Polanyian Footnotes To "From Biology To Consciousness To Morality"

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ABSTRACT Key Words: Michael Polanyi and emergence, critical biology, ultra-biology, minding as embodied.
This brief response to Goodenough and Deacon's essay "From Biology to Consciousness to Morality"sets forth Michael Polanyi's criticism of evolutionary ideas of his day. It analyzes Polanyi's approach to biology and suggests there are affinities with the provocative evolutionary sketch Goodenough and Deacon provide of the development of the human capacity for moral experience.

Polanyi and Contemporary Biology: A Cautionary Note

Thanks are due to Ursula Goodenough and Terrence Deacon for producing an interesting paper, a paper that they point out at the beginning takes some giant steps, in a sweeping Polanyian style, to address a deeply interesting question: how is the apparently novel human mentality and its sense of self related to our evolutionary heritage? This is a question akin to the large questions Polanyi tried to address philosophically in the last section of *PK* and elsewhere; Polanyi's wrestling with such questions, of course, did not, like Goodenough and Deacon, make use of the exciting results of today's biological research. What I aim primarily to do in this brief response to their paper is to try succinctly to articulate some philosophical points and themes that Polanyi offered, some Polanyian footnotes, from his discussion of evolution, emergence and tacit knowing in the roughly twenty years before his death. These footnotes are intended primarily to open an exploration of questions about the general fit of Polanyi's philosophical ideas with the account that Goodenough and Deacon sketch.

I see hints that Goodenough and Deacon are moving in directions akin to those of Polanyi's earlier discussions, but there remain ambiguities. Nobody more than Polanyi emphasized that a living research tradition grows, so it is hardly a surprise that contemporary biologists think rather differently than they did at the time Polanyi first carefully formulated his ideas in the fifties as he wrote *PK*. Polanyi then offered both criticisms of the new synthesis' account of natural selection and his own constructive account of evolutionary "emergence," which he identifies with the "logic of achievement" (*PK* 382). These days "emergence" is a common (if not always a clear) term in the vocabulary of biologists.

I don't think it is useful to try to bind Polanyi too tightly to contemporary scientific discourse, but I do believe that Polanyi clearly sounded some notes worth preserving as thinkers work out the melodies appropriate to today's move from science to broader philosophical and religious accounts. Insofar as Goodenough and Deacon are moving in this direction, Polanyi is a forbearer worth scrutinizing.

However, to see Polanyi's importance for contemporary efforts to link the discourse in biology, philosophy and religion, it is important to put aside certain dualistic conceptual schemes. Polanyi himself sometimes employs such a framework in order to articulate his criticisms of the biological literature of his time and to put forth an alternative. I am referring to a dichotomous framework whereby accounts are identified as either "reductionistic" or "non-reductionistic." For those with philosophical background, this pair seems

quickly to link to another pair, "materialist" as opposed to "idealist" accounts. For those with more background in biology, there is a similar dichotomy between "non-vitalist" and "vitalist" accounts. All of these dichotomies lead discussions through the battlegrounds of the past. They may have been somewhat useful in a particular context for drawing the issues, but they have become liabilities and need to be put aside or re-contextualized. Clearly, many contemporary biologists like Goodenough don't consider themselves "reductionistic," although they may find the term helpful for pointing out the differences in the way of thinking of contemporary biologists and those in Polanyi's time. In what follows, I will strip Polanyi's account of these now problematic terms; I invite others to do the same in linking Polanyi to thoughtful papers like that of Goodenough and Deacon.

Criticisms of Certain Interpretations of Natural Selection

There is no doubt that Polanyi was a dissenter about what he took to be the primary orientation of evolutionary thought in the so-called new synthesis. He apparently worked for some years at the project of articulating his discomfort. Marjorie Grene has reported that when she agreed to help Polanyi in the early fifties with his Gifford Lectures and later with the production of *PK*, one of her tasks was to "look up heresies in evolutionary theory, specifically criticism of the evolutionary synthesis…" [1] . Polanyi's criticisms seem to be articulated in several different ways. Perhaps the clearest way revolves around what is essentially a logical point; further, his constructive alternative to the status quo also turns on this point. He makes his case most succinctly in one paragraph in *PK*:

> . . . the theory of natural selection, by subsuming all evolutionary progress under the heading of adaptation as defined by differential reproductive advantage, necessarily overlooks the fact that the *consecutive* steps of a long-range evolutionary progress—like the rise of human consciousness—cannot be determined *merely by their adaptive advantages*, since these advantages can form part of such progress only in so far as they prove *adaptive in a peculiar way, namely on the lines of a continuous ascending evolutionary achievement*. The action of the ordering principle underlying such a persistent creative trend is necessarily overlooked or denied by the theory of natural selection, since it cannot be accounted for in terms of accidental mutation plus natural selection. Its recognition would, indeed, reduce mutation and selection to their proper status of merely *releasing and sustaining the action of evolutionary principles* by which all major evolutionary achievements are defined (*PK* 385).

