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Michael Polanyi's Tacit Dimension and Personal Knowledge in the Natural Sciences

It was an era characterized by a "logic of destruction"[1] (if destruction can, indeed, be termed "logical") that prompted the Jewish, Hungarian scientist Michael Polanyi (1891-1976) to turn his attention away from his acclaimed research in chemistry to the study of epistemology and the philosophy of science. Having lived through the destruction of European civilization, which included countless, unspeakable atrocities perpetrated on her own citizens, he could not help but ask himself this question: "why did we destroy Europe?"[2] A significant shift in the spiritual and intellectual climate of opinion had resulted in the crumbling of the moral foundations upon which Europe had been established for millennia. This seachange in perspective unleashed tidal waves of destructive nihilism which Friedrich Nietzsche in moments of philosophical lucidity had prophesied as a result of living in an "unsponsored"[3] universe. For Polanyi, the specific problem resided in nothing less than in a particular way of viewing the world, one that was rooted in an objectivist conception of science divorced from a human and moral base. As he put, "the main [destructive] influence of science on modern man has not been through the advancement of technology, but through the effect of science on our world view."[4] Clearly, Polanyi did not blame science and technology *per se* for the European disaster; rather, it was the modern scientific image of the world, the specific kind of scientific outlook that shaped the Western mindset that was the most pernicious problem. Consequently, he turned his considerable intellectual powers

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[1] Richard Gelwick, *The Way of Discovery: An Introduction to the Thought of Michael Polanyi* (New York: Oxford, 1977), 137.

[2] Michael Polanyi, "Why Did We Destroy Europe?" *Studium Generale* 23 (1970): 909-916; cited in Gelwick, *The Way of Discovery*, 160, n. 1.

[3] Gelwick, *The Way of Discovery*, 3.

[4] Michael Polanyi, "Works of Art," p. 30 (from unpublished lectures); quoted in Gelwick, *The Way of Discovery*, 5-6.

away from the laboratory to epistemological considerations, especially to questions regarding the nature and justification of scientific knowledge. As he explains in the preface to his most significant work *Personal Knowledge*, his investigation involves a critique of "the [modern] ideal of scientific detachment" because it "falsifies our whole outlook far beyond the domain of science," and in its place he seeks to offer "an alternative ideal of knowledge," quite broad in scope and application.[5] Indeed, it is the general ideal of "personal knowledge" which Polanyi promulgates, and according to him it means "that into every act of knowing there enters a passionate contribution of the person knowing what is being known, and that this coefficient is no mere imperfection but a vital component of his knowledge."[6] He also adds this observation to his central thesis: "For, as human beings, we must inevitably see the universe from a centre lying within ourselves and speak about it in terms of a human language shaped by the exigencies of human intercourse. Any attempt rigorously to eliminate our human perspective from our picture of the world must lead to absurdity."[7]

This was a Copernican revolution of a radical kind. From a modern perspective, of course, it was entirely unorthodox and constituted a fundamental contradiction, "for true knowledge is deemed impersonal, universally established, objective."[8] However, with the help of the findings of Gestalt psychology which Polanyi embraced wholeheartedly, he is able to demonstrate the cogency of his revolutionary doctrine which neither abandons the scientific

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[5] Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (Chicago: The University of Chicago Press, 1958, 1962), vii. This book is based on Polanyi's Gifford Lectures delivered at the University of Aberdeen in 1951-1952.

[6] Polanyi, *Personal Knowledge*, viii.

[7] Polanyi, *Personal Knowledge*, 3. Polanyi's conception of knowledge seems closely related to the biblical idea that the human heart is the unifying center and seat of the intellect, emotion, and will and consequently determines the very issues of life (Prov. 4: 23).

[8] Polanyi, *Personal Knowledge*, vii.

enterprise, though it does reshape it, nor does it give way to subjectivism, though it does entail the human dimension, nor does it sacrifice reality, though it is encountered in a new way. Around his central commitment to a re-humanized epistemology Polanyi constructs a battery of "correlative beliefs" that flesh it out. For what he intended was nothing less an fresh prescription for the European worldview which he hoped would spring forth from a comprehensive redefinition of the process of human knowing. I will discuss several of its features that are relevant to our present concern with worldview.

First of all, Polanyi argues that all knowledge is personal knowledge in the sense that it is tacit or is rooted in the tacit dimension. To employ the analogy of an iceberg, typical accounts of knowledge focus exclusively on what lies above the water line. From Polanyi's perspective, however, the greater part of knowledge is hidden from view. It lies, so to speak, below the water line. And yet it is enormously influential in shaping the knowing process.[9] There is an unobserved, background structure of thought and consequently "*we know more than we can tell*."[10] This notion challenges modern objectivism and also points out its potential dangers.

