Tradition & Discovery

The Polanyi Society Periodical

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PREFACE

With this issue, we introduce our new name, Tradition & Discovery. The search for the right title for our newsletter and papers has brought forth many helpful suggestions. One was to keep Polanyi's thought focal in our name, so we have the subtitle The Polanyi Society Periodical. Another was to use central Polanyian terms or concepts. We considered "Personal Knowledge" and found that it created a possible confusion in references to the book and to our periodical. Remembering, Michael Polanyi's statement that "the choice of the right word or wrong word is a matter of life and death," we hope we have chosen life.

Several signs of life already stand out in the Polanyi Society. One is the subscription to our periodical by major university libraries. This subscription though in its infancy could become a financially stabilizing development. Members of the Polanyi Society are encouraged to ask their libraries to subscribe to our periodical for $20.00 per year. Another indication of our vitality was the excellent attendance and presentations at the Polanyi Society meeting at the December 10th meeting of the American Academy of Religion. Besides the illuminating discussion of papers and work in progress, this meeting began plans for another program next year at the AAR meeting, and it also started investigation of a summer institute to be held the first week in August to share papers and study in the Polanyi archives. The next issue of Tradition & Discovery will carry reports and announcements of these plans.

Our newsletter and periodical will continue to evolve and improve with experience. The contributions of many persons are appreciated and especially the graphic work of Lyn Diehl, a Stephens College art student, who did the design for our new name.

Richard Gelwick

SUBMISSIONS FOR PUBLICATION

Please send news of publications and activities as well as papers. We hope to have the next issue out in March so material is needed by the first of February. Papers should be no more than 8-10 pages, single spaced, elite type, and 1 1/4 inch margins. Send papers camera ready so that we do not have to retype it.

VALIDATION IN THE HUMAN SCIENCES

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Any discussion of the bases of our claims about truth requires an examination of the intriguing but difficult literature in the philosophy of science. In the present paper I will integrate some concepts in that literature. The presentation will attempt to be thought provoking rather than systematic or rigorous. However, it will be concretely suggestive of a form of verification applicable to research in a humanistic psychology.

The paper consists of three sections: the first reviews what is called the received view. It is the philosophy underlying the way most of us learned to think about the problem of valididy in graduate school. The second indicates some criticisms of that positivistic view -- both developments within and some more radical departures from without. In these two sections I have found Polkinghorne's recent book Methodology For the Human Sciences (1983) most helpful; I recommend it as a comprehensive introduction to this area. The third section provides a description of a form of verification that emphasizes understanding as distinguished from validity. It is most sympathetic with the thought of Polanyi, Gendlin and Merleau-Ponty.

Two themes will emerge: the tension in our claims about knowledge between a demand for certainty and an acceptance of doubt; and, a second tension, the ideal of the scientist as a detached, impersonal observer as against the investigator as personally involved. The thesis of the paper is the provision of a middle position between, on the one hand, the possibility and value of seeking certainty through detachment and, on the other, a historical relativism or language game or play of texts -- positions that reject any ground of knowledge. The position taken offers the experience of understanding as a relatively firm although not indubitable ground.

1.

The development of the received view peaked in the 1920's with the neopositivism of the Vienna Circle. Originally arising in opposition to speculative thought of any kind, particularly to metaphysical speculation, positivism insists on certainty in regard to knowledge. A positivist seeks a system of inquiry in which knowledge can stand upon the most solid ground. The Vienna school sought that certain ground in an integration of Mach's sensationalism and Russell and Whitehead's logic. The former was a peculiar form of empiricism in which experience was taken as sense data. We do not see the apple, we see its qualities -- its roundness and its redness. Ordinary perception is reduced to a composite of elementary sense atoms. This view was a phenomenalism, in the sense of Kant's distinction, in which we have access only to the appearance of reality. Through reliance on this presumably apodictically or indubitably given sense data certainty is gained. In later developments the empirical ground became the now more familiar physicalism which holds that there are real objects which we experience directly in a publicly verifiable way. Through this physicalism any metaphysic can be excluded. With it we can directly judge whether or not a proposition is true. Statements like, "The pointer is on red," directly correspond to the brute facts of the physical world. They constitute the only allowable kind of propositions, the only admissable evidence, at least on this observational level.

However, these simple observations require the complement of a theory-based level. Borrowing from Bertrand Russell, neopositivism argues that all theoretical statements, as well as connectives within the observational level, should be based on the rules of logic. Laws and principles should be in the form of axioms, as in a mathematical system. Just a few logical operations such as the if/then rules of implication and rules also of conjunction, disjunction, and negation provide a syntax for the theoretical level and tie it to the observational level. These canons of deduction and inference can be formalized. It is important to note that these rules claim no necessary relation to psychological processes of inference. Rather, they have the force of a conventional system like mathematics.

In logic, then, validity means following the rules of logic. A valid argument is a sound one; it is not necessarily yet an empirically true one. However, if statements within the theoretical level are related by logical deductions and if predictions on an observational level are deduced from them, then the soundness of a mathematical logic and the apodictic certainty of observation combine. There are, then, two classes of meaningful statements in this logical empiricism, those that are verifiable in the sense that they correspond to an observation (the pointer is or is not on the red), and statements valid by virtue of following peculiar rules of logic (for all x, there is a y...). This is positivism's verification theory of meaning. Metaphysical argument and description of lived experience are meaningless and unallowable for presumably they are neither observable nor logical.

Several characteristics of this logical empiricist epistemology underlying psychology's hypothetical deductive style of experimentation set the context for later developments and criticisms:

1. The system is foundationist. It seeks and claims to find a certain ground so that knowledge is precisely and only certain knowledge. It does so by adopting a more or less exclusive preoccupation with the context of justification, treating validation as a problem in applied logic which, then, allows a direct opening onto given sense datum, as we have described.

2. Validation came to mean correspondence. The belief is that validation involves a match or fit between proposition and reality. Sure knowledge is like a perfect mapping of the real world. This correspondence is possible because logic, a logically perfect propositional language, and direct presence to sense data, it is claimed, can circumvent the transforming and distorting distance of experiencing, language, history, investigator intention and the like. Such an epistemology is in the Greek tradition from Plato in whom there is the possibility of pure presence and of the correspondence of idea with physical reality, both of which are real.

3. By positivistic lights, science can be conceptualized as a method centered enterprise in which individual investigators operate as independent observers guided by the rules of logic.

We have, then, a notion of validity whose end is certain knowledge, whose structure is correspondence or the perfect template, and whose agent is impartial and detached. All these features have been challenged.

2.

Beginning in the 50's there was widespread recognition that there were problems with the received view. F. Suppe's introduction to his edited volume Structure of Scientific Theories (1977) offers a full account. Here I will just exemplify this challenge from within.

On the observational level, it was realized that the distinction between observable and nonobservable was context dependent. For example, if a virus is stained so that heavy molecules attach to it and those molecules are viewed indirectly through x-ray diffraction can we say we have observed the virus? Does a statement based on that observation have the same status as "the pointer is on the red'? The sophisticated instrumentalism and operationalism of contemporary science blurred the line between the givenness of brute reality and theoretical propositions.

More tellingly, we can not fully rely on observation to validate theory, for observation reports are themselves theory-dependent. Any measurement employed imports its own theoretical assumptions. Measuring heat with a thermometer depends on a theory of movement of liquid in a vacuum. If ovservations are theory-laden then we do not have direct access to a neutral observed reality to which our predictions, deduced from propositions, can correspond.

On the theoretical level, Popper argued that even on logical grounds we can not prove a positive claim. Logic only extends to negative evidence. Theories are not proven true, they are whittled down by falsification. We can only be certain about the falseness of a theory. Our knowledge claims cannot assert truth or validity as correspondence but only truth as verisimilitude, the appearance of truth. There is here a further loosening of the positivistic foundation.

With these and other criticisms, for example of the positivistic equation of explanation with prediction, it was realized that inference and rules of logic were not as applicable to nor as foolproof in the construction of scientific theories as had been thought.

Beyond these changes from within, quoting from a recent article by Manicas and Secord, "In recent decades a virtual Copernican Revolution has taken place in the philosophy of science, a radical change that has profound implications for the human sciences." (1983, p. 399) I will point to two such revolutionary lines of thought.

Paul Feyerabend would have the philosophy of science focus on the history of science rather than on an analysis of the structure of logical systems. Its history reveals that science is more intelligible as a complexly determined social enterprise, a human form of practice, of problem solving and discovery, rather than as the development of a set of formal procedures with a concomitant preoccupation with the context of justification. Quoting Feyerabend, "Science as we know it today could not exist without a frequent overruling of the context of justication" (1975, p. 167). His historical examination of the work of Galileo shows that Galileo did not employ, nor was his work judged by such criteria; and if they had, gains in science such as he promulgated would have been greatly constrained. He argues that theories are incommensurable, that one theory historically has not, and in principle cannot, simply incorporate or extend a previous theory, as positivism has claimed. The meaning of any terms theories hold in common are incomparable, for they refer to different Weltanschauungen. For Feyerabend as for Kuhn, a theory is a world-view. The proliferation of theories, then, is desirable for it enriches -- it constructs a world. In Feyerabend's provocative style, "there is no idea, however ancient and absurd, that is not capable of improving our knowledge" (p. 47). He calls, then, for theoretical pluralism.

Further, he suggests that the competition of theories has had more to do with psychology, the psychology of persuasion, than with a formal hypothetical-deductive theory of validation. A final quote, "Once it has been realized that close empirical fit /what we have been referring to as the correspondence concept of validity/ is no virtue and that it must be relaxed in times of change, then style, elegance of expression, simplicity of presentation, tension of plot and narrative, and seductiveness of content become important features of our knowledge" (p. 157).

A second revolutionary line draws from the philosophy of language rather than the histroy of science. For Wittgenstein, words are tools constructed by a community to deal with particular current problems. The propositions of a language do not directly refer to or correspond with an independent reality, they more or less work. A theory is a language that is limited to pragmatic validity. Meaning and truth are a function of use in a particular social context. In this view, any formal logic has the limited status of a local language game that constructs a particular reality, one among many.

Derrida takes this notion that the world is a linguistic construct to an extreme. For Derrida meaningful experience has no presence that is prior to language. Hence there is not meaningful independent reality, no observational level, to which our propositions can correspond. Experience from the outset is linguistic. It is always already a text. All attempts at understanding and truth are simply another perhaps more adequate reading of a text. In Lacan's terms, we are stuck in a "chain of signifiers," while the signified, the referent, must remain elusive. Our investigations are largely a product and a vehicle of a historically evolving language -- texts largely determined by that language. The investigator is more conduit than responsible discoverer or inventive agent.

Feyerabend's anything goes anarchy and Lacan's ungrounded intellectualist textualism are radical positions. However, any middle position must take into account the insight common to these and other radical views -- that an epistemology, particularly for the human sciences, cannot be built on a nonexistent independent investigative vantage point. As investigators we are embedded in our cultural and historical situation. We are both subject and object of and in this human realm.

3.

The position I will describe here claims no apodictic ground outside our mundane experience. It makes the more modest claim that precisely that mundane experiencing can give, if not a sure ground, an always accessible and evolving touchstone. It recognizes our relative embeddedness without giving up the status for the individual of intentional subject and responsible agent.

Several thinkers converge in a notion that particularly the bodily sense of our personal participation in the world provides a basis for adequate understanding -- Eugene Gendlin, Michael Polanyi, the later developers of an existential phenomenology, and particularly Merleau-Ponty in his notion of the lived body, and less directly, Dewey and Piaget. These ideas also are consistent with Giorgi's development of an empirical phenomenology at Duquensne. I offer that they are also consisitent with and can provide a rigorous epistemology for a humanistic psychology.

