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THE TACIT-EXPLICIT CONNECTION: POLANYIAN INTEGRATIVE PHILOSOPHY AND A NEO-POLANYIAN MEDICAL EPISTEMOLOGY[±]

1. POLANYIAN INTEGRATIVE PHILOSOPHY, THE EPISTEMOLOGY OF "PERSONAL KNOWLEDGE"

A medical epistemology based on Polanyi's philosophy can be helpful to implement the suggestion in the Hastings Center Report "Goals of Medicine," namely, to "foster an ability to move back and forth between a narrowly focused scientific approach and a wide-angle lens perception of the human and social context of illness and disease"[1] (p. S22) The Polanyian Integrative Philosophy in Section 1 followed by a NeoPolanyian proposal in Sections 2 and 3 is sketched, giving an ontological and epistemological framework for clinical medicine which coincides with these goals as it applies to the mind-body relation and the doctor-patient relation. Medicine's relation to society is not discussed in this paper. Michael Polanyi - physician; chemist and philosopher of science - is one of twentieth century's untapped sources for theoretical medicine. His inquiry into the nature and justification of scientific knowledge led him to reject the prevalent deterministic world view advocated since Laplace. He worked out an alternative epistemology, called Personal Knowledge, a fusion of objective knowledge and of the knower's act of knowing.[2] (p. viii) Polanyi's epistemology of Personal Knowledge is especially adaptable to clinical medicine, because it neither loses sight of the need for medical science to be objective, nor does it lose sight of the human element in the doctor-patient relationship.

In the following pages I will explain Polanyi's new epistemology by presenting some "definitions" and examples. I will present my models by which Personal Knowledge can be conceptualized in an accessible manner, introduce an extension of these models as "indirect knowledge" (first suggested by Polanyi) which I call a Neo-Polanyian proposal, then show the application of this proposal to clinical practice.

1.1. "Definition" of Personal Knowledge and its Elements

Polanyi rejected the mechanistic conception of objective knowing as detached knowing. He believed this conception does not reflect the actual process of scientific activity. His epistemology is a re-definition of scientific knowing which emphasizes the personal participation of the knower in comprehension. This personal participation does not make our understanding subjective. He redefined "objective knowledge" as comprehension. It is "neither an arbitrary act, nor a passive experience, but a responsible act of claiming

universal validity. Such knowing is indeed objective in the sense of establishing contact with hidden reality; a contact that is defined as the condition for anticipating an indeterminate range of yet unknown . . . true implications" [2] (p. viii) He defined the knower's act of knowing as an action requiring skill: "Skilful knowing and doing is performed by subordinating a set of particulars, as clues and tools; to the shaping of a skilful achievement, whether practical or theoretical" [2] (p. vii) The epistemology of Personal Knowledge acknowledges that all our knowing is grounded in tacit knowing with integration as its most important feature. Polanyi introduced "tacit knowing" by an example:

I shall . . . [start] from the fact that *we can know more than we can tell*. . . . We know a person's face, and can recognize it among a thousand. . . . We recognize the moods of the human face, without being able to tell, except quite vaguely, by what signs we know it. . . . But can it not be argued . . . that the possibility of teaching these appearances by practical exercises proves that we can tell our knowledge of them? The answer is that we can do so only by relying on the pupil's intelligent co-operation for catching the meaning of the demonstration. Indeed, any definition of a word denoting an external thing must ultimately rely on *pointing at* such a thing.[3] (pp. 4-5)

Polanyi intends to convey by this example that both telling and learning are more than discrete pieces of information sent and received. The teaching of appearances and the learning from demonstrations must rely on the pupil's active mental engagement. This process is more than the adding of features and clues together. The *clues have to be "integrated," intelligently reorganized*, into what we are to recognize: a face, a plant, a diagnosis.

The direction of the reorganization process goes from the "clues," such as features, to the "object," the meaningful focus of our attention. This process of integration is never fully conscious - we know more than we can tell.

Polanyi's epistemology has three strands, each borrowed, but it is his novel organic reconception of these strands as elements in his theory of tacit knowing which give it merit. We will analyze the strands into "models," constituting tacit knowing.[4] The first model, the Gestalt Model, emphasizes perception, the second, the Action-Guiding Model, emphasizes the existential-phenomenological aspects of action, the third, the Semiotic Model, emphasizes meaning.

