# Tradition & Discovery

*The Polanyi Society Periodical*

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## *ARTICLES*



## *REVIEW ESSAYS*



## *REVIEWS*



## *JOURNAL AND SOCIETY INFORMATION*

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# CHANGES AHEAD FOR *TRADITION AND DISCOVERY*

This issue of *TAD* marks the last one to be produced on the campus of Mercer University. Beginning with the next issue, October 2015 (Vol. 42:1), Faithlab, of Macon, GA, will prepare the issues for printing and will send the issues to a printer that specializes in short runs. These changes will make the journal more readable and professional looking than we can currently do on our own. They will also allow us to increase the size of the issue when we have content beyond the 60 pages we can handle with our current printing arrangement. Most exciting of all, we will be able to offer an e-reader version of the journal that will work on iPad, Kindle, and Nook. Since *TAD* will remain an open access journal, links to the e-reader and downloadable pdfs will be made available on the Polanyi Society web site.

We will also begin mailing printed issues first class to members only rather than mailing bulk in the US to a larger mailing list. In the future, we thus anticipate that we will be printing and mailing fewer copies of each issue. ***This means that this could be your last print issue, if your dues are not current. Please see News and Notes and the enclosed flyer/return envelope for information on how to join or renew***.

These changes allow us both to improve the quality of *TAD* and bring production more in line with Society resources. We have long distributed almost three times more printed copies than we have regular paying members in order to take advantage of US bulk mail regulations, which gave a discount rate for mailing by the pound. With increases in foreign and bulk postage, the Society could no longer sustain these printing and distribution practices. The *TAD* Editorial Board explored several options and recommended to the Polanyi Society Board at its November 2014 meeting that we enter into a one-year experiment with Faithlab and send printed copies only to current, paid members inside the US (overseas and Canadian subscribers will still get electronic access).

In sum, these changes will allow us to uphold traditions of inquiry into the thought of Michael Polanyi and its implications for our time. They will also engage us in the process of discovery as we indwell more deeply the emerging age of electronic publishing.

What does *not* change, however, are the very affordable library, individual, and student membership rates ($25, $35, and $15 respectively).

In the meantime, readers of this issue will find important notices about upcoming meetings in November 2015 and June 2016 in News and Notes. This issue also contains a mix of articles that reflects Polanyi's wide-ranging engagements. David James Stewart examines the work of theologian David Brown in order to explore the nature of a heuristic theology. Jean Bocharova argues that connectionalist accounts of neural development that have come along since Polanyi's day are compatible with his ideas of emergence and personhood. We also have two review essays, the first of which is David Nikkel's review of Stephen Turner's book on the tacit, along with a response by Turner. In the second review essay Gabor Biro examines Nicholas Wapshott's popular book on the Keynes-Hayek debates and helps us better locate historically Polanyi's ideas on economics that the last issue of *TAD* explored. Finally, we have reviews of two books on topics that relate to Polanyi's work, one on moral development across the lifespan and the other on aesthetics. Enjoy!

*Paul Lewis*

# NEWS AND NOTES

## DUES MUST *NOW* BE CURRENT TO CONTINUE RECEIVING PRINT COPIES OF *TRADITION AND DISCOVERY*

As described in the Preface of this issue, we will be changing the format of the journal as Faithlab will be responsible for the production of the journal, beginning with the next issue. These changes will allow us to

- produce a more professional-looking product that is easier to read.
- increase, when needed, the number of pages per issue.
- provide an e-reader version of the journal for iPad, Kindle, and Nook.

We will also mail the journal first class, rather than bulk, so that issues will arrive sooner.

These upgrades come at a price, however, for we will now be mailing print copies only to those Polanyi Society members whose dues are up to date.

Overseas members will receive only electronic versions of each issue and will be notified when the next issue is available.

We remain committed to Open Access publishing, and so *Tradition and Discovery* will still be accessible to anyone from the Society webpage.

However, if you are in the US and want to continue to receive a print copy of the journal, be sure to renew your membership to the Polanyi Society!

## How to Keep *Tradition and Discovery* Coming to Your Mailbox

Pay your membership early this year. Dues run the academic year, but for this brief time, we will send you the Oct. 2015 issue if you have paid for 2014-2015. To continue to receive print copies thereafter, please pay for 2015-2016 by December 1, 2015. Rates remain the same as always: $35 regular, $25 library, and $15 student.

Residents of the United States can join or renew by using a credit card through PayPal (http://polanyisociety.org/register/join-renew.php) or sending a check made payable to the Polanyi Society to Charles Lowney, Polanyi Society Treasurer, Baker Hall 124, Washington and Lee University, Lexington, VA 24450. Those living outside the U.S. must use PayPal.

## 2015 Annual Meeting Information

The 2015 Annual Meeting of the Polanyi Society will be held in Atlanta on November 20 and 21. Like last year, we will have three sessions. Confirmed details about time and location will be posted at www.polanyisociety.org once they are available later in the summer. The full program with affiliations, paper titles, respondents, and times requested of the AAR will be available on the web site when you read this. Here, in brief, are the sessions and presenters:

*Friday, Nov. 20, 4:00-6:00 pm*

Short, focused presentations will be offered by the following individuals: Matt Sandwisch, Adam Johnson, Stan Scott, Robert Hyatt, Jon Fennell, Francesco Poggiani, and (perhaps) Chris Mulherin.

*Saturday, Nov. 21, 9:00-11:30 am*

Symposium on Thomas Pfau's *Minding the Modern*, with Martin X. Moleski, SJ, and Phil Rolnick. Pfau will reply before the session is opened for general discussion with business meeting at 11:15.

*Saturday, Nov. 21, 8:00-10:00 pm*

Walter Mead, "Theological Implications of Polanyi's Philosophy of Knowing," Lucila Crena, "A Polanyian Witness in an Age of Mistrust: A Majority World Perspective," and Matthew O'Sullivan, "Rules of Right Practice or Contact with Reality? Michael Polanyi and George Lindbeck on the Purpose of Theological Propositions."

## 2016 Summer Conference Celebrates 50 Years of *Tacit Dimension*

Next year, the Polanyi Society will sponsor a conference to celebrate the 50th anniversary of the publication of Michael Polanyi's *The Tacit Dimensio*n and to assess the legacy of Polanyi's philosophical efforts. The conference will be held 8-11 June 2016 (Wed-Sat) at Nashotah House Theological Seminary in Nashotah, WI. The registration fee for the conference is $275; this includes access to all conference sessions, all meals, and receptions.

*Proposals for papers* should be 250 words or less and be sent by 30 November 2015 to Andrew Grosso (atgrosso@icloud.com).

Additional information will be available at www.polanyisociety.org and in the next issue of *Tradition & Discovery*.

## Travel Fund Donations Needed

Because the Polanyi Society will be sponsoring two conferences in barely more than a year, we need to replenish the Travel Fund to enable young scholars' participation in Atlanta and Madison, Wisconsin. *We need not be reminded of how much the continuing accomplishment of the Society's goals depends upon actively involving those who are presently, or have recently been, engaged in their academic studies*.

Already we are looking forward to the involvement of an impressive number of new, talented, and young participants in Atlanta. But the task of making this happen in the midst of the increasing burden of student loans, the escalation of travel costs, and virtually non-existent college resources to facilitate such involvement, is a daunting challenge.

*Approximately $4,000 in new contributions will be needed* to meet our anticipated needs. *One person has pledged to match dollar-for-dollar the first $300 contributed*. Any amount donated will make a difference.

Please send your tax deductible contribution to Professor Charles Lowney, Polanyi Society Treasurer, Baker Hall 124, Washington and Lee University, Lexington, VA 24450. Checks should be made out to the Polanyi Society and earmarked for the Travel Fund.

## Lectureship Established in Memory of Richard Gelwick

In March 2014, the Hobby Center for Public Policy at the University of Houston honored Richard Gelwick by creating an annual endowed lecture series on the importance of ethics in public policy in his name. For more information, see http://www.uh.edu/class/hcpp/civitas/speaker-series/richard-gelwick/. Professor Sue Collins, of the Department of Political Science at the University of Notre Dame, gave the inaugural lecture on April 21, 2015.

## Recent Works of Interest

Esther Meek's work has been cited in Darcia Narvaez's new book, *Neurobiology and the Development of Human Morality: Evolution, Culture, and Wisdom*. Narvaez was the invited speaker at the Annual Meeting of the Polanyi Society in 2011.

Struan Jacobs and Phil Mullins, published "Friedrich Hayek and Michael Polanyi in Correspondence," *History of European Ideas*, 2015 (http://dx.doi.org/10.1080/01916599.2014.1002971). They argue that Hayek and Polanyi were committed Liberals but with different understandings of liberty, the forces that endanger liberty, and the policies required to rescue it.

Norman Sheppard published "The Nature of Progress in Science—the Differing Approaches of Polanyi and Kuhn to Paradigm Changes," in the *IOP History of Physics Newsletter* (July 2012):16-26.

Matthew C. Crawford's latest book, *The World Beyond Your Head: On Becoming an Individual in an Age of Distraction*, invokes Polanyi at several points. A review of Crawford's earlier book, *Shop Class as Soul Craft*, appeared in *Tradition and Discovery* 37, no.1 (2010-2011).

# The Fulfillment of a Polanyian Vision of Heuristic Theology: David Brown's Reframing of Revelation, Tradition, and Imagination

**David James Stewart**

*Key words*: Michael Polanyi, heuristic theology, tacit knowing, knower/known, dynamic orthodoxy, David Brown, tradition, discovery, imagination, revelation, interdisciplinarity

ABSTRACT

*According to Richard Gelwick, one of the fundamental implications of Polanyi's epistemology is that all intellectual disciplines are inherently heuristic. This article draws out the implications of a heuristic vision of theology latent in Polanyi's thought by placing contemporary theologian David Brown's dynamic understanding of tradition, imagination, and revelation in the context of a Polanyian-inspired vision of reality. Consequently, such a theology will follow the example of science, reimagining its task as one of discovery rather than mere reflection on a timeless body of divine revelation. The ongoing development of a theological tradition thus involves the attempt to bring one's understanding of the question of God to bear on the whole of the human experience. The pursuit of theology as a heuristic endeavor is a bold attempt to construct an integrated vision of nothing less than the entirety of all that is, without absolutizing one's vision, and without giving up on the question of truth.*

## Engaging Polanyi Theologically

Richard Gelwick once remarked that the "impact of Polanyi's philosophy would be to change the fundamental ground plans of contemporary theology" (Gelwick 1975, 311). In a similar vein, Avery Dulles commented that "a thoroughgoing renewal of theology along the lines indicated by Polanyi could profitably engage the joint efforts of many theologians for a considerable span of years" (Dulles 1984, 550). Following the lead of Gelwick, Dulles, and numerous other theologians who have recognized the theological significance of Michael Polanyi's post-critical philosophy and who have critically interacted with his thought in diverse and fruitful ways, I would like more carefully to consider the distinct vision of theological inquiry latent in Polanyi's philosophy.[1]

In light of this preliminary consideration, it is crucial to remember that Polanyi was not a theologian, but first a chemist, then a philosopher. While it is true that he did make some penetrating insights into the nature of religion (Polanyi 1963, 4-14; *STSR*, 116-30; *PK*, 279-86; *M*, 149-60), for the most part he was content to speak about religion and theology in general terms.[2] For this reason, we concur with Dulles that "Polanyi's value for theology lies less in what he explicitly stated about theological questions than in the transfer value of what he had to say about science" (Dulles 1984, 550). If we are to discover the untapped theological potential of Polanyi's philosophy, it will be by attending to the implications of his epistemology.

## Towards a Heuristic Theology

According to Gelwick, Polanyi's theory of personal knowledge implies that all intellectual disciplines are inherently heuristic (Gelwick 1975, 305). The word "heuristic" is used here to connote the potential

for novel discovery and an openness to continual exploration; it is intended to convey a sense of dynamism and mystery. And so the theologian will wonder: what might it mean to suggest that theology is a heuristic endeavor? This article offers a response to this question.

The initial phase of the article provides context for an answer to the question by outlining the main features of a "heuristic vision of reality" along Polanyian lines. The second phase proceeds to give an example of a contemporary theologian whose methodology is congruent with what a corresponding heuristic theology might look like. By examining David Brown's theological method against the backdrop of our heuristic vision of reality, paying special attention to his groundbreaking work on the interplay of revelation, tradition, and imagination, it will quickly become clear that Brown's model is extremely compatible with such an understanding of reality. This brings me to my central claim: David Brown's approach to theology can in fact be seen as a fulfillment of the heuristic vision of theology latent in Polanyi's philosophy.

After completing these two phases, I will draw attention to six main points of contact between the two models and finally offer a few brief comments on how this project sets the stage for further exploration.

## A Heuristic Vision of Reality

*The Triadic Structure of Tacit Knowing*

It will be helpful to begin our sketch of a heuristic vision of reality with a brief summary of the most salient features of Polanyi's epistemology. This is not to assert that tacit knowing needs to be understood as the center of Polanyi's work, but only that it provides a point of departure for this project. He starts with the presupposition that in all forms of knowing—intellectual, practical, or perceptual—"*we know more than we can tell*" (*TD*, 4, emphasis original). By emphasizing the personal participation of the knower in every act of knowing, Polanyi articulates a holistic theory of knowledge that effectively bypasses the objectivist/subjectivist dichotomy.[3] This novel theory of personal knowledge is characterized by the recognition of an unspecifiable Gestalt-like integration/shift that happens when a person indwells a particular set of subsidiary elements, attending *from* them *to* their focal/joint meaning (*M*, 34ff.; *KB*, 138-58; *PK*, 55-8). Consequently, meaning lies in the comprehension of a set of particulars with respect to the emergence of a novel comprehensive entity. Because this act of comprehension is a personal accomplishment that can neither be replaced by a formal operation nor fully specified in its process, Polanyi refers to it as "tacit knowing" (*M*, 38ff.; *TD*, 9ff.). The structure of tacit knowing is itself triadic in nature: (1) a knower (2) attends from a set of subsidiaries (3) towards a focal awareness of a meaningful whole or comprehensive entity (*M*, 38ff.). This triadic structure is indicative of the harmonious relationship between the knower and what is known (*TD*, 4). Because all knowing is either tacit or rooted in tacit knowing (*KB*, 144), the human capacity for tacit integration "underlies our routine intellectual life as well as the momentous breakthroughs of modern science" (Gelwick 1975, 303).

*The Dialectic of Reality/Discovery*

The relationship between Polanyi's epistemology and his ontology becomes clear at this point: in all instances of tacit knowing there is a correspondence between the structure of comprehension and the structure of the comprehensive entity of which it is a part (*TD*, 33-4). This allows us to recognize the presence of a dialectic at the heart of his ontology, that between reality and discovery. To make a discovery about reality, to designate something as "real," is to "expect that it may yet manifest its effectiveness in an indefinite and perhaps wholly unexpected manner" (*PK*, 279-86; *M*, 116). One can only discover something that was already there, "ready to be discovered" (*SM*, 34), and at the beginning of our pursuit "we can

know only quite vaguely what we may hope to discover" (Polanyi 1981, 97). Contrary to the objectivist ideal in science—which Polanyi consistently opposed as delusional and false (*PK*, 18; *M*, 25ff.)—the acquisition (i.e., discovery) of provisional knowledge about reality in this framework "consists in the exploration and elaboration of the relation, rather than in the conquest of an alien object" (Grant 1987, 266). Truth is thus understood as the expression of a relation between a personal affirmation made with universal intent and an objective reality. Because truth is a process directed from the real to an articulate expression of the real, and because this establishes a relationship between the knower and the known, the act of knowing a reality and giving it articulate expression is something persons do rather than something they observe (*PK*, 254). From a Polanyian perspective, knowing is not a possession but a skill.

The correspondence of the structures of knowing and what is known provides another insight about the reality/discovery dialectic. Quite simply, the irreducible structure of tacit knowing suggests a corresponding irreducibility to the structure of reality. As expected, its irreducibility is also threefold: (1) a knower indwells a set of unspecifiable subsidiary clues, (2) the process by which a knower integrates these clues is not fully definable, and (3) our expectation is that the "future manifestations indicated by this coherence are inexhaustible" (Polanyi 1981, 97). Because each aspect of the discovery process is dynamic and nonlinear, the acquisition of knowledge by a "systematic" process or "prescribed manipulation" would be akin to making a survey rather than a discovery (*SFS*, 14).[4] This allows us to appreciate an essential element of the discovery process: that there can be no success "without the thrusting imagination that pours itself into seemingly varied clues until they form a whole" (Gelwick 1975, 304). Every act of discovery testifies to the provisional nature of our knowledge of reality on the one hand, and the vital role played by the creative imagination on the other (Scott 1970, 50). The pursuit of truth is a heuristic, imaginative endeavor.

*The Dynamic Force of an Inexhaustible Reality*

Keep in mind that the capacity of a thing to reveal itself in unexpected ways is attributed to the fact that "the thing observed is an aspect of reality, possessing a significance that is not exhausted by our conception of any single aspect of it" (*TD*, 32).[5] If we allow the creative act of discovery to exist in dynamic tension with the provisional status of our knowledge and the capacity of reality to continually reveal itself in meaningful ways, a heuristic vision begins to emerge. To attribute the status of "reality" to a discovery—at least for a scientific discovery—is "to believe that it refers to no chance configuration of things, but to a persistent connection of certain features, a connection which, being real, will yet manifest itself in numberless ways, inexhaustibly" (Polanyi 1981, 93). This suggests that the hidden reality guiding the discoverer is a dynamic force. Polanyi explains it like this: "At the end of the quest the vision is becalmed in the contemplation of the reality revealed by a discovery; but the vision is renewed and becomes dynamic again" (Polanyi 1981, 93). Subsequently, when taken up by others, this renewed, dynamic vision has the power to guide them into new discoveries. To give an "articulate expression" of the real, i.e., to make a discovery about an aspect of reality, not only says something *true* about reality, but it also opens up the possibility for future discoveries. Every discovery increases our knowledge of what is true while simultaneously expanding the horizon of what we do not (yet) know. This is why Polanyi explains that while a discovery does reveal something new about reality, "the new vision which accompanies it is not knowledge. It is *less* than knowledge, for it is a guess; but it is *more* than knowledge, for it is a foreknowledge of things yet unknown and at present perhaps inconceivable" (*PK*, 135). A heuristic vision of reality entails a dialectical movement between provisional-truth/future-discovery.