Reduced to a sentence, Polanyi's claim is "we can know living beings only by appreciating their achievements" (*PK* 385). Applied to the matter of change in living beings, his claim is that "we can know their evolution only by appreciating the development of their achievements in the course of succeeding generations" (*PK* 385).

Biology as Critical and Convivial

Polanyi articulates his alternative to the new synthesis interpretation of natural selection in a variety of different ways. One way is to distinguish the nature of knowing in biology. Polanyi emphasizes what he terms the critical and convivial aspects of biology: "Since all life is defined by its capacity for success and failure, all biology is necessarily critical."(*TD* 51). Although he thinks there are hints of evaluation (i.e. ,"critical" aspects) in terms of success and failure in some inanimate studies (e.g., crystallography), it is at the level of life where appreciation of function is imperative. Biology is "critical" for Polanyi in the sense that the study of life always

involves suppositions about an active center and that center integrates the functioning of the whole. The more complex the life form, the more the critical aspects are deeply bound up with convivial aspects:

> Each new branch of biology that was developed to cover the increasingly complex function of higher animals sets up additional standards, to which the observer expects the animal to measure up. And this intensification of criticism coincides with an increasing enrichment of relations between the critic and his object. We know an animal, as we know a person by entering into its performance, and we appreciate it as an individual, in the interests of which these performances have their meaning. Even at the lowest, purely vegetative level, we accept the interests of the animal as the standard by which our own interest in the animal is determined. All biology is, in this sense, convivial. But this conviviality rises to emotional concern as the animal approaches the human level. We then become aware of its sentience, of its intelligence, and above all of its emotional relations to ourselves.
>
> Yet, however greatly we may love an animal, there is an emotion which no animal can evoke and which is commonly directed toward our fellow men. I have said that at the highest level of personhood we meet man's moral sense, guided by the firmament of his standards. (*TD* 51).

Polanyi here sketches a pattern of intensifying personhood and this pattern has at least some rough parallels with the kind of emergence sketched by Goodenough and Deacon, in which ultimately human beings are described as creatures who experience our primate brains symbolically, as creatures "uniquely aware of what it feels like to be pro-social," (16) and who possess the "ability to symbolically represent it [our rich heritage of social emotions] to ourselves" (16).

I should emphasize, however, that many of Polanyi's discussions are focused insistently upon the fact that we must never lose sight of the centeredness of all living creatures and there are suppositions about this centeredness that we bring to knowing life.[2] Marjorie Grene, a most able Polanyi interpreter, perhaps more directly than Polanyi, suggests what is philosophically at stake in acknowledging active centers:

> To know life is to comprehend comprehensive entities; to know knowing is to comprehend those particular achievements of living things which consist in their acts of comprehension. Mind is once more a natural reality, and nature once more both the medium and the object of mind's activity.[3]

In the same discussion, Grene also emphasizes "neither is sheer givenness, the only way things are"; minds or proto-minds are real things and Polanyi's kind of philosophical evolutionary realism frees us from that tyrannical dualistic division between materialism and idealism:

> The achievements of all living things, the achievements of human minds, are more than tiny superscripts on a single monotonous succession of mere facts. They are enrichments of being itself (*KK* 223).

She suggests, in a way that Polanyi was certainly reaching to articulate, that

> only such an acknowledgment . . . will enable us to see knowledge itself as a real achievement of real beings. The recognition of scientists at work . . . is an instance of the

> recognition of responsible persons, a performance of the same general kind as the recognition of patterns, individuals, or persons at lower levels of existence (*KK* 223).

Goodenough and Deacon clearly want to make a place for human moral awareness; their essay is an effort to outline a case. Polanyi's account of biology in terms of active centers and the critical and convivial aspects is a way ultimately to acknowledge the achievements of human minds, a way to affirm the reality of mental things.[4] Goodenough and Deacon seem to be moving toward such a broader affirmation.

