

**THE PARADIGM AS AN INTELLECTUAL MODEL**  
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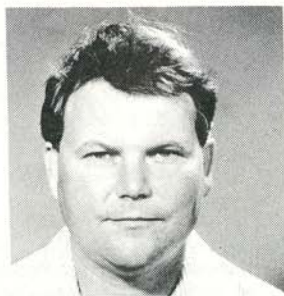
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THE PARADIGM AS AN INTELLECTUAL MODEL\*  
(DIE PARADIGMA AS 'N INTELLEKTUELE MODEL)  
ROGER C. FISHER\*\*



UITTREKSEL

Die Griekse ontstaan van die term **paradigma** met die letterlike betekenis van 'n model en die latere taalkundige gebruik as 'n woordvormingsmodel, word beskryf. Die metaforiese gebruik van Kuhn in die bestudering van die geskiedenis van die wetenskap word ondersoek en die gebruik van die term uitgebrei na die kunste. 'n Paradigma word soos volg omskryf:

1. Dit is 'n implisiete en gedeelde model wat die gemeenskapstrewes op die ervaring en interpretasie van die fenomenologiese omgewing in enige spesifieke tydperk rig.
2. Dit is 'n eienskap van die abstrakte wêreld. Die voorskrifte is onuitgesproke en ongeformuleerd, maar rig die intellektuele formulering van die gemeenskap. Die heersende paradigma staan buite die bereik van metastudies en kan nie geartikuleer word nie.
3. Dit is 'n gedeelde intellektuele model wat die 'normale' aktiwiteite van die gemeenskap reguleer en beperk. Om by die veranderende behoeftes van 'n gemeenskap aan te pas, moet dit nogtans in 'n staat van dinamiese ewewig verkeer.
4. Dit sluit sekere schemata van unieke individuele ervaring uit. Sodra voldoende van hierdie uitgeslote ervarings gedeel word, ontstaan 'n krisistydperk.
5. Dit vervorm na 'n tydperk van krisis, tot 'n nuwe paradigma. Dit kan die oue in geheel of gedeeltelik in- of uitsluit.

INTRODUCTION

The term **paradigm** is currently loosely applied, as it was by Kuhn. It would seem to serve equally well as a synonym for 'example' as it does for 'world view'. In order to determine a specific use for the term its meaning needs to be investigated and defined.

A discourse on paradigms derives from an understanding of man as a generator of ideas, which, as an intellectual tool, have survival value and as such need to be communicable and perpetuated in time. Further, that these ideas are encoded in a hierarchy of complexity and that the level of complexity at which

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these ideas are communicable will determine the intellectual environment of the community.

It was in his discussion of the intellectual environment as determinant of man's endeavour (in this particular instance man's scientific endeavour) that Kuhn (1970) postulated that such a shared environment existed. He coined the term 'paradigm' to designate such an environment.

### THE ORIGIN OF THE TERM

The term 'paradigm' was borrowed from linguistics, where it is used to describe any model for word formation, for example the Latin conjugation **amo, amas, amat, amamus, amatis, amant**. The original word is the Greek **paradeigma** which is literally a model. The **paradeigma** was a "... full-scale specimen of the more elaborate elements such as capitals. From these mock-ups builders could extract detailed dimensions with callipers, thereby achieving repetition for replicas without any need for scaling up or conversions" (Porter, 1979:3).

From this literal meaning of 'model' derived an abstract metaphorical meaning closer to 'exemplar'. The metaphorical usage suggests that the mind encodes experience into cohesive models in order that similar situations may be comprehended. Kuhn's choice in its metaphorical form implies that if one has an exemplar, one can proceed by analogy without the explicit articulation of a set of rules for doing so.

### KUHN'S USAGE OF THE TERM

Gregory (1984:561-2) has found parallels between Kuhn's 'paradigm' and William James' (1907) 'philosophic atmosphere', Alfred Whitehead's (1985) 'circumambient atmosphere' of 'unchallenged and unsuspected presuppositions' and Francis Cornford's (1950) 'abstract schemes of conception that escape notice'. The term 'paradigm' seems useful as replacement for these unwieldy descriptive terms if the meaning is retained.

