

FORM OF LIFE

A Transactional Study of Language

Stan McDaniel
Professor of Philosophy Emeritus
Sonoma State University

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In his definitive work *Philosophical Investigations*, Ludwig Wittgenstein remarks, "...to imagine a language is to imagine a form of life." This expression is very suggestive; it suggests something about language, and it suggests something about "form of life." My concern here is primarily with the latter, but with the meaning of the latter that is *suggested* to us by the quoted passage, independently of any speculation about what Wittgenstein himself may have had in mind.¹

In ordinary contexts, "form of life" has a biological connotation, like the similar expression "life-form." We speak, for example, of a class of plants or animals as a life-form. But when we hold a particular insect, say, in our hand and exclaim "what a curious form of life!" we do not necessarily refer to that particular insect, but rather to something much more abstract.

The exact nature of the abstraction is not easy to define. Although we may momentarily be fascinated by the present color and shape of the creature, and mean no more by "form" than this, the addition of the words "...of life" hints at something beyond. Certainly this beyond involves behavior. Not just the behavior of this present creature, certainly, and it is tempting to say something like this: what interests us here is *behavior embedded in a form*.

The article "the" is often used to indicate the generalization intended in such contexts, as in "The bee is a remarkable form of life." And we may go on to describe various habits of bees, such as the bee-dance, etc. By "the bee" we do not mean just the class of bees, but rather an *abstract form of vitality* within which hives and honey, dances and dandelions, queens and drones, all have a special interrelated meaning which is never exhausted or matched by any outside description. And it is in all probability greatly due to this sense of a secret inward meaning, that we find our attention held fast, momentarily, upon not just this particular insect, but this form of life.

For whether the concrete form of the insect is a function of the meaning-contexts in which it participates, or the meaning-contexts are a function of its concrete form, those meanings are literally secret. They are found out only by participation, and to know them one would have to accomplish the miracle of becoming a part of that very life-form. Whatever a bee may experience in the course of seeking out and alighting upon a flower, we cannot experience it; and whatever value the honey of the hive may have for the bee, it has a different value for us.

Bees are an especially useful example in this context because of the detailed studies of "bee-language" that have been carried out, such as those pioneering studies of Karl Von Frisch.² It is clear from Von Frisch's work that bees do communicate information in terms of concepts quite alien to our own. There emerges a picture, one forever dim, of a space-time world unique to this form of life:

“Distances” are really expressions of the effort and duration of flight; “directions” are conveyed by reference to the polarization of light in the sky relative to the sun, or by reference to the direction of gravitational force, interchangeably.³

Von Frisch, in an effort to understand the kind of visual patterns which supply directional information to bees, built a simulated “bee’s-eye.” Eight triangular segments of polaroid sheet were arranged in a radial pattern corresponding to the position of visual cells in a single ommatidium or “eye.”⁴ It was found that because of differences in the direction of polarization of light among these segments, the brightness-darkness relations among them differed according to the direction in which the “eye” was pointed (at a given time relative to the sun). Experiment showed that changes in the directional information given out (through the bee-dance) in the hive, subsequent to artificially introduced changes in stimulus, could be predicted and explained by use of such a polaroid analyzer.⁵

The bee’s eye is itself a compound structure of several thousand such ommatidia. Von Frisch points out that if, as experiment indicates, “the radially arranged visual cells function like polaroid, the bees would receive *simultaneously* the different impressions which we obtain one after another” (as we point the analyzer in different directions).⁶

To get even a remote idea of what this means one must also realize that the compound eye is shaped and mounted on the head in such a way that “the whole sky can always be observed.”⁷ The bee, therefore, is capable of directly experiencing a complete “polarization picture” of the sky at any given moment, and this picture gradually changes according to a fixed rule as the sun moves, providing continuous directional information at all times. The bee is as it were immersed in direction.