In my understanding, the most distinctive feature of "personal knowing," the active principle which shapes all forms of knowing and ties the three models together, is Intellectual Passion in its aspect of heuristic striving. To Polanyi this means a commitment to truth, and a striving for engagement with reality. The "models" offered below are meant

to clarify Polanyi's notion of tacit knowing as "man in thought" which he affiliated "to the organic evolution from which we have arisen" [3] (pp. 91-92)

1.2. *The Structure of Personal Knowledge: A Sequence of Three Models*

The first model is Polanyi's archetype conception; it explains integration of parts into a whole. The second model enriches the gestalt notion of integration; here perception becomes a guide to action, emphasis shifts from perception to performance, as in the use of a probe or a tool. The third model points to meaning as the direction of the vector of integration.

The three models will be illustrated by using Polanyi's examples.

(1) The Gestalt Model is based on the key analogy "scientific insight is like gestalt perception," an extension of Polanyi's starting point "we know more than we can tell". In his 1946 book *Science, Faith and Society*, Polanyi illustrates the re-organization of parts or clues into a whole:

Take for example, a ball or an egg: we can see their shapes at a glance. Yet suppose that instead of the impression made on our eye by the aggregate of white points forming the surface of the egg, we are presented with another, logically equivalent, presentation of these points as given by a list of their spatial co-ordinate values. It would take years of labour to discover the shape inherent in this aggregate of figures - provided it could be guessed at all. The perception of the egg from a list of co-ordinate values would, in fact, be a feat rather similar in nature and measure of intellectual achievement to the discovery of the Copernican system. We can say, therefore, that the capacity of scientists to guess the presence of shapes as tokens of reality differs from the capacity of our ordinary perception, only by the fact that it can integrate shapes presented to it in terms which the perception of ordinary people cannot handle. . . . These perceptions may be erroneous: just as the shape of a camouflaged body may be erroneously perceived in everyday life* (p. 10).

Polanyi argues, using this example, that scientific insight is a process analogous to ordinary perception. He points out that the Gestalt notions of the tendency to constant shapes, reorganization of parts to change the shape, the possibility of errors in perceiving shapes from incomplete clues and the process of guessing this entails, find their analogies in theory formulation and reformulation, and in the possibility of error in scientific insight. But just as Gestalt-perception would not be a reliable guide to knowing if we could not generally accept the reality of perception, "the final grounds on which the scientist holds his premisses and bases his decision of his conscience, . . . consists in the acceptance of

science itself as valid." [5](p. 47)

Polanyi emphasizes that neither Gestalt-perception nor scientific insight are inborn but learned. The capacity for perception of shapes is developed in practice during maturation, and the capacity for scientific 'insight' is developed by active participation in the scientific community: He stresses that an essential part in the learning process is played by a "form of intelligent guessing similar to that which underlies the process of discovery. To assimilate the hidden premisses of a major . . . intellectual process [i.e. perception of shapes] is in fact a minor feat of discovery." [5] (p. 31)

(2) The Action-Guiding Model emerged from Polanyi's 1958 book *Personal Knowledge*. This model develops the existential-phenomenological aspects of tacit knowing. Here Polanyi introduces the notion of two kinds of awareness, subsidiary awareness and focal awareness, and shows the relation between them.

In visual perception the appearance of the object at the center of our attention depends on clues to which we are not attending, but which contribute to the appearance of the object. Such clues are the movement of eye muscles and the view visible from the corner of one's eye. These clues jointly sustain the perception of the coherent object - they are subsidiary to our focal awareness of the object. In auditory perception, the distinction between subsidiary and focal awareness highlights that the particular sounds making up a word must be apprehended jointly - the sounds are in subsidiary awareness as we attend to the word in our focal awareness.

The distinction between the two kinds of awareness with respect to auditory perception brings out a characteristic of our attention: it can hold only one focus at a time. We hold the clues in our subsidiary awareness, while we are focally aware of the whole.