Kuhn's critics matched the term with other usages since the usage of his own term was unspecific. This was immediately seen to weaken his argument. Shapere (1964: 383-94), Buchdahl (1965: 55- 69) and Masterman (1979: 59-89) all identified Kuhn's equivocal use of the term. It was seen that what he termed 'paradigm' could be dismissed as 'theory', 'method', 'model', set of axioms or **weltanschauung**. Kuhn responded to his critics by appending a postscript to his 1962 opus in which he admits the ambiguity of usage:

... in much of the book the term 'paradigm' is used in two different senses. On the one hand, it stands by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. (1970:175)

Kuhn regards the second sense of his usage of the term as 'philosophically deeper'.

The first sense of the term is replaced by the term 'disciplinary matrix' (Kuhn, 1970:182) which is what a particular community of specialists share "... that accounts for the relative fullness of their professional communication and the relative unanimity of their professional judgements".

For the second sense of the word he retains the word 'paradigm' which he claims is the "... consequential knowledge of nature acquired while learning the similarity of relationships ..." (1970:190), a learning which "... comes as one is given words together with concrete examples of how they function in use: nature and words are learned together" (1970:191). Kuhn equates this with Polyani's 'tacit knowledge' (1970:191).

Kuhn's problem derives from his wish to explain the conduct and events of a particular discipline, namely science, and ascribe attributes to the practitioners of that discipline. Conceptual development is an attribute not only of scientists but of all mankind. It may therefore prove helpful to examine the understanding of the development of cognition before returning to the investigation of the word 'paradigm'.

## THE PARADIGM IN THE HIERARCHY OF COGNITIONS

The development of cognition has been a particular concern of psychologists of the twentieth century. Piaget has termed the first cognitive unit acquired by the intellect 'the schema' and it is defined as "... the internal representation of some generalised class of situations enabling the organisms to act in a co-ordinated fashion over a whole range of analogous situations" (Gregory, 1987:696). From a schema can be built an 'image' (Mussen, Conger & Kagan, 1974:212) which is "... a detailed, elaborate and conscious representation ..." A common set of attributes among a group of schemata in turn form 'concepts' (1974:272). The concept is "... an abstraction or general notion that may serve as a unit (or atom) of a theory" (Gregory, 1987:157), theory being "... systematically organised knowledge applicable in a relatively wide variety of circumstances: especially, a system of assumptions, accepted principles, and rules of procedure devised to analyse, predict or otherwise explain the nature of behaviour of a specified set of phenomena" (American heritage dictionary).

The purpose of this simplified setting out of cognitive development is to demonstrate the connection between the internalisation of experience and the formulation of theories of the phenomenological world. It could be said that if the schemata of individuals are too divergent there is no basis for shared theories. One can then argue that it is shared experience which makes schemata communicable as the basis of shared concepts in the theories of a society.

It is thus the set of shared schemata which constitutes Kuhn's 'paradigm'. These schemata are the underlying cognitions from which the model or pattern is constructed. The exchange, discussion and investigation of theories become possible through communicable analogies, metaphors and concepts. There will, however, be a body of schemata which is unique to the individual. Since it is individuals which constitute the members of a society, there will also be disparate and unshared schemata which will not contribute to the paradigm.

That 26 different interpretations can be attached to the meaning of Kuhn's use of 'paradigm' by Masterman (1979) without diminishing the validity of the term, leads to the question: "Why, if the use of the term is so imprecise, does it still remain both meaningful and contribute to as coherent an argument as Kuhn's is?" Insofar as his discussion is of attributes of the scientific discipline the term 'paradigm' is applied throughout the levels of the hierarchy of intellectual formulations of scientific thought. The pattern of the formulation within each tier of conceptualisation can be said to be 'modelled' on the broader intellectual pattern. Thus each formulation replicates the pattern of the broader intellectual framework in which it is formulated.

The 'modelling' implicit in the term 'paradigm' refers to the ways analogous phenomena are modelled intellectually according to the same pattern. However, as has now been shown, this modelling is not only at a particular level of conceptualisation but also replicates patterns of higher complexities of cognition. Thus the term chosen by Kuhn is not only apt but illuminating.