> The declared aim of modern science is to establish a strictly detached, objective knowledge. Any falling short of this ideal is accepted only as a temporary imperfection, which we must aim at eliminating. But suppose that tacit thought forms an indispensable part of all knowledge, then the ideal of eliminating all personal elements of knowledge would, in effect, aim at the destruction of all knowledge. The ideal of exact science would turn out to be fundamentally misleading and possibly a source of devastating fallacies.[11]

Obviously from Polanyi's point of view much is at stake if the thesis of the tacit dimension holds true. It would mean that a true model of knowledge, including the tacit aspect, would be under attack and potentially destroyed by the regnant objectivist paradigm. And it would mean that this regnant objectivist paradigm devoid of the tacit component would in fact be deceptive

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[9] Gelwick, *The Way of Discovery*, 65-66.

[10] Michael Polanyi, *The Tacit Dimension* (Garden City, NY: Doubleday, 1966), 4.

[11] Polanyi, *The Tacit Dimension*, x.

and the potential source of multiple misconceptions. Consequently, Polanyi offers a complex model of the knowing process grounded in the tacit dimension and points out the limitations in the reigning model. There is no way to do justice to its intricacies in a short space. But a brief sketch is possible.

In Polanyi's estimation, knowing was a humanly active, skillful comprehension of the things known. It operates at two levels. First, there is what he calls "focal awareness." It is the task, problem or meaning to which a knower is attending directly, and because it can appear to be at a distance from the knower, he also calls it the "distal term." Second, there is what he calls "subsidiary awareness" or the "proximal term" in which a particular set of clues or tools are subordinated in the task of achieving a practical or theoretical insight. These clues and tools are things employed in the knowing process, but are not in themselves observed. The knower relies on them but does not focus upon them, else there be a drastic change in the knower's awareness and performance (as any pianist, golfer, or carpenter knows). They are substructural, tacit in nature, a set of assumptions in which the knower dwells as he does his own body. In fact, they function as an extension of the body as the instrument by which the world is known, and consequently involve a change in the knower's very being. On account of these clues and tools, that is, because of the operation of subsidiary awareness, acts of understanding are non-critical in that they proceed on an assumptive basis, and are irreversible in that they can never be looked at in the same way again. In any case, people are able to know by relying on subsidiary awareness, and by attending to the focal awareness. Polanyi's alternative epistemological vision, therefore, blends objective and subjective factors as the best way of accessing reality, as he explains in these words.

> 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. Such knowing is indeed *objective* in the sense of establishing contact with a hidden reality; a contact that is defined as the condition for anticipating an indeterminate range of yet unknown (and

> perhaps yet inconceivable) true implications. It seems reasonable to describe this fusion of the personal and the objective as Personal Knowledge.[12]

Since all knowledge is personal and possesses a hidden or "tacit" dimension, such characteristics must be taken into consideration when attempting to grasp the nature of knowledge itself. Polanyi hoped that his new model would offset the devastating effects of a scientific objectivism that severed the connection between knowing and being, that eliminated a sense of responsibility for truth, and that entailed the valueless manipulation of the world and its objects, including its human inhabitants.

Second, Polanyi argues that all knowledge is personal knowledge in that it is fiduciary in character rooted in the ancient, Augustinian model in which faith establishes the basis for knowledge. The venerable Church father was responsible for the first post-critical philosophy, and Polanyi calls upon him to establish yet a second.

> Modern man is unprecedented; yet we must now go back to St. Augustine to restore the balance of our cognitive powers. In the fourth century A. D., St. Augustine brought the history of Greek philosophy to a close by inaugurating for the first time a post-critical philosophy. He taught that all knowledge was a gift of grace, for which we must strive under the guidance of antecedent belief: *nisi credideritis, non intelligitis* [Unless ye believe, ye shall not understand].

This Augustinian approach ruled Europe for a thousand years. But with the advent of the Enlightenment, the doctrine of faith as a cognitive source declined and was replaced by a growing confidence in the rational and empirical powers of the human mind, giving birth to modern critical philosophy. Polanyi quotes John Locke as the exemplar of this new perspective from his *A Third Letter on Toleration*.

> How well-grounded and great soever the assurance of faith may be wherewith it is received; but faith it is still and not knowledge; persuasion and not certainty. This is the highest the nature of things will permit us to go in matters of revealed religion, which are therefore called matters of faith; a persuasion of our own minds, short of knowledge, is the result that determines us in such truths.[13]

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[12] Polanyi, *Personal Knowledge*, vii-viii.

[13] Polanyi, *Personal Knowledge*, 266.