Von Frisch continues,

“One need not assume that the bee sees several thousand little star-shaped patterns. The individual excitations could be *centrally integrated to a unified total sensation*, just as with us the images furnished by the two eyes are fused into a unified space perception. Naturally we cannot know what visual sensations are actually experienced by a bee.”⁸

The reference to human space-perception, involving two eyes, helps us to understand, by contrast, how enormously different the space-time-direction experience of the bee must be from our own. We may, of course, deny the possibility that a bee may have any sort of “experience” whatsoever; questions of the existence of consciousness, however attenuated, in life-forms other than human may always be asked. However, to reduce the behavior of a form of life to something entirely devoid of what may be termed “experience” or “consciousness” is to assert that all of living nature is essentially mechanical. And in such a case, not to mention the fact that such a reduction has proven itself impossible, it would become meaningless to refer to *the bee* as a “form of life.”

The philosopher Olaf Stapledon, in attempting to describe speculatively our possible lack of relation to even more alien life-forms, wrote:

“We find ourselves living in a vast and boundless, yet finite, order of spatio-temporal events. And each of us...has learned that there are other such orders, other and incommensurable spheres of events, related to our own neither spatially nor temporally but in another mode of eternal being. Of the contents of these alien spheres we know almost nothing but that they are incomprehensible to us...”⁹

In Stapledon's comment we find several expressions which seem intended to convey a meaning similar to that of "form of life." These are *order of spatio-temporal events*; *spheres of events*; and *mode of (eternal) being*. There is a connection, certainly, between the intent of the words "order" and "sphere" in these expressions and the intent of Von Frisch's phrases "centrally integrated" and "unified" in the immediately previous passage. These intend to convey, it would seem, that the "secret inwardness" that marks any form of life is not merely a result of specific concrete forms, but of an *organization* of forms. And here we have identified one way in which "form of life" is abstract.

In the bee-hive, information derived from the unique space-time-direction experience of the bee is conveyed rather precisely by means of the bee-dance; yet the exact "wording" of the message can differ from colony to colony of bees.¹⁰ Unless we adhere to a dualistic, intellectualistic understanding of the term "concept" we can say quite reasonably that such unique experiences are conceptualized by the bees; that is, *brought into systematic relation with communicative acts which coordinate behavior with respect to those experiences*.

It is the obvious intent of Von Frisch's comment to distinguish between sensation, in the sense of disorganized or unrelated stimuli, and perception, in the sense of stimuli brought into systematic relationship with behavior in accordance with a rule. The behavior of the bees relative to polarized light being an instance of such systematization. In Von Frisch's terms "unified" and "fused," as well as in Stapledon's expression "mode of (eternal) being," there is a clear echo of that faculty of the understanding which Kant called imagination, whose purpose was to allow for the possibility of experience:

"What is first given to us is appearance. When combined with consciousness, it is called perception...Now, since every appearance contains a manifold, and since different perceptions therefore occur in the mind separately and singly, a combination of them, such as they cannot have in sense itself, is demanded. There must therefore exist in us an active faculty for the synthesis of this manifold. To this faculty I give the title, imagination."¹¹

What we wish to assert of a form of life is the presence, not merely of mechanical actions and reactions, and not merely of novel or "secret" sensory stimuli, but of novel *experiences*; and again, not merely of separate experiences, but of experiences which are related in some way, all together, to that unique way of being alive in the world which is the "form of life." Our earlier use of the expression "meaning-context" was a loose anticipation of this organizational requirement.

We may speak in a very general way of behavior on the part of an organism toward a class of stimuli, which is *systematic relative to the form of life* of which the organism is an expression. When we say "systematic relative to the form of life" we mean that relative to the form of life, the behavior has a "point." Such behavior we will call *point-laden*. It will follow that a form of life is a necessary condition for any point-laden behavior, and that any point-laden behavior is a sufficient condition for a form of life.

Whatever those organizational factors are that bring a given action into such a systematic relation with a form of life that it may be termed "point-laden" with respect to that form of life, such organizational factors will be understood to fulfil that unifying or "fusing" function which seems to be so necessary for the presence of "secret inwardness."