Before turning to Gendlin, whose work I will concentrate on here, let me at least direct you to Polanyi, whose contribution has been underappreciated. As one of Merleau-Ponty's primary descriptives is inhabitation,

Polanyi analogously decries the possibility and desirability of a detached investigator with his notions of indwelling and interiorizing. As Dewey finds knowledge in doing, Polanyi describes a participatory knowledge, a knowledge inherently lodged in the actively engaged body. Quoting Gelwick on Polanyi, "Our knowing in an integration of bodily clues that we indwell in order to understand," (1977, p. 27). We know that integration as the pianist knows the skill of his hand, by attending from it to its integrated product, the performance of the music. To realize this bodily basis of understanding we must participate feelingly in the active body. This necessary indwelling relation leads Polanyi to a concept of tacit knowledge. Since knowledge always remains and is only tacit or implicit no certainty is possible. I cannot, as a positivism requires, simply posit it , get it out there in front of me where I can observe it. To understand requires an active comprehension, and at least partially self-involving action on my part. Yet while no certainty is possible, this tacit bodily knowledge can function, quoting Polkinghorne as a "criterion by means of which various proposed knowledge claims can be judged" (p. 251).

In his Experiencing and the Creation of Meaning (1962) and "Experiential Explication of Truth" (1966), Gendlin rigorously demonstrates that understanding can be attained and criteria as to its knowledge claim are available through tacit bodily knowledge. Gendlin emphasizes experience's tacit meaningfulness -- the sense we have of what is going on at every moment that is felt but not yet in words. This only felt-meaning is embodied. It is given and present as a bodily sense, as for example, I have a bodily sense of what I want to say or express before I say it. I can refer directly or point to this implicit bodily felt-meaning. This kind of pointing to something that I am experiencing has a different semantic and experiential structure than when I point to that object over there. As I point to and focus on my experiencing, words can come to me, "symbols present themselves." I suddenly have an explicit thought which is a description of that felt-meaning. Conversely, an explication or formulation can "call forth" or "lift out" particular felt-meaning. In fact, any symbolization has meaning only if it calls forth a felt-meaning for the latter is the experienced meaning of the former. Bodily felt-meaning constitutes our having of meaning.

Further, there is in the complex relation between felt-meaning and its description the basis for a form of verification. It is itself an experiential criterion. After a tentative description of a phenomenon under study lifts out a felt-meaning there is what Gendlin calls a response, a comparison between formulation and phenomenon. I sense, "yes, that's it," or "that's what I was getting at, but I'm not quite saying it right." The response is an immediately given judgment of the description.

This comparison does not imply that the relation between description and felt-meaning is one of correspondence. The bodily felt-meaning does not contain meanings or words ready to be matched with my formulation. Experiencing is a "preconceptual richness" which always remains as such. It is always only felt, tacit, always as yet unschematized. It follows, then, that our description can never have the purported direct equilvalence sought in logical empiricism of a statement with a particular present object. Rather what we have is a felt response, a felt-relief as certain words allow a particular felt-meaning to move or advance.

Nor does this relation between a phenomenon and its explicit understanding require an inferential process. It is not a matter of inferring, in its etymological sense, of bringing into play rules of logic which if followed guarantee a sound argument or adequate description. It is more like a process of making evident. Focusing on the felt-meaning is akin to Husserl's suggestion to return to the things themselves as lived. But in place of Husserl's emphasis on direct evidence through a kind of seeing, the virtual seeing of intuition, we require here a bodily mode, a sensitivity to our own lived body. The process of verification, which here is inseparable from the act of investigation, is active and concretely self-involving. It contrasts to the distance and passivity of seeing either as registering sense data or as a self-transcending intuition or, on the other hand, to the detachment of the application of an intellective mode such as logical deduction. This form of verification involves understanding in the original sense of that term -- a standing under or with. Let me further explicate this by referring to Merleau-Ponty's ontology.

When the object of our study is a phenomenon in the human realm, then, what we seek to know is already part of us. Experience has the structure of the bipolar system lived-body/lived-world. Any experience is available as a sense of how I lived it bodily. Verification can be based on the experience of understanding for I am already bodily insinuated in the phenomenon of interest. I am already inhabiting it, dwelling in it; I am a participant in it and it is a part of me. As I have already taken it up, I can readily stand under or with it. Quoting Merleau-Ponty, "To understand is to experience the harmony between what we aim at and what is given... and the body is our anchorage in the world" (1962, p. 144).

Verification then is a self-verification, an experienced process wherein I sense a certain harmony or response between an evolving formulation and its felt-meaning, the bodily aftermath of the experience as lived. This kind of check is readily available and can be applied even to the implications of my eventual description or formulation. Again, any such implications whether or not logically deduced can be and must, in this epistemology, also be tested by this process of experiential verification.

Further, of course, another person can test my formulation for its response against his or her experience of the phenomenon under study. While understanding as a form of verification in the final analysis is personal it is open to an intersubjective check. Any reader and as well any subject in the investigation can be as coresearchers with respect to verifying a tentative formulation and adding to or modifying it.

Two other qualifications in closing: while not a psychotherapy, this style of investigation and verification obviously are consistent with gaining personal understanding and, hence, with personal growth. Finally, while understanding here is a personal process, as we have just shown its practice need not be asocial. Nor is the understanding reached idiosyncratic or idiographic. This is so because, again, the felt-meaning of the lived body is only a touchstone not a final ground. For we are embedded in and both constitute and are constituted by a complex of shared cultural forms, a living language, and a history. By and large we share and creatively evolve a common experience, a common world.

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FROM CONVIVIUM

Social Accountability and Selfhood. John Shotter. Blackwell: Oxford. 1984. Robin Hodgkin draws attention to the above book with a comment.

This is a book which is likely to be of great interest to anyone concerned with post-critical, non-reductionist trends in psychology and sociology. Among other good things in it is a clear presentation of Vico's two kinds of 'truth' - verum and certum.

This is not a review but here is a paragraph where the author explains what he is trying to do.

> We have concentrated far too much attention upon the isolated individual. As a result, we have failed to study the sense-making procedures made available to us by the social order (or orders) into which we have been socialised; procedures which have their provenance in the history of our culture. Such procedures are ... constitutive of people's social being in a very deep way. For among other things, they enable the members of a social order, not only to account for themselves to themselves and to one another, when required to do so, but also very generally, to act routinely in an accountable manner. (p. 173)

What Shotter does is to explore the social-psychological origins of much of tacit knowledge; though he only occasionally uses Polanyian language. He also plunges boldly, and occasionally incoherently, into a hermeneutic (non-reductive) sociology which takes account of the more diffuse process models of how living and non-living systems work. He draws on General Systems Theory, Paul Weiss's last book, Prigogine and David Bohm. An impressive, pioneering book.

HUMOR AND MICHAEL POLANYI'S THEORY OF KNOWLEDGE

Jere Moorman, MBA

There is the story of the young man who registered his requirements for an ideal date to a computer dating service. He wanted someone who enjoyed water sports, liked company, was comfortable in formal attire, and was very short. The computer sent him a penguin.

This paper will be an inquiry into the application of Dr. Michael Polanyi's theory of tacit knowing towards an analysis of this joke. A brief introduction to his theory is a parallel objective.

Dr. Polanyi, born in Hungary in 1891, has authored numerous books and articles expounding his belief on a person's personal participation in his knowledge, in both it's discovery and it's valuation. Among other terms he gives to this personal component of knowing is the tacit component. He has written about his theory in PERSONAL KNOWLEDGE and THE TACIT DIMENSION; and both of these books will be drawn upon heavily. Let us see how this tacit component might relate to our penguin joke. Remember that analyzing humor is often a non-humorous enterprise, undertaken by those without a sense of humor. Let us also remember that when humor is meant to be taken seriously, it's no joke!

Polanyi recognizes that the enormous range of lore and knowledge possessed by humanity has been made possible by the use of language; but that the basis for language itself is an inarticulate grasping of meanings, which differ only in an apparently slight, but crucial, way from animal knowing. Polanyi reports in considerable detail on this type, or level, of knowing; this inarticulate grasping of meanings. He demonstrates its pervasiveness throughout human endeavor. Language is known in tacit ways, whose correctness we can appraise in ourselves, but which we cannot reflect on critically as a whole. As the saying puts it, LIFE IS THE ART OF DRAWING SUFFICIENT CONCLUSIONS FROM INSUFFICIENT PREMISES.

We know something tacitly by relying on it, but being unable to explicitly tell what it is that we are relying on. WE KNOW MORE THAN WE CAN SAY! This epigram of Polanyi's is the quintessent statement describing tacit knowing. Denotation is an art, not an exact science; and language forever has a metaphoric quality, which both facilitates its vast richness, and leaves it open to gross hazards of incorrect inferences and misunderstandings.

This tacit component is shown by Polanyi to be necessary if we are to know anything at all. It can be reduced, but can never be eliminated. Failing to recognize and acknowledge the nature of this tacit component is contributory to many, if not all, interpersonal conflicts, conflicts which dogs and other animals are free of. As the saying puts it, IF DOGS COULD TALK, WE'D PROBABLY HAVE AS MUCH TROUBLE GETTING ALONG WITH THEM AS WE DO WITH PEOPLE.

In our penguin example, the joke specifies four clues, provided by the client, to the dating service, for his ideal date; clues which we see also describe a penguin. The description of the parts, or clues to the ideal date were originally known to the client in terms of their contribution to a plausible result. They have never been known and were still less willed in themselves; and therefore, to transpose a significant whole into the terms of its constituent elements is to transpose it into terms deprived of any purpose or meaning. As the saying puts it, TO SAY THAT A MAN IS MADE UP OF CERTAIN CHEMICAL ELEMENTS IS A SATISFACTORY DESCRIPTION ONLY FOR THOSE WHO INTEND TO USE HIM AS A FERTILIZER.

The penguin fits the specifiabilities of the clues presented in the joke's straight line; but the penguin is not a plausible result. The heuristic crossing of the logical gap of discovery from the computer dating service clues to a plausible result involves an unspecifiable element, a tacit component; a component not accounted for by the clues in their focally known state. There is more to the resulting whole than is in the relied upon clues; and these clues take on a radically different appearance in the whole, than they do as meaningless fragments. The forest looks radically different from the trees. We intimate that this reasonable result is out there; and we know that the penguin is not the result we are looking for. Our discovery of the implausible penguin is an example of comical juxtapositions which are possible in inquiries of this kind; sometimes, these novel juxtapositions are recognized as scientific discoveries.

We can communicate this explicitly unspecifiable knowledge of the ideal date, provided we are given adequate means for expressing ourselves. The police have recently introduced a method by which we can communicate much of the knowledge of a physiognomy that we know but cannot tell specifically how we recognize.

The police method mentioned involves a large collection of pictures showing a variety of noses, mouths and other features. The witness selects the particulars, or clues of the person he knows (and cannot say) and the pieces can then often be put together for a reasonably good likeness of the person whose identification is sought.

Let us suppose that these clues might produce a likeness which looks like a penguin; this result may well be amusing to the police artist and the witness; but it is unlikely that the result, literally "true", would be validated as a legitimate suspect for a bank robbery.

We can see that the formal description of our object, without considering this personal act of tacit integration, looking toward this known but unspecifiable reasonable result, is necessarily incomplete. Polanyi shows how both the discovery and validation of this reasonable result is rooted in this tacit, fiduciary act; and he calls upon us to acknowledge this tacit component as a vital component of knowledge, and not a mere imperfection, or subjective whim.

The mathematician, Kurt Godel, has shown that provability is a weaker notion than truth. In other words, our penguin is "provable" but not "true". "The letter killeth, the spirit giveth life." As the saying puts it, TO THE LEXICOGRAPHER, GOD IS SIMPLY THE WORD THAT COMES NEXT TO 'GOCART.'