## 'NORMAL' ACTIVITIES

The activity which derives from a shared paradigm Kuhn terms 'normal science'. This entails conducting research as a problem or puzzle solving activity which is "... an attempt to force nature into the

performed and relatively inflexible box which the paradigm supplies" (1970:24). This is a conservative enterprise which comprises

- (1) increasing the precision of agreement between observations and calculations based on the paradigm;
- (2) extending the scope of the paradigm to cover additional phenomena;
- (3) determining the values of universal constants;
- (4) formulating quantitative laws which further articulate the paradigm; and
- (5) deciding which alternative way of applying the paradigm to a new area of interest is most satisfactory. (Lossee, 1980:204)

One problem with this view of normal science is that it presumes some explicit formulation of the prevailing paradigm, for how else can we extend the scope of the paradigm (point 2) or further articulate the paradigm (point 4) or decide which alternative ways of applying the paradigm is most satisfactory (point 5)?

The paradigm can be seen as the systematisation of a body of schemata so as to facilitate the communications between individuals and accommodate phenomena within the communal cognition but which lie beyond the level of meta-cognition. Hence any attempt at formulation of a prevailing paradigm will exclude some tacit presupposition which is guiding the enquiry into the nature of that paradigm and which therefore too constitutes that paradigm.

The activities conducted within a paradigm do not impose upon the paradigm but may well expose the individual to experiences which require the formation of new schemata. These schemata may lie outside the set of the prevailing paradigm. Should schemata arise which are shared by a significant number of individuals, they will form a new set which gives rise to a new paradigm. This paradigm could be exclusive or inclusive of some or all of the schemata of a previous paradigm.

## PARADIGM CHANGE

Kuhn (1970:52) speaks of 'paradigm change' and says that this change is provoked by the activities of normal science. Since the scientist is exposed by these activities to new and unexpected phenomena, such exposure will of necessity provoke the formation of new schemata. He further postulates that:

The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgement leading to that decision involves the comparisons of both paradigms with nature and with each other. (1970:77)

Again we have the problem here of an acceptance of complete familiarity with a prevailing paradigm. If the paradigm is directing the investigation, it cannot be a weighing up of paradigms ~~per se~~ which the researcher is involved in. It is rather the reformulation of the schemata into an internally consistent whole. This is necessitated where the consistency of schemata is disturbed by newly encountered phenomena which then provoke the formation of new schemata. Such a reformulation of schemata, if shared by a significant number of persons, will provoke a paradigm shift. Hence "...the transition from a paradigm in crisis to a new one from which a new tradition of normal science can emerge is far from a cumulative process, one achieved by an articulation or extension of the old paradigm. Rather it is a reconstruction of the field from new fundamentals..." (Kuhn 1970:84). This Kuhn (1970:90) terms a 'scientific revolution'. When such a revolution occurs, then the paradigms changes and "...the world itself changes with them" (1970:111).

In his argument Kuhn cites from the field of gestalt psychology to illustrate how the community sees things previously unobserved. This is literally true since the development of a schemata enables one to observe something which may previously have created stimuli, but without analogous schema for the pattern recognition, remained subliminal.

### THE PARADIGMAS DIRECTIVE OF ARTISTIC ENDEAVOUR

Kuhn's postulate of a paradigm was formulated as an historian attempting to explain the discontinuities of scientific 'progress'. The scientific discipline is the attempt to impose a pattern on the phenomenological world so that man may engage and exploit that world. Science is but one of man's activities and all man's common activities are directed by the shared schemata or paradigm. Hence not only science, but all man's communal undertakings are directed by the prevailing paradigm.

Man encodes his artefacts with the ideas generated within the prevailing paradigm. His art reflects such patterns of encoding which constitutes the 'style' of the artefact. The prevailing paradigm therefore not only directs the scientific pursuit, but also the artistic endeavour. The style of artistic expression is thus a reflection of the prevailing paradigm.

Laszlo (1973:277-9) parallels the nature of scientific endeavour with the development of artistic style:

Similar to science, the collective endeavour of a population of aesthetically constructing natural-cognitive systems ('artists') can be examined as the multi-individual system in which such constructions are typical ('art') ...

We can talk of "normal-art type artists" - more simply conservative artists - and of "crisis-art type artists" - or the avant garde...

