Polanyi's Problematic "Man in Thought": the Tacit and the Real – an Exploration and a Critique

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ABSTRACT Key Words: architectonics, hierarchy, "ontological equation," tacit knowing, reals, inference, duality

Polanyi's philosophy of "man in thought," by all appearances, chronologically and structurally, seems to be founded on his epistemology. Polanyi's epistemology of tacit knowing as integration is teleological. By his "ontological equation," he patterned comprehensive (and complex) entities as emergence on his epistemology. This forces him to make puzzling formulaic statements which land him in trouble with fellow scientists. The equation also lends itself to unwarranted problematic interpretations. The exploration leads me to suggest that Polanyi may be understood as a "rational realist" who insisted on a tacit knowledge version of interactionist mode of mind-body relation.

1. Introduction

Polanyi, in his book *The Tacit Dimension*, declared his wish to present a vision, an organizing principle, which links our way of knowing to our way of being and to our moral conduct. That is, he proposed an architectonic of epistemology, ontology and ethics, in which the organizing principle is "man in thought," innovation premised on freedom, both opened up and constrained by reality. His method of elucidation follows the pattern set in his epistemology (his "ontological equation"[1]), which is teleological, i.e., vectorial, goal-oriented (see 2b.). And therein lies the problem.

Whereas purposive action (our shaping of a skillful achievement) in his theory of personal knowledge was innovative and a needed correction to older forms of epistemology, the teleological ontology he proposed - an emergent hierarchy of comprehensive entities - leads to either an unwarranted anthropological conception or may encourage a theistic interpretation. In any case, he was incorporating a troublesome final cause or value in his modified evolution of ideogenesis (cf. *TD* 48). He was reaching for a meaningful cosmos. The problems caused by carrying teleological notions from his epistemology through the rest of what he hoped to be an organic and unified vision bears examining.

The examination may show that we may more fruitfully take another approach instead of the angle of the ontological equation Polanyi suggested. We may ask a series of questions from Polanyi's perspective: how do we know the world, how do we know other minds, and what is real? These questions would be controversial, because they would open up the holistic embodied-knowing conception to asking questions about a "qualified dualism." It may also be fruitful to ask if Polanyi followed the pattern he assumed scientists in general follow, that is, he grounded his thinking in a metaphysics of blended scientific realism and redefined rationalism without declaring his ground. The paper explores some of these entanglements.

2. The Place of the Ontological Equation in The Tacit Dimension – an Exploration

Taking the plan of *TD* as the outline of his architectonic, it seems that the triad of tacit knowing - from subsidiary to focal awareness mediated by the integration performed by the knower - is enlarged into the

architectonic triad he named "man in thought." The dynamic mover[2] or connector in this triad is innovation. In this larger triad, the epistemology of tacit knowing forms the "from" dimension, and the ethics of the society of explorers by their responsible action (*TD* 52) forms the "to" dimension. The two are mediated by the ontology of emergence - premised *on the ontological equation of "what is comprehended has the same structure as the act that comprehends it"* (*TD* 55) - which culminates in the ontological "innovation" of intelligent man capable of moral decisions. Thus, in Polanyi's vision, his ethics circles back to his epistemology of intelligent action, this time guided by standards and ideals, just as intelligent action in his epistemology of science was guided by the standards and principles of science.

By all appearances, this architectonic is patterned on a progressive evolution of higher intellectual performances, the emergence of progressively more complex entities[3] and ethically more evolved civilized societies – a teleological kind of evolution.