In the case of the bee's eye, the utility of the perceptual organ is functionally dependent upon the physical fact of atmospheric polarization of sunlight. In general terms, this means that a form of life is itself not something thrust upon the environment from outside, but rather that it includes "selected" environmental factors. When we marvel at a form of life, we marvel in part at a selected

and special character of the environment, not just the organism and its behavior. A form of life, on its concrete side, includes a portion of the surroundings. And on its abstract side, a portion of the physical laws which operate in those surroundings. The physical laws which *can* so enter into the abstract structure of a form of life are just those laws which make possible a specific mode of point-laden behavior. We shall call such laws, laws which determine the range of *conceptual possibilities* relative to an environment.

By “conceptual possibilities” we mean the possibility of some specific form of point-laden behavior. We accept what seems obvious, that such possibility is determined by the physical laws operative within a given environment.

Cooperation between conceptual possibilities on the one hand, and concrete forms on the other, expresses itself as dispositions and actualization of dispositions. A form of life, therefore, includes what may be called a dispositional matrix, which is a function of both factors. Such a dispositional matrix has its own unique parameters, depending upon the possibilities “liberated” by the concrete form. This threefold structure is illustrated by the diagram in Figure 1.

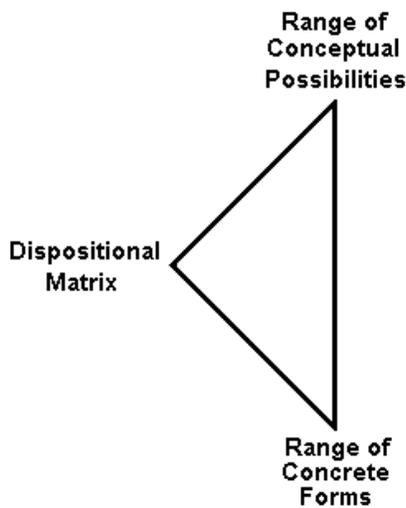


Figure 1

The dispositional matrix is a function of just that limited range of conceptual possibilities which the concrete form “selects;” the class of possible dispositional matrices is a function of the limited range of concrete forms which the conceptual possibilities “select.” (This reciprocity is indicated diagrammatically by the equal lengths of the sides of the triangle in Fig. 1.) The figure may be understood as specific to a given organ or as generalized throughout an organic system (whole organism), and the matrix contracts or expands accordingly.

It is not extremely difficult to illustrate the relations between these factors. C. H. Waddington gives rather specific examples. Specialized bodily organs, such as the bee’s eye, are developed from embryonic cells under the influence of an activated “system of gene activities” which initiates a “long course of development” in which “one stage will gradually succeed another until the adult condition is reached.”¹²

Waddington continues: “If the cell starts making a fair amount of one type of protein, then other alternative activities are shut off.” As a result of this, “progressively changing gene activities interact with one another in such a way that only certain paths of development are possible.” Such “canalized” paths of development are referred to by Waddington as *creodes* (from Gr. necessity + path). Waddington then describes the development of the organism in terms of a set of creodes. These, defined by “hereditary materials,” dictate the concrete form of the fully developed organism. But what determines the hereditary materials? Waddington concludes that “the organization of gene activities so as to define creodes...must have been brought into being by evolution.”¹³

Let us call that generalized integration of creodic development, governed by “hereditary materials” which result in a specific organic form, the *creodic rule* of that form. It is then stated that the creodic rule is a function of evolutionary factors, that is, factors governing adaptation and natural selection. Waddington points out however that “natural selection” does not occur in a vacuum. Rather the organism also *selects an environment*. What environment it selects is a function of its form of life. Waddington, in fact, uses this very phrase: “The recent members of the [horse] family

are animals whose form of life involves nourishing themselves by eating grasses and relying on their fleetness of foot to escape marauding creatures.” He continues by pointing out how evolutionary “improvement” of such a species through natural selection becomes a function of the environment relative to a form of life. Improvements in a species occur “within the terms of reference set by their particular way of life.”¹⁴