As a result of this increasingly majority opinion in the seventeenth and eighteenth centuries, “Belief was so thoroughly discredited that . . . modern man lost his capacity to accept any explicit statement as his own belief. All belief was reduced to the status of subjectivity: to that of an imperfection by which knowledge fell short of universality.”[14] But the Polanyian project is nothing other than the rehabilitation of the fiduciary mode as a humanly inescapable source for the knowing process.

> We must now recognize belief once more as the source of all knowledge. Tacit assent and intellectual passions, the sharing of an idiom and of a cultural heritage, affiliation to a like-minded community: such are the impulses which shape our vision of the nature of things on which we rely for our mastery of things. No intelligence, however critical or original, can operate outside such a fiduciary framework.

To be sure, this framework of faith is not self-evident, and the certainty it possesses is derived solely by believing in it robustly. Still, as the centerpiece of a human being, it provides the exodus from a thorough-going objectivism and consists of a set of convictions that precede and govern any assertion and any form of knowledge. It is faith, therefore, which seeks understanding, and in seeking understanding the faith itself is also challenged in a kind of critical dialogue. By invoking this Augustinian fiduciary formula, Polanyi writes: “It says . . . that the process of examining any topic is both an exploration of the topic, and an exegesis of our fundamental beliefs in the light of which we approach it; a dialectical combination of exploration and exegesis. Our fundamental beliefs are continuously reconsidered in the course of such a process, but only within the scope of their own basic premises.”[15] In other words, faith is always the basis of knowing, but in seeking knowledge, the faith is always put to a test, but only within the boundaries that the faith itself provides. Hence, in drawing upon this fiduciary thesis, Polanyi asserts that unless one first believes, one will neither know or understand. Belief is the key to knowledge and is a critical component of the tacit dimension. Faith is the unifying center of every

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[14] Polanyi, *Personal Knowledge*, 266.

[15] Polanyi, *Personal Knowledge*, 267.

person, and as a consequence the personal component is inextricably linked to every act of knowing.

Third, because of the tacit dimension and fiduciary nature of personal knowledge, the task of truth-seeking is always carried out in a circle, thereby entailing risk and inducing humility. This does not mean, however, being swallowed up in subjectivism. Polanyi firmly believes that there is an independently existing reference point for all knowledge enterprises. “The effort of knowing,” he says, “is guided by a sense of obligation towards the truth: by an effort to submit to reality.”[16] In fact, the real problem comes when thinkers try to approach this objective reality with pure objectivity. Those who embrace the scientific outlook and its corollary of personal detachment face what Polanyi calls “the objectivist dilemma,” namely the requirement to abandon commitment in order to reach a commitment! “The reflecting person is then caught in an insoluble conflict between a demand for an impersonality which would discredit all commitment and an urge to make up his mind which drives him to recommit himself.”[17] Some, in trying to keep this requirement, end up dividing their lives into public/professional and personal/private spheres. The former realm is characterized by an attempted detachment, and the latter gives free reign to the human personality. The alternative to such a destructive personal dichotomy and the ultimately vain attempt at public/professional self-dispossession is to recognize the inescapable omnipresence of human beliefs, and to acknowledge the circular character of the reasoning process. There is a danger in this, but what other alternative is left to human knowers? “*I believe that in spite of the hazards involved*,” says Polanyi, “*I am called upon to search for the truth and state my feelings*. . . . Any enquiry into our ultimate beliefs can be consistent only if it presupposes its own conclusion. It must be intentionally circular.”[18] This is not far removed from

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[16] Polanyi, *Personal Knowledge*, 63.

[17] Polanyi, *Personal Knowledge*, 304.

[18] Polanyi, *Personal Knowledge*, 299 (emphasis his).

Polanyi's recognition that people uncritically accept and identify themselves with their presuppositions as their inarticulate context for life. "When we accept a certain set of pre-suppositions and use them as our interpretative framework, we may be said to dwell in them as we do in our own body."[19] Since an inevitable, commitment-based circularity attends every act and field of human knowing, every act of knowing presupposes a measure of risk. Things cannot be known either exhaustively or objectively because of human limitations and prejudices. And human limitations and prejudices mean that human knowers will know only in accordance with their constraints and commitments. Consequently, Polanyi's system calls for and he himself exhibits a unique epistemic humility. Even regarding his entire project, he explicitly denies any illusion of objectivity and recognizes that its roots and warrants are grounded in his own convictions.

> Personal Knowledge is an intellectual commitment, and as such [is] inherently hazardous. Only affirmations that could be false can be said to convey objective knowledge of this kind. All affirmations published in the book are my own personal commitments; they claim this, and no more than this, for themselves.[20]

Thus, Polanyi seems to suggest that while it may be true that we know more than we can tell at the subsidiary level, at the same time we must be careful not to tell more than we actually know at the focal level. Personal knowledge is inherently circular, hazardous and humble.