2.a. Epistemology

In his epistemology of tacit knowing, the goal of knowing is making logical leaps to progressively greater understanding – a teleological act. Polanyi's epistemology explores the structure and function of these leaps. The structure of tacit knowing is comprised of various degrees of awareness. Its main structural features are presented by Polanyi as being of two levels of awareness, the subsidiary and the focal (cf. *PK* 55). One is subsidiarily aware of one's action while focusing on a problem, a goal, whether in physical or mental action. Focusing on the subsidiary, that is, on the action, destroys awareness of the goal; put in other words, focusing on the part destroys the sense of the whole. Polanyi called this "alienation." However, all learning consists of a dynamic oscillation between focusing on the part and focusing on the whole, that is analysis alternating with synthesis (cf. *STSR* 118f.). When seen this way, focusing on the part is not alienation, but redirecting the focus of activity, going beyond "alienation" to a renewed insight of the whole – it is a move freely and deliberately taken.[4] The insight is the logical leap, an integration or synthesis. Polanyi described the functions of tacit knowing in terms of the functions of intellectual passions in the sciences in the act of discovery and in the act of gaining validation from the scientific community for one's discovery. These functions are the selective, heuristic and persuasive functions, analyzed into conative and cognitive aspects. The operational functions in the individual act of discovery or insight are the selective and the heuristic ones. The persuasive function which is directed towards the scientific community is aimed to bring the same insight to the community at which the discoverer arrived. Both processes of knowing, the individual and the communal, encompass tacit and explicit components. These components form the two poles of knowing, the personal and the external. Since the goal of knowing is insight, in the process of learning, in the gradually higher levels and greater complexity of thought, the future scientist aims for progressively deeper insights into reality.

2.b. Ontology

In his ontology in *TD*, the goal of being is to make progressive leaps to greater complexity of physical structure, but especially to greater mental capability. Polanyi's ontology uses the notion of hierarchy controlled by boundary principles, where the principles governing higher levels cannot be derived from the rules of operation of lower levels. That is, the higher level is an innovation, a leap in complexity; it is emergence.[5] Even in his later Meaning Lectures[6] he defined "being" by the meaning of its function, teleologically. The notion of defining a thing by its function is borrowed from engineering where it is used to explain operational principles of machines (machines cannot be defined by principles applicable to the materials composing them). Polanyi also uses this notion to arrange the sciences in a hierarchy progressing

from physics to biology, according to the complexity of its object of investigation. If the criterion for the arrangement is a gradual increase in structural complexity, the notion is helpful as a partial analogy. However, as soon as one takes into consideration that the engineering example makes sense because a machine is a purposeful invention of a human mind, a teleological construct, a transfer of a hierarchical progression to an ontology of living things implies an inventor of purposeful complexification of these living things. Unless the notion is taken as a retrospective explanation of gradual complexity, using "function" in the sense of "purpose" as a heuristic device and not a full analogy, the operational principle governed by boundary conditions is highly problematic for any non-engineering conception or non-theological conception of ontology (since an intelligent first mover is required). *Polanyi's arrangement of the sciences as explanatory human constructs works because he patterned the arrangement on the gradual complexity of cognitive ability as performance in evolutionary time, that is, an aspect of his ontology is an ontology of mental performance as a noun (while his epistemology is an epistemology of mental performance as a verb). One must take care however, not to confuse the explanatory device with the content of what is explained. Kant has warned us against this error*.[7]

Another way to see this is that Polanyi's explanatory device "emergence" is to be taken as a label for a set of logical relations (cf. *TD* 34), therefore independent of time, an abstract device on a meta-biological level. The content of what is explained may be biologically dependent, therefore in time. But then is the abstract mode still teleological? Is it required to predict the form emergence takes at the next level? Prediction needs "content" to give detail to the form "emergence" takes. Polanyi's definition of "being" in terms of function may do that – but then it changes questions of "what" and "why" into "how."

At the same time that Polanyi outlines a teleological ontology and his dissenting notion of psychology and sociology, he states that he shares the metaphysical beliefs of the scientific community about the nature of things. This belief confirms that there is a reality "out there" which is knowable, and inquiries can produce original and valid conceptions of this reality; that is, his "beliefs about the nature of external scientific truth [is] unaffected" (*TD* 70).