Waddington calls this process “a feedback or cybernetic system in which there is nothing that is simply cause or effect.” Through natural selection the environment “chooses” hereditary factors; these “choose” the creodic rule’ the creodic rule “chooses” the concrete form; the concrete form, entering into transaction with conceptual possibilities, “chooses” a matrix of habits (dispositional matrix) which in turn “chooses” an environment.¹⁵

An important point is to be derived from this “chain” of mutual causality, or functional reflexivity (a chicken-and-egg relation). The environment specific to the form of life is a product of the concrete forms and the conceptual possibilities. It is the result of these factors. A fish born into total darkness fails to develop functioning organs of sight; its habitat remains the dark. Those conceptual possibilities present in the light are never realized. Activities which are full of meaning to the light-dwelling forms become “pointless” in the dark. Because of this functional relationship between concrete form, environment and conceptual possibility, the vertical axis of the diagram in Fig. 1, which represents the relation between concrete form and conceptual possibility, is appropriately termed *environment* (Figure 2). Waddington gives a dramatic example of these relationships:

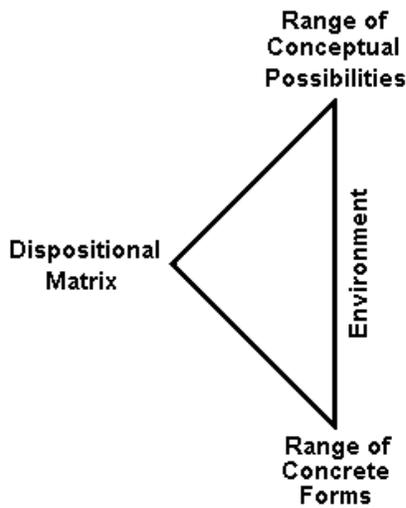


Figure 2

“...When for some reason the general background changes, a camouflaged species may have to evolve a new cryptic colouration; but this will be little use to it unless it is used “sensibly.” We have seen an example of this in the evolutionary changes of moths in industrial areas. The tree trunks on which the moths spend much of their time were...light in colour; so were the moths...more recently, soot from industrial smoke makes large patches of darkness on the trees; and a dark form of the moths has become favored by natural selection, because it allows the moths to be better concealed when they sit on the dark patches...The effective environment...is not something completely external, but is a combination of the outside world and the moth’s own behavior.”¹⁶

In Waddington’s terms the preferential behavior of the dark moths toward the blackened portions of the trees is an example of “sensible” behavior. We have called it point-laden. It is “behavior on the part of an organism toward a class of stimuli which is systematic relative to the form of life of which the organism is an expression.”

This systematic behavior is a portion of the dispositional matrix, or matrix of habits, which is characteristic of the form of life. The concrete forms include the soot-blackened trees as well as the dark moths. The possibility, in terms of physical laws, of a sense organ that can be integrated, as part of the creodic rule, into the moth-form in such a way as to allow adequate in-flight discrimination of the darkened patches, is among the necessary conditions for the existence of a specific conceptual possibility. The conceptual possibility, finally, is the possibility provided environmentally for the

existence of a form of life which can relate to *those* particular stimuli (e.g. the darkened patches) in just *that* particular way (protective cover).