Polanyi shifts then from examples of visual and auditory perception in which knowing seems to be a passive quality, to tactile perception. I signal this shift by calling it Action-Guiding Model. The shift allows Polanyi to investigate examples of knowing as action: the use of a probe, a skillful performance, and problem-solving. Analogy from tactile perception also gives Polanyi access to detailed description of some observable subsidiary processes of others as well as one's own. He explains knowing as action with this everyday example:

When we use a hammer to drive a nail, we attend to both nail and hammer, but in a *different way*. We *watch* the effect of our strokes on the nail and try to wield the hammer so as to hit the nail most effectively. When we bring down the hammer we are certainly alert to the feelings in our palm and the fingers that hold the hammer. They guide us in handling it effectively, and the degree of attention that we give to the nail is given to the same

extent but in a different way to these feelings. The difference may be stated by saying that the latter are not, like the nail, objects of our attention, but instruments of it. They are not watched in themselves: we watch something else while keeping intensely aware of them. I have a *subsidiary awareness* of the feeling in the palm of my hand which is merged into my *focal awareness* of my driving in the nail.[2] (p. 55)

This example shows clearly that subsidiary awareness of clues participates in perception by merging into focal awareness of the whole and by guiding our action. "*Merging*" and "*guiding*" together constitute the concept of integration Polanyi wants to use.

The hammer example resembles those of Maurice Merleau-Ponty,[6] who explored the notion of intentionality in common experience from the point of view of the embodied mind. Polanyi's *combined* conception of Gestalt re-organization and intentionality however puts Kohler's~ example of problem-solving (in primate subjects) into a new, more active mode: *intentional* acts involving "acts of insight". This can be clarified by looking at Polanyi's distinction between "latent learning," as can be observed in primates, and a process of problem-solving:

latent learning is transformed into pure problem-solving when the situation confronting the subject can be taken in by it from the start, at a glance. This reduces the exploration to a minimum and shifts the task altogether to the subsequent process of inference. Learning becomes then an act of "insight," preceded by a period of quiet deliberation; . . . [This] is an irreversible process which predominates throughout an important part of intellectual behaviour.[2] (pp. 74-75)

Insight is irreversible, because once the solution is found to a problem, it is no longer seen as a problem. It is irreversible, because the act is directed from selected clues toward completion guided by a hunch.

(3) The third, or Semiotic Model (which Polanyi called the "tacit triad") builds on the second model, to show how action is directed or "tends to" meaning. It is a schema absorbing the first two models' conception of the relation between the subsidiary and the focal, the tacit and the explicit. The "tacit triad" introduced in 1966 in *The Tacit Dimension* [3] seems to be Polanyi's attempt to de-mistify the "ineffable" by laying bare the structure of tacit knowing as "from-to" knowing.

Polanyi explains the notion of a "tacit triad" as follows: "Tacit knowing joins together three co-efficients...The person A can integrate the word B into a bearing on C. But to integrate a thing B bearing on some C amounts to endowing B with a meaning that points at C." [8] (p. 81) Polanyi wanted to endow the inference with a vectorial quality expressed

in this last passage by the term "point".

An obvious way to do this is to choose as B a finger pointing at C. Suppose a lecturer points his finger at an object, and tells the audience: "Look at this!" The audience will *follow the pointing finger and look at the object...* This directive, or vectorial way of attending to the pointing finger, I shall call our *subsidiary awareness of the finger...* A meaningful relation of the subsidiary to the focal is formed by the action of a person who integrates one to the other, and the relation persists by the fact that the person keeps up this integration. ...[In] general terms, the triad of tacit knowing consists of subsidiary things (B) bearing on a focus (C) by virtue of an integration performed by a person (A). ...we attend *from* one or more subsidiaries *to* a focus on which the subsidiaries are to bear.[8] (pp. 181/182)

But the pointing finger is not itself equated with tacit inference. Tacit inference is the *recognition* of pointing, the *act* of achieving understanding, the act of perception / provided that the result of the act is valid.[9]

The Semiotic Model formalizes Polanyi's conception of inference as "from/to knowing". "From/to knowing" is a single act integrating two levels the lower, subsidiary level into the higher, focal level. Single acts of integration can be organized into hierarchies, "joined" *stacked(in such a way that the focal object of the first triad becomes the subsidiary of the next.

To illustrate such a hierarchy, Polanyi points to the way language is formed as meaningful communication sounds are integrated into words, which in turn are integrated into sentences, while sentences are integrated into prose, producing a hierarchy of levels of meaning. Polanyi applies this conception of hierarchy to explain the growth of knowledge, the relation among the sciences, as well as the idea of emergence of higher ontological levels. The relation among the sciences is illustrated by the ontological hierarchy progressing from physics to chemistry to physiology and so on. In *The Tacit Dimension* Polanyi explains that in his ontology "emergence took over from tacit knowing the function of producing fundamental innovations." [3] (p. 55) That is, as integration functions within *one* act of tacit knowing, emergence functions in a *hierarchy*: they are alike in their vectorial quality, in their merging the lower into the higher levels, in their function of "creating" meaning and in being open/ended.