*The Ontological Status of Heuristic Vision*

Given the provisional status of knowledge in a heuristic vision of reality, by what measure do we uncover the significance of the ontological aspect of tacit knowing? Polanyi's approach to this question

is as suggestive as it is counterintuitive. He regards the "significance of a thing as more important than its tangibility" (*TD*, 33). He famously quipped that "minds and problems possess a deeper reality than cobblestones" (*TD*, 32-3), which is to say, "that which is most promising in its power to provide a growing range of discoveries in the future" (Gelwick 1975, 307) is most real. Bearing in mind the correspondence of the structure of comprehension with the structure of the comprehensive entity, we can draw out an important consequence of this counterintuitive idea concerning the higher levels of existence, such as minds and ideas. The participation of the knower in the thing known increases as the objects of knowledge ascend to higher levels and the "observer also applies ever higher standards of appreciation to the things known by him" (*SM*, 94-5). For John Apczynski, what this means is that eventually our knowledge of the known ceases to be an *observation* and instead becomes an *encounter* (Apczynski 1977, 160). Knowledge of higher level comprehensive entities has a distinct perichoretic flavor.[6]

*The Heuristic Circularity of Tradition*

This brings us to a key feature of a heuristic vision of reality: tradition. Quite simply, the evolution of any heuristic vision is a thoroughgoing communal affair. Communities preserve funds of personal knowledge in "traditions" (*PK*, 53). A tradition is a collection of mutually agreed upon premisses and assumptions. Without them, every creative endeavor of every human community would cease to exist (*SFS*, 56). Take the example of science: "Science is a system of beliefs to which we are committed. Such a system cannot be accounted for either from experience as seen within a different system, or by reason without experience. Yet this does not signify that we are free to take or leave it, but simply reflects that it is a system of beliefs to which we are committed and which therefore cannot be represented in non-committal terms" (*PK*, 171). Scientists can only make use of a tradition by placing themselves under its service and committing to it. But the communal character of a tradition in nowise precludes the important creative work of the individual. The communal character of a tradition simply requires that individual initiatives "must accept for their guidance a traditional authority, enforcing its own self-renewal by cultivating originality among its followers" (Polanyi 1962, 70). Polanyi further describes the influence of a tradition in terms of a "spiritual reality" standing over a community that compels their allegiance (*SFS*, 54).[7] Insofar as "our believing is conditioned at its source by our belonging" (*PK*, 322), the authority this spiritual reality exercises over a tradition reflects the "heuristic circularity"of every commitment. [8] This circularity, I contend, is a feature of the human experience that is to be both celebrated and appreciated, not explained away.

*Tradition as Dynamic Orthodoxy*

Pursuing science without a commitment to indwell its creeds and confessions would be to accept a positivist picture of science and regard its tradition as pure orthodoxy. In contrast to a static or pure orthodoxy, Polanyi describes the tradition guiding scientific inquiry in terms of "dynamic orthodoxy" (Polanyi 1962, 70). Colin Grant succinctly captures Polanyi's position here: "What distinguishes Polanyi's view of science and makes it dynamic orthodoxy is his suggestion that the orthodoxy of science, far from being firm and final in fact or even in intent, serves rather to provide a base for encouraging opposition to itself" (Grant 1988, 414; cf. Polanyi 1962, 54). In and of themselves, tradition and orthodoxy are static. They can only maintain a heuristic significance when they form a dialectic in which every affirmation contains an implicit challenge for clarification and further development.

The normative character of a tradition is in no way undercut by the demand that it be continually challenged and re-envisioned. Polanyi explains that it is "inherent in the nature of scientific authority that in transmitting itself to a new generation it should invite opposition to itself and assimilate this opposition in a reinterpretation of the scientific tradition" (*SFS*, 15-6). Inasmuch as a "dynamic orthodoxy claims to be a guide in search of truth, it implicitly grants the right of opposition in the name of truth" (Polanyi

1962, 70). This is how a heuristic vision of reality addresses the question of truth: it is precisely this "transcendence of truth over any particular approximation to it [that] facilitates the combination of orthodoxy and dynamism" (Grant 1988, 415). This is not to say that truth is some purely objective reality floating around "out there" that can only be grasped and approximated with asymptotic accuracy, but rather that truth claims never exhaust the real. Nevertheless, this combination of challenge and affirmation, of assent and dissent, is made possible by the fundamental assumption that our knowledge of the world, what we consider to be true, is always a glimpse of a much richer reality.[9] Thus we are in accord with Gelwick's summary of Polanyi's position: "Tradition serves as the grounds for discovery and in turn renews and finds its own depth" (Gelwick 1975, 319). A heuristic vision of reality grounded in commitment to a tradition allows us to appreciate that the relationship of reality/discovery generates a powerful feedback loop.

*Tradition, Responsibility, and Universal Intent*

A tradition that values dynamic orthodoxy carries with it a special responsibility: there is a "'sense of calling' that results when those committed to a tradition undertake pioneering efforts to make fresh contacts with the realities that they have been trained to serve" (Milavec 2006, 465). By establishing the normative place of heuristic vision in every act of knowing, we place a great responsibility on the one articulating a particular comprehensive vision. Articulating the vision of a comprehensive entity while being mindful of and faithful to the "accidents of personal existence" is, for Polanyi, the essence of humanity's calling (*PK*, 322; cf. Langford 1966, 45-6). Even though the vision of a comprehensive entity emerges from a particular tradition, at a particular time, among a particular community, those who articulate it assume the requisite task of clarifying the nature and character of that vision with "universal intent" (*M*, 195).

Universal intent can easily be misunderstood. Because we cannot know whether or not our vision will be accepted, Polanyi suggests that we think of our claims in terms of *aiming* for universal intent rather than "established universality" (*TD*, 78). Universal intent is not the absolutization of our vision, nor an attribute of our understanding, but rather the *goal* of our provisional understanding. Polanyi even suggests that this desire for universal intent could be understood as a clue to God: "We undertake the task of attaining the universal in spite of our admitted infirmity, which should render the task hopeless, because we hope to be visited by powers for which we cannot account in terms of our specific capabilities. This I hope is a clue to God…" (*PK*, 324).[10]

*Summary*

Not surprisingly, the foregoing sketch of a heuristic vision of reality along Polanyian lines is incomplete and only provisional. We have identified three dialectical movements inherent to a heuristic vision of reality. The interplay of reality/discovery is naturally accompanied by the dialectic of affirmation/negation in a holistic, dynamic vision that recognizes the provisional nature of truth articulately expressed with universal intent. The need for a dialectic of particularity/universality becomes clear when a provisional expression of the real is offered with hope of universal intent by a particular person indwelling a particular tradition. We can now trace the contours of David Brown's model of theological inquiry in hopes of catching a glimpse of heuristic theology in action.

## David Brown: A Case Study of Heuristic Theology

*Background*

David Brown is a contemporary Christian theologian in the Anglican tradition. Born in Scotland in 1948, he is currently the Wardlaw Professor of Theology, Aesthetics, and Culture at the University of St.

Andrews. Early in his career he focused on the relation between theology and philosophy, but in more recent years his interests have expanded to the relationship between theology and culture, more specifically, the relationship between theology and the arts. Between 1999 and 2008 he published a five volume series extensively addressing the relationship between theology, philosophy, the arts, and human culture. One commentator describes this series as "one of the most ambitious projects of contemporary theology and represents a substantial challenge to currently dominant perspectives across a range of important issues" (King, MacSwain, and Fout 2012, 328).[11] Totaling nearly two thousand pages, it would be impossible to do justice to the full spectrum of Brown's thought in such a short space. Because our primary interest is his theological methodology, we will focus on the first two volumes, *Tradition and Imagination: Revelation and Change* (1999) and *Discipleship and Imagination: Christian Tradition and Truth* (2000).

*Primary Themes*

Brown's groundbreaking theology is distinguished by a unique array of interlaced motifs: an emphasis on the vital role of the imagination in theological inquiry; a closing of the gap between revelation and tradition; a sustained demonstration of the culturally conditioned, provisionally mediated, and continually developing character of revelation; the recognition of the Christian Scriptures as a "moving text"; the blurring of a distinction between Scripture and tradition; the expansion of God's revelatory activity beyond the confines of the Christian tradition into the realms of secular philosophy, other religious traditions, and the arts; the rejection of a sharp distinction between natural and revealed theology; the prioritization of the incarnation over the atonement. He is a Christian theologian through and through, and his overwhelming commitment is to a "God of mystery who has disclosed something of that divinity to humanity but with an inexhaustible richness that means . . . there always remains something more to discover, something more to delight the senses and the intellect" (Brown 2008, 26).

*The Philosophical Trajectory of Brown's Argument*

Before we begin to unpack his theology, we should consider a few of his philosophical convictions. Charting a course between the Enlightenment's over-emphasis on historical criticism and the postmodern conviction that objectivity and truth are either a priori out of reach or empty categories, Brown grants the postmodern position that all thought is conditioned and involves antecedent commitments while rejecting the tendency to caricature the Enlightenment as nothing more than an excess of rationalism. He seeks to avoid the contemporary extremes of unqualified advocacy of the virtues of Enlightenment objectivity on the one hand, and the retreat from its challenges into the allegedly self-validating claims of Christianity on the other (Brown 1999, 106). He recognizes that our basic problem is not that we are forced to undertake the pursuit of pure, disinterested objectivity lest we grease the slippery slope of unadulterated relativism, but that the strict opposition of objectivity to subjectivity is as false a dichotomy in theological epistemology as it is in any epistemological framework.

In Brown's analysis, one of modernity's principal faults is its inclination to show contempt for tradition. The chief error of the Enlightenment, specifically, was not in looking more widely than any particular tradition but in supposing that this entailed the death of tradition rather than its enrichment (Brown 1999, 106). He recognizes that traditions often mature and develop through interaction with alternatives, and not always in opposition to them (Brown 1999, 106). Provided that the traditions to which we are committed "are allowed to function as open, both towards their past and to the wider context in which they are set," Brown is convinced that "being aware of the traditions upon which one inevitably draws is what makes progress possible" (Brown 1999, 11). Contrary to the conventional wisdom of modern rationalism, acknowledging our dependence upon, participation in, and commitment to a tradition in no way undermines the search for knowledge and understanding. Brown's critique of modernity on this point should not be understood as an unqualified endorsement of the extreme postmodern response, where our antecedent

presuppositions "become exempt from any form of effective critique" (Brown 1999, 52) on account of the circular nature of the hermeneutic event. Quite the contrary. The postmodern insight into the conditioned character of all thought demands that each of our commitments be subject to potential critique.

*The Incarnation: The Centripetal Force of Brown's Theology*

One of Brown's primary theological objectives is to demonstrate that no sharp lines of demarcation can be drawn among revelation, Scripture, and the Christian tradition: "Tradition, so far from being something secondary or reactionary, is the motor that sustains revelation both within Scripture and beyond" (Brown 1999, 1). Brown embraces the hermeneutical circularity of his position by acknowledging that his argument begins with a commitment to the reality of the incarnation (Brown 1999, 101). In other words, Brown makes no apology for indwelling the Christian tradition even while he reimagines key elements of it. The logic of Brown's argument for prioritizing the incarnation is straightforward. For persons to be both truly human and genuinely sane, they cannot think themselves as being divine (Brown 1999, 278). This means that, at least initially, Jesus of Nazareth could not have understood himself as the Divine Son of God (Brown 1999, 320).[12] The corresponding Christology requires that the incarnation be understood as "a real kenosis" (Brown 1999, 299).[13] There is thus a high degree of "accommodation to the human condition in the incarnation" (Brown 1999, 276). If the incarnation can be understood as the greatest point of God's involvement with humanity, then it follows that "God submitted perception of himself to the vagaries of a developing tradition; so why not elsewhere also?" (Brown 1999, 275). Brown's commitment to a dynamic, unfolding tradition is immediately related to his understanding of incarnation.

*The Imagination: The Centrifugal Force of Brown's Theology*

Misunderstanding the role played by the imagination in the theological task has largely contributed to sharp divisions among Scripture, revelation, and tradition (Brown 1999, 274). Whereas the incarnation acts as the gravitational center of Brown's theology, drawing the community together in a shared commitment to God's activity in Jesus of Nazareth, the human imagination acts as a catalyst for change, ensuring that the tradition never becomes stagnant and is always striving for cultural relevance, all in the name of being faithful to the trajectory of the tradition. Emphasizing the incarnation as accommodation to the vagaries of a developing tradition highlights "the necessary exercise of the imagination as the story [is] retold in the light" (Brown 1999, 299) of new social triggers. All else being equal, the inertia of a theological community promotes consistency over change.[14] Imaginative reappropriations of the tradition become necessary when they are given some "external prod" by changing social and historical situations (Brown 1999, 187-8). Of course, this is not to suggest that culture is the only catalyst for re-imagining the meaning of a tradition's key symbols and central commitments.

Of equal importance is the recognition that "the contribution of the imagination to understanding the significance of Christ by no means ended with the closure of the New Testament canon" (Brown 1999, 321). Once we allow the trajectory of incarnational belief to feed back upon itself, we will realize that the community makes an indelible mark on the unfolding tradition and in so doing has the capacity to actually "improve'" upon the contents of the original narrative or event (Brown 1999, 76-7). This is the basis for treating the Scriptures as a "moving text" (Brown 1999, 301).[15] Some will undoubtedly bristle at the notion of improving the contents of the original biblical narrative. If nothing else, this means that theological inquiry is more than fanciful speculation or mere reflection on the past; much is at stake in this potentially risky endeavor. If we truly believe that our words-about-God can and do change the way we indwell our world, if not the world itself—and why would we want to do theology if this were not the case—then theology is a dangerous enterprise that carries with it great responsibility, and making claims that go against the grain of tradition should not be made lightly if and when they must be made.

The advantage the imagination has over a purely linear, mathematical type of rationality is in its ability to think laterally, to allow for combinations not yet present in the mind or in nature (Brown 2000, 352). Even if all such connections were merely located in the mind, they would still be illuminating on account of the fact that becoming aware of a "symbolic field in the unconscious can alert us to other options, in particular that not everything that is 'known' has necessarily already been conceptualized" (Brown 2000, 353). This is not intended to drive a wedge between reason and the imagination as resources for accessing truth. Quite the opposite: this whole approach seeks a rapprochement between faith and reason, the imagination and tradition. Bottom line, the imagination allows for the possibility of remapping reality, not just with respect to what is already known, but with respect to what could be known as well (Brown 200, 360). Linking the imagination with the remapping of what could be known creates a space for revelation that emerges from the inside, as it were.

*A Dynamic Understanding of Revelation*

While Brown makes no attempt to give an account of the precise location where revelation occurs, as he believes this would be a mistake, it is clear that wherever revelation happens in space and time, the imagination plays a vital role. While revelation can be experienced as an event, sensually, we only have access to the *meaning* of revelation through our capacity to reason, to imagine (Brown 1999, 6). For Brown, this means revelation is not confined to the boundaries of the Christian tradition. His endorsement of the postmodern insight into the conditioned character of all thought leads him to expect that "God might have interacted with more than one religious tradition over the course of the centuries" (Brown 1999, 136). The ongoing reflection and imaginative rewriting of the tradition is itself part of the process of divine disclosure (Brown 1999, 169). God's accommodation to the human condition in the incarnation means that revelation will always be tied to a developing tradition, but never limited to a single one.

Thinking of tradition as the human reflection on an original and unchanging divine discourse has obviously been a part of the Christian tradition for a long time, for better or worse. Brown realizes this, but is concerned that such an approach does not adequately account for the ways in which "all human expression is embodied within, and limited by, particular cultural contexts" (Brown 2012, 267). He further argues that throughout human history, access to the divine was the norm rather than the exception, as it was commonly believed that God was available to be experienced everywhere (Brown 2012, 266). As far as Brown is concerned, the problem of religious experience and the challenge of biblical criticism is evidence of a crisis in both natural and revealed theology. He is not interested in downplaying the contributions these two approaches have made to the Christian tradition even though he is convinced that these "commonly-assumed frameworks are altogether too narrow" (Brown 2012, 266-7). Much and more could be said about the disintegration of the divide between natural/revealed theology, but at this point, suffice to say that a rapprochement of these two discourses is one of the most significant theological implications of Brown's work.[16]

*A Dynamic Understanding of Tradition*

Brown consistently argues against the common prejudice that treats tradition as something static, a prejudice that relegates it to the status of "mere inheritance of the past" (Brown 1999, 30). For Brown nothing could be further from the truth. The history of Christianity illustrates this: "even tradition itself needs first to be undermined before it can acquire a capacity for further development" (Brown 1999, 51). Further precedent for this is found in the Christian Scriptures. We could say that the Scriptures themselves give us permission to undermine them in the name of fidelity to the tradition. Brown shows how the Scriptures are part of a developing tradition by citing examples of how they imaginatively reappropriate material from the past to address questions of the present.[17] Because the Scriptures do not address every possible social situation, it seems reasonable to expect that when a tradition encounters new social condi-

tions it might generate new insights and then incorporate them back into the tradition (Brown 1999, 71). Brown suggests that these social triggers are themselves part of the revelatory process and evidence that the text itself cannot be understood as the exclusive generator of meanings. Rather than thinking about the Bible as the "already fully painted canvas and the traditions of the later Church as offering at most some optional extra colouring, we need to think of a continuous dynamic of tradition operating both within the Bible and beyond" (Brown 1999, 365).

*Three Advantages of Brown's Proposal*

Brown identifies three major advantages to this proposal (Brown 1999, 365ff.). The first is that it can release Christians from constantly trying to find justification in Scripture for positions that are more naturally read as later self-understandings. For example, rather than arguing that Jesus wasn't opposed to divorce or that Paul was in favor of homosexuality, Brown suggests that discussion of these issues should be focused on the trajectory set by the tradition, rather than the specific commitments of the tradition at a given time in history. Secondly, the Bible would no longer have an impossible burden placed on it. Biblical history would cease to be a unique exception to the normal pattern of divine action, thus requiring the church to take responsibility for its history. Finally, and perhaps most significantly, in Brown's model, Christians would be allowed to take seriously revelation as it occurs in other religions and disciplines. Insufficient attention has been given to this point in this essay, but this is undeniably one of the primary benefits of his model. It challenges the assumption that the efficacy of revelation is somehow undermined if "external material from the surrounding culture is used to illuminate or even rewrite its story" (Brown 1999, 104).

## Points of Contact

The foregoing analysis is ample evidence of the compatibility of the Polanyian and Brownian paradigms. I will now consider the six most salient points of contact between them. This will serve as a road map for reading Brown's model as an embodiment of a Polanyian-inspired heuristic theology.

*1. Overturning the Subject/Object Dichotomy*

Both models challenge the assumption of a fundamental split between the knowing subject and the object known. A heuristic vision of reality accomplishes this by demonstrating the correspondence between the subject/object in the triadic structure of tacit knowing. Brown accomplishes this by blazing an epistemological trail between caricatures of modernity and corresponding extremes of postmodernity. Both thinkers realize the choice is not between disinterested objectivity and unadulterated subjectivity, but between reductive and non-reductive views of the ontology/epistemology relationship. Polanyi's challenge to the objectivist ideal in modern science no more leads down the slippery slope of relativism than Brown's emphasis on the human imagination rules out the possibility of divine revelation.