Fourth and finally, because of the tacit dimension, fiduciary character, and circular nature of personal knowledge, in short, because personal knowledge has such a different form and function, it must be communicated by means of alternative pedogogies. Knowledge that is objective can presumably be passed on to others by traditional objective methods. However, personal knowledge, especially in the form of an art, is different, involving a genuinely human dimension. "An art which cannot be specified in detail," according to Polanyi, "cannot be transmitted by prescription, since no prescription for it exists. It can be passed on only by

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[19] Polanyi, *Personal Knowledge*, 60.

[20] Polanyi, *Personal Knowledge*, viii.

example from master to apprentice."[21] Here is his fuller description of the process of learning personal knowledge by means of personal example.

> To learn by example is to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyse and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself. These hidden rules can be assimilated only by a person who surrenders himself to that extent uncritically to the imitation of another. A society which wants to preserve a fund of personal knowledge must submit to tradition.[22]

In due course, such an apprenticeship develops into the expertise of a "connoisseurship," which "like skill, can be communicated only by example, not by precept. . . . you must go through a long course of experience under the guidance of a master."[23] Furthermore, this whole process can only be sustained by "the civic coefficients of our intellectual passions," that is, by the support and nurture of a society that respects and promotes the intellectual passions which, in turn, provide a rich cultural life for that society. In Polanyi's term, it is the involvement of human knowers in the "conviviality" of a like-minded community that is crucial. As he puts it, "our adherence to the truth can be seen to imply our adherence to a society which respects the truth, and which we trust to respect it. Love of truth and of intellectual values in general will now reappear as the love of the kind of society which fosters these values. . . ."[24] Consequently, then, over against the impersonal pedagogy and radical individualism bred by the epistemology of objectivism, there is a strong sense of commitment to learning by personal example and to the importance of an intellectually supportive community of conviviality fostered by the epistemology of personal knowledge.

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[21] Polanyi, *Personal Knowledge*, 53.

[22] Polanyi, *Personal Knowledge*, 53.

[23] Polanyi, *Personal Knowledge*, 54.

[24] Polanyi, *Personal Knowledge*, 203.

Michael Polanyi certainly walked to the beat of a different drummer, and did so courageously. Ever so briefly we have seen that for him personal knowledge is tacit, fiduciary, circular, and requires unique pedagogical methods by which it may be transmitted to others. Gelwick thinks that his unique contributions consist in the ideas that he forged a creative relationship between tradition and innovation, emphasized the knower's unity with the world, creatively joined science to the other human arts, tightened the bonds between the world and humankind, and fostered a view of history as a drama of high moral purpose.[25] Overall, however, his purpose was iconoclastic, yet with a constructive goal in mind. Truly he sought to smash the images which had smashed European civilization at the hands of a ruthlessly objectivist science. Yet at the same time he labored assiduously to grind the lenses of a new *Weltanschauung* by which Western civilization, and indeed, the whole human race could know itself and the world around it in accordance with the civilizing themes of personal knowledge. As Harry Prosch puts it, "Polanyi therefore attempted to show us what the consequences of his prescription are when we apply his new and more correct understanding of epistemology and of the philosophy of science to our views of life, of human beings, and of their activities. . . ."[26]

Polanyi's significant contribution was not lost on subsequent generations of thinkers. In fact, there is a remarkable confluence between Polanyi's understanding of the tacit character of the scientific enterprise and Thomas Kuhn's revolutionary concept of the 'paradigm.' In fact, Kuhn credits Polanyi with leading him to his notion as he explains in an address at a 1961 symposium on "The Structure of Scientific Change" at Oxford University.

> . . . Mr. Polanyi himself has provided the most extensive and developed discussion I know of the aspect of science which led me to my apparently strange usage [of paradigms]. Mr. Polanyi repeatedly emphasizes the indispensable role played in research by what he calls the "tacit component" of scientific knowledge. This is the

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[25] Gelwick, *The Way of Discovery*, 139-141.

[26] Harry Prosch, *Michael Polanyi: A Critical Exposition* (Albany, NY: SUNY Press, 1986), 124.

> inarticulate and perhaps inarticulable part of what the scientist brings to his research problem: it is the part learned not by precept but principally by example and practice.[27]

Hence, we proceed to investigate how Kuhn capitalized on Polanyi's insights as we investigate what amounts to a worldview revolution in understanding both the ongoing, normal operation as well as the structure of major cognitive changes in the natural sciences.

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[27] Thomas Kuhn, *Scientific Change*, ed. A. Crombie (New York: Basic Books, 1963), 392; quoted in Gelwick, *The Way of Discovery*, 128.