Polanyi argues persuasively that a thoroughgoing reductionism that contradicts this Gestalt point of view, produces a kind of ontological theory that denies organized wholes of the sort which includes ontological theories. I quote selectively from PERSONAL KNOWLEDGE on Polanyi's fiduciary program:

1) "We must now recognize belief once more as the source of all knowledge."
2) "No intelligence, however critical or original, can operate outside such a fiduciary framework."
3) "Our mind lives in action, and any attempt to specify its presuppositions produces a set of axioms which cannot tell us why we should accept them."
4) "This then is our liberation from objectivism: to realise that we can voice our ultimate convictions only from within our convictions--from within the whole system of acceptances that are logically prior to any particular assertion of our own, prior to the holding of any particular piece of knowledge. If an ultimate logical level is to be attained and made explicit, this must be a declaration of my personal beliefs." (pp. 264-267)

Polanyi seems to be suggesting a change from the ideal SEEING IS BELIEVING to BELIEVING IS SEEING. . .If I hadn't believed it, I wouldn't have seen it.

The very act of grasping of the meanings contained in any theoretical or conceptual operation involves these tacit, whole-perceiving functions. Perceptions and concepts themselves are achievements. As examples of goal seeking, purposeful activity, they are subjected to considerable analysis by Polanyi; along with achievements of all sorts, an animal's success in learning a maze, for example. As the saying puts it, THE SPEED OF A RUNAWAY HORSE COUNTS FOR NOTHING.

Similarly, a successful performance of a measurement in nuclear physics has the character of an achievement; and so does the ordinary process of reading a text and grasping its meaning. Even the use of a computer, or logical inference machine, requires a reading of the result and an appraisal of the correct working of the machine by those in charge of it. The penguin joke illustrates the absurdity of the result of a logical inference machine making decisions by itself.

As the story puts it, a computer once translated from Russian into English the biblical saying "The spirit is willing, but the flesh is weak" The English output read, "The vodka is good, the steak is rotten." As we have said, denotation is an art, an achievement, requiring unspecifiable, tacit acts of integration. We must ultimately rely on our beliefs as to their bearing on the experience we wish to know; when this happens invertedly forcing experience to bear on our belief, we run the dangers of logical paradoxes. Even worse, when a creed is inverted into a science, the results can be both blind and deceptive; the kinds of results which we saw in Hitler's Germany and Stalin's Russia, and perhaps suggested in Orwell's 1984.

Polanyi is seeking to establish an alternative to this, "to restore to us once more the power for the deliberate holding of unproven beliefs." We should be able to profess now openly and knowingly these beliefs; beliefs which are sincerely and responsibly held, that is, in conscientious awareness of their own conceivable fallability. When this takes place, there is an affirmation present which cannot be criticized on any ground whatsoever; though the facts themselves can be criticized on various internal and external grounds; the final acceptance of the fact as true is a fiduciary act which we are doing, not a fact that we are observing.

The penguin is somewhat compelling as a fact; but it is not a plausible date for a dance...the penguin is not reasonable. In other words, skillful knowing and doing is performed by subordinating a set of particulars, as clues or tools, to the shaping of a skillful achievement, whether practical or theoretical. We may then be said to become 'subsidiarily aware' of these particulars within our 'focal awareness' of the coherent entity that we achieve. Clues and tools, including denotative words, are things used as such and not observed in themselves. They are made to function as extensions of our bodily equipment and this involves a certain change of our own being. Acts of comprehension are to this extent irreversible, and also non-critical, or acritical. For we cannot possess any fixed, explicit framework within which the reshaping of our hitherto fixed framework could be critically tested.

One cannot endorse his own signature of a check. Such is the personal participation of the knower in all acts of understanding. But this does not make our understanding subjective. Comprehension is neither an arbitrary act nor a passive experience, but a responsible act claiming universal validity.

In the light of our analysis of humor using the theory of tacit knowing, we can see that humor is a momentary inversion of subsidiary and focal awareness. At the sudden, surprise appearance of the joke's punch line, subsidiary clues to the ideal date become opaque, deprived of their sense, meaningless. As we look at these clues focally we are aware that, yes,

they could describe a penguin, but they don't. Our puzzle is solved, our disfunction relieved, we let off a mildly euphoric laugh...and we put our mind and body back together in a from-to vectorial relationship with our clues toward the ideal date and our heuristic inquiry...only temporarily interrupted by the appearance of a lovable, but otherwise unsuited penguin.

I hope we will find Polanyi's theory worthy of further study. His insistence on the acknowledgement of the tacit dimension of knowing adds a needed bit of humility to our epistemology. As the saying puts it, EFFECTIVE KNOWLEDGE IS THAT WHICH INCLUDES KNOWLEDGE OF THE LIMITATION'S OF ONE'S KNOWLEDGE, and IF YOU THINK YOU ARE NOT IGNORANT, YOUR IGNORANCE IS BEYOND CURE.

We are all exposed to the hazards of knowledge every day of our lives during frequent interpersonal misunderstandings. Hopefully, a fuller knowledge of the tacit component can help us be more patient with ourselves and others during these misalignments of the tacit coefficients of knowing when we begin to recognize the difficulty of relying on one framework, and attempting to demonstrate a proposition to persons relying on another framework, we see that within two different conceptual frameworks the same range of experience takes the shape of different facts and different evidence.

Jere Moorman

"VOCATION RECALLED: PERSONAL KNOWLEDGE AND COSMIC RE-ENCHANTMENT"

James W. Stines, Appalachian State University

"I do not believe the universe is meaningless" (Polanyi 1958,286).

In stating and developing the broad implications of his "post-critical theory of knowledge" Michael Polanyi rearranges some important conceptual landscapes in a number of highly novel ways and invites us to view as close neighbors certain ideas which the modern intellectual legacy had seemed to divorce or even to banish forever. One such clustering of ideas embraces philosophy of nature, theology, the problem of other minds and the concept of calling (in that sense which has affinity with such cognates as "voice," "invoke," "provoke," "evoke," "vocation," etc.). The purpose of the present essay is to discuss the nature of this strange gathering with a view to demonstrating its promise for once again enchanting human consciousness and its world with the animating power of a grand vision in which the reality of persons is evoked and sustained.

The major aspects of Polanyi's thought giving rise to this conceptual mapping are: 1) the principle of marginal control; 2) emergence; 3) indwelling; 4) gradient of meaning; 5) mind. All that follows is predicated upon the reader's basic understanding of these concepts. We provide here only brief indications of Polanyi's adumbrations upon them.

1) The principle of marginal control refers to the control exercised by the organizational principle of a higher level of organization on the particulars forming its lower level. In terms of human comprehension the principle entails that we cannot expect to comprehend any comprehensive entity—whether a word, a rose, a snow crystal, a weaving loom or a game of chess—merely by a specification of its isolated particulars and the laws which govern them as such. Correlatively—in terms of the being of the word, the rose, the loom—the principle entails that comprehensive entities are not reducible to their parts and that the laws governing the comprehensive entity (the higher level of organization) "can never be derived from the laws governing its isolated particulars" (Polanyi [1966] 1967, 37).

2) A correlary of the principle of marginal control is the claim that every comprehensive entity is an emergence—an organization whose reality and whose operational principles constitute a new level, an innovation, which is not explicable in terms of its particulars considered in themselves together with the laws which govern them as such. The emergent entity depends upon its particulars, and we should say (following Polanyi and in anticipation of the ensuing discussion) that, as a "gradient of meaning" it evokes or calls them into being, bringing them under control as its own constituent particulars. Neither the particulars of the entity nor of our awareness of it can be released from the control bestowed by the emergent organization of which they are a part without ceasing to have the same force or

meaning. Abstracted and attended-to, rather than relied-upon as subsidiary components of an integration which is their meaning, the particulars are, at most, candidates for innumberable possible incorporations and, at least, meaningless, exanimate weight. Only when a particular begins to be appropriated does it begin to have a ('proper') place. Expropriated, i.e., isolated or unincorporated, it does not yet have meaning or place. Meaning in this sense of "calledness" in relation to emergent reality and our awareness of it is an essential aspect of the distinction between actual objects of consciousness and the abstraction of the an sich; and it is this calledness which bestows propriety and place.

3) For the enrichment of our understanding of emergence it is necessary to deal with tacit knowledge understood as indwelling.[1] The paradigmatic case of knowledge which we have by relying upon it for attending to other things (tacit knowledge) is the kind of awareness people ordinarily possess in relation to their own bodies and bodily processes. The body is, as it were, a probe and the ultimate instrument of all our knowledge. We do not ordinarily attend to it except in the privative cases of pain and illness; rather, we rely upon it for attending to other things. And everything which we annex to our own bodies—whether physical probes like telescopes and eyeglasses, or conceptual probes like the principle of the rectilinear propagation of light or the myth of Purusha—becomes for us a tacit moment in the bipolar tacit-explicit structure of knowledge. That is to say, all knowledge which we have by relying on it for attending to other things becomes knowledge which we have by dwelling in it, by embodying it or incorporating it. Our bodies in this enriched sense—human bodies in any other sense are abstractions, i.e., corpses (Korper), not lived bodies (Leib)—become the horizon from which and to which there appears a 'world', which is to say a conglomerate of explicit meanings. Hence, what Polanyi designates as "the proximal term" in tacit knowing is what we know by relying upon it, that is, by living its meanings. It is, in short, Descartes to the contrary, embodied intellect.

It is worthwhile noting that there is some fruitful equivocation in Polanyi on this issue of meaning which may be unscrambled, at least, partially, by recourse to expressing the issues in terms of the relation between being a meaning and having a meaning. In general it may be said that to be a meaning is, epistemologically speaking, to be an object of focal awareness and, ontologically speaking, it is to be a comprehensive entity; to have a meaning is to be an object for subsidiary awareness and, ontologically speaking, it is to be a subsidiary component of a comprehensive entity. Hence, there is what Polanyi calls "a semantic aspect" of tacit knowing which has to do with the fact that the tacit dimension is the meaning-bearer, the foundation and harbinger of meaning as the tellable. Whatever is accredited as being real and/or true is, as such, embodied by the knower and the knowing process itself. Here is the crux: The truth becomes ever more 'atoned,' 'attuned,' 'at one with,' the way; ontology becomes epistemology. Epistemology expresses ontology. Truth, incorporated and lived by the subject, takes on a life of its own and accordingly gains in its unspecifiable powers insofar as it wholly

outstrips any explicit control or deliberate manipulation. At any given level the boundary conditions, though presupposing the earlier levels of integration, are left open by them. Hence, "we keep expanding our body into the world, by assimilating to it sets of particulars which we integrate into reasonable entities. Thus do we form, intellectually and practically, an interpreted universe populated by entities the particulars of which we have interiorized for the sake of comprehending their meaning . . ." as components of ever richer and more comprehensive integrations (Polanyi [1966] 1967, 29).

These observations concerning marginal control, emergence and indwelling become most momentous when we begin to look at their implications in terms of the grand sweep of evolution. Problems and promises of organization and meaning at the macrocosmic evolutionary level suggest themselves at a glance in an approach to the study of an individual human being ranging from the study of the typical human shape, through vegetative functioning, sentience, consciousness, and ". . . uppermost we meet with man's moral sense guided by the firmament of his standards" (Polanyi [1966] 1967, 37). In this example, each level of organization is above the inanimate but presupposes it and, hence, for its operations, each level directly or indirectly relies upon the laws of physics and chemistry which govern the inanimate. But according to the principles already delineated here any account of these biotic levels and operations solely in terms of the laws of physics and chemistry will fail.