Initially, Polanyi sets aside the question of "how far does emergence go beyond man's moral sense" (*TD* 37). Later, he objected to and wanted to reshape evolutionary theory from a blind progression to a teleological notion: "The interest of evolution lies in the rise of higher beings from lower ones, and, principally, in the rise of man" (*TD* 46). According to him, the focus on the evolution of populations obscures "the more fundamental question: how any single individual of a higher species ever came into existence" (*TD* 47). *This personified conception of emergence of a single historic event (an individual of a higher level) is a reflection of his interest in creativity and is a clear parallel of his conception in epistemology of how a higher level of thought emerges toward a goal – clearly teleological*. This structural consistency lands him in a position where he has to leave emergence not only open, but also open to hints of a prime mover with a goal. It also lands him in difficulty as a scientist.

In the exploration of being in the ontological context, is one permitted to posit a goal of being? Wouldn't the question be better re-phrased as "What is the meaning of life?" and separated from ontological inquiries, placed in the ethical realm? Polanyi's ontological equation is a seemingly required intermediate step between his epistemology of tacit knowing and his ethics in the over-arching scheme of "man in thought." The equation makes his ontology teleological.

Polanyi's ontological equation has the flavor of a rationalist intuitionist move reminiscent of Spinoza's move in the *Ethica*, where Spinoza said "the order of connection of ideas is the same as the order and connection of things."[8] The source is Aristotle's statement "And thought thinks on itself because it shares the nature of the object of thought; for it becomes an object of thought in coming into contact with and thinking its objects, so that thought and object of thought are the same. For that which is capable of receiving the object of thought, i.e. the essence, is thought."[9] However, in the architectonic of *TD*, Polanyi has reversed Aristotle's equation, seemingly basing his ontology on his epistemology. If he were consistent, he would have started with an ontology of infinite mind.

It also bears mention that in Polanyi's scheme, not only are entities called "comprehensive entities" in accordance with the ontological equation, indicating that these are entities as we comprehend them, *but also in keeping with the hierarchical arrangement of comprehensive entities with the operational feature of boundary conditions, the entities are of various levels of reality – the higher an entity is located on the hierarchy, the more real it is. Since the hierarchy, both in its subject matter and in its description of the subject matter (the object of knowing) is a progression from the physical to the mental, the mental (a person, a problem, i.e., thought) is more real than a stone* (*TD* 32). *Polanyi's definition of real is that which is yet to reveal itself in unexpected ways* (*ibid*.)[10] *– that is, further innovations are to emerge*. By this definition, a thought is more real than a stone. Polanyi puts this in terms of "significance of a thing is more important than its tangibility"(*TD* 33). Putting reality in terms of significance transposes it into the mental realm, and the value realm, which is the direction of "evolution" of Polanyi's ontological hierarchy. This makes his ontology teleological, fitting the pattern set by his epistemology. This transposition also makes his ontology controversial (*TD* 36), because it challenges the notion of a blind, chance mechanism for evolution, making human thought and especially man's moral sense not only the "goal" of evolution, but by ignoring the "unsuccessful" strands of evolution, an inevitable goal of evolution. This is evolution conceived in the image of Polanyi's architectonic. The unifying force between the levels of reality is "emergence," less mysteriously described by the general term "innovation," a term uniting the epistemological vector of "integration" and the ontological vector "emergence." Using the general term "innovation" is to dispel the use of "emergence" in a miraculous sense, and to cement the ontological equation.

Polanyi's "man in thought" conception makes teleology the most important underlying principle of *The Tacit Dimension* when he describes the nature of epistemology, ontology and ethics. In light of this, how does he approach the question of justification of his position on knowledge, ontology and ethics? His epistemology seems to pose a lesser problem, as he takes his cue from the practices of the scientific community. New knowledge is justified by the authority of scientific peers and the tradition and premises of science.[11] His ontology is problematic however. Justification for his position in ontology is his definition of the real: that which is yet to reveal itself in unexpected ways (cf. *TD* 32).[12] He offers two definitions of "being" or "non-being": the "definition" of "being" in terms of the meaning of its function and a variation of the definition of real – that which is to reveal itself. The first "definition" a *looks towards a goal*, the second *looks from a potential state* and is left indeterminate. He also offers a warrant for a true statement about facts: a true statement is one, which, when the content of one's assertion is checked in experience, there is evidence for the truth of the statement (cf. *PK* 254f.). This warrant keeps in mind that "there is something out there," but by his definition, he wants to keep this "something" both as a goal and indeterminate. This makes sense in his framework only if it is cast on "the two poles of knowing" schema: internal – external, self - world, potential – actual, intimation of reality – contact with reality, striving for the goal – reaching the goal. Justification for

his ethics, following the pattern of his epistemology, is in tradition excluding dogma (*TD* 62) and including the principle of justice.