1.3. *The Dynamic Connection Among the Models and its Function in Scientific Knowing*

Polanyi's concept of Intellectual Passions provides the dynamic connection between the three models. Let me point this out briefly by addressing the question of truth. Intellectual Passions may be considered the driving force of the "personal" in Personal Knowledge.

Polanyi defined Intellectual Passions as

a complex system of emotional responses by which scientific value and ingenuity . . . are appreciated. . . . A scientific theory which calls attention to its own beauty, and partly relies on it for claiming to represent empirical reality, is akin to a work of art. ...In teaching its own kind of formal excellence science functions like . . . other constituents of culture [2] (p. 133)

Intellectual Passions link intentional action, reality, beauty and truth together. Intellectual Passions can be identified in the three models in the following way:

In the Gestalt Model explaining scientific insight, our reliance on pattern recognition can be erroneous. Polanyi held that Personal Knowledge involves intellectual commitment. As such it is inherently hazardous, that is, our belief in the reality of our insight can be false. Intellectual Passions in this model thus have a strong aesthetic aspect. We may note, that the Gestalt Model presents a notion of insight as an internally consistent whole, a candidate for the coherence theory of truth,** with the attendant problem that there may be alternative wholes; and the difficulty of the connection of such consistent wholes to reality.

The Action-Guiding Model links the knower to the world through intentionality. This model opens up the Gestalt by actively linking the knower with that which is known. Here Intellectual Passions manifest themselves in heuristic striving. Polanyi used the image of striving for realizing our ideals as an analogy of heuristic striving to the goal of discovery. The discovery is revealed in a self-transforming act of insight, a goal which attracts the knower by its beauty as the token of its reality.

The Semiotic Model formalizes Intellectual Passions as a vector, an inference.

Polanyi guards herewith against deceptive beauty or false insight in at least three ways: the appreciation of scientific value, adherence to the premisses of science and upholding the standards of criticism of the scientific community.

The factors affirming scientific value are: accuracy of empirical observation, systematic relevance indicated by reproducible or predictable events, and intrinsic interest which eliminates from consideration possibly trivial discoveries. Polanyi links heuristic striving with affirmation of scientific value.

Furthermore, scientific discovery reveals new knowledge grounded in the premisses of science, which are an accumulation of scientific concepts and discoveries to which the foregoing criteria of scientific value have been applied. This Polanyi speaks of as "the

factor of tradition."

Thirdly, the practitioners of science form a community, self coordinated by mutual adjustment, each member subject to criticism and encouragement by others. The scientific community's standards, which Polanyi refers to as "the factor of authority," help guard the truth of a discovery.[11,12] (pp. 84–85; p. 16)

1.4. *Relation of Polanyi's Meaning of "True" to his Conception of "Two Poles of Knowing"*

Polanyi's notion of truth excludes the possibility of certainty but allows the certification of truth. Polanyi's way of certifying the truth of a discovery is to show that the scientist has a conviction that his belief in his insight will correspond to reality. This conviction is a heuristic. What the scientist seeks is *good evidence* that the insight is true - it is an estimation of truth.[13] (p. 121) This notion of truth estimation is important if scientific knowing is to be open-ended. As Polanyi formulated his notion, "The selection and testing of scientific hypotheses are personal acts, but like other acts they are subject to rules . . . [of] probability." [2] (p. 30) "[What we mean by 'true' is that we are] *asserting* an upper limit [of degree of probability] which can be asserted with a reasonably high degree of confidence."*** [2,3] (p. 31; p. 77) Polanyi does not offer an analytic definition of the concept of truth,[14,13] (pp. 3g-54; p. 121) rather he chooses to emphasize the warrant of a true statement.