'Conservative artists' (and this term is used here to include not only professional artists but all conservatively creative persons) constitute that segment of the art community which is concerned with maintaining an already established style. This style is the basis of their artistic activity; it functions analogously to a paradigm in science. Conservative artists do not seek stylistic innovations - their creativity consists of adopting the style for their own artistic purposes. Theirs is an essentially 'puzzle-solving' activity. They take a style, and use their skill and ingenuity in devising new techniques and new topics for it. Thereby they extend the range of application of the aesthetic constructs proper to that style, and refine them...

A 'style' in art is the functional analogue of a 'paradigm' in science. Both are construct sets, lending meaning to experience and coding conative responses to it...

The world of perceptual experience is constructed as the "natural universe" in science, and as a meaningful, "felt reality" in art...

Much like scientific hypotheses, artistic styles can lose their validity when new patterns of experience supervene over the old ones. Thus a style which incorporated adequate aesthetic constructs at one time can find itself working with forms and techniques which, at a later time, appear inadequate to many artists. At such times, stylistic change is called for and is normally initiated...

Drawing our parallel with science in the framework of art as a cognitive discipline, we can say that a style which incorporates adequate aesthetic constructs in an art-orientated sub-group in culture represents the paradigm for that group. The members of the group practise the style, but do not basically revise it. The picture changes when the style is no longer felt by the



members of the group to express their personal felt experiences. The conservative "normal-art" members become revolutionary "crisis-art" innovators. They are out searching for a new paradigm - a style which could map with more adequacy and greater faithfulness the patterns of felt experience in their culture. The kind of activity undertaken by the avant-garde has much in common with the activity of scientists during a period of crisis: there is a scramble for new ideas, new ways of expression and new techniques, and in this rather haphazard activity many experiments with new styles are undertaken. In the art of this period, novelty is itself a value, and it can come to be so highly prized that it becomes a fad: it is sought for its own sake. But such "purely experimental" works normally create but a temporary stir; they seldom stand the test of time. Novelty coupled with a basic idea, which grasps in some hitherto unexplored manner what most members of the community feel and are trying to express, is what is required for an art experiment to become a lasting success. If it does, it may lead to the establishment of a new style — a new paradigm which thereafter will be imitated and explored in thousands of versions.

As the discontinuities in man's scientific formulations reflect a change in the paradigm, so do the discontinuities in the style of his artistic endeavours reflect the same change and thus these changes should be synchronous. This synchronicity within a particular discipline is well known and can be readily understood, for example the simultaneous development of Newton's 'fluxions' and Leibniz's 'calculus' and the subsequent controversy about priority to the discovery, and similarly, Darwin's and Wallace's simultaneous formulation of theories of evolution of organisms through natural selection. More difficult to recognise is the simultaneity in development in disparate disciplines especially if communicated by differing techniques, for example the abstract language of science as opposed to the stylistic language of art.

## THE PARADIGM AS TRANS-DISCIPLINARY CONCEPT

We need not speak of 'style' in art in the sense of 'paradigm' in science, but may use the term 'paradigm' for both, since style is discernable and is employed by tacit agreement with the tacit directive, which is the paradigm.

Not only are disparate enterprises directed by the same paradigm but these enterprises give rise to the nature of that paradigm. The prevailing enterprises of a particular culture generate the models for drawing analogies.

It then follows that if man's enterprises dramatically change - for instance from hunter-gatherer to white-collar worker, from forest dweller to inhabitant of the concrete jungle, from noble savage to space ape, - his paradigms will of necessity also change. Failing this, he will be ill-equipped for his changed intellectual environment and the culture will probably fail.

## SUMMARY

From the previous discussion the following observations can be made concerning the nature of a paradigm:

1. A paradigm is implicit and shared and directs the common endeavours of a community in its encountering of the phenomenological world at a particular time.
2. A paradigm is a property of man's abstract world. Its precepts are tacit and unformulated but direct the intellectual modelling of the community. However, it exists beyond the meta-level of cognition and cannot therefore be articulated by the community and as it is an endlessly regressive set of schemata, it cannot be determined at will.

3. The paradigm, as a shared intellectual model, directs and limits the normal activities of the community. What is important, however, is that this is a state of dynamic equilibrium in order that the paradigm adapt to altered circumstances of the community.
4. The paradigm will be exclusive of certain schemata. If enough of these become shared, a period of crisis will prevail.
5. A paradigm changes after a period of crisis and gives rise to a new paradigm, which might be partly or wholly inclusive or exclusive of the previous paradigm.

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