Polanyi on Emergence

If you give priority to an active center (i.e., if you treat biology as critical and convivial), Polanyi believed you must think about evolution in a particular way. The emphasis upon centeredness can be found in the ways in which Polanyi discusses emergence. He thinks of emergence in terms of the release of self-sustaining operational principles that must be described as at a different and higher level than the principles that released them:

> I have described this process [the emergence of a living being from inanimate constituents] as a chance fluctuation which releases the action of certain self-sustaining operational principles. This results in the formation of two levels of existence: an upper level governed by physiology, and a subsidiary, lower level defined by physics and chemistry—the operations on the upper level being predicated on the emergence of an individual, whose interests they serve. In the course of anthropogenesis, individuality develops from beginnings of a purely vegetative character to successive stages of active, perceptive, and eventually responsible, personhood. This phylogenetic emergence is continuous—just as ontogenetic emergence clearly is. Hence the higher principles governing the emergent forms of evolution presumably gain control gradually of the evolving beings, in the same way as they gradually become more pronounced and predominant in the course of man's embryonic and infantile development (*PK* 394-395).

At least on the surface, Polanyi's focus upon a hierarchical account of emergence seems to resemble Goodenough and Deacon's succinct description of emergence as "something more from nothing but"(6). Much of Polanyi's attention, however, is drawn to the matters of (1) how we are compelled to articulate the connection between two logically distinct levels in emergence and (2) how it is appropriate to describe the transition in evolutionary history through which new operational principles come into being.

On the first matter, Polanyi insists higher principles operate in margins left open by lower principles and higher principles need to be described as serving an emerging active center. As noted above, Polanyi was unhappy with much of the biology of his day because he believed the active center deploying higher operational principles was overlooked. Ultimately, in evolutionary history, that active center is the human person. Clearly, Polanyi, as well as Goodenough and Deacon, are impressed by the human mind. In an impassioned idiom that frightens many readers, Polanyi suggested that anthropogenesis should be central to evolutionary biology and, ultimately, such study must account for human responsibility as an ongoing personal and communal enterprise:

> The point is reached here at which the observer's appraisal of biological achievement turns into his submission to the leadership of superior minds. This corresponds to the extrapo-

> lation of biology into ultra-biology, where the appraisal of living beings merges in an acknowledgment of the ideas transmitted by our intellectual heritage. This is the point at which the theory of evolution finally bursts through the bounds of natural science and becomes entirely an affirmation of man's ultimate aims. For the emergent noosphere is wholly determined as that which we believe to be true and right; it is the external pole of our commitment, the service of which is our freedom. It defines a free society as a fellowship fostering truth and respecting right. It comprises everything in which we may be totally mistaken (*PK* 404).

On the second matter, Polanyi emphasizes that we need very carefully to describe the way higher principles come into being in evolutionary history. Since Polanyi regards active, centered subjects as "an embodiment of an ordering principle" (*PK*, 401),[5] he insists upon a distinction between what releases and sustains a principle and the action which generates the principle: "Random impacts can *release* the functions of an ordering principle and suitable physico-chemical conditions can *sustain* its continued operation; but the *action* which *generates* the embodiment of a novel ordering principle always lies in this principle itself"(*PK*, 401).

Goodenough and Deacon portray emergence is terms of three orders. The difference between the first-order and second-order seems to be time; in shape interactions played out over time, what happens next can be influenced by what has happened before. The difference between second and third-order emergence seems to be that shape and time are compounded with "remembering how to do it"(7). Instructions constrain self-organizing systems specifying particular outcomes called biological traits, which can change through mutation and selection. In third-order emergence, what seems to be involved is the coming into being of what Polanyi would regard as a higher order principle embodied in a center.[6]

Although Goodenough and Deacon want to move (as their title suggests) "from biology to consciousness to morality," they don't, in this short paper, frame the issue, like Polanyi did several decades ago, in terms of a claim that biology is critical and convivial. They don't directly emphasize that such an acknowledgment is a prerequisite as well as a prime motive for making the move from biology to consciousness to morality. In a sense, what Polanyi claims is that biology must explain our interest in understanding biology and our struggle for moral responsibility as explorers of the universe, but to do so requires at least tacit recognition and affirmation of that which is to be explained. Philosophically, this Polanyian move, as Grene says, puts mind back in nature, but recognizes mind or minding as a real and dynamic feature of reality. I emphasize, however, that Goodenough and Deacon's paper is a short paper. I don't think these contemporary scientists are preoccupied, like Polanyi was, with taking a stand against what Polanyi in an earlier day sometimes labeled the "materialism" and "reductionism" of biology. On the other hand, I think it is certainly the case that all contemporary scientists interested in the move "from biology to consciousness to morality" need to appreciate what is sometimes called the hermeneutic circle but that Polanyi called the critical and convivial nature of biology. At the heart of biology is respectfully acknowledging that responsibly knowing nature is an aspect of reality. Such an acknowledgment brings biology to merge seamlessly into what Polanyi called "ultra-biology" (*PK* 404). Finally, I also note that I find much more in Goodenough's *The Sacred Depths of Nature* than in this short paper that emphasizes the critical and convivial nature of biology. I can see clearly that understanding life is inextricably bound up with the moral enterprise when Goodenough speaks of framing a perspective on "how Nature is put together, and how human nature flows forth from whence we came"[7] issuing ultimately in gratitude for existence, reverence for the way life works and a deep sense of the importance that life continue.