*2. The Priority of the Creative Imagination*

Both models recognize the central role of the imagination in all acts of human knowing. A heuristic vision of reality recognizes the interplay of intuition and imagination in all acts of knowing, from scientific discovery to knowledge of other minds. For Brown, it is only our capacity to imagine that allows us to participate in the unfolding drama of revelation. There is also a further, deeper connection between Brown's notion of imagination as lateral thinking and Polanyi's conviction that we know more than we can tell. Brown argues that the imagination allows us to remap reality—not only with respect to what is already known, but with respect to what could be known.[18] This supports his argument that not everything that is known has already been conceptualized. Clearly, this is similar to the idea that we know more than we can tell. Furthermore, Brown's notion that the creative imagination has the capacity to remap reality dovetails with a Polanyian understanding of discovery.

*3. Discovery*

Both models place an emphasis on discovery, even though they use different language in so doing. As we have seen, the notion of discovery is a central feature of a heuristic vision of reality. While discovering hidden areas of reality and bringing them to our understanding has long been a hallmark of science, in Gelwick's estimation, this example has unfortunately not been followed in theology (Gelwick 1975, 301). Aaron Milavec explains that in "contrast to modern science, Christianity has often been characterized as commitment to the mere repetition and preservation of a onetime discovery about God revealed through Jesus" (Milavec 2006, 48). Gelwick wonders if this type of approach to theology might partially explain "why the layman today does not really expect much from theologians except trite clichés of the past" (Gelwick 1975, 301). Brown's model seriously challenges such an approach to theology. His commitment to a God of mystery disclosing reality to humanity with an inexhaustible richness means that "there always remains something more to discover, something more to delight the senses and the intellect" (Brown 2008, 26). A heuristic vision of reality challenges theology to follow the example of science and come to understand its task as the ongoing discovery of the richness of reality rather than reflection on a static deposit of revelation preserved in a holy book. The upshot is that theologians would no longer be understood as mere "expositors of the past," but instead as "explorers of the present claiming to have an important angle of understanding reality and expecting to learn new things from it" (Gelwick 1975, 315). This is precisely what Brown is arguing for when he suggests that, "instead of thinking of tradition as purely human reflection added to an original and unchanging divine discourse . . . we need to see that continuing human reflection [is] itself an indispensable part of the process of divine discourse" (Brown 1999, 169). At this point, the heuristic character of Brown's theology becomes abundantly clear.

*4. Inexhaustibility of Reality*

Both models conceive of reality as inherently inexhaustible. From a Polanyian perspective, the irreducible structure of tacit knowing implies a corresponding inexhaustibility to the structures of reality. In a heuristic vision of reality, that which is most real has the capacity of manifesting itself in unpredictable, inexhaustible ways. Only that which is real can properly be discovered, and discovery always opens up the possibility of more discovery. From a Brownian perspective, there is a requisite commitment to a "God of mystery who has disclosed something of that divinity to humanity but with an inexhaustible richness . . ." (Brown 2008, 26).

*5. The Primacy of Tradition*

Both models maintain that there is no knowledge outside of participation in a community of shared commitments (i.e., outside of tradition). Both models further recognize the heuristic/hermeneutical circularity of these commitments. Scientists and Christian theologians alike must be committed to the particular set of presuppositions and methods appropriate to their tradition if they are to carry out their work. Attempting to ground commitment noncommittally is a non-starter in both cases.

*6. The Dynamic Nature of Orthodoxy & Revelation*

Both models realize the dynamic nature of a tradition. Both models recognize that the viability of a tradition is related to its ability to continually undermine itself in the name of development, relevance, and truth. A tradition matures only when its affirmations are accompanied by a corresponding invitation to challenge the legitimacy of its affirmations. The dynamic orthodoxy of tradition in a heuristic vision of reality implicitly grants the right of opposition to it in the name of truth and faithfulness. For Brown, God's accommodation to the vagaries of a developing tradition in the incarnation attest to the reality of dynamic revelation and the need for a tradition to continually re-imagine itself in light of our best knowledge of the world.

## Concluding Remarks

Andrew Grosso's diagnosis of the challenges facing the theological enterprise provides context to the urgency of embracing what I have been calling a heuristic vision of theology: "One of the primary challenges facing the theological enterprise is the need to make itself understandable within the broader social and cultural context in which it exists, a context that may be in no way beholden to the religious commitments that inspire and support any particular vision" (Grosso 2007, 32). Transferring the value of this heuristic vision of reality into a corresponding model of theology thus carries with it the additional responsibility of articulating a vision of God that is grounded in tradition, strives for universal intent, and yet resists "the tendency to absolutize the content of its vision" (Grosso 2007, 32). As far as I am concerned, this challenge can only be met if theology becomes willing to engage in genuine interdisciplinary conversation, and thus becomes willing to reimagine one or more of its central commitments when necessary. For numerous reasons, a heuristic theology is well equipped for such conversation, not the least of which is its refusal to absolutize its claims. Grosso recognizes that when the elements of a theological vision become intractable, it inevitably marginalizes itself within the broader culture (Grosso 2007, 32). The stagnation of a theological vision would represent a fundamental "betrayal of the implicit purposes of a heuristic vision, that is, the ongoing effort to understand better a reality that is expected to continue to reveal itself in new and unforeseen ways" (Grosso 2007, 32-3).

Brown offers a model of theology that naturally resists stagnation. By following Brown's analysis of the role played by the imagination in the development of a religious tradition, and by implicitly placing this analysis in the broader context of Polanyi's challenge to the objectivist ideal—an ideal that has served to divide theology from science—we have seen how Brown's appeal to the imagination allows him to close the gap between tradition and revelation in theological discourse, untethering theology from anything that might resemble a "positivism of revelation" (Green 1989, 34). He has also found a way to treat other religions as sources of revelation without compromising the integrity of Christianity, thereby creating an avenue for rich, inter-religious dialogue. Heuristic theology thus sees itself as but one voice in a much larger discourse. A heuristic theology is inherently interdisciplinary.

Bearing in mind that in a heuristic vision of reality what is most real is that which is most significant and most promising to expand the horizon of future discovery, in a corresponding theological vision, systematic reflection on what is most real, significant, and promising will involve the attempt to bring one's understanding of the question of God to bear on the whole of the human experience. The pursuit of a genuinely heuristic theology is thus boldly attempting to construct an integrated vision of nothing less than the entirety of all that is. It can be seen as an attempt to give an account of the infinite from the perspective of the finite such that the infinite necessarily includes the finite, but is not a simple conglomeration of it. This of course assumes that the finite is capable of imagining and/or experiencing the infinite in meaningful ways.

As a theologian in pursuit of what it means to live as a Christian, I am interested in embodying a mode of theological discourse that is faithful to the kind of God I see at the center of the Christian tradition: a God that is creative, dynamic, and incarnate; an inexhaustible reality that can neither be reduced to the metaphysical Big Other beyond the sky nor limited to a projection of human culture and/or the human psyche. Such a pursuit is greatly enhanced by wrestling with the Polanyian tradition. A heuristic theology not only allows us to see our project as one of perpetual development, change, growth, and response, but also one that recognizes saying words-about-God happens within the broader human experience, implying that a heuristic theology sees the sciences, the arts, and other religious traditions as invaluable conversation partners, as discourses that can and do tell us true things about God, the universe, and ourselves.

Bottom line: subscribing to a heuristic vision of reality requires a corresponding mode of theological inquiry, one that endorses a holistic epistemology, sees reality as an inexhaustible playground, values discovery, the creative imagination, a dynamic understanding of orthodoxy and tradition, and aims for universal intent without denying that it is inextricably bathed in particularity. This approach to theology sees reality as a playground, finds pleasure in playing with ideas, and isn't afraid to make mistakes even while it understands the inherently risky nature of saying words-about-God as well as the immense responsibility assumed by those who undertake such a potentially dangerous endeavor. A heuristic vision of theology recognizes that Christianity contains its own negation, that its radical, subversive core prevents it from ever becoming a stagnant system of dogma (for too long), and that it is first and foremost a way of living, moving, and being in the world.

Such is the trajectory of theological inquiry latent in Polanyi's philosophy. It has been my argument that Brown's model largely follows this trajectory, and that his approach can be seen as an embodiment of heuristic theology. I have not undertaken this pursuit simply to add clutter to academic shelves by bringing together two thinkers who have hitherto been treated separately. I have undertaken this conversation because Polanyi's thought continues to be a positive conversation partner for the theologian, because I am convinced that a heuristic theology has implications that cannot be ignored, and that we can begin to appreciate the implications of Polanyi's work for a mature, dynamic approach to theology by paying attention to the exciting work being carried out by David Brown.[19]

## Endnotes

[1]Based on his analysis of Thomas Torrance's interaction with Polanyi, Alister McGrath has identified a methodological distinction between two ways of theologically appropriating Polanyi's work: "foundational" and "illuminative." Whereas illuminative approaches simply involve "pointing out convergence at points of significance," foundational approaches involve a much more sustained engagement that entails a "form of total commitment to Polanyi's general methods or assumptions" (McGrath 1999, 229). Upon surveying a selection of theologians who have constructively appropriated Polanyi's work, theologian Andrew Grosso—attending to McGrath's distinction—argues that "neither approach has managed to represent the theological potential of Polanyi's work with complete success" (Grosso 2007, 114). Grosso is not suggesting that these efforts are necessarily misguided. Its simply the case that among those surveyed, those who selectively employed Polanyi in an illuminative manner, "often failed to represent the full scope of his thought, and have often been rather narrow in their application of his thought to the task of theology," while those who took the more ambitious foundational approach "often failed to account adequately for the dogmatic content of the theological tradition and the responsibilities that inhere with its reception and perpetuation" (Grosso 2007, 114). Thus, any theological appropriation of Polanyi's work must be mindful of the limitations typically encountered by exclusively pursuing one approach over the other. This is clearly one of Grosso's chief concerns in his monograph. By not limiting himself exclusively to either approach, he seeks to avoid the pitfalls typical of each. Instead, his intention is "to initiate a conversation between Polanyi and the theological tradition with the expectation that there is much to be gained on both sides from sustained, meaningful interaction" (Grosso 2007, 114). He further expects that "as we examine the correspondence between the theological tradition and Polanyi's thought, we will recognize new ways of approaching familiar theological questions while also seeing the extent to which it is only a theological mode of inquiry that can bring to fruition the ambitions of Polanyi's philosophy" (Grosso 2007, 114). I draw attention to these distinctions in hopes of contextualizing my own interaction with Polanyi in this paper, which shares Grosso's intention and expectations.

[2]There are few times however when Polanyi does explicitly engage in dialogue with a theologian. For example, he interacts with Teilhard de Chardin's understanding of the human person in "The Mind-Body Relation" (Polanyi 1968, 102). He also comments on Teilhard's notion of "noogenesis" in *Personal Knowledge*, 388. But the most consistent interaction he sustained with a theologian was with Paul Tillich. There is an (in)famous reference to Tillich in a footnote on page 283 of *Personal Knowledge* where he says that he finds many of his own theological intuitions confirmed in Tillich's *Systematic Theology*. He also takes Tillich to task on the relationship between science and faith, engaging him extensively in "Faith and Reason" and "Science and Religion."

[3]Colin Grant observes that the real epistemological issue Polanyi sought to address was not the divide between objectivism and subjectivism, but the alleged gulf between the knowing subject and the object known. Thus we should recognize that, "the real alternative is not between objectivism and subjectivism, but between the assumption of the subject-object dichotomy, which results in this oscillation between objectivism and subjectivism on the one hand, and a comprehensive approach, such as Polanyi advocates" (Grant 1987, 266). For Grant, Polanyi occasionally "compromises his holistic approach by appearing to be advocating subjectivism in reaction against the objectivism he opposes, and, in so doing, overlooks some of the most illuminating insights his comprehensive vision can afford," namely, diagnosing our "modern malaise as a form of acute-self consciousness" (Grant 1987, 267). This, Grant refers to as Polanyi's "near miss."

[4]Polanyi identifies two types of problem solving: "systematic" and "heuristic." The difference between them is that while a systematic operation is a "wholly deliberate act, a heuristic process is a combination of active and passive stages" (*PK*, 126) The active stage involves the deliberate process of "preparation" and is followed by a period of "incubation" where nothing is done and nothing happens on the level of consciousness. The fruit of the investigator's efforts, the advent of a "happy thought" is not the result of deliberate action, it simply "happens" (*PK*, 126). Elsewhere, in "The Creative Imagination" especially, Polanyi emphasizes the roles played by the intuition and imagination in this process. The important point is that a heuristic vision of reality prioritizes the roles played by both in the discovery of truth.

[5]This puts the "real" in Polanyi's critical realism. Despite his consistent opposition to an objectivist epistemology, this makes it clear he does not offer a subjectivist one in its place. He explains that scientists, throughout their inquiries, rely "on the presence of something real hidden out there," and thus they will "necessarily also rely on that external presence for claiming the validity of the result that satisfies the question" (Polanyi 1981, 106).

[6]This has immense consequences for theological epistemology—consequences which I can only here provide clues to. In a subsequent article I will flesh out these issues more fully by bringing Polanyi into conversation with a particular reading of Hegel.

[7]In the preface to the second edition, Polanyi says that while he spoke of tradition as a "spiritual reality" in the original publication, he later came to think of it as a belief in "the reality of emergent meaning and truth" (*SFS*, 17).

[8]"Heuristic circularity" is a wonderful little phrase borrowed from Aaron Milavec (Milavec 2006, 474).

[9]This is why positivism is self-defeating: the quest to capture reality in a knowledge "that is firm and final is a denial of life, a pursuit of death" (Grant, 1988, 415).

[10]There is an uncanny resemblance between Polanyi's idea here and George Steiner's "wager on transcendence" as the source of all meaning (Steiner 1989, 4).

[11]Others have expressed similar appreciation. John Macquarrie described the first volume in the series as "the most impressive theological book I have read in quite a long time" (Macquarrie 2001, 471-3).

[12]Brown wonders if Jesus ever understood himself in this way. Brown further suggests that it is not inconceivable to think that Jesus might have understood himself in some sense as sinful—although this would in no way make him a sinner.

[13]For a more sustained treatment of kenosis in Brown's theology, see *Divine Humanity: Kenosis and the Construction of a Christian Theology*.

[14]Mark C. Taylor argues this exact point in *After God.* His aim is to develop a definition of religion that is both sensitive to the stabilizing as well as its de-stabilizing movements (Taylor 2007, 12-3).

[15]The chief criticism raised against Brown on this point is the paucity of clear criteria for determining whether or not a development in the tradition is to be considered progressive (i.e., revelatory) or not. For as much as Macquarrie praises Brown's work in his review of *Tradition*, he sees this as an important question left unanswered: "How does one discriminate among those efforts of the imagination? Can one decide whether its recreations of an event have a sound basis, or has imagination run away with the imaginer?" (Macquarrie 2002, 769). Brown himself acknowledges this weakness in *Tradition* (375) and specifically takes up the issue in *Discipleship* (389-405), suggesting nine specific criteria for how we can decide if a development should be considered consistent with revelation or not.

[16]This is a classic Anglican position (King, MacSwain, and Fout 2012, 328).

[17]E.g., the Gospel of John's treatment of Pentecost (Brown 1999, 60ff.), the different treatments of Jesus' birth story (Brown 1999, 76ff.), and the development of the Abraham narrative (Brown 1999, 227ff.).

[18]It is interesting that when making this point he cites Eliade, Jung, Lacan, and Lévi-Strauss as examples of thinkers who recognized this—but not Polanyi (Brown 2000, 353 n. 32).

[19]This article was originally presented at the Polanyi Society Annual Meeting at the American Academy of Religion Annual Meeting on November 22, 2013. The comments offered by the three respondents—Jon Fennell, Andrew Grosso, and David Brown—genuinely helped me to clarify my argument and stimulated me to think about many of my central claims in new ways. Thanks for your careful reading of my original essay and your insightful reflections along the way.

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# The Emergence of Mind: *Personal Knowledge* and Connectionism

**Jean Bocharova**

*Key words:* Connectionism, Michael Polanyi, emergence, mind, neurocomputation, PDP

ABSTRACT

*At the end of* Personal Knowledge, *Polanyi discusses human development, arguing for a view of the human person as emerging out of but not constituted by its material substrate. As part of this view, he argues that the human person can never be likened to a computer, an inference machine, or a neural model because all are based in formalized processes of automation, processes that cannot account for the contribution of unformalizable, tacit knowing. This paper revisits Polanyi's discussion of the emergence of consciousness and his rejection of neural models in light of recent developments in connectionism. Connectionist neural modeling proposes an emergentist account of brain structure and, in many ways, is compatible with Polanyi's philosophy, even if it ultimately neglects questions of meaning.*

In his discussion of evolution in "The Rise of Man" at the end of *Personal Knowledge*, Polanyi touches on the emergent properties of human development. He argues in this section that the movement from embryo to fully developed human person cannot be explained either as mere preprogrammed maturation or as the result of an "external creative agency" (395). Rather, human development involves something he calls the "intensification of individuality" (395). According to this view, stages of development—new achievements of a developing human person—arise in a manner similar to the emergence of new scientific discoveries: both processes require the crossing of a "gap," a heuristic gap in the case of the scientist or an ontological gap in the case of the human person. Just as the scientist strives toward a truth that can only be intimated, so too does the infant passionately strive toward an achievement yet to be realized but intimated as possible. The result of such striving is the emergence of personhood, achieved most fully when a child enters into the "traditional noosphere," his or her culture's "lasting articulate framework of thought" (388). For Polanyi, this intensification of individuality at the level of human development is consistent with his view that higher-order structures and characteristics of the human mind are not predetermined in the material substrate of biology but emerge indeterminately as a result of an individual's personal commitment (395-397). In this way, his view of the emergence of human consciousness is part of his larger refutation of a Laplacean conception of the universe as reducible to the laws of physics and chemistry.

Related to Polanyi's discussion at the end of *PK*, the concept of emergence has recently begun to gain prominence among cognitive neuroscientists who model brain function using connectionism. Connectionist models of brain architecture assume that higher-order cognitive functions can only be understood globally in terms of patterns of activity distributed over multiple connections in the brain. In this sense, and for readers familiar with Juarrero's work, it could almost be called a dynamical systems approach to human cognition (e.g., McClelland et al. 2010). Connectionism stands in opposition to "grandmother cell" theories that try to locate thoughts in specific neurons or groups of neurons; representational nativists (e.g., Pinker and Chomsky) who argue that humans are born with significant domain-specific knowledge located in specialized, predetermined modules in the brain; probabilistic models of cognition, which ad-

vocate a top-down modeling approach to study cognitive processes; and other computational theories of mind (e.g., Fodor and Pylyshyn) which argue that the brain operates like a digital computer. In contrast to these other theories and approaches, connectionists argue that the complex brain architecture of an adult is emergent from simpler neural structures (Rumelhart 1987; McClelland et al. 2010, 348; McClelland 2011, 134). These structures, rather than being pre-programmed to mature a certain way or to specialize for pre-determined functions, acquire their abilities by encountering inputs in their environment (McClelland 2010, 753). As a revision of the brain-as-computer metaphor, connectionism informs many of the most prominent contemporary discussions about the mind-body relation. It provides a foundation for neurophilosophy, eliminative materialism, embodied cognition, dynamic core theory, and work in artificial intelligence.[1] Because connectionism is so fruitful in the cognitive sciences, it is worth considering how it might agree with or depart from Polanyi's understanding of emergence, especially as it relates to his larger arguments about human development and the relationship between mind and body. Below I explain how many of Polanyi's objections to the neural model in *PK* do not apply to current neural models based on connectionist assumptions. Connectionism, which favors pattern recognition rather than logic as a descriptor of cognitive processing, agrees with many of Polanyi's points about the nature of tacit knowing. Despite such agreement, however, there remains a divergence regarding the status of the human person as an active center.