In an extremely general and non-mentalistic sense of the term “concept” we may say that a specific form of point-laden behavior *defines a concept pragmatically*. This is the only sense, at present, in which the use of the expression “conceptual” is intended. Because of the definitional relation between “point-laden” and “form of life,” given earlier, “concept” is thereby relativized to “form of life.” This is consistent with non-mentalistic theories of meaning developed in Pragmatism. Dewey, who defines an object as an event-with-meaning, argues that a set of qualities only come to constitute an object “...in virtue of the consequences of which the existent qualities...are signs, and of which they are the conditions provided operations institute certain interactions not then and there occurring.”¹⁷

The reference to “interactions not then and there occurring” takes the place of the requirement, in our discussion of “point-laden,” that immediate qualities are related, through behavior, systematically to the form of life. The sensory qualities, in other words, must be brought into system with other events and demands, actual and potential. Dewey says

“The singular object stands out conspicuously because of its especially focal and crucial position at a given time in determination of some problem of enjoyment or use which the total complex environment presents. There is always a field in which observation of this or that object of event occurs. Observation of the latter is made for the sake of finding out what that field is with reference to some active adaptive response to be made in carrying forward a course of behavior...isolation of what is perceived from the course of life-behavior would not only be futile, but obstructive, in many cases fatally so.”¹⁸

Here “course of behavior” is a function of the dispositional matrix. The “total complex environment” includes the matrix in its “field” as a function of the concrete forms and conceptual possibilities which the form of life represents. In requiring that the object must be related to “some problem of use or enjoyment” Dewey expresses what we have taken more generally as the systematic relation of the specific behavior to the form of life.

Although we have taken the liberty of identifying this systematic relation by means of the undefined term “point,” we will not say that point-laden behavior must be limited to problems of “use” or “enjoyment.” To do so would be to circumscribe “point-laden” prematurely.¹⁹ Yet it must be noted that this entire construction, so far, rests upon our undefined or intuitive understanding of behavior that “has a point” (Cp. Waddington’s “sensible”). Nevertheless by placing the expression “concept” in system with “point-laden,” as we have done in our use of the expression “conceptual possibility,” we have adopted a position which ultimately links value with meaning, a keynote of Pragmatism.

In describing the nature of the creode Waddington emphasizes that the path of development “exhibits a balance between inflexibility (tendency to reach the normal end-result in spite of abnormal conditions) and flexibility (tendency to be modified in response to circumstances).” The flexibility of the creodic rule has its parallel in the dispositional matrix. We have sometimes referred to this as a “matrix of habits” but habits in this sense are not necessarily rigid or mechanical. Dewey early distinguished between intelligent habit and routine habit. Saying that mechanization is not all there is to habit, he called habits “arts,” or “working adaptations of personal capacities with environing forces.” Character, he continues, is the “interpenetration of habits.” Such an “interpenetration” is what we have called a dispositional matrix.²⁰

Gilbert Ryle, making a similar distinction, prefers to reserve the word “habit” for routine behavior and to refer to more flexible dispositions as “intelligent capacities.” Epistemologists, Ryle argues, “often fall into the trap of expecting dispositions to have uniform exercises.” But on the contrary, “there are many dispositions the actualizations of which can take a wide and perhaps unlimited variety of shapes...if we wished to unpack all that is conveyed in describing an animal as gregarious, we...have to produce an infinite series of different hypothetical propositions.”²¹

Indeed Ryle and Dewey were speaking mainly of human dispositions; but it is not possible any longer to draw a sharp line between instinctive and acquired habit. Flexibility of habit is as important in processes of evolutionary change as is mutation or creodic flexibility. Hockett and Ascher express this as follows:

“Genetics and tradition work in a constant dialectic complementation...The domain within which these two mechanisms operate is not the individual but the community, which has a gene pool, a distribution of phenotypes and a repository of lifeways, and which, as a functioning unit, faces the problems of survival.”²²

Here the expression “lifeways” would appear to be equivalent to what we have called the dispositional matrix of a form of life. It is a concept which intends to include both genetic and traditional components of behavior. In this we have a restatement of the view of Waddington to the effect that the behavior pattern, in “selecting” an environment, helps to determine the creodic rule through natural selection in such a way that “there is nothing that is simply cause or simply effect.” Hockett and Ascher speak of this as “a constant dialectic complementation” among genetic and behavioral materials in which “neither [in isolation] is wholly responsible for anything.”

We have expressed this dialectic as a chain which turns back upon itself. With the foregoing material at hand, we may now represent this chain in diagrammatic form.