To rehearse the equation: if (a) knowing is tacit as well as explicit thought aimed at innovation; if (b) being means that the mind is the meaning of the body,[13] the mind is free (self-directing) and has infinite potential to be realized; and in Polanyi's metaphysical belief the external world, is both knowable by the mind, and "determined" to emerge to the level of man; – do we have an ontological equation?

3. Critique[14]

3.a. An Unstable Equation ?

It seems to me that *TD* runs into problems when its design deliberately offers a plan in which epistemology is not only the foundation of the whole structure, but its structural pattern. Polanyi's epistemology of tacit knowing, a redefined epistemology incorporating the insights of psychology, is innovative. Epistemology is no longer exclusively the investigation of the nature and justification of explicit knowledge with emphasis on justification, but an investigation righting a lack, the nature of the knowing process in its tacit aspects. Its greatest contribution is its central theme, the mental process of scientific discovery in the context of a functioning scientific community, the analysis of learning, of apprenticeship, of insight, of connoisseurship, premised on creative freedom, yet recognizing the limiting function of the social and physical worlds.

The ontology is of two disparate parts. There is a seemingly rationalist ontology of real entities consisting of things we comprehend. Whether the thing is a stone or an idea, the emphasis is on "comprehend." Our theories about the world are coherent pictures (Gestalten) of the world. On the other hand, there is an ontology to which his scientific community subscribes and which he affirms – that there is an external reality, and it is knowable. This would seem to make him a scientific realist of a non-strict sort, who holds that claims of discovering something new must be verified in experience – there should be a correspondence between our claim and facts of experience. These two disparate parts of ontology carry two kinds of theories of truth, a coherence theory and a correspondence theory. Yet, Polanyi claimed, his theory of truth is probabilistic in the sense of "degree of confirmation" (cf. Jha 1997, note 14).

One should remember that Polanyi's aim was to describe a strategy for inquiry, one, that to him seemed more in keeping with the strategies of working scientists than the descriptions promoted by the logical positivists, or even by the "standard" line, including Russell. *Polanyi wanted to introduce a way to validate the discovery of the new, the unique act.* That meant, he had to open up the strategy for inquiry to the historic dimension and a teleological account of the progress of reason. This move exposed him to the charge of Hegelianism. The evidence for this charge was only strengthened by his ontology of hierarchy of comprehensive entities, which seem to be a Hegelian Reason unfolding in the world.

If one takes Polanyi's architectonic as he presents it (i.e., starting with his epistemology), then one notices that his epistemology evidences a series of transformations: from Gestalt to existential-phenomenological forms. Its earliest Gestalt notion is drawn from Kohler's studies of problem solving with the central notion of parts composed into a dynamic whole. Kohler's studies show traces of mechanistic notions of concept formation. This is the notion he explores in *SFS* and at the beginning of *PK*. Other mechanistic-like features show themselves in the notion of emergent properties in individual cases modeled on the functions of machines, and the notion of polycentricity for spontaneous coordination of multiple

individuals (i.e., a social group). The Gestalt notion is then transformed into a phenomenological-existential notion, where the organic whole is emphasized: knowing is embodied knowing, an integration of elements into an organic, new synthetic whole (cf. *TD* 46). This organic whole is not formed deliberately (as a mechanistic notion may suggest), but neither is it formed randomly. Organic notions of integration work best with a probabilistic notion of forming wholes. Note that Polanyi's notion of warranting the truth of a discovery is a probabilistic one, in which he held that the assertion of truth is a degree of confirmation of truth (cf. *PK* 31; *TD* 77).