## Connectionism: An Overview

Connectionism traces its origins to the 1940's with the McCulloch and Pitts neural model, but it is generally understood to have begun to take its current form in the 1980's as a result of studies in artificial intelligence (McCleod et al. 1998, 314). It was at this time that David Rumelhart, James McClelland, Geoff Hinton and others developed computer models of brain function that operated through parallel distributed processing (PDP). PDP involves many small "neuron-like" units operating simultaneously over a multilayered network.[2] In these networks, information is not carried in whole chunks (such as binary units of 1 or 0). Instead, it is conveyed as a pattern of activity among many units. For example, whereas a localist or symbolic representational system might assign a whole concept, such as "dog," to a single neuron, a small group of neurons, or a single unit in a computer network, distributed systems do not represent or store such a concept in any single place. Rather, a representation of "dog" would arise from a pattern of activity among many different units, units which are also used to represent other concepts, like cats or coyotes (Elman et al. 1999, 90-91). This pattern of activity is generated and stored as a potential in the weights between connections in the network. These weights reflect the probability that a unit will activate given various levels of input (McClelland 2000, 583).

Thus, connectionism treats the human brain primarily as an information processor. But unlike other brain-as-computer theories, connectionism rejects the notion that the brain operates through symbolic processing, with preprogrammed and sequential steps, local storage of memory, and discrete packets of information. Instead, they propose that it is more likely that the brain operates through weighted connections that store and generate information over a distributed network, with units operating in parallel and with larger systems emerging from simpler architectures (Elman et al. 1999, 50-56).[3]

Since the 1980s, parallel distributed processing models of cognitive function have shown that significant cognitive tasks, such as learning the meaning of words and identifying similarities and differences between objects, can be performed by multiple simple units working in parallel in layered networks (Rumelhart and Todd 1993, 14-15; Elman 1990, 200). Much current work in connectionism focuses on modeling human learning and development, and researchers in the field have built computer models that mimic how humans acquire and perform higher-order cognitive tasks such as learning how to pronounce

words (Plaut et al. 1996), learning advanced rules of syntax (Elman 1993), recognizing faces from multiple angles (McLeod et al.. 1998, 294-300), predicting the effects of weight and distance on a balance beam (McClelland 1989), and reconstructing a whole image from a partial association (Hertz et al. 1991). To demonstrate the biological plausibility of the models, the performance of these networks is often compared with studies in human cognition, including studies of children's acquisition of similar tasks as well as studies of patients with brain damage. More recently, researchers at The Neurosciences Institute have developed brain-based devices (BBDs) with artificial nervous systems that allow these devices to learn about their environment and to navigate in response to it. As these devices learn about their environment, each one develops in its artificial brain a unique activity pattern between connections (Edelman 2006, 131-141).

In short, connectionists argue that many higher-order cognitive functions—as well as physiological structures (e.g., specialized brain regions) and developmental processes (e.g., critical periods)—are emergent (McClelland 2010, 751). In these theories, the term "emergence" is assumed to be the appearance of unpredictable structural novelty, especially those with causal potency. Complex abilities, structures, and processes involve a large number of simple elements that are shaped into a new structure by dynamic, contextual forces (McClelland 2010, 754). The novel form cannot be reduced to any of its constituent elements; it is dependent on but more than the sum of its parts. A complementary assumption is that new structures by their very nature are not designed. Although connectionists allow for initial constraints to be placed on individual components of a complex system (e.g., a learning rule or simple starting architecture), they argue that these initial constraints cannot determine in themselves what the final emergent form will be. The neurons that will be involved in processing language, for example, are not specialized for this task until they find themselves in an environment saturated with linguistic input (Elman et. al. 1999, 265-267). The complexity of a network's final configuration is not pre-programmed.[4]

## Polanyi's Critique of the Neural Model

These dynamic features of connectionist networks distance contemporary neurobiology from Polanyi's critique of the "neural model" of mind. In *PK*, Polanyi objected to a neural model of the human mind for two reasons. The first reason is that a neural model, by focusing on the subsidiary contribution of the body to the comprehensive entity which is the mind, destroys the thing it is trying to understand. Just as reducing life to the laws of physics and chemistry is meaningless, he writes, "it is likewise meaningless to represent mind in terms of a machine or of a neural model" (*PK*, 382). I discuss this first critique toward the end of the paper. The second reason, which is more prominently discussed in *PK*, is that neural models are characterized as automated, formalized, specified systems of explicit inference, systems incapable of the tacit inferences that characterize human thought. A closer look at Polanyi's understanding of a "neural model," however, demonstrates that it differs from connectionist assumptions about the nature of neurocomputation.

When Polanyi refers to neurology or the "neural model" in *PK*, he consistently likens it to a symbolic processing machine. He objects to the neurological model precisely because he objects to those who would see the mind as a kind of computer. But in *PK*, "computer" means *digital* computer, which is significantly different than a computer working on a parallel distributed processing model. The chief problem that Polanyi identifies with digital computers, inference machines, and automation in general is that they try to formalize and specify the unformalizable and the unspecifiable; in so doing they eliminate the tacit coefficient that constitutes the active center of a human person (*PK*, 257-8). Automation, if it is cleverly designed, may seem intelligent, but this intelligence is illusory: it can never be more than the manipulation of symbols through the use of prescribed rules specified and formalized by its program. Because rules are fed to the machine in advance, there is no room, he says, for unformalizable, unspecifiable (i.e. tacit)

components to enter into its operation: "A routine game of chess can be played automatically to the extent to which the rules of art can be specified. While such a specification may include random elements, like choices made by spinning a coin, no unspecifiable skill or connoisseurship can be fed into a machine" (*PK*, 261). By extension, neural models, for Polanyi, also operate by "fixed symbolic operations" (*PK*, 337), assuming pre-determined rules that foreclose the possibility of unspecified, tacit contributions to human life. He calls this the "automatic neurological model" (*PK*, 262), a model that, should it admit of human consciousness, could only allow for a consciousness that was superfluous to the automatic functioning of a nervous system over which it could exert no influence (*PK*, 336). In short, Polanyi rejects neurology because it is "based on the assumption that the nervous system—*functioning automatically* according to the known laws of physics and chemistry—*determines* the workings which we normally attribute to the mind of an individual" (*PK*, 262; emphasis mine).

Like Polanyi, connectionists also reject the metaphor of mind as a digital computer. Unlike digital computers—which run input symbols through a series of rules in a formal program in order to reach an output—connectionist networks do not work by symbols or deterministic programs. Instead, patterns of activation trigger other patterns of activation that lead to an output. Over time, as the network encounters common patterns in the environment, some pathways between connections are strengthened while others are weakened. Whereas digital computers are characterized by "fixed symbolic operations," the connectionist network that has discovered structure in its environment is not the same as the one that was originally built by a human technician. Similarly, unlike most who use the metaphor of the mind as digital computer, connectionists also reject the claim that genes "code" for higher-order cognition or complex neural structures. Instead of likening genes to a "computer program" or a "blueprint," they use the metaphor of genes as "catalysts" that enable—but do not direct—the emergence of new structures and processes (Elman et al. 1999, 350-351). In this sense, connectionism agrees with Polanyi's view that DNA "*evokes* the ontogenesis of higher levels, rather than *determining* them" (*KB*, 235; emphasis original).

## Emergence

Given this brief sketch of connectionist perspectives, the question now arises: do connectionist networks achieve "higher levels" of being in the sense that Polanyi means it? True emergence, for Polanyi, is more than mere holism: the irreducibility of emergent entities, he writes, "must not be identified with the mere fact that the joining of parts may produce features which are not observed in the separate parts" (*KB*, 230). Instead, emergence requires the addition of higher supervening principles—boundary conditions that harness lower levels of being. For a connectionist model to be truly emergent, it would have to be under dual control, with a higher operational principle harnessing the boundary conditions left open by lower levels. In this section, I want to suggest that the set of weights found in a trained network may constitute such an operational principle. Just as personal acts of knowing comprise the tacit integration of subsidiaries into focal wholes, so too do networks integrate subsidiary inputs into global patterns of activity. Higher order operational principles emerge when networks cross their own conceptual "gap," a point in the training where the network achieves the ability to better discriminate between inputs. The set of constraints found in a trained network enable it to complete tasks which other networks with random weight assignments cannot complete.

The possibility of a network's emergence due to dual control can be seen in connectionist explanations of the mechanics underlying sudden insights and new developmental achievements. It is worth here recalling that Polanyi sees the process of scientific discovery—a process marked by sudden insight as one crosses a heuristic gap—as paradigmatic for tacit knowing (*TD*, 24-25) and for the emergence of mind (*PK*, 395). The new interpretative framework that arises when we cross a heuristic gap is "of the

same kind" as the emergence of individual personhood, a process undergone in stages and culminating in the emergence of human culture (*PK*, 395). Personal commitment leads to a passionate striving toward a hidden reality and to the eventual achievement of discovery (*TD*, 25; *PK*, 311-312). Because such striving and achievement involves personal commitment, the process of scientific discovery and other forms of emergence related to the human person cannot be formalized or prespecified (*TD*, 25; *PK*, 311-312). Instead, we integrate subsidiaries informally, achieving focal awareness and understanding in an unspecified way. Most striking is how connectionism suggests that this process of tacit integration can be observed in the global patterned activity of networks processing inputs across a large number of small (subsidiary), weighted connections.

Tacit integration of this kind can be seen in connectionist explanation of sudden learning. Like humans moving from one phase of knowledge to another, where they may at first not understand or only partially understand a concept before gaining mastery, artificial connectionist networks sometimes demonstrate sudden, unexpected advancements in their ability to process information. Such complex outcomes, however, are the result not of new enabling interventions or dramatically new learning mechanisms but rather of simple learning mechanisms making small changes over time. One example is a network developed to identify the sum of a sequence as even or odd. After 17,999 training cycles, the network was limited in its ability to identify whether the sequence was odd or even and had not been able to extract a general principle. On the very next training cycle, cycle 18,000, the network was suddenly able to give the right answer in all instances (Elman et al. 1999, 230-236). Looking from the outside it would seem that the network passed through a dramatic stage in its development—or that it crossed a heuristic gap. This jump in ability, however, was the result of a single learning algorithm making a large number of small adjustments to connection strengths. These small changes amounted not to a linear change in output—with each adjustment corresponding to an observable change in the system's behavior. Rather, the small adjustments to weigh strengths resulted in non-linear change at output. The network's behavior seemed not to be affected until a critical threshold of change had been passed, after which point outputs changed significantly. Another example of sudden, seemingly dramatic learning can be found in a network developed by Plunkett and Marchman to learn vocabulary. Like children, who exhibit sudden vocabulary spurts around 22 months, the network also demonstrated distinct jumps in its ability both to produce and comprehend vocabulary (Plunkett et al. 1993). As with the first network, the large change in output did not occur as a result of a large change or addition to the network's basic learning mechanisms. In both cases, and as is common in dynamical systems (Juarerro 1999, 123-125), small incremental changes led to complex, seemingly sudden and dramatic changes in the systems' behavior.

For Polanyi, the child's ability to speak represents an emergent achievement. Through the intensification of his or her own individuality, higher-level operational principles take control, allowing the knower to form meaningful coherences out of subsidiaries—in this example, to distinguish and produce meaningful utterances from a collection of various sounds (*KB*, 233, 235). It is the child's own operation of tacit knowing that allows him or her to move from unbounded subsidiaries (mere sound) to meaningful coherences (words) controlled by new operational principles. What exactly happens then when an artificial network gains the ability to distinguish words from sounds? Like other machines, such networks seem to be working according to a higher operational principle irreducible to physics and chemistry; like living beings, they seem to have achieved such higher operational principles through an emergent process. Given the absence of passionate striving and personal commitment, however, we cannot say that such a network has achieved something in the same way that living beings do. Yet clearly something has happened when a network that has not been programmed to do so acquires an ability to make conceptual distinctions and to formulate conceptual prototypes. Like Polanyi's description of the developing child at the end of *PK*, whatever has happened to the network is not the result of a program running through its operations or of an external agent intervening at every step. Polanyi describes the first view as the belief

that a genetic program already contains all of the instructions for the mature adult and that maturation is simply the carrying out of these prespecified directions. This view is not shared by connectionist theories of human cognition or by connectionist modelling. Although connectionist networks begin with basic starting architecture (cf. basic wiring of neurons in the brain) and are equipped with a learning algorithm (cf. properties of neurons that allow them to strengthen or weaken connections with other neurons), it would not be accurate to say that a network's successful performance is the result of its simply running its program. Nor can it be said that the programmer intervenes and adjusts the network to meet the task at hand. The weights of an "immature" connectionist network respond to stimuli it encounters in the environment. Although programmers "intervene" by providing the network with a training environment, it is significant that they do not actually rewire connections or rewrite programs to help the network perform. The same algorithm used in one task could be used by another network performing a very different task. The formative variable is the training environment.

Are these networks then "determined by" their training environment? Perhaps, and I will revisit this question below**.** For now, suffice it to say that the new weight space that develops in a connectionist network could be said to function as a new operational principle bringing the system under dual control. That is, the new weight configurations of a trained network, a set of constraints that processes information predictably and using a pattern it had not previously used, harness the principles left open by the boundary conditions of the network's lower levels of being, the *random activation* that precedes the trained network's *patterned activation*. Thus, the trained network would seem to exist, in Polanyi's terms, as an emergent from the untrained network.

It should not be surprising then to see connectionists themselves noticing those characteristics of thought and intelligence that Polanyi considers throughout his writings. In an article about the topic of emergence in cognitive science, James McClelland, one of the leading original members of the PDP research group that first developed connectionist networks, discusses the possibility of the emergence of consciousness in a way that evokes Polanyi's concepts of achievement, success, convivial societies, heuristic striving, and tacit knowing. The similarities are so striking that McClelland (2010, 752-753; emphases mine) deserves to be quoted at length:

> But, in fact, these simple regularities [emergent forms of dynamic systems] are not the essence of intelligence or the supreme *achievements* of nature. When it comes to intelligence, the real stuff consists of *human success* in everyday acts of perception, comprehension, inductive inference, and real-time behavior—areas where machines still fall short after nearly 60 years of effort in artificial intelligence—as well as the brilliant creative intellectual products of scientists and artists such as Newton, Darwin, Einstein, Shakespeare, Michaelangelo [sic], and Beethoven. According to an emergentist perspective, all of these products of the mind are essentially emergents. I do not think anyone who emphasizes the importance of emergent processes would deny that planful, explicitly goal-directed thought plays a role in the greatest human intellectual achievements. However, such modes of thought themselves might be viewed as *emergent consequences of a lifetime of thought-structuring practice supported by culture and education* (Cole & Scribner, 1974). Furthermore, proponents of the essence of human thought as an emergent phenomenon might join with Hofstadter (1979) and others in suggesting that key flashes of insight and intuition may not have arisen from planful, explicit goal-directed thought alone, but instead might reflect a massive subsymbolic constraint-satisfaction process taking place *outside of awareness*. In the case of Darwin, for instance, biographers (e.g., Quammen, 2006) have written about the origins of his work on his theory of evolution. It appears that Darwin set his mind to this investigation

> *knowing intuitively that there was something interesting to discover, while not knowing exactly what it was*. This intuition, arguably the key factor in his discovery, might have arisen as an emergent consequence of a subconscious constraint-satisfaction process, which then led him to engage in more intentional (yet still perhaps intuition-guided) exploration. This sequence in discovery may be the rule even in formal domains such as mathematics and physics, where the *intuition may come first, followed only later by formal specification and rigorous proof* (Barwise & Etchemendy, 1991).

For McClelland, explicit inferences, conscious thought, and scientific discovery may arise from the tacit workings of an individual who has lived and worked in a convivial society: They are "emergent consequences of a lifetime of thought-structuring practice supported by culture and education." The bulk of this paragraph sounds as if it were written by someone familiar with Polanyi's writings, with the exception of the phrase "sub-symbolic constraint satisfaction process"—and here lies the crucial departure from Polanyi. A central—perhaps *the* central feature of Polanyi's theory of personal knowledge and tacit knowing is the existence of an "active center," a human person who strives towards that which is only intimated. In McClelland's quote above, we see the hallmarks of this active center: achievements, successes, heuristic striving, intuitive intimation of future discovery. But in the place of the active center out of which these things proceed, we get a sub-symbolic constraint satisfaction process. What emerges in these models is a set of probabilistic constraints governing the interaction of physical neurons and groups of neurons.

## Gradients of Probability and "Enlarged Laws of Nature"

How might such a vision of emergence correspond to Polanyi's understanding of the emergence of an active center? The idea that probabilistic constraints may play a role in the emergence of mind is not in itself antithetical to Polanyi's view and, in fact, plays a major role in his writing. The distinction between the emergence of machine-like principles in nature and the emergence of mind involves the relationship of the emergent to its gradient of probability. Returning to his discussion of DNA, for example, we see this gradient of probability working as a causal force. Here he argues that if DNA is to be seen as a blueprint for a complex machine, the machine's growth "seems to require a system of causes not specifiable in terms of physics and chemistry, such causes being additional both to the boundary conditions of DNA and to the morphological structure brought about by DNA" (*KB*, 231-2). That system of causes responsible for the development of the embryo, he describes variously as an "integrative power," "field-like powers," and "a gradient of potential shapes."

It is significant here that Polanyi refers to Waddington's epigenetic landscape, which depicts a marble in a hilly landscape moving toward a wall (Waddington 1957, 67). He says that these images "show graphically that the growth of the embryo is controlled by the gradient of potential shapes, much as the motion of a heavy body *is controlled by* the gradient of potential energy" (*KB*, 232; emphasis added). In other words, as a heavy body at the top of a hill will, with minimal force, be pulled to the bottom, so will an embryo be pulled towards the most probable shapes along the course of its development.[5]

This process of being pulled along a gradient of greatest probability is described in connectionist terminology as descending along an error gradient or settling into a weight space. They too refer to Waddington, noting the similarity between his landscapes and their graphic representation of a network error surface. A network moving toward a solution to a problem in a weight space is said to be seeking "low ground" in its error surface—the point in the landscape where errors will be minimal (Elman et al. 1999, 17-18). The descent of a network along an error gradient as it arrives closer to achieving a solution to a problem set resembles Polanyi's description of how a knower makes contact with reality in a heuristic field:

> We assume that the gradient of a discovery, measured by the nearness of discovery

> prompts the mind towards it…. The assumption of a heuristic field explains now how it is possible that we acquire knowledge and believe that we can hold it, though we can do this only on evidence which cannot justify these acts by any acceptable strict rules. It suggests that we may do so because an innate affinity for making contact with reality moves our thoughts—under the guidance of useful clues and plausible rules—to increase ever further our hold on reality (*PK*, 403).