As we have seen, the relation of a comprehensive entity to its particulars is a relation between two levels of reality with the higher level controlling the marginal conditions left open by the principles governing the lower one. Such levels form an inverse pyramid or a hierarchy which eventually opens onto the panorama of stratified living beings and to reflective consciousness and human society. This stratification offers the frame for returning to the concept of emergence as "the action which produces the next higher level, the first from the inanimate to the living and then from each biotic level to the one above it" (Polanyi [1966] 1967, 55). Each more primitive level may be said to have meaning(s) in terms of its bearing on the comprehensive entities of which it is a subsidiary component or in terms of the act of comprehension to which it is a clue.

This scenario gives rise to reflexivity and inevitably evokes the question of what, if any, is the marginal condition to which the emergence of human consciousness is subordinate. If there is any higher level it is consistent with the foregoing to conceive it as a meaning by which all more primitive comprehension and emergence has been evoked—evoked, as we shall see, not as by necessity and "destiny", but contingently as by "vocation." The question of such a transcending comprehension is, of course, not evoked in, nor provocative to, a disembodied mind. It is not asked nor is there any sense of the promise of an answer except insofar as one stands at the top of a pyramid of emergent organization indwelling its legacies, and experiencing the calling unique to such an act of cosmic interiorization.

4) Before launching more fully into the implications of these suggestions it is necessary to consider what status, if any, in the

scheme delineated to this point, is to be accorded to the concept—heretofore acritically employed—of "call" and its cognates. This consideration has to be discussed in tandem with what Polanyi terms gradient(s) of meaning.

One of the conditions in terms of which a given material may be said to 'speak' to us or become the medium of some sort of message or signification is that it is ordinarily information-neutral. If, for instance, stones had any inclination at all to roll themselves, or to be blown by winds, or washed by floods, into letters and words, we could not successfully use them to convey the message at the station, e.g., "Welcome to Zima Junction." When we attend to a weak radio signal we do so because sound, as such, is signal-neutral. We distinguish signal from background noise only insofar as we attend to certain sounds with the emerging conviction that they are not arranged or disarranged, as usual, but precisely because of the improbability of their order. We can speak meaningfully of a DNA configuration transmitting information only as a function of the tacit recognition that its order is not reducible to the forces of potential energy. "Just as the arrangement of a printed page is and must be extraneous to the chemistry of the printed page, so the base sequence in a DNA molecule is and must be extraneous to the chemical forces at work in the DNA molecule" (Polanyi 1975, 172). Otherwise, we should never have gotten interested in it and, certainly, we could not think of it in terms of information transfer. Moreover, we may make judgments about failure or success, pathology or health, what supports in contrast to what constitutes violence in relation to any material organization only insofar as we perceive it to be suffused by a gradient of meaning—that is, by a directional tendency which we sense that it is striving or being called upon to achieve. We may try to disinfect our thinking of the embarassing crypto-animism which may seem implicit in this kind of language. However, doing so seems inevitably to entail a great deal of obfuscation if not downright violence to the phenomena in terms of which we, in fact, recognize fruitful problems and seek their solution. Mere potential energy clearly does not explain how we come to observe just this or that discrete event, and no one would offer it as an explanation except in a moment of gross abstraction. We focus on discrete phenomena because they evoke our attention as meanings or as potential meaning-bearers, i.e., in light of our sense of something which they achieve (or which is achieved in them) which we take to be significant precisely insofar as what they are achieving is underivable from potential energy.

Polanyi notes that physicists do not themselves think of potential energy except in tandem with the supposition that inanimate nature is controlled by forces which draw it toward stabler configurations. This assumption ". . . substitutes a new sort of 'end' in nature for old 'ends'. It does not eliminate the notion of 'end' altogether if, by 'end', we mean simply a directional gradient exhibited by a process" (Polanyi and Prosch 1975, 174). Neither probable tendencies ". . . nor the gradient of the minimization of potential energy could be said to cause the ensuing event, although they might be said to evoke it" (Polanyi and Prosch 1975, 175).

We have here, then, in the idea of gradients of meaning, an ingredient in terms of which emergence is discerned to be not simply a function of what lies 'under' or 'behind' physical processes, but also of what lies 'ahead' evoking them. Evolution becomes a series of emergent syntheses each level of which relates to the past as the stage upon which novel gradients of meaning become manifest as the lure of a genuine future—as a call in contradistinction to a destiny. (Destiny, as such, is eternally posited 'from behind.') In human terms, as Polanyi would put it, my historical condition is the stage upon which I receive my calling. The accidents of my subjective condition provide one pole in the assignment of my problem. The acceptance of my condition is one with the acceptance of concrete opportunities for exercising personal responsibility. "This acceptance is the sense of my calling" (Polanyi 1958, 322).

5) At this juncture we arrive at the fifth in our series of concepts: mind. In cosmic terms our understanding of the affiliation of emergence with gradients of meaning suggests a series of levels, being lured hierarchically and contingently, until we come full circle to the human mind seeing a problem and undertaking its pursuit in light of a range of potentialities for meaning and under the influence of a gradient of meaning sloping in the direction of the resolution of tension. It should be noted, however, that we do not cast aside at any level the coupling of emergence and the principle of marginal control. Deliberate thought or mind presupposes, but is irraducible to, the antecedent levels of emergence. It is not therefore, even for the sake of argument, as in the case of inanimate and prevolitional stages of emergence, to be modeled in terms of spontaneous gravitation, or reagency, in the context of material, efficient or final causes or some composite of these. As Polanyi notes, "discoveries differ from inanimate events in three ways: (1) The field evoking or guiding them is not that of a more stable configuration but of a problem; (2) their occurrence is not spontaneous but due to an effort toward the actualization of certain hidden potentialities; and (3) the uncaused action which evokes them is usually an imaginative thrust toward discovering these potentialities" (Polanyi [1966] 1967, 89). We may add that what Polanyi here, in the context of discussing mind, calls "uncaused action" (which is a corollary to freedom) is clearly not a fact among other facts. Rather, freedom is the presupposition of every fact for consciousness; and humans could not even explore the issues of free will and determinism without presupposing the act of choice in terms of which a project is made of defining freedom in such a way as to be able to determine its presence or absence. Such a project, in other words, presupposes freedom. Hence, if freedom is a fact it is one which is clearly out of phase with other facts since it is behind them or ahead of them and never simply standing present as one fact among others of the same order. In this sense it is correlated to the commitment situation presupposed by all explicit awareness; and, as Polanyi would say, the commitment situation cannot itself by expressed non-committally. It is mind as abode or habitation and as choice.

Mind, then, stands at the highest evolutionary level presupposing and, in varying ways, embodying antecedent levels of emergence and the

gradients which evoked them. As such, mind is the fulcrum point which is inexpendable and inalienable in all attempts at a comprehensive approach to nature. Our descriptions of world-minus-the-person tacitly presuppose the projects of consciousness or, if you will, Berkeley's and Anselm's god. If we could get rid of mind and its projects we might get rid of god; just as surely, in the Biblical view, if it weren't for God, we surely wouldn't have ourselves on our hands. But if knowing is personal, and if knowing and being co-respond, no ontology will be able to discard the concrete subject which, as such, has a world. It would appear that even God is concrete in this sense and, therefore, vulnerable insofar as He calls or speaks a world into being.

Synopsis: Re-enchantment

> "I shall show how we can arrive by continuous stages from the scientific study of evolution to its interpretation as a clue to God" (Polanyi 1958, 285).

Clearly, Polanyi is inviting us to consider marginal control, emergence, indwelling, gradients of meaning, in their confluence in producing and being produced by mind or personal knowing, as clues to God. And he is inviting us to consider the way by which we come to know and influence other minds as an analogue to the way by which we might come to know (and to influence and to be influenced by) God. Hence, God is implicitly a marginless (beyond every image) marginal condition, a gradient or voice in terms of which the world itself might be said to speak. If nature and history 'say' nothing, if they have no semantic dimension, then our existential experience of them is that of pure violence. Bertrand Russell gave eloquent expression to this fact when, in "A Free Man's Worship" (Mysticism and Logic) he spoke of the brevity and powerlessness of man's life: ". . . on him and all his race the slow sure doom falls pitiless and dark. Blind to good and evil, reckless of destruction, omnipotent matter rolls on its relentless way." "Man is the product of causes which had no prevision of the end they were achieving. . . his origin, his growth, his hopes, his fears, his loves and his beliefs are but the outcome of accidental collocations of atoms . . . ." But the foregoing descriptions suggest that evolutionary changes emerge in connection with gradients of meaning which are irreducible to the presumed muteness of atomic particulars taken in themselves. Moreover, it would be arbitrary to assume that the only evocations which remain after so long a history of evocation are the ones which mind in isolation from any other provocation--and thus mind as a Cartesian abstraction--supplies to itself. Communication at this level, as at lower levels, involves the coincidence of call and response; but here the call is both addressed to, and evocative of, a deliberate--yet-evoked act of indwelling of a sort which must be common to the most basic philosophy of nature (including environmental wisdom) and to religion. In both cases human understanding is one with its way of indwelling the cosmos itself.

A major manifestation of what Polanyi has called the

"self-immolation of the modern mind" is that there is an overwhelming bias against listening for meaning at this level of inclusiveness. A central aspect of Enlightenment self-congratulation has been in relation to disenchanting the cosmos. Locke's world of primary qualities is colorless, odorless, tasteless, and utterly mute. Nature cannot chant or call since its reality is given from behind in atomic constituents which comprise brute facts. Certainly it is a scandal to the critical skittishness of Enlightenment disenchantment to suggest that the enterprise of questioning about mind (and its questions) is itself a response to a gradient of meaning which must lie beyond the "world" understood as the specifiable processes fully contained within our present evolutionary condition. However, to Polanyi, the real scandal resides in the absurdity of the description of knowing and being which is correlated to the objectivist-materialist idiom. Moreover, the refusal or incapacity for listening to, or asking about, meaning at this present level is one with the lack of any fundamental philosophy of nature or sense of correspondence with nature. That threatens abortion of the historical-natural future by condemning us to regarding world, in a kind of self-fulfilling prophecy, as cadavre (Korper). In such a context nature can be valued only with respect to inevitably partial and selfish projects. The motivation to unselfishness does not reside in the world regarded as a chance collocation of atoms and/or as a machine. As such, it is dumb. Only if indwelled and regarded as lived-body (Leib) does it speak.

Now it is implicit in Polanyi that to indwell the cosmos is to 'know God' or that knowing God corresponds with a kind of cosmic insight. Knowledge of God and world is knowing even as I am known. The analogy suggested is that God is related to the world, in certain important respects, as I am related to my own body. Hence, knowing God is like knowing other minds. The issues here may be clarified by Polanyi's succinct statement in Meaning (46-47): "The theory of tacit knowing, while it . . . tells us that we do not know another mind by a process of inference, nevertheless retains the dualism of mind and body in this sense: it says that the body seen focally is one thing, while the body seen subsidiarily points to another thing; these two things are the body and the mind."

"The body seen subsidiarily points to another thing"—that is, the body as relied upon, the body as lived (Leib) has a semantic dimension; it has meaning as the bearer of meaning. It is the given, the indwelt—present, indicative, active—upon which I rely in listening, leaning toward or sensing something else. As such, body is the manifestation of mind and is, for each person, inalienable. He/she can never make his own body, in this sense, an object for focal awareness, for all focal awareness will presuppose it.