But Polanyi's main purpose was to show the creation of a new idea, a unique event. He wanted to explore not only the quality and texture of a whole "intuited" and then analyzed in a situation, but how change and novelty can be analyzed in an epistemology which takes into consideration the context of discovery. The element of novelty and chance introduced the aspect of unpredictability and indeterminacy of the unique historic event. His "degree of confirmation of truth" version of probability theory of truth was designed to verify, or rather warrant, the reality of the unique event.

Up to this point in the discussion, we see Polanyi drawing on features and concepts generally associated with the hypotheses of mechanism, organicism and contextualism in building his epistemology. But he also drew on a Platonic-Aristotelian kind of formism relying on the general notion of similarity. His numerous analogies are built on the notion of similarity of some features, where to explain conceptions outside of or straddling frameworks, he relies on either a series of free-standing or of overlapping analogies.[15] He built categories by having particulars participating in characteristics (again, a kind of triad – particular–participating–characteristic - working by a modified form of deduction reminiscent of Peirce's abduction). He first built his hierarchies of thought, then his hierarchy of entities which explain what there is in the world. A pair of levels of a hierarchy can be "intuited" together, as when one hears a musical chord consisting of individual notes on one level and a harmonious composite on the next level. Although Polanyi defines "intuit" as guessing right, the notion seems closer to apperception.

On a broader scope, Polanyi's metaphysics seems to be the following: hierarchies, categories and similarities lead one to postulate that there are regularities in nature. This is one of the basic premises of scientific inquiry. Another basic premise is that empirical statements are contingent, and true statements are those corresponding to what there is in the world. His epistemology, as I have indicated above, seems to be a blending of mechanism, organicism, contextualism and formism. His ontology seems narrower, a blend of formism and mechanism with an organicist overlay. From all appearances, it would seem that Polanyi attempted to synthesize a philosophy out of the major trends or hypotheses of the history of philosophy. The synthesis seems to be unstable, because it lacks a simple coherence. He named his hypothesis "man in thought" and tried to provide the coherence needed by the metaphor of "innovation" to complete his architectonic. However, the template of the structure of tacit knowing as applied to all aspects of being makes the ontology fragile, unscientific and philosophically troublesome.

3.b. Reals/Things and Minds

Polanyi discussed "the real" in three aspects, although not delineated as such: external reality, which is the subject matter of science, other minds, and the other as "not self." Polanyi affirmed that he concurs with that aspect of ontology held by scientists which confirms the existence of external knowable objects (*TD* 68). "There are real objects existing independently of our consciousness" (*TD* 77). According to this, we may read him to be a realist. But again, he does not fit comfortably with his peer's worldviews. He objected to the

"scientific rationalism" of his time because to him it seemed to be based on radical doubt (cf. *KB* 8-13), which insisted on accepting only "statements based on tangible data and derived from these by a formal inference, open to testing"(*TD* 62).

His theory of tacit knowing, the foundation of all knowing upon unformalizable mental skills "cannot be disposed of within the framework of [scientific] rationality," he said (*KB* 106f.). This position would indicate that he is a realist. So what kind of realist is Polanyi? He accepts abstract objects of formal science – numbers, propositions, meanings – and the natural objects of the natural sciences as knowable. He is insisting on not treating the natural sciences, especially biology and psychology, with the same formality as the "formal" sciences. His epistemology of tacit knowing is especially developed for biology, psychology and sociology (*PK* vii). But it seems there is yet another set of "objects": thoughts, theories, problems – objects of mental life. All three sets of objects are real for Polanyi. So is his a "general realism"? Abstract and natural objects, as well as mental objects exhibited externally (i.e., ideas expressed) are objects of experience. Yet this cannot be a mature realist-empiricist position, which would be reductionist.[16] It may be said that an epistemology for abstract objects and for "mental objects" may need to be intuitionist and apriorist and this would make it an anti-realist position.