For connectionists, this "innate affinity" is the computational properties of neurons. Under both models—connectionist error surface and Polanyi's heuristic field—making contact with objective reality is described as descending along a gradient. For connectionists, it is the potential of the initial weight conditions, the network's learning algorithm, the quality of inputs, and the changing internal constraints of the developing set of weights that pull a network toward low points. For Polanyi, however, there comes a point in the development of the embryo where a higher operational principle—the individual's active center—harnesses this movement in the field of potentialities so that it no longer moves passively along lines of force but actively seeks its own direction. Gradients of probability, he says, control the development of the *embryo*, but not the active center of an individual. For the latter, such gradients only go so far as to open up possible opportunities for behavior, without determining or controlling that behavior (*PK*, 403).

It is unclear how connectionist theories would respond to Polanyi's distinction between entities passively following a line of force along a probability gradient and those—like the human person—which actively traverse their environment. Even taking into account the role of modulatory and attentional systems, it would be difficult to reconcile with connectionism this jump from passive movement to active movement. Active movement in the sense that Polanyi means it would simply be a much more complex network following lines of probability, no more active than simpler networks. The emergence of a complex brain which "speaks mainly to itself" (to use Gerald Edelman's words [2006, 20]) would still seem, from the perspective of connectionism, to be largely the product of a unique dynamic system responding to inputs in the environment, inputs which exist along too many dimensions for an error landscape to fully represent. Despite the seemingly deterministic role that the training environment still seems to play in shaping these networks, however, connectionist "emergence" does seem to correspond to Polanyi's intimation of "enlarged laws of nature," laws that would enable the rise of consciousness in biological material and that would allow consciousness to shape that material for its own ends: "Since action and reaction usually arise together in nature, it would seem reasonable, on the contrary, that the new laws of nature, which would allow for the rise of consciousness in material processes, should also allow for the *reverse* action, that is, of conscious processes acting on their material substrate" (*PK*, 397). In viewing the brain as a complex, dynamical system, connectionist thought suggests that as higher order cognitive functions emerge they direct and shape the very material on which they depend—that is, the physical synapses that carry and store information—by choosing among alternative behaviors, beliefs, and interpretive frameworks (Edelman 2006, 95). In this way, the nonlinear dynamics of connectionist networks do seem to use "enlarged laws of nature" that make possible a third alternative to the unwelcome views of human development as either genetically pre-determined or as requiring external intervention at every stage (*PK*, 395).

Despite many points of confluence, prominent connectionists who speak about the existence of mind tend to make statements antithetical to Polanyi's philosophy. At one end of the spectrum, for example, the Churchland's eliminative materialism posits that concepts used in "folk psychology" (e.g., desire, belief, fear, intention) can and should be eliminated in favor of material, neurobiological explanations (Churchland 1992, 6). At the other end of the spectrum, Gerald Edelman (2006), an anti-reductionist, describes consciousness as the activity of the brain's dynamic core. For him, our thoughts and feelings are entailments of brain states: just as the spectrum of hemoglobin is not separated from but entailed in

the molecular structure of hemoglobin, qualia are non-causal but faithfully informative of our brain states (91-92). Despite the remarkable strides made by connectionism and the fruitfulness of it as an explanatory theory, the central problem that Polanyi identifies still remains: so long as we focus on mechanics, including the dynamics of a complex system, the human person disappears. Neurobiological explanations account for failures of cognition and provide a detailed explanation of the conditions that it requires. But they cannot define success. The meanings we find in the world—a skillful dance performance, a word, the expression on a familiar face—are real, though artificial. They are created by a knower who constructs a coherent mental representation out of subsidiaries. Just as these realities disappear when we focus on their subsidiary components, so too does the mind when we focus on neurobiology.

Thus, perhaps the biggest point of divergence between Polanyi and various strands of connectionist thought is located in Polanyi's articulation of the relationship between knowing and being. Scientists who see themselves as endeavoring to strip away illusions or as trying not to be fooled by appearances have already subscribed to a generative metaphor—one that places them in an imagined position of mastery, or potential mastery, over both the untrustworthy shows of nature and the masses who are still enchanted. This knower-as-master contrasts with the knower who gropes around seeking to touch or make contact with reality. Polanyi's assertion that we know by dwelling in a comprehensible object or process thus points to the inadequacy of descriptive explanation as a full map of reality. If, as connectionists say, our physical bodies change in response to what we encounter in our environment, connections become stronger or weaker and neuronal structures are built and dismantled, we might call these changes a form of indwelling, as information takes on physical (non-linguistic, sub-symbolic) form in the brain's microcircuitry. We may then know through indwelling as these subsidiary connections register high-dimensional discriminations. But, as Polanyi notes, what we know, what interests us, is something other than mere prototype vectors. If connectionists are right that our conscious thoughts and feelings correspond in some way to brain networks that register discriminations among a very large number of dimensions, then the descriptive language used in the sciences is inadequate to the task of fully recording and replicating such fine-grained, quickly changing activity. Attempts to articulate our knowledge, including attempts by scientists, will always leave out many dimensions of experience, including the experience we are trying to describe—we will always know more than we can say. As creatures who know through indwelling, we must articulate those truths we have come to know by drawing on multiple forms of expression, including figurative language, music, image, gesture, and even silence. Thus, it may not be as helpful to talk about emergent *things*, as if an emergent must be fully described and describable. Instead, we ought to look (as Polanyi does) at emergence as a process of knowing, whereby the many dimensions of being unfold, shift, open themselves up to us in ways that exceed our ability to capture fully in language. Regarding the mind-body question, Polanyi's post-critical philosophy continues to challenge us both to embrace new discoveries of neurobiology and to reject the idea that they are sufficient to explain what we are as humans and how we ought to live.

## ENDNOTES

[1]See, for example, on neurophilosophy Churchland (1989); on eliminative materialism, Churchland (1992); on embodied cognition, Lakoff and Johnson (1999) and Feldman (2006); on dynamic core theory, Edelman (1987); on artificial intelligence, Smolensky (1987).

[2]Rumelhardt (1987) describes his frustration with forms of AI based on symbolic processing as a motive for his looking to the brain for inspiration. If we took seriously the notion that the brain is a computer, he asked, what kind of computer would it be and how would it process information? The fruitfulness of connectionist models is found in their radically different method of processing information, not in a claim

for strict biological plausibility. Artificial connectionist networks are not intended to correspond exactly to neurons or neuronal groups, which exist on a scale much greater than any model that can be currently built and which involve the interaction with various modulatory hormonal systems. Rather, these networks are supposed to process information in ways that more closely resemble the operations of the brain than other computational theories of cognition based on a Turing-Machine, von Neumann, digital-computer model.

[3]Connectionism does not foreclose the possibility of emergent higher-order structures working in ways that appear to be rule governed. As such, they are not opposed to computational models that try to capture these phenomena (McClelland et al. 2010, 349-350; Feldman 2006). The disagreement arises when models of larger brain structures or processes are used as the bases of explanatory theories (McClelland et al. 2010, 350). The connectionist position on modularity is, perhaps, best summed up by Elman et al. (1999) in the following: "domain-specific representations can emerge from domain-general architectures and learning algorithms and . . . can ultimately result in a process of modularization as the end product of development rather than its starting point" (115).

[4]For an account of how human brains might have evolved to take on initial architectural constraints rather than genetically determined brain regions see Elman et al. 1999, 238-317; McLeod et al. 1998, 303-313**;** Calabretta and Parisi 2005.

[5]See David Agler (2014) for an extended discussion of Polanyi's references to experimental embryology and its influence on his writings on emergence.

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*A Review Essay*

# Unpacking the Tacit

**David Nikkel**

Stephen P. Turner, *Understanding the Tacit*. Routledge Studies in Social and Political Thought, vol. 81. New York and London: Routledge, 2014. Pp. 234. ISBN 978-0-415-70944-6 (hb). $140.00.

*Key words*: tacit knowledge, Donald Davidson, neo-Kantianism, framework, worldview, Michael Polanyi, from-to structure of knowing, embodiment, mirror neurons, explicitation of the tacit

ABSTRACT

*In* Understanding the Tacit, *Stephen Turner contends that 1) neo-Kantian frameworks, understood as identical (tacit) possessions collectively shared, do not exist and 2) in communicating with a person from another perspective, a speaker is not making explicit one's tacit knowledge, but rather improvising an articulation relative to a given context. Turner establishes the first point in convincing fashion. However, he does not allow for the possibility of similar tacit knowledge that is in some sense "shared." While Turner has positive things to say about the embodied nature of tacit knowledge, other contentions seem to undermine the crucial nature of embodiment. Turner is also correct on his second point, though he could have strengthened his argument by recognizing Polanyian implications and insights on the difficulty or impossibility of making the tacit explicit.*

The tacit has long occupied philosopher Stephen Turner. Author of the 1994 monograph, *The Social Theory of Practices: Tradition, Tacit Knowledg*e, *and Presuppositions*, he has also considered the topic in several articles over the years. In *Understanding the Tacit*, Turner returns to the topic with a new monograph. In his introductory chapter, he helpfully outlines the history of what Michael Polanyi designated as "tacit knowledge" by Western philosophy. In so doing, Turner honors Polanyi and those in Polanyi's tradition who struggle to make sense of this tacit dimension.

A major focus of the book concerns what happens when humans understand one another through language. Davidson's thought on translating languages constitutes a starting point for Turner. While translation is underdetermined in the sense that no one definitive translation exists (there is no one-to-one correspondence between languages), translations typically allow human beings with different native tongues to understand one another (42). For Davidson, this entails that speakers of one language do not possess wholly incommensurable conceptual schemes; however, neither do humans share a common conceptual scheme. Indeed, the neo-Kantian notion of common conceptual schemes is precisely the problem.

Turner follows Davidson in thorough-going fashion by rejecting frameworks, structures, systems, worldviews, traditions, presuppositions, paradigms, etc., in the sense of social or collective possessions that are the same for those supposedly sharing them. Thus, whatever tacit knowledge regarding a concept or

a practice might be, it is not a same something held in common by different individuals. The notion "that the same practices, presuppositions, and the like get into the heads of many people requires a means of transmission that is little short of magical" (69). Rather individuals acquire, adjust, and adjust to concepts, practices, skills, and habits through interaction with other human beings. Experience and learning always involve both normative and informational content, so we need no neo-Kantian "spookiness" to account for the normative (131-35). All of this has ramifications for the tacit dimension: when persons need to "unpack" something another fails to understand, they are not rendering explicit the tacit knowledge they possess, but rather improvising to make the matter at hand intelligible to one's interlocutor. In this vein, Turner criticizes Charles Taylor for alleged misunderstanding of the tacit, claiming that Taylor mistakenly believes that "when articulating tacit presuppositions we are reading off something that actually is present in the tacit realm, ready to be read off" (7).

Turner does make a convincing case for the untenability of any neo-Kantian version of genuinely collective conceptual and practical possessions. No "causally autonomous" or "different collective dimension" obtains (69). The wrong-headedness of such neo-Kantian theories keeps coming up chapter after chapter. Putting a positive spin on this, one can rightly say that Turner thoroughly discredits the neo-Kantian ethos. Less charitably, some might feel, after a while, that he is beating a dead horse.

If forced to choose between locating concepts, practices, and skills in "the social" in the sense of a collective or "supraindividual place" or, instead, in the individual or "nonsocial," Turner correctly places Polanyi in the latter category (67-68). Yet I judge that Turner forces this either-or and misses a possible *tertium quid*. He insists that for people to truly "share" a framework, the framework must be exactly the same for all sharers. Either all is shared or nothing is shared. This entails that the means of transmitting or acquiring a framework "must be error free," which is obviously not the case (69). Though we might like to think that cases of tacit knowledge involve something "fixed and stable" (6), which for Turner entails sameness of tacit knowledge among individuals speaking a language or engaging in a practice, such hope is illusory.

As an alternative to collective sameness versus individual variations, I would suggest the possibility of *similar* tacit knowledge among individuals sharing a skill, practice, language, or tradition. In the course of this review, I will address this possibility of similar tacit knowledge in terms of physical embodiment, language—which I will claim relies upon our embodiment substantively, not merely instrumentally—and broader conceptual schemes, including worldviews.

Turner sometimes focuses on embodied knowledge in the sense of somatic knowledge (for example, 14), though he does not regard this as fundamentally different from linguistic knowledge relative to the tacit (a non-fundamental difference may be that one would be less likely in general to attempt to explicate somatic knowledge or to explicate a physical performance through language [58-60, 204]). Turner, in keeping with his antipathy to "sameness," declares that "throwing a curveball, for example, is individual in a complex way," given the "different physical characteristics" of people (14). However, if we take the examples of simply throwing a ball overhand in the proper way for baseball or Polanyi's example of riding a bicycle, which Turner refers to several times (59, 98, 191, 204), my intuition is that something similar occurs with regard to the tacit knowledge involved for almost all humans. The basic similarity of most human bodies constitutes the basis for my hunch that most people are employing similar physical techniques in balancing on a bike or successfully throwing overhand.

I have acknowledged a relative distinction between somatic knowledge as in a physical performance versus linguistic knowledge, though I affirm that all knowledge ultimately is embodied knowledge. In this acknowledgement and affirmation, I concur with Michael Polanyi. While Polanyi notes that "our body

is the ultimate instrument of all our external knowledge," our body is not merely instrumental but also substantive (*TD*, 15). Polanyi makes "a wider generalization of the feeling we have of our body" beyond the somatic: "when we make a thing function as the proximal term of tacit knowing, we incorporate it into our body—or extend our body to include it—so that we come to dwell in it" (*TD*, 15-16). Turner expresses openness to the notion of the embodied nature of all knowledge in his opening list of how adequately to account for the tacit: "Acknowledge that much of what is discussed as tacit is embodied: Perhaps all of it should be understood in this way" (2). Also, he refers to Michael Oakeshott's thought on practice, apparently approvingly: "All experience is, so to speak, experience through one's abilitied body" (135). Yet he also writes in ways that downplay the crucial nature of embodiment. He tends to locate social practices and the tacit in individual "brains" rather than "bodies" (for example, 68, 74). Mary Midgley has commented on this tendency among some scholars:

> What is ironic, however, about this ostensible rejection of 'dualism' by most contemporary philosophers of mind, is the persistence in their thinking of shades of the Enlightenment ghost they thought they had routed. For, when they discourse about the "mind/body" relation they rarely consider anything in that "body" below the level of the neck. Either they focus exclusively on the mind's relation to the brain, or more generally, on its relation to the physical world *tout court*. Flesh and bones (and, unsurprisingly, women's minds) are still relatively neglected subjects in the field (Midgley, 66-67).

Additionally, Turner's handling of Harry Collins on somatic knowledge misses an opportunity to affirm the radicalness of our embodiment. Collins offers the thought experiment of riding a bicycle on an asteroid "with almost zero gravity," concluding that in such an environment we could "probably" make fully explicit the rules for balancing the bicycle (Collins, 110). Collins further concludes that we could make rules for balancing a bicycle on earth explicit, if only our brains were faster (Turner, 59). From a Polanyian perspective, though, it would seem that a key aspect of the speed of our brains—and bodies—is precisely that they holistically process information through our tacitly attending from subsidiary elements to a focal object. As Mark Johnson and George Lakoff put it, "most of our thought is unconscious in the sense that it operates below the level of cognitive awareness, inaccessible to consciousness and working too quickly to be focused on" (Johnson and Lakoff, 10). By way of contrast, a computer, however fast, needs information to be explicit in order to process it. Turner criticizes Collins for applying different standards for whether knowledge can be made explicit to somatic knowledge, on the one hand, and social knowledge by a machine or computer, on the other (64).[1] However, he never directly challenges Collins' model wherein somatic knowledge is not "irreducibly tacit," but instead "based on a mechanical string-transformation type process" (Turner, 60).

I believe that there are aspects of our embodiment that are so basic, so radical, that they defy any explicitation. "Radical" means that our embodiment is the root of all knowledge and meaning, including linguistic meaning. All language builds upon the base of—radically and tacitly relies upon—our bodily being in the world, upon our seeing, hearing, smelling, tactile, motile, and sexual bodies. The very nature, structure, and logic of human conceptual systems are rooted in our embodiment. As William Poteat put it, "language is structured *upon* and therefore structured *like* our sentiently oriented and motile mindbodies" (Poteat, 187-88). Johnson and Lakoff refer to non-propositional embodied schemas, upon which the very intelligibility of language depends and some of which I believe defy explicitation. These schemas arise from our perceptual interactions with the world, bodily movements, and manipulation of objects (Johnson, 29). Such schemas contrast with body image, which is relatively external and more amenable to explicitation. When Turner writes of schemes, frameworks, or the like, he engages conceptual or propositional ones, ones amenable to significant externalization. Yet behind or below such frameworks are tacit bodily schemas upon which they rely for their meaning, for their ability to be understood.

Mirror neurons offer a new dimension to the embodied nature of knowledge, and Turner does commendably bring them into his discussion. He notes that "the mechanism of mirror neurons doesn't operate on anything collective or tacit, but rather on what someone can see or hear—paradigmatically physical movements" (75). Though we do not know how extensive human reliance on mirror neurons actually is beyond physical movements and imitative behavior of infants, such as crying upon hearing another baby cry, Turner ends up putting a lot of weight on them for our development of skills and for our communication with others. Given his contention that we do not "share" tacit knowledge with others, mutual understanding depends upon social interaction and "mirror neurons" which "are already, implicitly," psychological or neuroscientific "facts about social interaction" (169). We use our individual knowledge, including our individual tacit knowledge, "on the fly" as we give the explicit information we guess will enable another to understand (Turner, 153 and 168). This neglects the *similar* perceptual, kinesthetic, and emotional tacit bodily "schema" I believe we do in some sense "share" with our fellow human beings. Furthermore, as suggested by Turner's identification of mirror neurons as mechanism, his model of our embodied understanding of others may be too mechanistic. As Turner recognizes, mirror neurons allow the imitation or copying of others' movements but in themselves tell us nothing of the meaning of a movement to another (75-76). In contrast, bodily schemas would give us some knowledge of what something means for others.