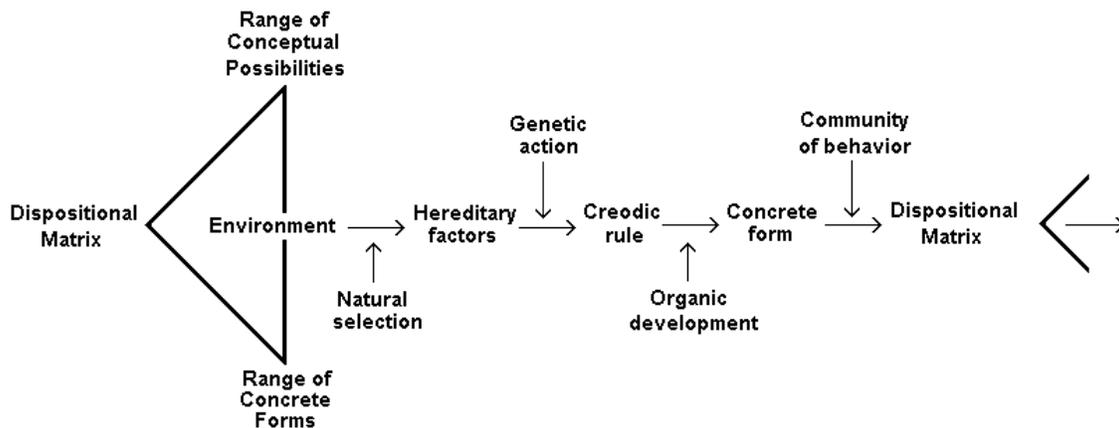


Figure 3

Figure 3 is an extension of Figs. 1 and 2. The two factors of creodic rule and dispositional matrix are placed within a single developing system. This step is consistent with Hockett and Ascher as well as with Waddington. It is an expression of the essential thesis of E. J. Sinott who wrote in 1955,

“...the insistent tendency among living things for bodily development to reach and maintain, as a norm or goal, an organized living system of a definite kind, and the equally persistent directiveness or goal-seeking that is the essential feature of behavior and thus finally the basis of all mental activity, are fundamentally the same thing...two aspects of the basic regulatory character all living stuff displays.”²³

An element of the picture that has hitherto been in the background is here brought out into the open. The “essential feature of behavior,” says Sinott, is “persistent directiveness or goal-seeking;” in other words, a teleological factor. The telic nature of life is implicit in our understanding of “organ” and “organized” as well as of “function” in the sense of the functional relationship between the components of an organic system. Aristotle describes an organized body in just such terms:

“The parts of plants are...”organs;” e.g. the leaf serves to shelter the pericarp, the pericarp to shelter the fruit, while the roots of plants are analogous to the mouths of animals, both serving for the absorption of food.”²⁴

In this passage “serves” indicates the telic functions, which here include “shelter” and “nutrition.” If we understand behavior which provides shelter and nutrition as point-laden, then we may say that this passage asserts a functional relation between structural characteristics, behavior, and some undefined *telos* or aim. It is this *telos* that brings the structure on the one hand, and the behavior on the other, into a common system.

Let us refer to behavior in more general terms as the dynamic of a system. The *telos* of a system may then be understood as the principle or rule in terms of which a structure and a dynamic become organized with respect to one another. The *telos* is the principle, or rule, of a structural-dynamic unity. This general format is implied by Aristotle in his definition of soul: “The soul is the first grade of actuality of a natural organized body.”²⁵

In this definition “natural organized body” we understand to refer to a structural-dynamic unity, while “first grade of actuality” stands for the form or essence of a thing, or “that precisely in virtue of which a thing is called a ‘this’” Elsewhere this is translated as “principle.” I have referred to it as “rule.”