But Polanyi's position seems to be that we can know abstract objects by inference, mental objects by tacit inference and natural objects by a combination of tacit inference and laws of causality. Since Polanyi redefined knowing as tacit knowing, a combined cognitive and conative process, he would have to be judged, from this angle of epistemology as a modified rationalist. Since his ontology makes him a "general realist," or better yet, a modified realist, his philosophy turns out to be a "modified rational realism," if labels from mainstream philosophy are insisted upon.

In keeping with the above, Polanyi insisted that there is a qualitative difference between mind and body, that one should recognize "thought as an independent self-governing force" (*STSR* 147). Although one knows other minds indirectly, by analogy to one's own, and one knows the thought of cultural leaders indirectly, from their works, one must make a conceptual leap – have an insight into – their innovative thoughts. This understanding of them is "indwelling" in the expressed thought of the other. Since one cannot indwell another body, one cannot ever know another in all particulars. Therefore, "indwelling" does not lead to collapsing the "other" into the "self."[17] Polanyi insists on this, to maintain his anti-reductionism. Does this conception open the door to the "other" in the theological sense? His writings do not develop this notion. The idea of Ultimate Intelligence is not explored – Polanyi only expresses his doubt (in the context of his hierarchical ontology of emergence) that evolution is meaningless. Polanyi, sitting on the cusp of his confirmation of external reality conceived by science, and his confirmation of mental reality as he developed it, leaves the discussion of emergence of a "higher intelligence" untouched.[18] It could have led him further into a position of having to explain a dualist stand.

The notion of knowing other minds is not explored thoroughly. A beginning has been made in 1968 in two essays[19] with the introduction of "from-at" knowing in addition to "from-to" knowing. *This signals a shift from the double-aspect theory to the interactionist theory on the mind-body question, and to a qualified dualism*[20] *- not a Cartesian duality, "but interaction according to the logic of tacit knowing"* (*KB* 223). In "Life's Irreducible Structure," he explained, "understanding hierarchies needs 'from-at' conceptions. We cannot analyze a higher level (the mind) by simply integrating the principles of the lower level (body).

These are two different logical levels" (*KB* 235). In a note to the Meaning Lectures he explained that the hierarchy forms a structure where levels play the role of parts to the structure's whole, each level having its intrinsic function, sustaining the level above it (cf. PP 21:15).

Conclusion

Polanyi's ontological equation, which at first sight seemed to be a useful explanatory device, created many problems for him from which he did not extricate himself with careful, warranted explanations and analysis. His strength in epistemology was not matched in his ontology.

Endnotes

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[1] "Ontological equation" is my shorthand for Polanyi's phrase "a handy model," by which he meant a structural equivalence between knowing and being.

[2] It is well to remember that *SFS* was originally tentatively titled "Science, Ideals and Society – a Study of Dynamic Order," cf. the letter from Polanyi to Stolper, October 3, 1943, PP 4:10

[3] It would be interesting to compare this to other anti-mechanistic notions of emergent evolution.

[4] See Polanyi's note (PP 23:15) : Hegel on "alienation" from G.W. Hegel, *The Phenomenology Of Mind*, Phil. Bib. German ed., p. 346.

[5] Polanyi's notion of "emergence" may differ from most current philosophy of science notions. It seems to designate not only explanatory emergence (the laws of more complex situations in a system are not deducible by any composition of laws of simpler situations), but also presupposes descriptive emergence (properties of wholes cannot be defined through properties of parts), a legacy of the Gestalt model from *SFS*.

[6] Meaning Lectures, University of Texas, Austin, 1971. There are "two kinds of complex entities: a) formed on one level of principles; b) formed by harnessing to an irreducible (higher) principles. Remember the instrument of unknown purpose. This was its meaning. The way a machine functions tells us the purpose of its parts. The way a living being sustains itself tells us the purpose of its parts. This is their meaning just as the purpose of action is its meaning." Notes to Lecture 4, p. 6, PP 41:9, cf. also *KB* 225-239.