Moreover, far-flung extension and manipulation of bodily schemas appear to underlie linguistic syntax. Harry Hunt cites psychological experiments supporting the theory that gesture is a key stage of the organization of sentences, externalizing their otherwise implicit spatial design (Hunt, 154-56). Lakoff has categorized examples of this dependence of syntax on bodily semantics involving physical and spatial relationships, including the following: 1) "Hierarchical syntactic structure (i.e., constituent structure) is characterized by part-whole schemas," 2) "Grammatical relations and coreference relations are represented structurally by link schemas," and 3) "Syntactic categories, like other categories, are characterized structurally by container [in-out] schemas" (Lakoff, 290). For a fluent native speaker, it would seem that tacit knowledge of rather complex syntactical "rules" obtains. At least, attempting to formally diagram a sentence grammatically can be very complicated. To travel part of the way with Turner, the process of learning one's native tongue is undoubtedly different for every child. Nevertheless, I find it plausible that similar tacit syntactical processes occur among most fluent native speakers once they have learned their language's syntax.

If I am correct about bodily schemas and the embodied nature of language, these then seem to support the similarity though not sameness of tacit knowledge mentioned above. Regarding learning and understanding concepts, Turner writes that "'sameness' in this case is sameness only at the level of functional intersubjective understanding—not a neural fact, much less one produced by common body experiences" (117). I have contended, however, that we do have similar body experiences. While we do not have exactly the same perceptual, motile, or emotional abilities or capacities, our embodied experiences are sufficiently similar to enable transmission and mutual understanding. We can consider an outlying case of someone whose embodiment is very different from most in a key aspect, for instance, the case of a congenitally blind person. This person derives some meaning from others' use of color terminology and is usually able to use color terminology correctly. Such making sense of color terminology by blind persons tacitly relies upon some analogy with the embodied perceptions of which they are capable, perceptions and other embodied experiences they share with sighted individuals. This is to say, that even in a case of major dissimilarity, enough similarity of bodily experiences pertains to enable understanding.

Thus far I have dealt mostly with the bodily bases of meaning, in the senses of somatic knowledge and of basic understanding of language, of words. Now I will focus on larger frameworks of meaning that involve tacit assumptions and understandings. The shared meanings of a group or culture may be referred

to by various terms such as framework, tradition, ethic, or worldview. I would stipulate that each version of a worldview held by a member of a culture will be somewhat different from everyone else's version. This accords with Turner's insistence on the "different tacit backgrounds" of individuals. Think of all the learning, all the experiences, that a person has in growing up and appropriating a worldview. Most of what underlies or constitutes this worldview is tacit at any given moment. Thus, the tacit knowledge of individuals sharing a worldview will not be the same. When persons draw upon that tacit knowledge in making an assessment or taking an action, they will draw upon tacit knowledge that is not exactly the same as another individual in the same situation, because of their different backgrounds. Additionally, as a person has new experiences drawing on a worldview, one's version of that worldview with its tacit knowledge will change at least slightly. Indeed, this comment connects with Turner's dilemma concerning Bourdieu's notion of *habitus*: making it too powerful, humans become automata, while "allow(ing) too much improvisation renders it powerless" (11). Polanyi indicated that the transmission of a scientific or any human tradition, which itself always involves interpretations beyond mere facts, involves further interpretation that modifies the tradition in light of present concerns, if only slightly (*PK*, 160). As with native speakers of a language understanding one another, what is required is not sameness of tacit knowledge, but enough similarity to understand and acknowledge one another as sharing a worldview or tradition. Of course, beyond the on-going activity of current interpretation, traditions are always contested to a greater or lesser extent. This is precisely what we should expect if each person's version of a tradition or worldview is somewhat different from everyone else's.

However, my strong concurrence with Turner in rejecting the sameness of worldviews among those within a tradition does not require the rejection of significant similarities in worldviews. I began this review by noting Turner's unequivocal opposition to neo-Kantian frameworks or schemes, which neo-Kantians take to be as universal as Kant's categories of space, time, substance, and causality in constraining our engagement with the world. This opposition leads Turner to ignore what I believe is an undeniable reality: that linguistic concepts and worldviews can significantly constrain our perception and thinking, making certain interpretations unlikely if not impossible, while making other interpretations very likely if not inevitable.

Color offers an example of how language can in certain particulars constrain perception/interpretation, despite the reality of "pan-human perception universals." Regarding said universals, Berlin and Kay identified eleven basic color categories. Eleanor Rosch studied a tribe (the Dani of New Guinea) virtually devoid of color terminology. She found the central members of these basic color categories to be "perceptually more salient," readily learnable, and more easily remembered, with very similar structures of color memory for both the tribespeople and English speakers (Varela, Thompson, and Rosch, 168-69). Subsequently, researchers have corroborated these findings with speakers of 110 non-literate languages (Regier et al.). Thus, the similarity of basic human perception suggested earlier finds additional support. Nevertheless, an experiment concluded that Russians, who do not have a word equivalent to the English "blue," but rather two distinct words for "dark blue" and "light blue," more quickly distinguish between shades of blue than do English speakers (Boroditsky).

The intricacies of Trinitarian theology exemplify how language can constrain abstract thinking, including thinking deeply implicated in worldviews. The Greek formula of three hypostases in one *ousia* and the Latin formula of three *personae* in one substance happened to be just the opposite regarding which coefficient is the more concrete and individual versus which is the more abstract and general. This led Eastern Orthodox theology to regard the three divine manifestations as the more concrete and Roman Catholicism the one God as more concrete. Thus the danger to avoid for Orthodox theology was tritheism, while that to avoid for Catholicism was unitarianism; thus the ultimate source of divinity was the Father (*o theos*) for Orthodoxy and the Godhead for Catholicism. These alternative ways of viewing the divine

led to disagreement on the procession of persons within the Trinity, which formed the theological basis for the split between West and East in 1082 C.E., as the Pope excommunicated Orthodox believers for their "heresy."

Polanyi famously employs the example of the Zande practice of divination via administering poison to chickens to show how well protected from challenge a worldview can be. Each worldview or tradition involves a thick network of tacit interconnections—or I might even say a thicket of tacit interconnections, wherein wholes are greater than the sum of their parts. This systemic thickness helps explain the resistance of a worldview or framework to challenges. In the case of the Azande, they have multiple explanations for apparent problems with the practice raised by modern science and medicine (*PK*, 287-94).

In overlooking the holistic nature of tacit knowing, Turner appears to ignore another aspect of Polanyi's thought, an aspect alluded to earlier. Polanyi emphasized the "from-to" nature of knowledge, which entails a distinction between subsidiary and focal awareness. As we come to know, as we act, we attend from subsidiary meanings—partial meanings or clues—to the focal or holistic meaning, the meaning of a whole, of a "comprehensive entity." This from-to nature of knowing means that knowledge of the totality of what might become explicit—the sum of the parts—is *not* the same as the comprehensive meaning of a complex whole; the articulated focal meaning of a part is not the same as that part's tacit meaning. As Polanyi puts it, "subsidiary awareness and focal awareness are mutually exclusive" (*PK*, 56). Indeed, if we fail to realize this Gestalt-like nature of knowing, we are guaranteed to miss the wider meaning of things, according to a Polanyian perspective. Strikingly, Polanyi notes the problems attendant upon focusing on particulars in performance or action. One example is how a pianist can lose the music "by concentrating attention on his fingers" (*TD*, 18).

For Polanyi, however, the irreducibility of whole to parts extends beyond the performative to all tacit knowing, including that involving language, from discerning the connotations of an individual word in a particular practical context to holding a worldview. While important elements of a worldview can achieve articulation, Polanyi's recognition of the holistic from-to nature of knowledge raises a caveat. When we isolate aspects of a worldview that contribute to the whole of that worldview, we thus attend to or focus on elements that are usually subsidiary. However, the meaning of these particulars when we access them in isolation is *not* the same as their joint meaning in the whole for Polanyi. Applying this phenomenon to tradition, to analytically dissect particular components of a tradition risks alienating one from its wider integrated meaning. The economy of grace or "the gift" might provide one such example. Deconstructing "the gift," Jacques Derrida concludes that any expectations of the recipient by the giver must vitiate the graciousness of a gift. Yet in lived experience the following occurs: someone gives a gift in *hopes* of some kind of appreciation or reciprocity, but without any condition that the gift should be returned if this does not eventuate. Such integration within a tradition does not assume that important concepts—and their underlying primary metaphors—are always propositionally or logically consistent. All the same they may complement each other and cohere at a more tacit, prereflective, deeper level of embodiment. Noteworthily, philosopher of myth Ernst Cassirer and Polanyi independently have commented on how myth typically involves antimonies incompatible when considered separately, yet point to an import which encompasses their joint meaning—a sympathetic coherence, involving a "unity of feeling," in Cassirer's language (Cassirer, 81ff.; Polanyi and Prosch, 152ff). Such polarities may include the one and the many (unity/multiplicity), creation/destruction, primordial goodness/evil, and order/chaos.

To close, for the Polanyian there are many dimensions of the tacit that Turner chooses not to explore. Yet his project's purpose was not to explore all the significant implications of Polanyi's thought, but rather 1) to debunk neo-Kantian models that insist that something identical must be tacitly shared to enable social communication and 2) to understand what is happening when people from different perspectives

do in fact understand one another. I have already indicated that Turner succeeds on the first point, a point with which Polanyians can agree. On the second point, Turner argues that what occurs is actually not a making explicit of a speaker or writer's tacit knowledge, not the conveying of tacit knowledge per se, but rather the "constructing [of] an articulation, on the fly, that is sensitive to context" (168). I find convincing Turner's second point as well. Indeed, Polanyi can offer support for this point that Turner does not tap into, specifically relating to the difficulty or impossibility of making the tacit explicit. Given the plethora or thicket of tacit knowledge a speaker draws upon and the from-to structure of all knowing, there is no way for that speaker to even begin to accurately make explicit to a person, especially one coming from another perspective, all the tacit knowledge that she or he relies upon; the articulation forms just the tip of a mostly tacit iceberg, which must for both practical and theoretical reasons remain submerged in the sea.

## ENDNOTE

[1]This criticism is one move in the wider context of Turner arguing against Collins' advocacy of collective tacit knowledge.

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# Embodiment and its Relation to the Tacit: Response to Nikkel

**Stephen Turner**

*Keywords:* Embodiment, Michael Polanyi, Tacit Knowledge, Lakoff and Johnson, Andy Clark, Luria

ABSTRACT

*In this response to David Nikkel's review essay on* Understanding the Tacit, *his suggestion that the book fails to incorporate insights from embodiment theorists is addressed. It is noted, against his appeal to the example of Lakoff's and Johnson's discussion of the bodily origins of metaphors used in reasoning, that there are problems with treating particular embodied elements as ineliminable. Also noted is the evidence of Luria's studies of reasoning among the unschooled, which suggest that syllogistic inference is learned, which raises questions about the relation of embodied knowing and these kinds of inferences. It is suggested that another kind of embodiment thinking, involving emulation, is a better way to approach higher reasoning, and by extension also the kind of specialized knowledge usually discussed as tacit knowledge by Polanyi.*

I thank David Nikkel for his generous and interesting review essay on *Understanding the Tacit*, which highlights a number of important issues. Much of his commentary relates to embodiment, which is an important and muddled topic, for several reasons I will try to briefly explain. I also want to express agreement on some of his other points, such as similarity of responses. What I have tried to give, in this book and elsewhere, especially the last chapter of *The Social Theory of Practices* (1994), is an explanation of why people behave similarly, but one which does not involve a kind of hidden collective server from which they download the "same" mental contents.

There is a common theme to my reluctance to endorse certain accounts of the tacit, which relates to the use of analogies. The neo-Kantian analogy that I take to be both paradigmatic and misleading is between explicit forms of reasoning and the reasoning that is commonly attributed to the tacit realm, notably the concept of presuppositions. But the issue extends to a whole range of analogical notions, such as conventions, tacit rules, and so forth. It is convenient for us to think of there being such things as "concepts," which have a specific meaning, shared between people, and to think that there is also some

sort of psychological analogue to these things: convenient, but groundless. The psychological experimental evidence we have is muddled and does not point in this direction, as I note in the book. Moreover, as I argued in *The Social Theory of Practices*, there is a basic issue with all of these analogical notions, especially in connection with the idea of sharing or sameness: there is no known mechanism that gets the same thing into multiple heads (or bodies, one of the explicit concerns in that book) in the fashion implied by the analogies.

How does this relate to embodiment as discussed in the cognitive science literature? Nikkel suggests that embodiment is not only important but basic, and that I don't pay enough attention to it. He cites in particular Lakoff and Johnson. Their problem is to locate "our conceptual system" in the individual´s "perceptual and motor systems" (1999, 555). This project raises some red flags for me. First, the idea that there is such a thing as "our conceptual system" is problematic, unless it is used in a very loose sense. Perhaps our bodily concepts are more or less universal, despite the specific differences between cultures in the way they speak about the body. But even if there were universal body schemas, one would then also need to explain how the highly varied sorts of things that come under the heading tacit knowledge relate to these universal features of embodiment.

Lakoff's and Johnson's argument is controversial. Andy Clark notes that the issue is with their "claims of tight links between forms of embodiment and basic conceptual repertoires" (Clark 2008, 54). There is a general problem here that applies to many cognitive science explanations. We may be able to reasonably argue that something—such as bodily states—"plays a role" in higher cognitive processes at least some of the time, without being able to conclude that they are essential to these processes. Andy Clark puts it thus:

> the question, as will become increasingly clear, is not whether or not gross bodily states and processes play a role in the determination of mental states, but whether they play a unique, non-trivial, and ineliminable role. One test for this is to ask whether a creature lacking that kind of body could nonetheless enjoy those very same mental states (Clark 2008, 43n8).

There are other ways to skin a cat, so to speak: we know that the same cognitive performance can be achieved using different means. What we don't know is which of these ways is actually operating in a given cognitive performance: the one dependent on gross bodily states, or some alternative "not tethered in any simple way to gross bodily bedrock" (Clark, 2008, 54). In short, while it makes sense to note that at least sometimes metaphors relating to the body are used in advanced conceptual thinking, reducing it to these metaphors, by insisting that *only* metaphorical uses of bodily states can explain the relevant kind of thought, is another matter entirely.

I agree with this point, though it is not central to my account of the tacit. I have a somewhat different reason to question the idea that there are tight links between bodily experience and higher inferential thinking. I am impressed with Luria's studies of peasants and syllogistic reasoning (and not so impressed with the critics, who seem often not to have read the studies carefully). What he found, essentially, was that peasants who were unschooled but highly competent in practical matters could not answer or apparently even follow simple questions involving generalizations from which inferences needed to be made from generalizations that were provided by the researcher to particulars. So why were these peasants unable to respond to Luria's questions—or even understand what he was getting at? Infants "reason" inductively, so in some sense they generalize, and even make probabilistic judgments. The peasants did not lose these innate capacities. The innate capacities simply were irrelevant to their ability to answer the questions. Yet people with just a little schooling were good at answering them.

What this suggests to me is that something else is going on here—something "social." Students, I think, learn by emulating the performances of teachers, by trying to follow what they say and therefore how they reason. The peasants had no such experiences. They wouldn't need many to reason in the way Luria expected them to, but they needed some experiences of this "schooled" kind. They weren't syllogizing directly off of their bodily capacities, in any case.

But this kind of emulationist explanation is not anti-embodiment. Wilson summarizes the situation for sensorimotor imitation thus:

> Consider the special case of mentally simulating something that is *imitatible*—that can be mapped isomorphically onto one's own body. Such stimuli in fact primarily consist of our fellow humans. There are good reasons to believe that this isomorphism provides a special foothold for robust and non-effortful modeling of the behavior of other people … Given that we are a highly social species, the importance of such modeling for purposes of imitating, predicting, or understanding others' behavior is potentially quite profound. (Wilson 2002, 634; italics in the original).

I think this is an excellent clue. "Embodiment" imitation provides a foothold: we model the physical behavior of others, as a starting point in a larger developmental project in which we do a lot more emulation, which is no longer just physical.

The thing left out of the standard embodiment accounts is precisely the fact that we are a "highly social species." There is a disconnect with research on infants, which keeps pushing such skills as detecting intentions to earlier points in development (Choi and Luo 2015). The research shows that our awareness of others is omnipresent from birth and develops rapidly. We pick up on what others are doing: we follow them and come to follow their thought. This, I think, is also what Polanyi was getting at by talking about tacit knowledge in science and science as an apostolic succession, and it is central to the concluding parts of *Understanding the Tacit*, as well the conclusion of my *Explaining the Normative* (2014).

In writing about tacit knowledge I have tried to avoid commitments to particular cognitive science theories. They will come and go—the core phenomena of tacit knowledge, as established by Polanyi, will not. Mirror neurons will perhaps turn out to be a false lead, of no real cognitive significance. There are many skeptics (see Hickok 2014), some of whom are very vociferous indeed. But empathy, and empathy in the form closer to joint attention I have called weak empathy, will survive. So will habituation. One necessarily articulates these issues in terms of the scientific ideas, approaches, and findings of one's time, however, and these are mixed up with projections of what future results will be produced by these approaches. Mirror neurons have something to do with empathy; habituation has something to do with connectionist learning. They are thus grounded in the neuroscientific. Nikkel is more optimistic than I am about classical embodiment, Chomsky's linguistic theories, and Lakoff's and Johnson's ideas about the bodily basis of thought. But these are reasonable differences.

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*A Review Essay*

# Michael Polanyi and the Limits of State Intervention in the Economy: Towards a New Approach to the Keynes-Hayek Debate

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Nicholas Wapshott, *Keynes Hayek: The Clash that Defined Modern Economics.* New York: Norton, 2012 pb (2011 hb). Pp. xiv + 382. ISBN: 978-0393343632. $17.95 ($28.95 hb).

*Key Words:* Michael Polanyi, Friedrich August von Hayek, John Maynard Keynes, history of economic thought, economic theory, economic policy, state intervention.

## ABSTRACT

*This brief essay summarizes Nicholas Wapshott's* Keynes Hayek: The Clash that Defined Modern Economics *and relates the early economic thought of Michael Polanyi to the dispute by raising questions for further reflection: Should we classify Polanyian economic thought as Hayekian or Keynesian, or is it something in between? How can it help us better understand the debate between these two? How is the agenda of the economist and social theorist Polanyi revealed through its connection to one of the most important episodes of the history of economic thought in the twentieth century?*

## Introduction

Nicholas Wapshott treats a narrow segment of the history of economic thought in the twentieth century which is widely known as the great dispute between John Maynard Keynes, the defender of state intervention, and Friedrich August von Hayek, one of the last crusaders for classical liberal economic policy emphasizing free market economy. This book avoids painting with a broad brush and differentiates between the shades of liberalism, economics and economic policy. It handles with proper distinction the original writings and the secondary literature as well as the influence of economic ideas on ordinary people. While the book does not describe all the economic theories of the era, it sketches the political, social, and economic background of these particular streams of economic thought. In my review I not only evaluate the presentation of the clash between the economic ideas of Keynes and Hayek, but I also position the early economic thought of Michael Polanyi in the Keynes-Hayek debate. I argue that seeing how the economic thought of Polanyi is related to the two thinkers can be revealing and helpful for interpreting one of the most well-known economic disputes of the twentieth century.