Polanyi's conception of the relationship between what he means by "true" and what he means by "tacit knowing" is described by the following schema: there are two poles of knowing,[3] (p. 87) the "internal" (personal) pole and the "external" pole. The "tacit" is at the internal pole, "true" is at the external pole. At the internal pole tacit knowing encompasses guessing (hunch), intimation of reality (judgment) and claim of truth (responsibility). Striving to reach a solution is grounded in the tacit and connects the poles. "Guessing right," contacting reality, truth itself, and reaching the goal belong to the external pole.† The external pole connotes "objectivity" and *verification* of facts of experience. The natural sciences are nearer to the external pole while the humanities with their greater personal component are nearer to the internal pole. The internal pole connotes *validation* (not verification) of facts of experience.² (p. 202)

It must be noted that Polanyi emphasized the tacit, the "internal pole," in his works to correct the old ideal of scientific detachment, but as a scientist he had to account for the "external pole".†† This he did, for example, in his analysis of the "scientific value of fact" in a discovery and by offering an analysis of "affirmation statements" in the warrant of a true statement, pointing out that we subject statements to the test of experience. In the search for knowledge we aim for truth; however, we are fallible; fallibility is an aspect of objective knowledge. It is with this note in mind that the heuristic function of Intellectual

Passions in Personal Knowledge should be understood.

2. THE MIND–BODY RELATION

Polanyi postulated an "ontological equation" to bridge his epistemology and his ontology: as "integration" was the organizing principle of his epistemology, so "emergence" would be the organizing principle of his ontology. The structure of comprehension and the structure of the comprehensive entity which is its object correspond in this:[3] (pp. 33-36) they are both hierarchical. Polanyi considered this ontological equation controversial but plausible. In his earlier work, *Personal Knowledge*, he explained the operational principle in a hierarchy by remarking that each level of complexity has its own set of principles. The principles of the higher level constitute a higher logical level than the levels immediately below it which comprise its parts and on which it is built (and whose principles it absorbs into itself), as chemistry is "built" on physics, physiology on chemistry, etc.[2] (pp. 401, 176, etc.)

In Polanyi's "ontological equation," the physiological principles governing the function of the body are the "clues and parts" to the "whole" which is the embodied mind. In this sense, the mind is the meaning of the body.[13] (p. 40) the operational principles of the mind cannot be fully explained or defined by the lower level operational principles of the body. The mind is an "emergence" as an insight is an "integration" - they are both "innovations".

2.1. *The Neo-Polanyian Proposal: Extension of the Semiotic Model to Accommodate "Indirect Knowledge"*

In what I believe to be an attempt to further examine the "external pole" of knowing, Polanyi modified his novel idea of "from-to knowing" by a distinction he introduced between "from-to" and "from-at" awareness. Polanyi's thinking showed a tentative, experimental mode during this examination and he was unclear in his statements about the distinction between "from-to" and "from-at." For this reason, I will first present Polanyi's tentative statements, then I will show how they can be clarified and utilized in a Neo-Polanyian proposal.

On the one hand, Polanyi said "Tacit knowing is a from-to knowing. Sometimes it will also be called a from-at knowing, but this variation will be only a matter of convenience"[15] (p. 29) On the other hand, he said that "from-at" knowing is a "shifting one's attention from the direction on which the subsidiaries bear and focusing instead on the subsidiaries themselves." [15] (p. 39) In earlier work, he described the process of focusing (of one's own awareness) on the subsidiaries as alienating, destroying the integration of the entity which is in focal awareness.[16] (p. 146)

Polanyi introduced the distinction between "from-to" and "from-at" while attempting to work out connections in the case of "the disparity between the experience of a subject observing an external object like a cat, and a neurophysiologist observing the bodily mechanisms by which the subject sees the cat"[15] (p. 39) What he meant was, I argue, that the scientist's knowledge of the cat is indirect. That is, we may say he does not see the cat and does not experience the subject's experience - he interprets the subject's experience of the cat using physiological data. The difference is in how the external object, the cat, is known to the two observers: the physiologist does not experience the same "cat" as the subject does, his knowledge of the subject's integration "cat" is an "at" knowledge because his body does not respond to external stimuli whose focus is "the cat". The person's from-to knowledge "is a subsidiary awareness of bodily responses evoked by external stimuli, seen with a bearing on their meaning situated at the focus of his attention."††† [15] (p. 39)

The suggestion can be clarified briefly in Polanyian terms thus: the physiologist's knowledge of the subject's brain process is "from-to" knowledge, and the subject's knowledge of the cat is "from-to" knowledge. The physiologist' knowledge of the subject's perceptual-conceptual integration "cat" is "from-at" knowledge (the physiologist has indirect knowledge with reference to the experienced "cat"). If the physiologist were to equate the subject's brain-function with the subject's experience he would objectivize the subject.