[7] Kant's notion that a teleological explanation is a heuristic to explain the technique of nature. That is, the "principle of ends" is a necessary maxim of reason to explain the products of nature, but it is only a heuristic for investigation, using the notion of "regularity of design." One cannot use a purely mechanistic explanation, but neither can one use a merely teleological one, as the later would be "visionary." One can use a "union" of empirical and teleological "explanations" (notice quotation marks; these two types cannot be actually unified because they rest on different principles) in the form of an exposition, which is not a true explanation generated from a principle – it is only a heuristic. See Kant, *The Critique of Judgement*, Part II, [411], 69, transl. by J.C. Meredith (Oxford: Clarendon Pr., 1928/1952).

[8] Benedict de Spinoza, *Ethics* II, prop. 7, in: *On the Improvement of the Understanding; The Ethics; Correspondence*. Transl. by R.H.M. Elwes, (New York: Dover Publ., 1955)

[9] Aristotle, *Metaphysics* XII, 7, 1072b, 19-21, in: *The Basic Works of Aristotle*, ed. R. McKeon (New York: Random House, 1941)

[10] This was his solution to Kant's "ignorabimus," the transcendent existence of objects. See Notes to Meaning Lecture 4, p. 2, PP 21:15.

[11] *PK*, Ch.6: Intellectual Passions. Cf. my commentary on justification of knowledge in S. R. Jha, "A New Interpretation of Michael Polanyi's Theory of Tacit Knowing …" , *Studies in Histy and Philosophy of Science* 28 (1997), 611-631.

[12] In the "Meaning Lectures," he restated his definition of reality in terms of integration: "It is the tacit integration of parts which realizes the reality of their coherence…" "Kinds of self-centered integration," p. 14, PP 21:10, n.d. probably 1969. The coherence is the anticipation of the real as defined (in *TD* 32) above teleologically.

[13] "The relation between body and mind has the same logical structure as the relation between clues and the image to which the clues are pointing." Integrating the clues gives the image its meaning. By the ontological equation, the mind is a higher level integration (leap), an emergent quality of the body. Therefore, by this "deduction," the mind is the meaning of the body, see *KB* 213.

[14] For an exegesis of Polanyi's work from a Polanyian perspective, see my (1997) paper in note 14.

[15] Some freestanding analogies: whole-part (from Gestalt, from function of machines), etc.; some over-lapping analogies: from art: contrast of a flat surface having a deep perspective; from religion: Pauline scheme, and secular elements transmuted into sacred; from sport: skill of a bicyclist, etc.

[16] Polanyi wanted to explore what (realist-empiricist) scientists mean by "theoretical reduction" without "logical reduction." In response to his question, Beloff's reply was on epistemological reduction: by use of a theory one can infer properties of a system from the properties of the parts and their interactions [explanatory reductionism/methodological individualism?], Beloff (1963), PP 6:3. Beloff, in the name of scientists in general, distanced himself from ontological reduction, as not relevant to theoretical reduction. Polanyi wanted to claim that scientists "forget that mechanical models are "as-if" models of biological processes" , cf. Polanyi's letter to Gillespie (1966), PP 96:8. Problem discussed in Jha, *Polanyiana* 5 (1966), nr.2.

[17] There are ambiguities in the term "indwelling." In "On Body and Mind," *The New Scholasticism* 64 (1969), nr.2, he defined "indwelling" as interiorizing parts of a comprehensive entity so as to attend from the parts to the meaning of the whole. This is tacit knowledge. Yet, it is explicit knowledge, which distinguishes humans from animals, and "explicit inferences operate with a minimum of indwelling." (*ibid*. 201) But in learning skills and expertise of the sciences, explicit is only a link between tacit "input" and "output."

[18] Cf. PP 21:10. Occasionally Polanyi made statements on the function of the Christian religion. These seem to be either by way of analogy, or as a way of using the speech of the general public (his "everyday examples"). There is no serious analysis of theology in his works.

[19] Cf.. LP 27 and *KB* 225-239.

[20] The possibilities opened up by the "from-at" conception of knowing are discussed in S.R. Jha, "The Tacit-Explicit Connection: Polanyian Integrative philosophy and a Neo-Polanyian Medical Epistemology," *Theoretical Medicine and Bioethics* 19 (1998), 547-568.