Living Things as Centers That Possess Tacit Powers and Grow Meaning

There is another way in which one can formulate Polanyi's peculiar but consistent emphasis on the active centeredness of living things (i.e., the critical and convivial aspects of biology). This way of formulating matters draws somewhat more on his late thought. It is worth briefly outlining this perspective because I think it may have more affinities with ideas Goodenough and Deacon sketch.

Another way to put Polanyi's point that acknowledging active centers is central to biology and philosophy is to say living forms have and live through the use of tacit powers. There is nothing mysterious about Polanyi's model or this claim, in my view. It simply means living things have the capacity to acquire, combine and make natural skills through which they respond to a changing environment. Although they want clearly to distinguish the mediation of cellular awareness from brain-based awareness, Goodenough and Deacon outline a contemporary description of how life works that seems akin to Polanyi's account in terms of deploying tacit powers. Living things are creatures that develop skills that are habituated, according to Polanyi. Our physical bodies operate--and we also engage the world beyond us (cultural and physical)--by attending from what we dwell in to our interests. The scope and complexity of habit and its potential for active integration is mind boggling when we move from an amoeba to a human being, a creature offered the rich resources of language and culture.[8] Active centers dwell in subsidiaries and integrate them to produce comprehensive achievements. Comprehensive achievements may also be described as meaning. Meaning for human beings, in Polanyi's account, ultimately becomes articulate; articulate beings have an opportunity and a mandate to explore the unknown and understand the rich universe, using our sophisticated tools. But Polanyi insists also that "all life is endowed with originality and originality of a higher order is but a magnified form of a universal biological adaptivity" (*PK* 124). Articulate meaning is an extension of the use of tacit powers found in the simplest life forms.

Goodenough and Deacon provide a perspective that insightfully sketches the way in which meaning works in the development of evolutionary history. Like Polanyi, they point out that meaning in an amoeba's world and in a human being's world are in continuity and yet are sharply distinguishable. As certainly Peirce and likely Polanyi also recognized, semiotic systems are emergent at least in the sense that meaning grows.[9] Goodenough and Deacon helpfully adapt a Peircean semiotic distinction to talk about the indexical nature of meaning in the world of an amoeba:

> And a molecule diffusing from a decaying food source and binding to and activating a receptor on the surface of an amoeba *means that* the food source is nearby. The molecule is not the food source itself but rather a sign indicating its proximity. In each case, a sophisticated biochemistry is recruited to translate/interpret the sign's meaning. . . (8).

To extend this account from a Peircean framework, one might say the sign has a significant effect, an interpretant. That interpretant itself becomes an object which gives rise to a new sign that produces a future interpretant. Thus the cycle of organismic action and reaction in a niche unfolds and this ultimately plays itself out over time in the changes in the frequencies of different sets of instructions for making organisms. From a more Polanyian framework, one might say the molecule binding and activating a receptor is an organismic tacit integration of clues, an achievement of sense-reading, if you want metaphorically to apply a Polanyian semiotic triad.

Goodenough and Deacon, of course, want also especially to focus on the way the one-man band amoeba differs from the large orchestra multicellar organism. I find their account provocative. The indexical semiotic capacity of brain-based awareness is complex and even more fascinating is what they describe as the robustly epigenetic mammalian brain development and its "second-order emergence" (6). Ultimately, the "something more" than indexical meaning emerges in the co-evolutionary cycle of culture, language and brain in their account. Goodenough and Deacon want to hold equally to what Polanyi might call both levels of a two-level description when describing a person: "What a person is and what a person is conscious of are representation, and representations—although *nothing b*ut physical objects and events—are *something more* as well" (15). They caution that it is important "that we not lose track of our mental evolutionary antecedents"(16):