My proposal can be stated this way: because the physiologist's knowledge of the subject's experience is indirect, he needs to reach to a higher level of understanding of the subject as a body-mind, a level where he can integrate the "elements" of scientific knowing of the body, the interpretation of the subject's experience and the knowing of the subject as a person (existential being). The middle element, "interpretation," can be used as a hook for the intelligent reorganization of the other two elements: knowing the body and knowing the existential being. Interpretation, which is conceived of as knowing by a combination of imagination and inference, helps in aligning the "from-to" knowing of the existential being and the "from-to" knowing of physiological data. Conceiving of the role of interpretation in "from-at" knowing in this manner demystifies somewhat the notion of intelligent reorganization necessary to reach the next level of complexity, and the notion of understanding "the other" as body-mind.

The integration of these three elements is to be driven by the conjoint forces of heuristic striving (intellectual passion) and active empathy (humane passion), corresponding to the driving force of Intellectual Passion in Polanyi's theory of scientific knowing. Active empathy is an ability for the act of mental duplication, of re-living, of the experience of "the other" by virtue of sharing a similar ontological structure. The result can be understood to be an enfolding of indirect knowledge into direct knowledge, the "from-at" into the "from-to". For the sake of simplicity the conjoint force may be labeled intellectual-humane passion.

I argue that the usefulness of this formulation is in delineating the difference in immediacy between knowing another mind and knowing another body in the first instance and a beginning of an analysis of some aspects of integration in the second instance.

"From-at" knowing is controversial among Polanyi scholars because it seems to break the coherent formulation of his conception of tacit knowing as embodied knowing schematized in "from-to" knowing. ‡ I would argue that the concept of "from-at" should be utilized as a bridge and an opportunity to expand Polanyi's theory of tacit knowing in the direction of a finer-grain conception of knowing "the other." At the very least, it provides a schema for a Neo-Polanyian approach to combine scientific medicine (the curing function) with the humane component (the caring function) in clinical practice.

[Next part](#)

NOTES

+ Originally published in *Theoretical Medicine and Bioethics* 19: 547-568, 1988. Reprinted with kind permission from Kluwer Academic Publishers.

* Michael Polanyi. *Science, Faith and Society*. London: Oxford University Press, 1946: 10. ["Faith" in the title is used in the sense of "ideal". The original title of the manuscript was "Science, Ideal and Society: a Study of Dynamic Order". Polanyi Papers (4:10). Author's note)

** Polanyi's theory of truth however is not a coherence theory; he considered it to be a probability theory of truth in the sense of "degree of confirmation". For an analysis of Polanyi's theory of truth see my article, A new interpretation of Michael Polanyi's theory of tacit knowing. *Studies in History and Philosophy of Science* 1997; 28(4): 628.

*** Polanyi mentions that this conception resembles Carnap's notion of probability as "degree of confirmation". See p. 322 and Rudolf Carnap, *The two concepts of probability*. In: Herbert Feigl and Wilfred Sellars, eds, *Readings in Philosophical Analysis*. New York: Appleton-Century-Croft Inc. 1949: 334.

† The logical form of these two poles with regard to assertion of facts is thus: belief is at the personal pole, test of experience is at the external pole. Polanyi explains: "An articulate assertion is composed of two parts: a sentence conveying the content of what is asserted and a tacit act by which this sentence is asserted. The articulate assertion can be tested by separating its two parts and tentatively canceling the act of assertion, while the

unasserted sentence is being confronted with experience. If as a result of this test we decide to renew the act of assertion, the two parts are reunited and the sentence is reasserted. This reassertion may be made explicit by saying that the originally asserted sentence is true". Polanyi, *The logic of affirmation* (p. 254).^[2]

†† See his analysis of the "scientific value of fact" in a discovery and of "affirmation statements" in the warrant of a true statement (statements are subjected to the test of experience).

††† Navon hinted at a similar differentiation: according to my understanding of his suggestion, his "phenomenal experience" resembles Polanyi's from-to knowing, and his "information" resembles Polanyi's from-at knowing. David Navon. *Experience and information should be distinguished*. *Behavioral and Brain Sciences* 1993; 16(2): 405-06.

‡ See criticism of the leading Polanyi scholar and former collaborator of Polanyi: Marjorie Grene. *Tacit knowing: Grounds for a revolution in philosophy*. In: *The Philosophy of Michael Polanyi [Festschrift]* *The Journal of the British Society for Phenomenology*, Oct. 1977; 8(3): 169. She is referring to Polanyi's "Logic and Psychology", 15 pp. 29, 39~0 where Polanyi hints at "mind-body dualism".

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Polanyiana Volume 8, Number 1–2, 1999
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