Nor can I, if I wish to comprehend the mind of another person regard his/her body simply as an object of focal awareness. I must enter upon my relation to another human body as an entity having meaning by virtue of being indwelled—or, in short, in the same way I enter upon knowing anything through a dialectical interplay of indwelling and subsidiary awareness-focal awareness-subsidiary awareness. The difference here is that the object or subject of focal awareness, the

mind-body of the other, can never be fully indwelt and, as it were, put behind me as object simply for incorporation as a means because the object (subject) here is living and endlessly rich with meaning; thus it opposes any presumption to be finished with it. Hence, it's always cynical if someone looks at you out of the corners of the eyes and says "I know you!" That's like saying "Bang! You're dead," or "We're finished!" I must regard your body as "minded" or ensouled and your mind as an embodiment or "indwellingment," and I, also, must attempt to indwell your body if I am to have any hope of understanding you, of knowing your mind. We do not reduce the master chess player's mind to the moves he makes, or we reduce them to corpses. In disenchanting, we brutalize. Rather, we dwell in these moves as subsidiary clues to the strategy of the master mind which they will enable us to see to the degree that we catch sight of his sublety (Meaning p. 48). I.e., if I do not 'em-pathize' and rely upon your body as you do, if I do not regard it as haunted by you, it will be as dumb and unspeaking as any other old stick of wood. Even otherwise beautiful bodies lose their charm when thus disenchanted.

I believe it clear in Polanyi that if I am to understand the cosmos I must come to see it as having a personal coefficient, as being literally haunted by others like myself and, even more fundamentally, as being haunted by God who as the ultimate speaker relies upon it for his own self-manifestation. Thus indwelling it and calling through it, He would rescue it from uttimate muteness and brutality.

The world simply as object of focal awareness—the first moment of explicitation—probably does, as Sartre has argued, disintegrate into sheer facticity lending itself to any conceivable use or meaning and leaving such concepts as "impropriety" or "violence" in relation to it without any toehold. Disembodied 'souls' and disensouled 'bodies' are correlative. The one is like a speaker without words, and the other is like words without a speaker. Neither communicates. Both are abstractions. The concept of violence is as inconceivable in relation to a purely objective or disensouled world as it is in relation to a wholly amputated and exanimate arm or toenail or atomic constituent thereof.

Ultimately, therefore, any philosophy of nature which is correlative to the sense of knowing which we have described and which, as such, would provide support for a living environment and for speech, must speak in terms of a world regarded as Leib. That is, as with the relation between a physician (worthy of the name) and his patient, the basic—though not the only—moment of our relation to it must be one in which it is regarded as one would regard the body of another person when seeking to know the person. We know something about violence in that case. We know, for instance, that an approach to that body purely as Körper (unincorporated and dis-placed object) presumes death at the outset and ultimately, therefore, entails not the knowledge of, but the destruction of, the other as Leib. This suggests the reason we cannot know another mind by coercion. In fact, our experience of violence or brute force is parasitic upon the primacy of hearing a beckoning call, of freely listening for another word (vocable) and responding. If

necessity were primary there could be no brute force, no crime of violence, no rape, no speech, and no vocation.

Polanyi held that "The way these religious conceptions speak of the entire universe and of our destiny as human beings within these boundless perspectives make them mystical . . ." (M. p. 126). He also said that "The assumption that the world has some meaning which is linked to our own calling . . . is an important example of the supernatural aspect of experience . . ." (Polanyi 1958, 285). One is reminded of Wittgenstein's comments about the mystical in the final paragraphs of the Tractatus and his declaration that if there is any meaning to the world, it must be outside the world. It would appear that this meaning which lies outside the world and which is "mystical" or "supernatural" may be no more nor less basically mystical than the emergence which every comprehensive entity is, and which, while it is immanent in its constituent particulars, is not reducible to them. If "world" (understood generally the way Wittgenstein understood it in the Tractatus, as what is housed in language) has any meaning, if it is Leib, then its meaning, like my own, is both immanent within and transcendent to the body, just as the meaning of language is both immanent within and transcendent to its material constituents.

Now this basic imagery in terms of which "world" is regarded as Leib is, of course, not novel. What is novel is the set of concepts which Polanyi's work has provided for thinking this issue anew. The idea obviously suggests hair-raising theological questions. E.g., if God, as here suggested, is to be conceived as the boundless boundary condition of all being, is He, then, dependent upon, but not reducible to, the laws governing the particulars whose boundary and meaning He is? But Polanyi clearly wants to say that 'god' and/or meaning are in some sense 'ahead' of 'world.' (See M. p. 125ff. etc.)

A gradient of meaning would seem to be at least correspondent to particulars, luring them as meanings into being, but dependent upon them for the manifestation of meaning. God might be said to lure the world into being, and insofar as the lure is not thwarted, to be manifest in a vision of at least some of the tendencies of the world. Polanyi allows for a failure of this cosmic seduction only very ambiguously and ambivalently. In Meaning (p. 18) he says: ". . . we are addressed by nature to the attainment of meaning, and what genuinely seems to us to open the doors to greater meaning is what we can only verbally refuse to believe. As Santayana has also said, should we ever 'hear the summons of a liturgical religion calling to us: Sursum corda; Lift up your hearts, we might sincerely answer, Habemus ad Dominum, Our hearts by nature are addressed to the Lord.' " This accords with a very interesting admixture in Polanyi of Platonism and existentialism. But perhaps there can be rapprochement here. Polanyi does acknowledge that gradients of meaning may be unrealized. Further, it is clear in Polanyi that they are not given a priori but in correspondence with the questing mind. This suggests that human projects and human freedom can count and can be relatively limitless while, nevertheless, being called—not destined—to accept the limits imposed by some such gradients as the condition of regard for other lived bodies as such and for their response to vocation and the realization of meaning. Gradients

as "call" or "voice" cannot contradict freedom and response-ability without becoming destiny and thus reducing all of reality to violence or—more accurately—rendering the concept meaningless.

The plethora of questions which Polanyi evokes at this point reduplicates itself as what I have come to think of as "Polanyi's Taoism." The manifest being of things modifies our knowing and being; and our knowing modifies being by incorporating it into new meanings. This dialectic is never finished any more than life, as such, is ever finished. Polanyi, therefore leads us toward a kind of wu-wei, a kind of vulnerability to life and to its source which is to be contrasted to the death wish implicit in the will to invulnerability of the traditional objectivism.

Note

1. Some of the material in this and in the following paragraph is in press for Zygon.

References

Polanyi, Michael. 1958. Personal Knowledge. Chicago: The University of Chicago Press.

_____. (1966) 1967. The Tacit Dimension. Garden City: Doubleday.

_____ and Harry Prosch. 1975. Meaning. Chicago: The University of Chicago Press.

This paper is a condensation of the original which was given as a lecture at UNC-Charlotte.

NEWS AND NOTES

Convivium, our counterpart in the United Kingdom, reports from Prof. T. F. Torrance that Personal Knowledge is being translated into Chinese. The importance of Polanyi's thought for a society moving rapidly into moderization through science and technology is extraordinary. We can all share the hope that the freedom and independence of thought that Polanyi desired for all persons may be aided by this translation.

Contributors of papers to this issue:

Jere Moorman is a businessman who takes part in the Polanyi Study Group in San Diego, California. His address is 1259 Hornblend St. #7, San Diego, CA 92109. His humorous Polanyian meditations have appeared in cartoon form in our publications before.

Kenneth J. Shapiro is both a philosopher and a practicing psychologist who teaches in the Psychology Department at Bates College.

James W. Stines is a member of the Philosophy and Religion Department at Applachian State University. His paper is related to another one on Polanyi and Taoism, which is in the forthcoming issue of Zygon.

Professor Avery Dulles, S.J., has an article "Faith, Church, and God: Insights from Michael Polanyi," in the September, 1984 issue of Theological Studies. The article is essentially the presentation made by Dulles as principal speaker at the Kent State Conference on Polanyi and Education.

R. Valentine Dusek, Prof. of Philosophy, University of New Hampshire is a member of the Sociobiology Study Group at Cambridge, Massachusetts, and has called my attention to the journal Science For The People. Dusek is very critical of the reductionist nature of sociobiology. As a graduate student at Yale, he met Polanyi when Polanyi gave the Terry Lectures. Though it does not refer to Polanyi, Dusek's article "Rape and Sociobiology," Science For The People Jan./Feb. 1984 takes a very critical look at the false objectivity and reductionist viewpoint of recent sociobiology.

Ronald Hall of FrancisMarion College, a longtime member of the Polanyi Society, has an article "The Analogy Between Ethics and Science" in Zygon, vol. 19, no. 1, 1984.

Roberta Imre, Adjunct professor of social work at Fordham University and Adelphi University published "The Nature of Knowledge in Social Work," Social Work, Journal of the National Association of Social Workers, 29(Jan.-Feb.,1984.) Her address is 697 Bement Ave., Staten Island, N.Y. 10310.

Jeffrey Kane, Prof. of Education at Adelphi University has published Beyond Empiricism: Michael Polanyi Reconsidered. We are anticipating a review in our next issue.

Bruno Manno, Director of Research and In-Service Programs, The National Catholic Educational Association has reported a study of effective business mamagement that uses Polanyi's concept of tacit knowing. The study is by Richard Wagner and Robert Sternberg, psychologists, and appears in a current issue of The Journal of Personality and Social Psychology.

ARTICLES FROM CONVIVIUM

The following section of articles are taken from Convivium, No. 19, October, 1984, and by special arrangement with Joan Crewdson, Convivium editor. Convivium is the publication of the Polanyi Society in the United Kingdom.

FROM CONVIVIUM

Tacit Knowledge and the Implicate Order. A cutting was recently sent to me by a subscriber from a paper, (unfortunately no details given) by David Bohm, because of the use he makes of Polanyi's theory of tacit knowledge in illustrating his theory of implicate order. In view of Prof. Morris Berman's critique of holistic thinkers, which includes David Bohm, in this number of Convivium, I thought readers would find the following extract of interest:

I would like to consider all this from a kind of implicate order. To do this, I first recall Polanyi's notion of tacit knowledge. He illustrates this with the example of riding a bicycle. In order to remain stable and upright, it is necessary for the rider to turn into the direction in which he is following. The rider actually accomplishes this by an indescribably complex set of movements of the details of which he is largely unaware. When he learns to do this, he has what Polanyi describes as tacit knowledge.

Now, from Newton's laws of motion, it can be shown that when the bicycle is being properly ridden, the angle at which the wheel is turned and its angle of tilt are related by a certain simple formula. But of course, it would be of no use for the rider to try purposefully to follow this formula. Rather, an overall movement that is described (to a high degree of approximation) by the formula is the net outcome of an entirely different level of movement (involving muscles, nerves, and brain). I would like to propose that this latter may be regarded as an implicate order, which unfolds into an explicate order of movement of the bicycle that is described in part by the formula. The law of the explicate order is thus seen to furnish an abstraction of what is actually a single feature of a much larger implicate order.

It is evident that all knowledge of the explicate order must be related concretely to reality as a whole through tacit knowledge of this sort (e.g. when it is applied in practice). But ultimately, this tacit knowledge arises in an activity of learning, which is simultaneously perception (as a non-conceptual attention to the complex movements involved) and action (that is ordered by such attention). Indeed, as indicated by the Latin root of the word "perceive," which is "percipere," meaning "to grasp thoroughly," there is at bottom no separation between the act of attention and the physical action of "grasping" which flows out of it (and back into it). The ultimate origin of such knowledge is then in this kind of perception, and only later is this knowledge gradually accumulated as skill and memory.

