type D management, because it is open-ended and potentially disruptive of established orders, is often avoided. As a result, rather than explicitly encouraging some timely type D activity to resolve an intractable problem, managers continue with other ineffective management methods and often fail to appreciate that they are not tackling the trouble. The end result is usually some damaging breakdown which then has to be dealt with using type D management (e.g. involving restructuring, breakups and sell-offs) which have far more undesirable consequences than timely type D intervention might have had.

The type D manager, and the managed entity, are on a journey of creation. The manager, and usually the participants in the managed domain, have some image or description of a destination, or at least a set of values and concerns, which they will, if type D activity is going to be fruitful, be constantly reviewing, re-structuring, and re-creating. Since creational change means becoming something which is not prefigured in what currently exists, the participants must appreciate that they can only know the result by undergoing the creational change – the result cannot be promised or predicted. However, this does not mean that the participants are unable to express their values and concerns and cannot influence the change.

Indeed, they influence the change and outcome by being part of the creational change. But, because it is creational change, it may be that the values and concerns that the participants enter with are some of the very things that will be transformed by the change. On this view, type D situations demand courage from the participants: the courage to accept some destruction and loss in order to achieve, perhaps (but without guarantee), some new creation and gain.

Some timely type D management activity, according to the view presented here, is of value but is difficult to initiate, we end this paper with a section devoted to some guidelines and suggestions for creational change in human systems.

4. GUIDELINES FOR TYPE D MANAGEMENT SITUATIONS

Type D management situations are always interwoven with types A, B, and C. Furthermore, creational change as a conscious activity (undoubtedly with subconscious aspects) is not undirected or unguided: principles, goals, values, concerns, knowledge, beliefs, attitudes, frameworks, paradigms, and many other factors will provide directional influences. But the key point is that creational change has to transcend these established things since it is change that does not come directly out of what already exists. Often the new will drive out or replace the old, or will modify, complement or cooperate with it in significant ways; rarely will the old be unchanged by the new. Creational change starts from what already has a grip on existence – what already exists: often whatever this is will not easily release its grip. These ideas underlie many of the points made below.

The following guidelines are not particularly original, and many of them are common management practice or are recommended in management books – see, for example, “Thriving on Chaos – Handbook for a Management Revolutions” (Peters, 1988). Their purpose is to reinforce the main message of this paper which is that creational change has a vital role to play in the health of human systems and it is a form of change that has to be lived, and worked with and through, on each separate occasion. It cannot be proceduralised or passed over to experts.

4.1 In type D management situations people and human systems are the primary sources and subjects of creational change. Potentially, all the relevant parties have to change so they must all be part of the change. Don’t design the system in the abstract – even if creationally done. Get everyone involved since they are the stuff that has to change and they need, to a greater or lesser extent, to be involved in the creational change.

4.2 Novelty may come from re-arranging and re-contextualising the old.

This derives from the point that an existent may have properties that only become manifest and effective in certain contexts. An obvious application of this is to get people and human systems to change roles, to try different jobs, use new tools, etc. This can be de-stabilising but it can lead not only to the occasional startling success but also to the creation of rich and productive understanding that repays the inherent dangers of de-stabilisation.

4.3 If things are so tight that they can’t be rearranged then they can’t enter into new relationships, and opportunities for creational change are removed. Keep a bit of slack, have a bit of slop. Don’t over-specify, over proceduralise, or over-legislate.

People need time to reflect, opportunities to experiment, time to enter into new relationships, time to try new ways. So do human systems. Keeping things so tight that there is no time, kills this potential.

4.4 If things are too loose, if anything goes, if there is little commitment or responsibility then fragile and difficult things have little chance for survival and little chance to prove their worth.

This problem is the opposite of things being too tight. There need to be a supportive and protective structures, obligations and duties, constraints on interference.

4.5 Creational change usually requires several new things to be in complementary and supportive relationships to one another before viable newness results, and often requires the removal or suppression of old things – so a lot may have to change for success. Sometimes minimal intervention will produce large and important change, but more often it will not.