It seems to follow from the foregoing that a form of life is essentially an expression of a telic rule. Actually this requirement was inherent in our assertion of the definitional relation between “form of life” and “point-laden.” Although “telic” implies “aim” or “end,” it does not necessarily imply “end-state.” When we speak of “telic” we do not limit the discussion to the idea of the attainment of some final state, but remain open to the sense in which the carrying on of a certain kind of activity can be its own “end.” Although creodes, for example, are pathways that lead to a relatively definite end-state, this seemingly linear teleology of the creode may not exhaust the meaning of the telic relation of creodic development to the form of life.

At this point our most significant primitive term is not “telic” but “point-laden,” which takes its meaning from our intuitive understanding of expressions like “having a point” or “what is the point of that?” We spoke earlier of *whatever* organizational factors there may be that “bring a given action into such a systematic relation with a form of life that it may be termed point-laden with respect to that form of life.” There we identified such organizational factors with the unifying or fusing function necessary for the presence of “secret inwardness” and discussed the relation of that idea to Kant. Now we may identify such an organizing factor as the telic rule of a form of life, avoiding any interpretations of “telic” that may go beyond this.

Bearing this in mind we may now add the telic rule as the fourth factor in our generalized picture of a form of life. This will derive from Figures 1, 2 and 3 by adding another axis. From the inspection of Figure 3 it becomes clear that this (horizontal) axis is appropriately the behavior axis. A form of life is therefore presented as a structural-dynamic unity as shown in Figure 4.

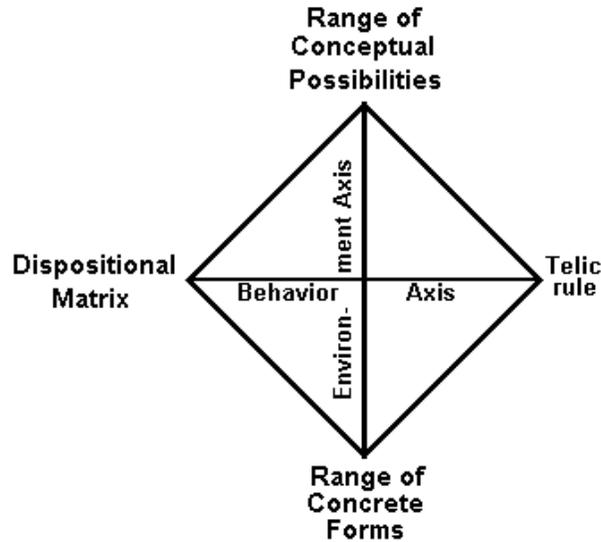


Figure 4
“Form of Life”

“Form of Life” as conceptualized in Fig. 4 is general and is not strictly limited to biological contexts, but may find application among social subject matters. It is here that Wittgenstein’s remark “To imagine a language is to imagine a form of life” is of some interest. Wittgenstein’s comment cannot of course suggest that a language is a necessary condition for a form of life. But it may suggest that a language is a sufficient condition. If so, then upon the hypothesis of Fig. 4 some specific range of conceptual possibilities, a range of related concrete forms, a dispositional matrix involving these forms and generating an “environment,” and a telic rule which links these in such a way as to bring into existence a universe of experience based upon a multitude of functionally interrelated point-laden behaviors, would become necessary conditions for the existence of a “language.” On this hypothesis, communicative behaviors on the part of living organisms at any level of biological nature are rendered continuous with those at the level of human consciousness.²⁶

This observation naturally raises the question of the position of consciousness relative to a form of life. Given the stress on continuity across all levels of biological (organic) nature suggested in the foregoing and perhaps implied also by our definition of “concept” in terms of point-laden behavior, it would be inconsistent to assume that consciousness is an exclusive property of human-level embodiment. A more satisfactory thesis is that put forward by the philosopher-paleontologist Pierre Teilhard, who claimed empirical justification for a complexity-consciousness axis along the line of evolutionary development.²⁷ On this view consciousness is a function of the degree of complexity of an organism, where “complexity” refers to functional interrelations of organs. In terms of the model of a form of life shown in the hypothesis of Figure 4, any such organic system necessarily is so in virtue of a rule of organization, which we have called the telic rule.