Thus far, I have been discussing the activity of learning concrete physical movement. But now I suggest that learning of abstract knowledge is basically similar in structure. As attention to the actual inward process shows, all thought, however abstract, is carried out in a set of movements, involving fleeting images, feelings, sensations, intentions, muscular tensions, etc., which is at least as indescribably complex as is that involved in bicycle riding. So thought also originates in an implicate order, of which we are generally hardly aware, as happens with physical actions. In the beginning a given content is learned, in an activity of perception through the mind, leading to understanding or comprehension (i.e. "grasping all together"), and gradually this is accumulated as tacit knowledge (which we experience, for example, as skill in thinking of a familiar subject). As with riding the bicycle, the net outcome of the subtle movements of such tacit knowledge corresponds to what we call the content of our abstract knowledge. Evidently, such features are actually contained in an immensely greater implicate order of unspecifically complex and fleeting mental movements. When these latter are being properly carried out, the abstracted (explicate) features will be found to obey the rules of logic, and this comes about in a way that is similar to how the formula describing the movement emerges from the activity of riding a bicycle.

Further reflection and attention to what actually happens in thinking will make it clear that the implicate order of thought and the implicate order of physical movement are not separate. Rather, they merge and interpenetrate in a single larger implicate order, in which mental and physical aspects are to be understood as sides of a greater whole. Thus, for example, an image of danger in thought is simultaneously a movement of preparation of the body to meet it (e.g. increasing adrenalin, muscular tension, etc.) while a physical sensation is the beginning of a mental movement in which thought changes accordingly, to provide some notion of what the sensation means.

Continuing along these lines, one may be led to suggest that matter in general arises in a similar way as an abstractible feature (so that the mathematical laws of nature come out rather similarly to how the movement described by the formula emerges in bicycle riding). The body participates inseparably in the implicate order of what may be called the material universe. Mind, participating similarly in the body, is also participating in the universe. What I propose therefore is that the whole of reality, mental and material, merges in a single (ultimately unknown) implicate order, containing sub-implicate orders that are abstractible (because of relative autonomy and independence). This could then provide the basis of an explanation of how knowledge and its object may be related. For because of the common ground in an immense totality of implicate order, thought can not only reflect certain areas of reality (in a relationship or correspondence as described earlier), but it can also operate within such areas as a further constituent of reality by participating in activities that creatively realize hitherto unknown potentialities that could not have been realized without the operation of thought.

So I am saying that knowledge is not primarily in reflective correspondence with its object (though there is a limited and abstract form of such correspondence). Rather, knowledge and its object are both primarily merging and interpenetrating movements in a larger implicate order. In this larger order, both may be said to be active as well as acted upon. At bottom, however, they are one, in the sense that the very being of one is a contribution to the being of the other, while both are contributions to the being of the larger implicate order.

POLANYI AND THE CYBERNETIC DREAM

FROM CONVIVIUM

Recently, the transcript of an article came into my hands entitled The Cybernetic Dream of the 21st Century. Its author, Prof. Morris Berman of the University of Victoria, Canada, has also written a book called The Reenchantment of the World, (Cornell U.P. 1981), which I have not read but which pursues the same argument: that the philosophical agenda of today's world should include "the revival of the magical tradition in a way that is scientifically credible." (p. 28) I hope that having read this summary, you will understand why I have thought it worthwhile to outline his argument.

By 'magic', Berman means, not sticking pins into dolls, but affective, concrete and sensual experience of life and he is particularly concerned that holistic thinking of the cybernetic variety is in danger of losing touch with this kind of 'enchantment', though it is precisely the impulse to revive it that underlies the research of people like Gregory Bateson, David Bohm and Rupert Sheldrake. Berman is not opposed to holistic thinking, but he points out that a certain type of such thinking threatens to replace the mechanistic science of the last 300 years with a disembodied world of pure metaphor, of programming and of patterned activity, a world that has been called "mysticism without a soul" and which Berman suggests might more accurately be called "mysticism without flesh". His article provides a perceptive critique of the paradigm offered to us by such writers as David Bohm, Rupert Sheldrake and Ken Wilbur and a warning to those who reject the mechanistic science of Enlightenment thought to be careful what they put in its place.

During the Sixties, an important critique of the scientific world view came to fruition, a critique with a long tradition behind it associated with thinkers like Husserl, Heidegger and Wittgenstein. Theodore Roszac argued that the scientific mode of perception, with its mechanical conceptions of reality, was neither morally neutral nor value-free, but was rather a mythology, a type of cultural construct in which society had invested its sense of meaningfulness and value. (See The Making of a Counter Culture, N.Y. Doubleday, 1969) Marcuse also argued that science possessed no real neutrality, but had a bias, which he termed "the logic of domination". (See One Dimensional Man, Sphere Books, 1972). Marcuse argued that technological society encourages a materialistic mode of life, preoccupied with technology, the consumption of goods and the standard of living. There is nothing neutral about a methodology that confines ideas and actions to a system that denies transcendence. One result of this materialistic type of thinking has been a growing disenchantment with science and an increasing interest in various cults, including the occult - astrology, witchcraft, magic, E.S.P. etc. Those involved in such practices discover with surprise something that magical practitioners have known for centuries - that magic works - or, at least, that mental attitudes make a difference to physical effects. Even science has made the discovery that reality is influenced by perception and has, says Berman, some claim to be called "the magic of the modern era." (p. 6)

This reaction led to the development of a large "new paradigm" literature. Scientists, using the language of cybernetics or systems theory, began to write books that made them sound like alchemists. An alternative reality to mechanism began to emerge, a 'process' reality, having "a clear resonance with Taoism, with quantum mechanics, with the work of Carl Jung and Wilhelm Reich" (p. 8). Unfortunately, the holistic approach has not sustained its early promise of holding mind and nature together. For example, in Gregory Bateson's revision of Darwin, evolution becomes an almost entirely mental process, and before his death in 1980, Bateson had solved the mind-body problem by doing away with the body altogether. Berman comments, "The holistic or cybernetic thinking of the 1980's simplifies the problem of holding mind and matter together by dispensing with matter before the game even begins." (p. 9)

Berman accuses the new mythological vision of reality of being purely abstract and formal. He finds this not only in the sphere of philosophy but also at the professional level and in the daily life of the ordinary citizen, which is increasingly filled with video games and home computers. Teenagers are becoming video addicts, happy to escape, "at least momentarily, from boredom, anxiety and other emotional difficulties, all of which are felt in the body." (p. 12). Even home computers encourage disembodied activity and help to diffuse the same mode of perception which once inspired the Gnostics, "In this way our culture is starting...to acquire a kind of 'computer consciousness'" (p. 12). Video games and home computers create for millions of people a notion that reality is a function of programming and in so doing they are creating "a vast subculture that lives entirely in its head" and sees reality as a form of pure mental process, essentially neutral, value-free and disembodied.

At the professional level, Berman notes that the impact of cybernetic technology on our modes of perception and on our relationships is becoming more noticeable every day, even though the method of computer analysis and systems theory cannot capture the subjective dimension of human life or take account of attitudes, perceptions, modes of cognition, emotions or ideologies. Data that is not amenable to quantitative analysis tends to get dropped from the research agenda though it is largely in these omitted areas that the real life of human beings is to be found. As Berman says, "The more the humanities, history and the social and behavioural sciences succumb to the glamour and professional pull of computer analysis, the more precise they will be and....the less they will have to say." (p. 17). The result is exactly what Orwell predicted for 1984: that the goal of the State would be the creation of a system of thought that can embrace everything. The popular mind thrives on the belief that more and more information means an increase in knowledge of the real world and a consequent increase in efficiency in managing it. But in fact, our range of thought is being narrowed by cybernetization, because all the information is of one kind, "bits" of information abstracted from an organic context and reassembled in generalized cybernetic patterns. This systems theory approach is being applied, not only to history and the social sciences, but to ecology, biology and clinical psychology.

The result for ecology is not a holistic vision of man and nature in a biotic community. Cybernetics is unable to show the world as an organic web of life, but sees it "as an abstract globe whose resources can and

should be moved around according to ecosystem trends formulated by simulated cybernetic models". (p. 19). The result is no less a disenchantment of the world, no less a logic of domination, than science and technology has already produced without the aid of the computer. In biology, living organisms are being described as 'systems of information' and the survival of the fittest as 'the survival of the best informed'. It is a disturbing fact that, whereas holistic thinking held out the promise of abolishing the fact-value distinction and of restoring the sense of nature as alive and sacred, the very opposite is happening. We seem rather to be moving into the age of biotechnology. Life, writes Jeremy Rifkin, is regarded as 'self-programmed activity' and as 'information flow', - "surely the final desacralization of nature!" (Algeny, Viking Press, N.Y. 1983). The last example Berman gives of cybernetics used in the professions is its application to clinical psychology. Self-help books abound, designed to make the reader think of himself as a cybernetic system. But the high point of New Age Science in America is a new therapy called Neuro-Linguistic Programming, (N.L.P.). Its bible, entitled, significantly, The Structure of Magic, (Science and Behaviour Books, 1975), was put together by Richard Bandler and John Grinder after observing three great therapists at work and then generating a cybernetic model of what they were doing by breaking down their therapeutic interactions and reassembling these 'bits' of information into a generalized pattern. The authors claim to have distilled and 'scientized' the 'structure of magic', but they forget that the structure of magic is not the same thing as magic itself. All three therapists were, or are, "intuitive geniuses akin to Zen masters and their talent is legendary." (p. 22) But their skill derived, not from following some cybernetic formula or technique, but from an ineffable personal power and talent. Once again, Berman points out, we have mechanism in updated clothing.

Finally, Berman looks at the holistic and cybernetic thinking of philosophical spokesmen of the New Age, with their evident concern to escape from the world of Newton and Descartes and their desire to revive the 'magical tradition' of a living and embodied world. But he does not find their cybernetic mechanisms so very different from the clockwork models of the 17th century. On the contrary, cybernetics and general systems theory turn out to be "the last outpost of the mechanical world view, a continuation of the scientific project of the 17th century rather than the birth of a truly new way of thinking." "To combat the mechanical philosophy", he writes,

> we now have 'implicate orders', 'morphogenetic fields' and 'holographic paradigms' amongst other things. All of these notions are ingenious, and some of them may even be 'true',...but for the most part, they are disembodied, value-free and content-neutral, (p. 24)

David Bohm's concept of the 'implicate order', "an enfolding and unfolding process" he calls "holomovement" is criticised as being purely formal.[1]

Sheldrake's notion of 'formative causation' by means of 'morphogenetic fields' is also a formal system.[2] In the case of both these thinkers, and that of many others, human beings tend to disappear from the picture. Another prominent thinker, Douglas Hofstadter, author of Godel, Escher and Bach, (Basic Books, N.Y. 1979) is likened to a computer jockey who extends cybernetic operations to the whole world, but whose brand of holism is so out of touch with reality that the world we know disappears from the pages of his book, leaving a universe of symbolic patterned activity, the creation of artificial intelligence. Hofstadter is regarded in America as "a leading spokesman of the cybernetic age...a mind truly to be reckoned with", (p. 27), yet when asked by a student after a lecture given before a vast audience in an East Coast university to say what he thought dreams might be, he replied that they were "confused brain programmes"! Berman comments that we really have to ponder what it means in the history of a civilisation when a thinker of this sort comes to be regarded as a man of penetrating insight.