> . . . we share strong cognitive and emotional homologies with our primate cousins, and to the extent that degradation/reconfiguration went into generating our capacity for language, it occurred in the midst of a primate brain that remains very much a primate brain. Any perspective on the human condition that brushes this fact aside is an incomplete perspective—indeed, we would say that it is an impoverished perspective (16).[10]

Remembering our evolutionary antecedents is something that I think Polanyi does do in his own fashion insofar as he works out a model of the person as an active center engaged in minding, which is always an embodied action. Certainly in his day he never dreamed of what Goodenough and Deacon discuss as the degradation/reconfiguration that likely occurred in evolutionary history, but Polanyi consistently emphasizes both embodiment and continuity: that is, he wanted to show how what he calls tacit powers work throughout the organic world. It appears to me in fact that Polanyi's account of minding as embodied might be quite a fruitful venue to develop the emphasis that Goodenough and Deacon place upon meaning and evolutionary antecedents. What Polanyi, of course, wants to emphasize is the growth of meaning and the way this entails the nurture of certain kinds of human responsiveness /responsibility as human beings take up their callings in interpretative communities.

Endnotes

[1] Marjorie Grene, *A Philosophical Testament* (Chicago and La Salle, IL: Open Court, 1995), 91.

[2] In *PK*, Polanyi refers to the "three-storied" character of perception in biology (*PK*, 364). We can, for example, be aware of an animal's active-perceptive responses only in relation to a focal awareness of the animal as an individual. We must see the particulars of an animal's activity subsidiarily in a focus upon the whole animal in order to know what the animal is knowing or doing.

[3] Marjorie Grene, *The Knower and the Known* (Berkeley: University of CA Press, 1966), 224. Hereafter this book is abbreviated as *KK* and cited in parenthesis.

[4] This does not, of course, mean that living things that are not human are uninteresting and insignificant.

[5]Polanyi suggests that a higher level principle comes into being as it becomes embodied within the margins left open by lower level principles. I think Polanyi probably thought in his day that an overemphasis upon mutation and natural selection obscured interesting questions about hierarchically-organized sets of principles. I am not surethat such questions are today regarded as philosophically interesting or important in biology.

[6] Can the way instructions constrain self-organizing systems which change through mutation and selection appropriately be described as "fields of opportunity and of striving" that are "neither conscious nor deliberate" but are "directed toward this opportunity"? This is the way at the end of *PK* (404) Polanyi puts his description of evolutionary emergence. He is here interested in casting the whole of evolutionary emergence in terms of a "heuristic field" (*PK* 303). He contends the field description is the best way to portray evolution if one is committed to showing that knowing is but

a member of "*the class of achievements that are comprised by all forms of living*" (*PK* 403). Polanyi's account of emergence, in other words, never allows one to separate completely--and treat as logically distinct--matters of mutation and selection and matters of knowing. They belong together, he insists, and responsible knowing must in some ways set the terms used to describe the results of mutation and selection.

[7] Ursula Goodenough, *The Sacred Depths of Nature* (New York: Oxford University Press, 1998), xviii.

[8] The opening chapter of "Part Two: The Tacit Component" of *PK* is titled "Articulation" and is a critical chapter for understanding Polanyi's account of tacit powers and language. Marjorie Grene has reported (in her appraisal of Polanyi in "Tacit Knowing: Grounds for a Revolution in Philosophy," *Jou. Brit. Soc. for Phenomenology*, 8:3, Oct. 1977: 164-171) that this chapter took Polanyi a year to write and she was originally puzzled by this but came to understand its centrality for Polanyi's post-critical philosophy:

> I did not really understand at the time why just this problem: the grounding of articulation in the inarticulate, should need to be spelled out so painfully. But it is indeed the heart of the matter—not, again, because Polanyi was developing an "irrationalism" . . . but because the understanding of understanding, of rationality itself, demands an understanding of the way in which the subsidiary supports the focal, in particular of the way in which the ineffable supports the activities of voice or pen (168).

Three of many interesting comments by Polanyi about language and its roots and fruits seem much akin to suggestions sketched in Goodenough and Deacon's short essay:

> The origin of this intellectual striving which (somewhat paradoxically) both shapes our understanding and assents to its being true, must lie in an active principle. It stems in fact from our innate sentience and alertness, as manifested already in the lowest animals in exploratory movements and appetitive drives, and at somewhat higher levels in the powers of perception. Here we find self-moving and self-satisfying impulses of both purpose and attention which antedate learning in animals and themselves actuate learning. These are the primordial prototypes of the higher intellectual cravings which both seek satisfaction in the quest for articulate knowledge and accredit it by their own assent." (*PK* 96).