According to Teilhard, such an organization involves a factor of *centreity*, i.e. it is a telic system

centered on itself, and to the degree that an organic system is so centered, it is conscious in that degree. “Consciousness” is the inward manifestation of centreity, what Teilhard calls the “within,” and what we have referred to above as the “inwardness” attending an organization of forms as a structural/dynamic unity. Following this hypothesis, we would locate consciousness (diagrammatically) as shown in Figure 5.

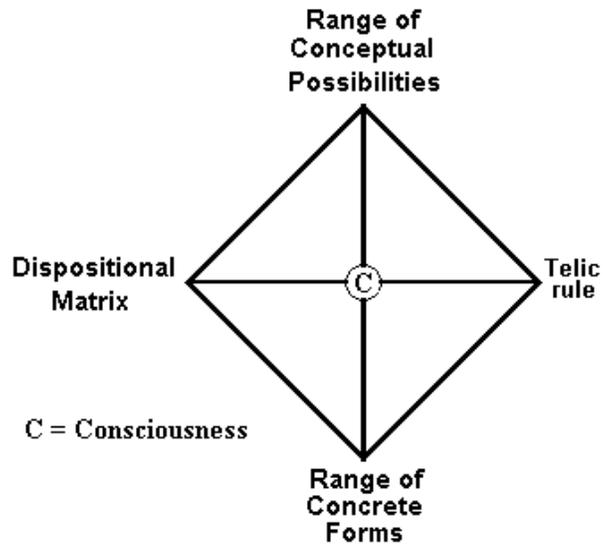


Figure 5

Original draft 1975
Edited and expanded Jan. 31 2010

ENDNOTES

1. Wittgenstein, Ludwig, *Philosophical Investigations*. Basil Blackwell, Oxford, 1958. Sections 19, part I.
2. Von Frisch, K., *Bees: Their Vision, Chemical Senses, and Language*. Cornell U. Press, N.Y., 1950.
3. Ibid., p. 76.
4. Ibid., p. 100.
5. Ibid., p. 105.
6. Ibid., p. 99 (my italics).
7. Ibid., p. 96.
8. Ibid., p. 103n (my italics).
9. Stapledon, Olaf, *Last and First Men*. Dover Publications N.Y., p. 229.
10. Von Frisch, op. cit., p. 74
11. Kant, I., *Critique of Pure Reason*. Macmillan 1958, pp. 143-144. Kant's use of "imagination" here is not the same as the common use of "imagining" something or fantasizing. It is rather an active faculty of the mind which brings together (synthesizes) sense impressions with concepts.
12. Waddington, C. H., *The Nature of Life*, Harper Torchbook TB 580 G, p. 63.
13. Ibid., cf. pp. 63-71.
14. Ibid., pp. 107-108.
15. Ibid., p. 89.
16. Ibid., p. 90
17. Dewey, John, *Experience and Nature*, Dover T471, pp. 318-324, and *Logic: The Theory of Inquiry*, Henry Holt 1938, p. 130.
18. Dewey, John, *Logic: The Theory of Inquiry*, Henry Holt 1938, p. 67.
19. Dewey however certainly means the categories of "use" and "enjoyment" to cover all possible modes of point-laden (meaningful) behavior. In Dewey's sense of the phrase it covers the sphere of all conceptual possibilities for a form of life.
20. Dewey, John, *Human Nature and Conduct*, Modern Library 1922, Ch. I and pp. 70-71.

21. Ryle, Gilbert, *Concept of Mind*, Barnes & Noble 1949, pp. 42-51.
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25. Ibid.
26. For further discussion of continuity and teleology see papers located at <http://www.stanmcdaniel.com/pubs/development/development.html>
27. Teilhard, Pierre (de Chardin), *The Phenomenon of Man*, Harper Torchbooks 1961 (originally published in French, 1955).