Recognising that creational change has sort of critical mass is important since it means time and resources must be allowed which are sufficient to see the creational change through to solid success. All to often, in the UK for example, inventions are created and innovations are developed and then denied the final support and investment to see them become commercial successes. Other countries, Japan as a notable example, seem to fall not so frequently into this trap. If you start on creational change then be prepared to give it all you have got – half-hearted attitudes and support will almost certainly fail.

4.6 There are no reliable signposts during creational change.

Any specifications, blueprints, plans, maps; listings of objectives, terms of reference, principles, should all be seen as simply contributing to rather than dictating creational change. Such constraining devices are needed, but should not smother the potential for creational change.

If at first you don't succeed, try, try, try again. Creational change doesn't follow a time-table – it does what it does by doing it. And it isn't a neat efficient course that it follows. It is an exploration.

4.7 Creational change involves waste, delay, repetition, mistakes, misconceptions, wrong judgements, distorted values, foolishness, blindness . . . Recognise this, accept it.

4.8 Do prototyping, experimenting, re-designing, improving, re-building; accept an evolutionary approach. Do pilot studies, trials, get feedback. Don't go hard on a solution too soon. Don't make it impossible for people to change their minds and judgements. Don't demand highly specified deliverables. Keep options open, maintain variety, don't suppress disagreements and conflict, encourage contrary opinion. Keep things fluid until they gel of their own accord.

4.9 Strong current existents will deny existence to the emerging, fragile new – the new needs nurturing, supporting, protecting. Sometimes it needs the territory of the old so threatens the old.

New things can get swallowed up, trapped, or destroyed by existing things when what they need is to be given protection from the old so that they may have the chance to link with other new things, or [become] disassociated [from] old things, to be able to show their worth.

Sometimes the strong current existents have to be restrained; sometimes the old just has to be wilfully broken up as the only way the domination can be relieved or the territory released.

4.10 Goals, values and attitudes need to be included in creational change. These are perhaps the tightest existents in most human systems and the source of the most restraint on fruitful creational change.

5. SUMMARY

In this paper we have introduced a classification of change into three types in order to show how various sorts of management situation map onto these types. Our particular concern has been with type 3 change which we have chosen to call creational change. Type 3 change has the capacity to produce significant new existents and relationships. It is characterised by producing outcomes that are not prefigured in, and therefore not determined by, the existents and relationships which are current prior to the change. Creational change is, within its own arena, unique and not open to scientific accounting although the characteristics of its product may well be.

Four types of management have been briefly introduced, ranging from the most rigid which has non-creational change in both the managed and managing domains, through to the most open, which was labelled type D, and which has significant creational change in both these domains.

The idea of type D management situations has been discussed and we ended the paper with a selection of brief guideline relevant to this type of management.

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[This paper was delivered at a symposium on Information Science held at University College, London on July 11th 1990. It was chaired by Professor F. H. George who provided the following notes on the discussion.]

DISCUSSION

Dr Elstob explained in his paper the threefold nature of change which is involved in management. It is the third type of change – creational change – which was the main target. It was agreed by a number of speakers that creational change was of extreme importance and that it was not immediately amenable to scientific processing; only after the creational change has been achieved did the traditional scientific processing go into action.

Professor Penrose and others likened the process involved to the use of the imagination in seeking new ideas and then formulating these ideas more explicitly for use by logical inference making.

Dr Elliman agreed with the possibility of drawing such a distinction in matters of change, but was doubtful whether the traditional scientific procedures still could not be used throughout.

One of the problems that was discussed was that of whether creational change always involves novelty or whether the novelty is simply a matter of novelty to the creative thinker. The idea that "there is nothing new under the sun" was mentioned, but almost everyone agreed that in fact new things were being discovered and new ideas developed all the time. That such new things and ideas were implicit in the world may or may not be the case, but this in no way alters the fact that people in the world continually discover or invent new things.

Dr Clementson voiced support for Dr Elstob's viewpoint and argued that creative change is a reality and that change itself is cumulative both at the inventive or creative level and at the practical and applied level.