> As language enlarges the range of our thought, the ape's pleasure in playing with a stick is expanded to a complex system of emotional responses by which scientific value and ingenuity of many kinds are appreciated throughout natural sciences, technology and mathematics. (*PK* 133).

> To learn a language or to modify its meaning is a tacit, irreversible, heuristic feat; it is a transformation of our intellectual life, originating in our own desire for greater clarity and coherence, and yet sustained by the hope of coming by it into closer touch with reality. Indeed, any modification of an anticipatory framework, whether conceptual, perceptual or appetitive, is an irreversible heuristic act, which transforms our ways of thinking, seeing and appreciating in the hope of attuning our understanding, perception or sensuality more closely to what is true and right. (*PK* 106).

Diane Yeager's recent article "Confronting the Minotaur . . ." (*Tradition and Discovery*, 29:1 (2002-03): 22-48) offers an excellent discussion of Polanyi's concern with the fragility of the cultural firmament that language makes possible.

[9] Peirce, of course, defined the human being as a sign. Vincent Colapietro's *Peirce's Approach to the Self: A Semiotic Perspective on Human Subjectivity* lucidly treats Peirce's account of semiotics and how he applies this to human beings. Polanyi comes closest to outlining his account of semiotics in his 1967 essay "Sense-Giving and Sense-Reading" included in Grene's collection of Polanyi essays, *Knowing and Being*. Although Polanyi's semiotic triad seems to have been designed primarily to outline the growth of articulate meaning in the human world, I suggest that it works reasonably well to model philosophically the growth of meaning in the activity of any living center deploying tacit powers. Robert Innis ("Peirce and Polanyi: Perceptual Consciousness and the Structure of Meaning," *Proceedings of the International Colloquium on Language and Peircean Sign Theory*, Series 4. NY: Berghan: 531-560), like me, thinks Peirce and Polanyi

offer a similar semiotic account. Both regard perception as an "instance and an exemplar of semiosis or meaning-making" and for both perception is "the matrix and condition of all 'later' or 'higher' signitive events such as language and art, which drive the expanding spiral of semiosis and the construction of those webs of signs by means of which we 'articulate' both ourselves and our worlds and are enabled to double back to ourselves and control and evaluate our conduct" (532).

[10]This seems to me a sensible cautionary note. It resembles the note that biologists and philosophers of biology have sounded in the work done over the last forty years on explaining the concept of function in biology. This work has carefully developed a way to conceive and talk about function that incorporates the emphasis upon evolutionary history that is central in modern biology. See the excellent summary of stages in this development in David J. Buller, "Introduction—Natural Teleology," *Function, Selection and Design*, ed. David J. Buller (Albany: SUNY Press, 1999): 1-27. The challenge, of course, of a discussion of persons is (as Goodenough and Deacon suggest) not to lose track of our mental evolutionary antecedents, but also not to lose track of human mental prospects. It is these prospects that Polanyi's odd discussion of evolution tries to bring into focus. Explaining persons must avoid explaining away the futural. That is, persons are living realities oriented toward the future; we pursue, even as we revise, our anticipations. This is the gift of symbolic language, and moral life is bound up with our responsiveness as creatures able to anticipate the future and revise that anticipation.

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Submissions for Publication

Articles, meeting notices and notes likely to be of interest to persons interested in the thought of Michael Polanyi are welcomed. Review suggestions and book reviews should be sent to Walter Gulick (see addresses listed below). Manuscripts, notices and notes should be sent to Phil Mullins. Manuscripts should be double-spaced type with notes at the end; writers are encouraged to employ simple citations within the text when possible. MLA or APA style are preferred; because the journal serves English writers across the world, we do not require anybody's "standard English." Abbreviate frequently cited book titles, particularly books by Polanyi (e.g., *Personal Knowledge* becomes *PK*). Shorter articles (10-15 pages) are preferred, although longer manuscripts (20-24 pages) will be considered. Consistency and clear writing are expected.

Manuscripts normally will be sent out for blind review. Authors are expected to provide a hard copy and a disk or an electronic copy as an e-mail attachment. Be sure that electronic materials include all relevant information which may help converting files. Persons with questions or problems associated with producing an electronic copy of manuscripts should phone or write Phil Mullins. Insofar as possible, *TAD* is willing to work with authors who have special problems producing electronic materials.

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