## Economics, Faith and Influence

Wapshott's book has eighteen chapters. The first sketches the economic, social, and political situation during and soon after World War I. It also colorfully portrays the personal and professional background of Keynes, showing how the talented Cambridge genius turned to economics from mathematics due to the imposing persuasion of Alfred Marshall, one of the key figures of Neoclassical Economics. We also witness how Keynes entered the budgetary line of the war machine, despite his pacifism, and eventually

tired of international politics. His unpleasant experience led him to write the witty and quite acrimonious *Economic Consequences of the Peace* (1920), a book that made him astonishingly popular in the eyes of the common person and at the same time an unwelcome guest in a few elite political circles.

Unfortunately, Wapshott lacks the background in advanced theoretical economics to explain the full range of economic thought at this time, or perhaps he simply did not deem it necessary to present schools other than Keynesian and Austrian economics. The latter could be important because—as Mr. Wapshott also points out—even Keynes himself turned to the discipline due to the encouragement of Alfred Marshall, one of the main figures in Neoclassical economics. Marshall cut off the rough edges of the reigning paradigm, which was based on the micro-perspective of the economy and the concept of marginalism. He introduced a new, consistent economic toolset with his *The Principles of Economics* (1890), that became the most widely used university textbook in economics after the reign of Mill's *The Principles of Political Economy* (1848). Marshall introduced four time periods into economic analysis and frequently used *ceteris paribus* methodology to get more accurate results. His work was mainly responsible for turning political economy into economics using mathematical tools and laid down the solid foundation of the Neoclassical school. Nevertheless, he insisted on considering himself a follower of the great predecessors of the Classical school, also reflected in his motto: '*Natura non facit saltum*!' By the time Keynes and Hayek began to fight their battles, the Neoclassical paradigm was mainstream, so I suggest that Wapshott should have more fully described it in his analysis. Similarly, there is an unfair neglect of the economic concepts of the Historical school. Wapshott needs a more colourful palette to portray the economic thought of the twentieth century to clarify the factors influencing the thought of Keynes and Hayek.

The Historical school primarily focused on the inclusion of ethical and social factors in economic thought, the same factors constituting the core of the normative layer of Keynesian economics. Keynes declared that he entered the arena of theoretical and applied economics to support the helpless who were plunged into poverty by the consequences of World War I. His views eventually became popular, partly because of this agenda. Nevertheless, the popularity of all new post-war economic ideas came from the same root. All addressed the burning questions about the contemporary economy: the poverty, unemployment and inflation caused first by the war, then the treaties, and later the Great Depression. People wanted answers they could not provide themselves. And they wanted them quickly. This helps to explain the *raison d'être* for the advancement of newly emerged economic concepts such as Marxian economic thought (a form of socialism which is not equal to the economic thought of Marx as it also includes the writings of his followers as well as the secondary literature on the topic), the economic thought of the Nazis, and Keynesian economics. The only common thread in these three was the increased role of the state in the dynamics of the economy which could also be seen as some kind of liberation of the people from the burden and responsibility of taking care of their own plight. People saw the smallest chance to break out from their terrible situation and grabbed it tightly. What they did not know is that once Pandora's box is open, things soon go out of control. Although the harmful effects of the Nazi and Soviet economic policy were commonly known, only a few people recognized the danger of Keynesianism and even fewer raised their voice against it. One of them was a lesser known Austrian nobleman, Friedrich August von Hayek.

## Loyalty, Money and the Rise of the Austrian School

The second and the third chapters focus on Hayek's life and the intellectual road he took after the outbreak of World War I and the emergence of Keynesian economic thought. As a soldier and an ordinary citizen, Hayek experienced the disastrous economic consequences of the war, so when he read Keynes's early book, *Economic Consequences of the Peace* (1920), he welcomed Keynes's bravery in raising his voice against actions that brought about the complete destruction of the economies of the

states that lost the war. As Wapshott points out, the argument of Keynes was not only based on social and ethical reasons, but also emphasized that the *Treaty of Versailles* (1919) allowed no seeds for economic growth to sprout among the defeated nations and was altogether unreasonable. For his outspoken views, Keynes was accused of disloyalty by Austen Chamberlain, the British minister of finance. Keynes then turned to monetary issues in his *A Tract on Monetary Reform* (1924), *The Economic Consequences of Mr. Churchill* (a title that echoed his earlier book) of 1925, and *Treatise on Money* (1930), which made the life of monetary policy-makers easier, on the one hand, but harder, on the other. Wapshott argues that Keynes differentiated between savings and investments and thought that the monetary policy of the central bank is the only tool capable of balancing between these two. If investments exceed savings, the result is economic boom; if savings top investments, companies go bankrupt and economic downturn comes with deflation and unemployment.

Although the young Hayek felt the milder version of socialism (*Sozialpolitik* of Rathenau) was close to his views, he unambigously rejected Marxian socialism. After the end of the war, he began to study the economic ideas of Menger, Böhm-Bawerk, Wieser and Ludwig von Mises at the University of Vienna and soon became one of the most influential Austrian economists with a help of one unexpected ally.

In the fourth chapter, we find out that this unexpected ally was Lionel Robbins, who was determined to defy the economists of Cambridge and establish a new bastion of economic thought at the London School of Economics, where he was the head of the Department of Political Economy. Robbins eventually became (after Polanyi came to England in 1933) a friend of Michael Polanyi and, among other things, helped him by reading and commenting on the manuscript of *Full Employment and Free Trade* (1945). Robbins deemed the theories of the Austrian school promising for addressing contemporary economic problems. He thoroughly prepared the scene for someone who—Wapshott argues—might successfully stand up against Keynes and his devoted young acolytes, the "*Cambridge Circus*," which included Joan Robinson and Richard Kahn. Hayek undertook the role of the debater, even though he probably knew this would be a difficult challenge due to his poor English skills and the excellent argumentative skills of Keynes, as well as Keynes's wide popularity.

Hayek, the fifth chapter makes clear, directly walked into the lair of his Cambridge enemies. Before he delivered his 1931 London lectures, which Robbins invited him to do, he accepted an invitation to make a presentation in Cambridge before the Marshall Society, which included many Keynesian economists. His reception in this hostile environment was cold and unfair, in part because the participants did not completely understand Hayek's English, and in part because what they understood they could not criticize properly. This unfortunate Cambridge adventure was followed by an auspicious series of lectures at the LSE and a long-awaited academic job offer from Lionel Robbins, who grew increasingly certain that he found the counter to Keynes he had been looking for.

## The Greater Evil and the Keynesian Curse

In chapters six through nine, Wapshott provides a brief outline of the battle between the two economists, beginning with Hayek's sharply critical review of Keynes' *A Treatise on Money* (1930) in the London School of Economic's journal *Economica* (then edited by Lionel Robbins). The end of Hayek's volley promised a second part and was undoubtedly aimed to get Keynes and his followers to take up the gauntlet, which Keynes did. The Keynes—Hayek debate is still considered to be one of the largest fractures in the history of twentieth century economic thought. In the November 1931 *Economica*, Keynes made his riposte which lacked the air of absolute intellectual superiority generally characteristic of his writing; he took the role of an *ad hoc* defender. Keynes admitted that his ideas evolved and that he had thought otherwise about several things in *A Treatise on Money* (1930) than he thought at the time of the publica-

tion of the review. His manner of response shattered the sanctity of the belief in Keynesian economics. The "*Cambridge Circus*," led by Piero Sraffa, launched a counter-attack on Hayek's 26-page review. The rich correspondence between Keynes and Hayek that followed demonstrates that the two also continued the debate in a more informal way. These letters reflect that they both sought to overcome the other by asking for endless comparative explanations of the meaning of the key terms in their theories. Finally, Keynes refused to prolong the public dispute. Rather he used the time to write a better, more consistent and more insightful book, which became his 1936 magnum opus.

Wapshott, as a provocative journalist, treats the clash between Keynes and Hayek as if each is the nemesis of the other and suggests that their endless warfare in theoretical economics shaped the discipline that we today called modern economics. However, he underestimates the fact that Hayek and Keynes were also brothers-in-arms in the "bastion of light," fighting against dictatorship and totalitarian states. Hayek tried to warn Keynes not to play with dark magic he could not completely control, but Keynes refused to take the advice from the Austrian scholar. Keynes's meddling with the market likely prevented the economy from sudden collapse, but it also put the curse of fiscal deficit and public debt on future generations. We can still not shake this debt. Once Keynes prevailed, Hayek was just regarded as the second herald of pessimistic economic thought after Thomas Robert Malthus. If political economy earned the title of "dismal science" because of the undesirable future Malthus predicted in the 19th century, it might have equally justly earned the title of "cold-blooded science" in the twentieth century because of the sober warning of Friedrich August von Hayek. He was convinced that, regarding state intervention, less is always more. Despite any disastrous situation in the economy, he thought we must wait until the new seeds of the market mechanism sprout and balance is resurrected from the ashes of the dead body of post-war economies. In contrast, Keynes thought it was possible and better to create the resurrection through his interventionist policies and not wait for something he cannot contol. Keynes's views soon became the most influential not just in academia, but in shaping the economic policy of many states. His ideas helped build a new international economic order and his advice today flows from leading think tanks. His magnum opus, *The General Theory of Employment, Interest and Money* (1936), has become a classic text.

## Keynes, Hayek and Polanyi in Between

As the ninth chapter emphasizes, *The General Theory* was a remarkable success. Keynes used his time wisely and corrected his previous errors. While Keynes was on a lecturing tour in the United States, during which he became more and more influential, Hayek neglected the mission he was chosen for in the first place and did not provide Robbins the review of *The General Theory*, as Wapshott points out in the tenth and eleventh chapters. He rather struggled to write his own definitive book, which proved to be a difficult task for him.

I don't accept Wapshott's statement that the first theoretical exposition of Keynesian economics was *A Guide to Keynes* published in 1953 by Hansen, for Michael Polanyi had published his *Full Employment and Free Trade* eight years earlier in 1945. In his book, Polanyi made it clear that he intended to write for a wide readership with an aim to increase the popularity and acceptance of Keynesian ideas. As with his earlier film, he wanted to foster common knowledge of economic issues. I am disposed to accept Wapshott's argument in the twelfth chapter stating that Hayek's *Pure Theory of Capital* (1940) was by no means as popular as *The General Theory* because it was difficult to read and understand, and it lacked the optimism and easy solutions people were looking for in wartime conditions. I presume that the distance between Polanyi and Hayek increased in the forties as the latter more and more emphasized that he thought that economists should only deal with theoretical problems and leave the practical issues for other professionals. Polanyi accepted the Keynesian adjustment of the money supply by the central

bank as he clearly presented the process in his film of 1940, but he also deemed the market mechanism really important as it fosters a dynamic order in the economy. Unlike Keynes, however, he voted against public works and deficit spending as a means of regulating the economy because he recognised the threats of the politically based misappropriations and bureaucratic empire building that Keynes did not want to notice due to his overflowing optimism.

Keynes and Polanyi had a starkly different concept of the public role of economists than Hayek. Keynes regularly gave interviews on the radio and wrote many articles to newspapers seeking to reach ordinary people, while Polanyi made an easily comprehensible film, gave a series of lectures, and published *Full Employment and Free Trade* (1945) with an explicit aim to address a wider audience. Not surprisingly, the number of the followers of Keynesian economics increased day after day, whereas the rather theoretical economic thought of Hayek languished. Hayek's seemingly lost situation was saved by developing his political philosophy with the new method of public persuasion used in the *Road to Serfdom* (1944). As it is described in the thirteenth chapter, Hayek argued that increased state intervention would likely lead to serfdom through the restraint of public liberty and private freedom. In this chapter (as well as in the fifteenth and sixteenth chapters), Wapshott wrongly states that the top-down perspective of economic thinking later named macroeconomics was discovered by Keynes. The theorists of classical political economy also used a similar perspective beginning at the end of the eighteenth century. We may find similar concepts such as the *Tableau Économique* (1766) of the physiocrats in France or the first essays on inflation in the United Kingdom even before that. The shift in the perspective of political economy is commonly linked to the Marginal Revolution when systematic micro-concepts were introduced to economic thinking. The new perspective gave birth to Neoclassical economics in the last quarter of the nineteenth century, which was greatly improved by Alfred Marshall, who also steered the scientific interest of the young Keynes towards economics. Keynesian economics ought not be seen as the first appearance of macroeconomics, but rather as a successful re-engineering of the earlier perspectives with new methods uniting the abstract mathematical toolset of the Marshallian legacy with his own pragmatic genius.

The fourteenth chapter shows how Hayek became the leading figure of the handful of social theorists who intended to save classical liberalism. They persevered even though the climate of opinion was really malevolent for them. Hayek established the Mont Pélerin Society where he met with fellow thinkers with similar beliefs and attitudes, including Ludwig von Mises, Lionel Robbins, Frank Knight, George Stigler, Milton Friedman, Fritz Machlup, John Jewkes, Michael Polanyi, and Karl Popper. At this point a distinction must be made. As Mr. Wapshott states several times, Keynes also thought himself a liberal, and some of his remarks are without doubt liberal even in the traditional sense. It must be noted here that the liberalisms of Keynes, Hayek and Polanyi are not the same. I think this topic would require a thorough analysis which would exceed the frame of this review. In any case, plenty of differences can be found between the classical, laissez-faire based liberal political economy and the one Keynes and his followers forged.

Michael Polanyi comes into the picture at this point. Polanyi came from a similar cultural background as Hayek. The two were called to the same army under the flag of the Austro-Hungarian monarchy during World War I and witnesssed all the maleficent collateral effects of warfare economies as well as the sudden economic shock experienced in the post-war era. Later they corresponded on many topics including economics. They both worked in the United Kingdom as professors (Hayek at the London School of Economics, Polanyi at the University of Manchester) and tried to save liberalism during the two world wars and afterwards in the Mont Pélerin Society. They agreed as critics of the Soviet economy and the totalitarian state, but disagreed on how to build a better and brighter tomorrow. As a consequence of the triumph of Keynesian economic thought, Michael Polanyi turned from being a thoughtful laissez-faire supporter to a mild Keynesian, which certainly affected his relation with Hayek. Although the Polanyian

turn was radical and the faith he had in Keynesian economics was quite firm, he saw the danger of the increasing economic power of the state and offered his own remedy for the Keynesian curse: economics education. To realize his agenda, he published *Full Employment and Free Trade* (1945), which he intended to be an interpretation of Keynesian economics with some unique remarks. He did not accept public works and deficit spending. Rather the flow of money in the economy impressed him, reminding him of the movement of fluids in chemical experiments, and regulating this flow shaped his understanding of economic management.

In 1920, Keynes wrote *The Economic Consequences of the Peace*, which was addressed to a wide audience. Then he focused on works with more complex and technical arguments, which were written primarily to convince economists about his ideas and therefore lacked the simplicity which is essential to reach a lot of people. Fortunately, many followed the footsteps of Keynes, so the secondary literature on his ideas is really vast. Not so fortunately, scientific integrity was often overwritten by simplicity. The essence of the great dispute between Keynes and Hayek is rooted in their fundamentally different attitude towards people, as Wapshott properly states. Wapshott sees Hayek as more pessimistic about people. He doubted that the state bureaucracy could take on more responsibility as it only consists of self-interested individuals, whereas Keynes was rather optimistic about the skill and character of people as well as the efficiency of state intervention. Polanyi thought that spontaneous order is unambiguously better than any kind of corporate order or authoritative guidance for governing economic processes efficiently. However, he saw that the process of spontaneous re-engineering could not start up by itself, so in a depression the economy needs a boost to get its circulation running again. Eventually, he accepted the Keynesian treatment, but only with the restrictions mentioned before.

I argue that the early economic thought of Michael Polanyi is important for gaining a deeper understanding of the Keynes-Hayek debate, because in some ways he was the middleman between the two. He was part of the Mont Pélerin Society and a wholehearted liberal who contributed to the advancement of liberal philosophy in its darkest hours. At the same time, he was a convinced Keynesian on a quest to make economics education better in order to create more educated people who could take responsibility and decide whether the state is running things as it should. He thought that people can be educated in economics in order to be able to make better decisions and provide better checks on the state, which is a rather optimistic view, but he also thought they should be aware of the increasing role of the bureaucracy, which is obviously pessimistic.

## The Aftermath of the Keynes-Hayek Debate

The fifteenth chapter underlines that the triumph of Keynesian economic thought continued after the death of Keynes in 1946 and influenced the economic policy of many states, including the United States and the United Kingdom, between 1946-1980. As Wapshott indicates in the sixteenth chapter, Hayekian economic thought mostly influenced economic policy in the Thatcher and Reagan administrations. This might be considered as a milestone, as previously Hayekian thought did not go maintream, nor did it influence significantly practical economic issues. Rather, it remained on a theoretical and academic level. These two chapters are more concerned with economic policy than economics, and while they give us an insightful and fascinating look at the political history and the dynamics of the economic policies of the second part of the twentieth century, they are not an adequate introduction to the advancement of theoretical economics.

As we witness in the last two chapters, the two streams of economic thought continued to oppose each other not only at a theoretical level, but also competed to become more influential in economic policies. Recently the two schools clashed for the role of the saviour from the financial crisis of 2008,

and I must agree with Wapshott when he states that the final outcome of the battle is yet undecided. The theories nowadays seem so fragmented that soon new principles might emerge to interlink the remnants of the almost forgotten intellectual warfare and create new consistent theoretical frames from the latter. The economic thought of Michael Polanyi might also help us better to understand and resolve oppositions in the Keynes-Hayek debate. Polanyi undoubtedly turned to Keynesian economics and in some cases accepted state intervention to foster economic growth despite his commitment to spontaneous order and liberalism. He intended to save liberalism from the looming shadow of authoritarianism and continuously looked for solutions to fulfill his mission. Polanyi, Keynes and Hayek all fought for this noble aim, but took different roads toward what they deemed best for society.

Wapshott's book offers us an exciting and colourful journey into one of the greatest debates of the economic thought of the twentieth century. It is therefore excellent for those who have a little or no background in economics or who are more interested in economic policy than economics. He emphasizes the difference between Keynesian and Hayekian economic thought, but forgets that they were also associates with others in the war to save liberalism from the greatest contemporary ideological threats. I therefore strongly recommend this book for those particularly interested in the economic policy of the United States and the United Kingdom in the second part of the twentieth century, but who are not particularly interested in the theoretical and ideological background of these. For those who are deeply interested in theoretical economics or the history of economic thought, I only recommend this book as an admittedly stirring and picturesque outline of a quite narrow segment of modern economics.

## ENDNOTES

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# REVIEWS

Mark L. Jones, Paul A. Lewis, and Kelly E. Reffitt, eds. *Toward Human Flourishing: Character, Practical Wisdom, and Professional Formation*. Macon, GA: Mercer University Press, 2013. Pp. xii + 291. ISBN 978-0-88146-436-8. $30.00 pb.