In conclusion, Berman identifies the real issue for today as "not mechanism versus holism, but whether any philosophical system contains an intrinsic ethic - (not a value-free one) - and whether it is a truly embodied approach to the world." (p. 28) He rejects the holistic paradigm as constructed by such thinkers as Bohm and Sheldrake because, in the process, "the 'magic' gets left behind." The paradigm that Berman is looking for needs to be "grounded in the real behaviour of man in the environment. It would incorporate the sort of information that arises from our dream life, our bodies, and our relationship to plants, animals and natural cycles. And I am absolutely convinced that it would usher in a profoundly creative and liberated period in the history of the West." (p. 28, 29) Most holistic thinkers are moving in a very different direction. In the name of enlightenment, we drift into a hall of mirrors; we are offered reification, 'circuits', 'feedback loops' and the like. "To think such things exist apart from real situations is a Neo-Platonic dream; it is to fall into what Whitehead called the 'fallacy of misplaced concreteness!" (p. 30). Merleau-Ponty recognized this tendency as early as 1960 and wrote in an essay, "Scientific thinking must return to...the soil of the sensible and opened world such as it is in our life and for our body - not that possible body which we may legitimately think of as an information machine, but that actual body I call mine..." (Eye and Mind in The Primacy of Perception, Evanston, 1964, p. 61). So Berman asks of any new philosophical statement, whether it takes us into the real world, or whether it makes it easy for us to run away from reality.

> Does it enable me to shut out the environment, ignore politics, remain unaware of my dream life, my sexuality and my relations with other people, or does it shove these in my face and teach me how to live with them and through them? (p. 31)

I was both saddened and challenged by this very excellent article; saddened, because nearly thirty years after Personal Knowledge was first published, so few thinkers seem to have benefitted from the insights which Polanyi offered to the world, insights which would undoubtedly have saved holistic philosophy from losing touch with the 'magic' of embodiment, or from entertaining a vision of reality that looks and sounds for all the world like a Laplacian topography transposed into a mental key; challenged, to continue the urgent task of making Polanyi's thought and his epistemological paradigm better known and more easily understood by those engaged in the ongoing quest for post-critical understanding. This, as I see it, is the task of Convivium and the sole rationale for its continued existence.

J. Crewdson

Notes

1 David Bohm, Wholeness and the Implicate Order, R.K.P. 1980.
2 Rupert Sheldrake, A New Science of Life, Paladin, Granada, 1983.

COMPETENCE AND TACIT KNOWLEDGE

FROM CONVIVIUM

The following notes on competence are from Robin Hodgkin's forthcoming book Exploring Education which will be published in 1985 by Methuen. Using a Polanyian approach the author outlines an educational theory which sees the learner essentially as an explorer and maker. This leads up to a discussion of new ways of thinking about integrating visual and verbal learning. The passage below follows a discussion of the idea of 'competence motivation' - the general idea that what one can do competently one will want to do.

We need to sharpen our understanding of what should be the educationally central concept of competence, especially in its relation to Polanyi's somewhat similar concept of tacit knowledge. Both are to do with consciously known ingredients of knowledge as well as with unconscious ones. Both are dynamic and constitute those energising and directional processes which are sometimes spoken of in terms of motivation. Yet the two concepts need to be distinguished from each other.

Polanyi certainly gave tacit knowledge a very wide connotation but he was at pains to protect it from becoming a portmanteau term for all sorts of mysterious and inexplicable powers. One may think of the phrase as denoting all that inherited and acquired information in an individual organism which can be brought to bear on an act. Both Piaget and Popper use a similarly extended and biologically rooted concept of knowledge. Polanyi's 'tacit knowing', however, is distinguished from Popper's 'knowledge'

by the way in which he insists on the personal knower as the agent who brings the process to a focus and, as we have just seen, Polanyi is also intensely interested in the groping and intuitive stages of discovery. Popper is more interested in that 'objective' knowledge which a group or community may share and he pays less regard to the actual process of discovery. How, then, does the concept of a person's tacit knowledge differ from his competence, for both seem to be made up of a flexible bundle of skills and inherited and acquired information?

The most satisfactory answer is to regard competence as a recognisable, educationally accessible part of tacit knowing. We may conceive of the latter as resembling the total root system of an ancient but living tree, a tree which constitutes the information patterns comprising you or me or a learning child and which includes our genetic inheritance. Most of the 'root system' is deeply hidden but it is not, in principle, inaccessible to scientific enquiry. Like the roots, tacit knowledge was laid down in the past and yet it has a bearing on the future shape and health of an information rich organism. A similar picture is given by Douglas Hofstadter in his book Godel, Escher, Bach when he discusses the hidden springs of action in the deep strata of our brains.

> It seems that a large amount of knowledge has to be taken into account in a highly integrated way for 'understanding' to take place. We can liken the...thought processes to a tree whose visible part stands sturdily above ground but depends vitally on its invisible roots which extend way below ground giving it stability and nourishment. In this case the roots signify complex processes which take place below the level of the [conscious] mind - processes whose effects permeate the way we think but of which we are unaware. These are the 'triggering patterns of symbols'[1]

When he speaks of the 'triggering patterns of symbols' he is referring to assumed neurological patterns which correspond to some of those powerful transforming experiences in the world of culture which are of such interest to poets, analytical psychologists and theologians, as well as to teachers.

If, moving to the surface of the soil, you call to mind the base of our imagined tree model - an old gnarled tree - you will be able to envisage just a few main roots coming together at the trunk. It is these main roots which are analogous to the principal, identifiable clusters of skills which I am designating 'competences'. They are certainly nourished by tacit knowledge and yet they are now united in large recognisable bundles and they are more open to instruction by parents and teachers than are the deeper layers of knowledge.

It is interesting to notice how these concepts, both tacit knowledge and competence, have gained currency amongst scholars in a number of different fields, all of which converge on the central idea of creative flexibility. For example, Polanyi in his essay 'sense-giving and sense-

reading'[2] shares the problem of competence-for-language with Chomsky but he answers it differently. He speaks of language as an instance, a very sophisticated one, of the intelligent use of 'the power exercised by higher animals of tacitly integrating hitherto meaningless acts into a bearing on a focus that thereby becomes their meaning.' He should perhaps have added 'or acts hitherto meaning something else' for in language, above all, we often integrate old words into new meanings. Then, in phrases which foreshadow more recent biological theory Polanyi adds 'I would try to trace back the roots of this faculty to the primordial achievements of all living things'.[3]

In the example of the dancers I sketched the general idea that five main competences for culture may be identified - the interpersonal, enactive, iconic, musical and language-like levels or 'highways' into culture. One can cut a cake in many ways and it will be obvious that within these overlapping competences lie many subsidiary competences or skill clusters. To understand any of these - rock climbing or singing or teaching for example - we need to bear in mind not only the way in which skills from different levels all grow in the play-practice-exploration cycle and that they support each other but also that all of them have an ancient history in our individual and biological development.

Margaret Boden in her book on Piaget also steps firmly across the biological/anthropological divide when she stresses the common ground between Piaget's discussions of language development in children and the way in which living cells can grow along different morphogenetic pathways in organisms which are developing, or regenerating damaged tissue. Speaking of the fruitful comparisons which can be made between higher cognitive activities and biological processes, she uses words which bring together important trains of thought:

> The word 'competence' is deliberately reminiscent of Chomsky's postulation of the adult's tacit knowledge of grammatical rules and the baby's innate language-specific learning system, and highlights and the structured and creatively generative potential of...'knowledge'.

Boden is here construing 'knowledge' in the wide, biological and cybernetic sense of information systems which bear on anticipated future achievements and which are also open to constant modification and feedback. Such overlap with the study of cybernetics and artificial intelligence cannot be avoided because it is an important focus of the current discussion of competence. (Boden. 1979, p. 124).

What then of teachers whose task it is to be both crucible and alchemist, to sustain the space for learners to be active in and to speed up the metamorphoses which such learners must be competent to endure? It should scarcely surprise us to find that if the process of discovery does, as a rule, pass through recognisable stages,[4] then those whose task it is to enter that process and to monitor it, to protect and to stimulate it -

that such teachers cannot remain in only one stage of the teaching-learning process with one unyielding persona. They too have to show creative flexibility, to draw on ancient patterns, to play for time and to be open to someone else's future.

R. Hodgkin

Notes

1 P.569. In this passage Hofstadter uses the word 'symbolise' where 'signify' would suffice. His reference to 'the triggering pattern of symbols' shows that he is aware of the essentially dynamic quality of symbols.

2 In Knowing and Being. RKP, 1969, pp181-207. To trace back the causal roots into the biological past or to draw on biology for models to help our understanding of the present is not to say, as do some sociologists, that all behaviour can be explained in biological terms.

3 Op. cit., p196.

4 These stages were outlined in my Getting to Know in Convivium No. 17.

COMMENTS ON: WHAT IS PAINTING? BY M. POLANYI

FROM CONVIVIUM

In this article (British Journal of Aesthetics vol X No 3) Polanyi quoted M.H. Pirenne's argument about the paintings on the vault of the church of St. Ignazio in Rome. I was in Rome recently and I went to see St. Ignazio. There are painted columns on the vault and the dome which appear to be continuations of the real architecture of the church, but the illusion is only valid for a spectator standing on a marked spot in the middle of the nave, or another under the dome for the dome paintings. If the spectator moves away, he sees that the painted columns lie at an angle to the rest of the building.

Why are not all perspective paintings distorted in the same way as a spectator moves past them? Pirenne asks, and he replies - because our subsidiary awareness of the flat canvas protects the painting from this kind of distortion. This he says is the factor which is missing in the painted vault of the church.

But there is a much more obvious reason for the distortion in the church, namely that the perspective experienced here is partly that of a three dimensional real structure and partly that of a painting. When the spectator moves, he sees the real structure from different angles, and takes his standard of the vertical from these real features. Of course it would be impossible to paint the pillars on the vault in such a way that they would be seen from all points of view as correct continuations of the actual architecture of the church.

The fact that the surface of the vault is not recognised subsidiarily does not affect the issue. It would be quite possible to paint the vault in such a way that the surface was noticeable, but there would still be an appearance of continuity between the painted pillars and the rest, which would still distort when the spectator moved.

In ordinary paintings, Pirenne says, our awareness of the flat canvas as well as our awareness of the perspective appearance of depth prevents a fully three dimensional impression, and prevents the perspective being distorted as we move past it. If this were so, a trompe l'oeil painting in which we have no awareness of the flat canvas but can really imagine that we are seeing, say, a bowl of fruit in a niche, should distort as we walk past it. But it does not. Only if, like the vault painting, it is continuous with a real structure whose lines it apparently carries on, does it distort at the point of junction of the two. There is an interesting example in the theatre built by Palladio in Vicenzza in the 16th century. Here the back of the stage is a classical facade with a central arch through which is seen a city street stretching away from the spectators. This street is not a flat painting, neither is it a 'real' street; it is a wooden construction in which the perspective of the street is very much shortened, so that while perhaps only ten yards long it appears to be fifty to a hundred yards long. An actor could not walk away down the street because he would rapidly come to appear absurdly large, besides having to walk steeply up hill as the lines of perspective converge. This strange construction has of course no flat surface like a painting, awareness of which could save it from distortion. Yet it is seen undistorted from any point in the auditorium. What would happen if the constructed street was continuous with a normal street leading back across the stage? I believe it would distort.

Another interesting example is the interior dome of the Baroque church of Die Wies. This is an extraordinary piece of perspective painting. What is in fact a very shallow dome, like an inverted saucer, is so painted that it appears to be a very much higher dome. The spectator is given a double illusion, first that the whole area above him is open sky with groups of people and objects floating about it (this is not really an illusion but a 'willing suspension of disbelief', since a real sky is never full of floating people and gates and thrones), second, that all this is painted on a high dome of which the spectator is subsidiarily aware. In fact the high dome does not exist, and the spectator is not aware of the low dome which does exist, unless he climbs up to a point from which he can look into the space above it. So this is a very peculiar illusion. But there is no distortion, wherever the spectator stands, although some very definite and complex objects are represented. This freedom from distortion must come here too from the fact that the perspective in the painting does not connect with the actual structure of the church.

In a two dimensional representation, whether on a flat or curved surface, the point of view from which everything is seen is fixed. If you watch tennis on television, you are usually looking straight down the centre line of the court; move to the right or left as far as you can, you are still looking straight down the centre line. And we all know about portraits whose eyes follow us round the room; if the portrait is painted with the eyes looking straight at the painter, they will look straight at any spectator who looks from any angle as long as he can see the face. If you were looking at a real tennis court you would be able by moving to get a different view, say from the corner of the court; and if you were looking at a real person instead of a portrait, you would be able to get out of range of his eyes, unless he turned completely round. I believe that this fixed viewpoint, rather than awareness of the canvas, is the important clue which makes us tacitly aware that we are looking at a picture and not a real scene. The trouble at St. Ignacio's is that part of the architectural scene is real, so by moving we get a different view of it, while the other part is a painting, so we don't.

I believe that St. Ignacio is a red herring for Polanyi's argument. He was excited by Pirenne's work because it confirmed his ideas about the fusing of contradictory clues in a work of art; the stage and the action of the play, the frame and the painting. The fact that Pirenne may have been wrong about what the contradictory clues were in this case does not affect the validity of Polanyi's argument.

I once told my doubts about St. Ignazio to Polanyi and he wrote in reply that these doubts had given him some guidance. In the later version of his argument reproduced in 'Meaning', p. 91, he acknowledged his debt to Pirenne, but added "His argument is not reproduced here, however, since I would prefer not to rely altogether on the particular evidence he uses." I regret I did not have opportunity to hear him say more about this. My object in following it up is to separate Polanyi's argument from the red herring of Pozzo's pillars in the church of St. Ignazio, which might throw suspicion on it.

D. Scott

BELIEF IN MIRACLES

FROM CONVIVIUM

What is a Christian, or a scientist, to think about miracles? Here is a subject of recurring, sometimes bitter controversy, which surfaced again recently in arguments about the fire at York Minister. A number of people were deeply disturbed by the reported views of a Bishop elect, views which seemed to cast doubt on miracles which they thought central to the

Christian faith. Some suggested that the fire itself was a miracle expressing God's anger at the consecration of a man who held these views.

One may wonder how they could be sure that God's anger, if indeed it was shown, was directed against the Bishop rather than against his critics! But at least their protests made us think again about belief in miracles. A number of scientists wrote a joint letter to the Times to say that they all gladly accepted the Christian miracles. "Miracles" they said, "are unprecedented events... Science, based as it is on the observation of precedents, can have nothing to say on the subject. Its laws are only generalisations of our experience."

This makes miracles altogether too easy! I believe in miracles, but they have to be astonishing, disturbing, hard to believe, or they are not miracles. I tried to imagine these scientists watching a pig with wings flying round the garden, and saying to each other, quite calm and unastonished, "that's interesting, we have not observed that before." Of course this is not what they would say; they would either think a clever trick was being played, or that they were hallucinating. For the pig would not simply be unprecedented but incredible.

These scientists hold one common view of science. But there is another view, which would say that science is not just generalisation from known instances, but an imaginative penetration of the rationality of the universe, involving faith in that rationality. The "law" that all swans are white is indeed simply a superficial generalisation from experience, and so is destroyed by the first black swan one sees. But the laws discovered by a Newton, an Einstein or a Planck are profound insights. After the discovery of such a basic law, instances are often found which seem to disprove it; but if the law is deeply revealing of a newly understood rationality in the universe, scientists often tolerate the contrary evidence in the belief that it will be explained later. The law may have to be modified but will not be abandoned.

The basic framework of physical law which science upholds is the essential matrix for miracles. If anything can happen, nothing is miraculous. And on the other hand, if scientists were prepared to believe anything they saw, science could never have made any progress. For many, many centuries men saw the sun going round the earth; generalising from that daily experience would never have got us through the Copernican revolution.

Science has something to say about miracles, for science lives in a necessary tension of faith, holding fast to laws and regularities already discovered, while remaining alert to recognise anomalies and to judge whether they are errors or fakes, or whether they are clues to a deeper coherence, a more profound law, which will change the whole outlook of science.

What makes a miracle, even the greatest miracle, the Resurrection, so challenging is that such an event is deeply incompatible with our best understanding of how the universe works. It is hard to accept: it ought to

be hard. What can make the miracle nevertheless believable has to be that we see it as a pointer, a clue, to an even deeper understanding of the way the universe works, so convincing that we are compelled to have faith that the difficulties and contradictions will one day be resolved. A miracle points to a hidden meaning, and the profundity of the meaning can make us accept that in some way we cannot yet understand it must be true.

Thus miracles in turn may have something to say about science; they may challenge its understanding of natural laws in the name of a deeper understanding.

Many happenings which apparently break the laws of nature, such as a flying pig, are not miracles, for they reveal nothing; there is therefore no reason to believe them, every reason to look for a mundane explanation. It is only a glimpse of great and compelling meaning which can make us venture out of our known laws, like Peter out of the boat.

This is in fact just what happens with great discoveries in science. They are often rejected for a time because they upset the firmest beliefs so far held by scientists. The new view, the new law, is accepted only when it is felt to be so much more deeply satisfying to reason that a sort of conversion takes place.

Something like this may be the way we have to look at miracles. The scientist-philosopher Michael Polanyi offers us a view of evolution as a long progress towards meaning, a progress in which we may in a sense see each step as miraculous - life evolving from lifeless matter, then on to intelligence, then to spiritual understanding and moral responsibility. At each step new laws come into operation which, without transgressing the laws of the lower level, reveal new possibilities in their working. A true miracle could thus be a clue to a yet higher level of reality whose laws we only yet glimpse in such flashes of revelation. Such glimpses are perhaps more likely to upset than to confirm any belief that we know exactly what God intends - without however removing our belief that God does have intentions.

D. Scott

BOOK REVIEWS

FROM CONVIVIUM

Francis Dunlop: The Education of Feeling and Emotion George Allen and Unwin, London: 1984.

In this extremely interesting book Francis Dunlop is reasonably polite about the Hirst-Peters school of educational philosophy though he strongly criticizes them. Their analytic rationalism has dominated the British

educational scene for twenty years. Few voices have been raised in protest and the resulting one-sidedness has certainly impoverished educational thinking and practice. For this reason alone the book is welcome.

The second chapter is the best. It brings John MacMurray's and R.S. Peters' views on reason and emotion into fruitful opposition. Dunlop starts with some pointed criticism of Peters' attempt to isolate rational action and clear thought from feeling. Feelings, according to this view, get in the way and have to be suitably 'canalised' and expressed. The key question here is whether a person's feelings are an essential basis for rational action, or are they an extra? Peters answers in the latter vein and claims that 'One cannot act in an appropriate way out of wonder or grief; one is overwhelmed by them.' To which Dunlop replies that such a claim is 'simply false' and he goes on, in words which will have a surprising, and to some ears a refreshing, note:

> I step out of my country cottage at night and look up at the clear starry sky. Deeply stirred by the wonder of it all, I am moved to utter a prayer of thanks to God for the glories of creation. Or again, I hear the news that a very dear friend has died. Full of grief, I decide to cancel my evening engagement. These seem to be to be completely appropriate actions that one may perform out of wonder and grief respectively.... Peters rejects [such arguments] because ritual is expressive; to count as action proper, and hence to be the sort of thing one would have a 'motive' to perform, action must involve taking a means to an end.

This kind of means-end instrumentalism has had a stultifying effect on educational thought and practice and it is a relief to turn to some of MacMurray's writings on the subject. MacMurray and the German writers whom Dunlop quotes accept that feeling (or passion, in Polanyi's sense) is always an energising aspect - part of the living root system - of rational thought or of authentic, skilled action. Dunlop's main criticism of MacMurray is that he swung rather too far, probably in reaction against the positivism of the nineteen thirties and placed 'too much emphasis on pre-conceptual knowing'. Examples of this (not cited) would be the tendency which developed among some teachers to overcompensate and elevate art education above more hardheaded disciplines; instead of bringing them together. Or else, as modern Quakers have done, some people elevated 'good relationships' and situation ethics above the guide lines of a more far-seeing morality. What was needed and what is still especially needed in education is an adequate synthesis which holds heart and head and an organic community in proper balance.

After the splendid second chapter, I do not find in the rest of the book, the same quality. Dunlop surveys a wide range of issues and draws important authorities into his discussion of feeling - Bantock, Langer, Polanyi and Scheler, for example. There is a pleasing knock-about session

in which Mary Midgley deals firmly with John Wilson -- Man does have a nature and teachers can't just recreate it. We are then introduced to an elaborate taxonomy of emotions from P. Lersch's writings. This may be interesting as a check list but it left me wishing that it had been adequately explained in the text.

I found the penultimate chapter on 'Educating the Emotions' fairly thin. It contained many useful precepts but it lacked a coherent theoretical thread. Dunlop's diffuse paragraphs on the teaching of English are an example. There has been much discussion of theoretical ideas in this area recently and I would have expected to see more of it in evidence. Then there was scarcely a mention of school drama. Yet this is a field, more than any other, in which movement and feeling and thought can all be experienced and shared by teachers and learners.

Francis Dunlop's book has many of the qualities and some of the limitations one associates with the thin end of a wedge; or of an ice breaker in a frozen sea - opening up space, where others may follow.

R. Hodgkin

T.F. Torrance: Transformation and Convergence in the Frame of Knowledge
Eerdman's, pp 352 + xiv, no price quoted.

The essays and lectures which make up this collection were written or presented between 1970 and 1982, and as such represent Torrance's mature reflections on, amongst other things, the inter-connections between science and theology. Most have been published before, and anyone who was a student at Edinburgh during those years will have used many of them during their degree. Nevertheless, their publication in one volume is a welcome event making available to a wider audience lines of argument which might otherwise gather dust in obscure journals.

Of the science-theology papers, only one, "Christian Faith and Physical Science in the Thought of James Clerk Maxwell" was completely new to me, but as such it provides a testing-ground for how the essays will appear to a new reader.

Torrance's recent interest in Maxwell, which is a natural extension of his interest in Einstein and Quantum Theory, has already born fruit in the publication of a new edition of Maxwell's A Dynamical Theory of the Electro-magnetic Field under his editorship.

Whereas many writers on science and religion over-play the significance of scientists' religious faith in the genesis of their ideas, Torrance conveys very impressively in his essay on Maxwell that perhaps the most important single quality that faith can confer is the very sense of faithfulness to that which the scientist explores. As is reiterated many times in these essays, it is the willingness and determination of scientists not to impose their arbitrary systems of thought on nature, but to permit their enquires and the nature they explore to be mutually corrective within a framework which takes as axiomatic the fundamental intelligibility of all that is, that is the most desirable attitude of the scientist, and

that has been so fruitful since the Reformation.

Convivium readers will be particularly grateful that Torrance's important essay on Michael Polanyi, "The Place of Michael Polanyi in the Modern Philosophy of Science" has been reprinted at last. In a world where at all levels we increasingly encounter reductionist modes of thought and positivist attitudes of mind, the need for Polanyi's reintegration of human knowing and that which is to be known has never been greater. Torrance stresses the way in which Polanyi, like Einstein before him, draws out attention to the human pole of knowing in terms of the free creative thoughts which arise in our minds under the impact of the inherent intelligibility of the universe. In other words, the universe does not "disclose itself", and it is not our place to impose our orderings and constructed intelligibility upon it, but rather in an attitude of faithful enquiry it is our task to allow the free creativity of our minds to be moulded by reality, and hence to formulate new, more penetrating questions to put back to reality in order that we might understand it still better. Here, self-evidently, the notion of indwelling is central and crucial, the notion of that immersion of the self in the world which will permit the mind to be configured by the true nature of the reality we there encounter. And that, equally self-evidently, is the true nature of worship and of the knowledge of God.

J.C. Puddefoot

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