As the editors of *Toward Human Flourishing* note in their "Introduction," this book stems from two interdisciplinary projects and three sponsored symposia, the first two symposia on professional education and formation in terms of ethics, character, and an ethical sense of vocation, the last symposium on cultivating practical wisdom or *phronesis* in professional education and formation. Appropriately, the book's division into three parts parallels the sequence of those three symposia. Over fifty pages of appendices follow the body of the work for those who might want to utilize various exercises and strategies for the university classroom or other professional educational contexts.

As in any edited anthology, variations in style and content occur, including with respect to the broadness or narrowness of relevancy; but I judge the overall quality of the contributions to be high. Two contributions are noteworthy for framing the overall discussion: Paul Lewis begins Part I with a survey of the history of character education in the twentieth century, noting the decline of integrated character education and the arising of four schools, movements, or programs that tried to fill the gap: cognitive developmentalism, values clarification, "revitalized character education" (19) promoted by former Secretary of Education William Bennett, and citizenship education. William Sullivan initiates Part II with a brief overview of the history of university education preparing persons to serve in the various professions, including teaching. He delineates "the three apprenticeships of professional education:" 1) the academic apprenticeship that focuses on cognitive skill or intellectual knowledge, 2) the practical apprenticeship that focuses on skill in professional practices, and 3) the socio-ethical apprenticeship that focuses on "identity and purpose" (108), which crucially for Sullivan involves a sense of obligation for public service.

Most of the remainder of my remarks will concern points in the book that especially grabbed my attention, points I mostly endorse but a few to which I take some exception. While I appreciate Darcia Narvaez's rejection of biological determinism and her ideas for developing "mature moral functioning," I believe she overstates the case in claiming that "the role of genetics [in character] is very small" (28). I think of research on psychopathic personalities, where their inability to empathize is genetically based. I also think of those on the autistic spectrum: while environment and phenotypical factors constitute a trigger, genes do determine who is a candidate for a condition with significant ramifications for moral character.

Having encountered and written about religious relativism in the classroom, I resonated with Thomas Lickona's chapter on developing moral thinking and agency in students who tend towards moral relativism. Given the willingness of many students to cheat, I appreciated his highlighting of a classroom writing and small group discussion exercise by Hal Urban, which has proven effective in leading students to place a higher value on honesty, particularly because of how (dis)honesty affects one's sense of self-respect (61-62).

William Sullivan's chapter, already mentioned in regard to the three apprenticeships, develops the case for "civic professionalism" and describes how the professions developed and should exist for the sake of "public goods" (102-105). Analyzing the matter in terms of economics, he notes that the professions are granted social, political, and economic privileges in expectation that they in turn contribute to public welfare. In an age where economic self-interest and self-aggrandizement permeate our culture, including within the professions and professional education, this reminder of what should be obvious is most welcome.

Jack Sammons' chapter is the only one to specifically reference the thought of Michael Polanyi. Unfortunately, I did not find Sammons' critique of Sullivan's notion of the three apprenticeships to be

particularly helpful. Sammons argues that the three apprenticeships should not be separated, in light of Polanyi's insistence that all knowledge derives from a process and practice of personal integrative effort rooted in the tacit dimension (153-155). His solution is that all three elements—the cognitive, practical, and moral—be fully integrated into the first apprenticeship (156). While I completely agree that cognitive apprenticeship needs to integrate the practical and the moral in every feasible way, I think that, practically speaking, the educational contexts of contemporary society dictate some relative separation. That is to say, some education needs to be in academic settings and some in field-work and internship type settings. Sullivan for his part clearly repudiates any notion of making the moral third apprenticeship a separate one chronologically or contextually. He refers to that option as the "additive strategy" and instead opts for an "integrative strategy" (110-112). So where do Sullivan and Sammons disagree on the third apprenticeship? I interpret part of Sammons' meaning to be that the ethical dimension needs to be a determinative pre-reflective or tacit component of all professional education. He also holds out little hope that Sullivan's strategy can succeed, given contemporary society's dominant sense of self as the self-serving, autonomous individual, rather than as part of a community of practice. This diagnosis of the rational, self-interested economic self parallels that of Sullivan and other contributors. My contention would be that, precisely because of the dominance of such individualistic, self-centered models of the self, the apprenticeships centered on the classroom and on practice need to explicitly raise and advocate professional ethics—as well as embrace the tacit and pre-reflective integration of moral values with the cognitive and practical dimensions of professional education.

Schwartz and Sharpe offer the most intriguing insight of Part III: that rules and incentives constitute a "war on [practical] wisdom," the former by discouraging the development of skill in moral discernment as we face life's variegated situations, the latter by framing moral issues in terms of self-interest rather than of intrinsic rightness (177-183). Particularly striking was an example from an Israeli daycare center: in order to reduce the incidence of parents picking up their children late, the director instituted fines. The result? Lateness increased and stayed higher for at least six months after the ineffective fines were eliminated! As the authors put it, parents interpreted the fine "as a *price*; . . . a price worth paying," because lateness had literally been "*de-moralized*" (182; italics original). One reason this section especially resonated with me is that my campus has been passionately debating students' accessibility to faculty and campus citizenship more broadly in the wake of stronger rules on faculty office hours. The authors' insight is daunting as well as intriguing, for motivating people to do the right for the sake of intrinsic rightness is not an easy matter. But we can thank Schwartz and Sharpe for warning us about what can make matters worse.

As someone with no more than acquaintance with the pragmatic philosophy of John Dewey, I found David Ritchie's summary of Dewey's epistemology in terms of practical wisdom to be cogent and informed by diverse works of Dewey. Much of Dewey's epistemology seemed congruous with Polanyi's tacit dimension, including the crucial components of our drawing on past experience and our homing in on the "felt difficulty" of a problem (201-204). I noticed one element missing in Dewey's understanding of wisdom, at least as recapitulated by Ritchie, a lack which aligns with a potential downside of being "pragmatic" in the colloquial sense: ignoring the question of moral rightness. Dewey writes about what works, but does not here distinguish between working in terms of self-interest versus working in terms of wider concerns.

The editors' brief conclusion focuses on something central to the profession "professed" by myself and many readers of *TAD*: "the good of liberal education (whether for elementary students, undergraduates, or professionals)" (214). They attest that "(w)e need wisdom so as to know both how much of the good of liberal education can be sustained under present social circumstances and how to go about achieving it" (215). Fortunately their book furnishes some of that needed wisdom.

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Ritu Bhatt, ed. *Rethinking Aesthetics: The Role of Body in Design.* New York: Routledge, 2013. Pp. xv+239. ISBN 978-0-415-53474-1 (hb), 978-0-415-53475-8 (pb). $180.00 & $54.95.

The titles of some books seem to have little to do with their contents. Not so with *Rethinking Aesthetics.* Its essays deal in different ways with expanded notions of aesthetics. The traditional primacy of vision in theories of aesthetics is downgraded in most of the essays. Instead, as the book's subtitle suggests, tacit embodiment assumes a primary place in analyzing aesthetic design. Because the book is thematically centered in embodiment, not surprisingly it is architecture—the art form within which bodies dwell—that is the particular aspect of design upon which essays focus. Indeed, most of the authors are either practicing architects or professors of architecture. However, in many of the essays, the "aesthetic" is seen as a quality of all experience, perhaps coming to clearest focus in works of art, including architecture, but more broadly available for those attentive to how experience arises and is shaped.

The book is replete with examples of thinkers and schools of thought that aid persons in recognizing the ways our mind-body (a term used by several essayists) creates life-sustaining meaning. Maurice Merleau-Ponty and Nelson Goodman are the philosophers who are most cited in the essays. Zen Buddhism is the tradition that is most frequently drawn upon as a resource for expanding traditional views of aesthetics.

The thought of Michael Polanyi is explicitly mentioned in the book only in the article by Chris Abel, which will be discussed later in this review. However, ideas that resonate with Polanyian philosophy occur throughout. Thus, not only is there an ongoing critique of such dichotomies as body and mind or the artistic and the everyday, but also the importance of tacit processes is a recurring theme. Such Polanyian notions as levels, background beliefs, integration, and focal attention are scattered throughout the essays. More strikingly, editor Bhatt mentions what she calls the "post-critical turn" in her essay. This phrase refers not to Polanyi's concept, but to "a series of influential essays" written in architectural and design journals, articles which have taken a non-skeptical "attitude toward 'other' traditional (often pre-modern) knowledge systems" (182). There is no indication of borrowing from Polanyi in this usage, but in both uses of the post-critical the role of the personal rather than some universal standard is evident.

Perhaps enough has been said about the book in general to indicate what a rich and provocative collection of essays it includes. Now a few words are in order about the most striking individual essays. Philosopher Mark Johnson is the writer who especially emphasizes that the aesthetic "is the very stuff of any meaningful experience" (49); this is the point of his essay, "Dewey's Big Idea for Aesthetics." For Dewey, the integrative acts that produce unified experience are guided by aesthetic standards. His thick notion of aesthetically unified experience is seen to be what authentic thought is rooted in and to which genuine philosophy must refer (38).

Richard Schusterman offers a vision of the aesthetic that is only slightly less encompassing than Dewey's thought: Schusterman advocates living a life of awakened consciousness "in which ordinary or everyday things can be appreciated through aesthetic perception and thus transfigured into a special experience" (25). The thought of Emerson and Thoreau and the somatic practices of Zen are claimed to be particularly instructive for those eager to embrace philosophy as an enlightened style of living. Another essayist, Yuriko Saito, also is motivated by Zen to honor the innate properties of objects. In her "The Moral Dimension of Japanese Aesthetics," she claims that an aesthetic attitude of honoring otherness, when transferred from objects to persons, constitutes the foundation of morality (165).

Architect Juhani Pallasmaa sees our aesthetic sensitivities as deeply embedded in the course of human bio-cultural evolution. "No doubt, our aesthetic preferences reflect our biological past and our aesthetically based choices have had evolutionary values" (226). Beginning with the tactile responsiveness of bacteria, embodied touch is seen by Pallasmaa to be the originating connection of living beings to the wider world. Touch is embedded within all forms of sensation. Touching is cognately related to

feeling and feeling suffused with aesthetic sensitivity underlies experience in general and perceiving in particular. "Touch is the unconsciousness of vision, and this hidden tactile experience determines the sensuous qualities of the perceived object…. It is exactly this unconscious dimension of touch in vision that is disastrously neglected in today's retinal and hard-edged architecture" (220).

Remei Capdevila-Werning makes a claim about aesthetic experience that would likely be affirmed by the majority of the authors. She says that "aesthetic experience is a primarily cognitive endeavor and, for that reason, aesthetics is a branch of epistemology, which focuses on the broader field of understanding rather than on only propositional knowledge" (86). The connection with Dewey's thought is evident in her claim. Works of architecture may themselves be regarded as symbols belonging to one or more symbol systems. Symbol and system are each subject to changing cultural emphases and thus open to multiple interpretations. Interpretations of a building's meaning must be judged on how well they relate to its symbolized qualities and some interpretations have a better fit than others. How buildings are seen to operate symbolically is itself a matter of interpretation and Capdevila-Werner suggests six characteristics of proper symbolization (96).

The articles by Galen Cranz and Ritu Bhatt suggest how several schools of thought and practice that rely upon the intuitions of a body-mind can improve the quality of design. Cranz utilizes the Alexander Technique, of which she is a teacher, to reflect upon the proper design of chairs. "The built environment," she writes, "especially the common chair, can interfere with the proper coordination of the head, neck, and back" (147). To properly accommodate the ideal needs of body-minds within the built environment, designers should "first understand the activities that take place within a space and the life of the inhabitants before starting the designing" (153). Bhatt describes the traditional Chinese organizing approach of feng shui as taking into account unconscious needs for security in architectural siting and design, unconscious needs typically ignored in contemporary architecture. Likewise, architect Christopher Alexander's rather idiosyncratic pattern language is seen to rely upon "deeply-felt human sensations and needs [that] should guide architectural design" (8).

Finally, let me say something about the one article that explicitly makes use of Polanyi's thought. "The Extended Self: Tacit Knowing and Place Identity" by Chris Abel is the longest essay in the book, and befitting its length, Abel attends to such diverse topics as place identity, the neurosciences, embodiment, the development of the self, and what implications all these factors have on the way the built environment is shaped. In discussing the home as the core of place identity, Abel suggests that there is a tension between those who affirm the functional, comfortable design of typical suburban houses and critics of the tastes and values embraced by suburbanites and manifest in their architecture. One set of critics, exemplified by Martin Heidegger and architect Christian Norberg-Schulz, laud enclosure and density as essential to existentially positive place making and dwelling. Abel argues that such a construal of ideal dwelling ignores the diversity observable in various cultures about how best to dwell. He notes that Australian aborigines identify their home with the land on which they dwell; their temporary shelters are of little importance. He might have pointed out that in the western United States the ideal of many is to eschew density in favor of a ranch or at least a ranchette.

Not only the nature of the ideal home, but also the nature of the ideal city elicits aesthetic debate. Kevin Lynch's *The Image of the City* praises the image elements of the typical European city and disparages American urban design, which prioritizes car traffic rather than pedestrian friendly streets. However, again there seems to be no universal aesthetic at work in people's notion of ideal place identity. "However, one inescapable factor that every human being shares with every other human being on the planet in his or her own day to day experience of the world—regardless of background or culture—but which is generally taken for granted, is the human body" (110). Embodied persons not only want to feel their homes are meaningfully related to their environments, they want to experience intimate places within their homes where they feel centered and whole.

Does body identity play a role in suggesting what constitutes the best suburban and urban design? Abel turns first to Merleau-Ponty and Polanyi and then to neuroscientists—especially Sandra and Matthew Blakeslee in their *The Body Has a Mind of Its Own*—to explore the ways bodies relate to their environments. Merleau-Ponty insists that our bodies are not best seen as existing in abstract space. Rather they inhabit space in a world-creating way comparable to that employed by other persons and which therefore allows us as bodies to identify with others (114-116). Abel artfully describes Polanyi's notion of indwelling, emphasizing how those components that function as subsidiaries are enveloped by our body so that our being is not limited to the extent of our skin. Polanyi thus offers an explanation "not only for how people identify with others, but also for how they identify with the homes, cities and other places they inhabit, and which help shape their lives" (120-21). Consequently Abel suggests that place-identity is an aspect of tacit knowing involving a metaphoric extension of a person's body.

Polanyi's insights are seen by Abel to be confirmed by the work of the Blakeslees and other neuroscientists. They describe several types of internal body maps that represent an elaboration of Polanyi's notion of latent learning. The way bodies become oriented and purposefully act in a flexible space domain is described by the term "peripersonal space." Self-centered body maps are augmented by geocentric place cells and grid cells, all of which as embodied phenomena move beyond the purely mental images of Lynch in his justification of European urban design.

Abel makes use of Polanyi's thought in one direct and one indirect way. Polanyi appreciates how beginning architectural students come to their study with a tacit understanding of buildings and environment that would best be nourished by apprenticeship and learning by example, rather than through overly intellectual indoctrination. Polanyi and others show that place making is a dynamic and flexible process, but it is a process that tends to settle into a preference for that which is familiar, that which establishes a core place identity. It is this inflexibility that worries Abel in the last section of his essay. More important than what one prefers in the design of places is the threat of unsustainable urban and suburban design dependent on cars. Thus concentrated living as advocated by Norberg-Schulz, Lynch and others trumps merely aesthetic reasons for design. Abel does not mention some of the key works of the so-called New Urbanism (works like *Suburban Nation: the Rise of Sprawl and the Decline of the American Dream*), but clearly his article as a whole is sympathetic to this movement.

Diverse and stimulating, *Rethinking Aesthetics* is a book that lives up to its name.

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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. Manuscripts normally will be sent out for blind review.

*Articles* should be sent to Paul Lewis at lewis_pa@mercer.edu

*Book reviews* should be sent to Walter Gulick at wgulick@msubillings.edu.

All manuscripts should be submitted as a Microsoft Word file attached to an email message (.doc or .docx) and formatted as follows:

- double-spaced
- with 1" margins
- in a reasonable typeface (Times New Roman 12 is preferred)
- with paragraphs indented 0.25"

As to other matters of style:

1. *Spelling*: We recognize that the journal serves English-speaking writers around the world and so do not require anyone's "standard" English spelling. We do, however, require all writers to be consistent in whatever convention they follow.

2. *Citations*: We recognize that Polanyi's work connects with scholars who work in diverse disciplines and typically use different style guides such that we are "fluent" in different conventions for citations, capitalization of titles, and so forth.

- Our preference is for Chicago's parenthetical/reference style in which citations are given in the text as (last name of author year, page number), combined with bibliographical information at the end of the article.

- Endnotes should be used sparingly and be placed before the reference section.

- To the extent that our software allows, we will, however, accept other styles (e.g., APA or MLA) so long as the author is consistent and careful in following it. The main point, of course, is to give the reader enough information to locate and engage your sources.

- We do encourage one exception to this practice. Polanyi's major works may be cited parenthetically: for example: Polanyi argues that …. (*TD*, 56). Full bibliographical information should still be supplied in the references section since many of us may work with different editions of his works. If you take this option, please use the following abbreviations (note that abbreviations are italicized):

| | |
|---|---|
| *CF* | *Contempt of Freedom* |
| *KB* | *Knowing and Being* |
| *LL* | *Logic of Liberty* |
| *M* | *Meaning* |
| *PK* | *Personal Knowledge* |
| *SEP* | *Society, Economics, and Philosophy* |
| *SFS* | *Science, Faith, and Society* |
| *SM* | *Study of Man* |
| *STSR* | *Scientific Thought and Social Reality* |
| *TD* | *Tacit Dimension* |

# NOTES ON CONTRIBUTORS

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## WWW Polanyi Resources

The Polanyi Society web site (www.polanyisociety.org/) provides information about Polanyi Society membership and meetings. The site also contains the following: (1) digital archives containing all issues of *Tradition and Discovery* and its predecessor publications going back to 1972; (2) indices listing *Tradition and Discovery* authors, reviews and reviewers; (3) the history of Polanyi Society publications; (4) information on *Appraisal* and *Polanyiana*, two sister journals with special interest in Michael Polanyi's thought; (5) a link to the "Guide to the Papers of Michael Polanyi," which provides an orientation to archival material housed in the Special Collections Research Center of the University of Chicago Library, Chicago, IL 60637; (6) photographs of Polanyi; 7) links to a large selection of primary material, including (a) Collected Articles and Papers of Michael Polanyi (the 1963 Gelwick microfilm collection of more than 100 items); (b) Polanyi's 1940 film, "Unemployment and Money;" (c) unpublished texts of Polanyi's Gifford Lectures (1951-1952), Duke Lectures (1964), Wesleyan Lectures (1965); and (d) audio files for Polanyi's McEnerney Lectures (1962), Ray Wilken's 1966 interview of Polanyi (audio and text), and Polanyi's 1966 conversation with Carl Rogers (audio and text).

## Electronic Discussion List

The Polanyi Society supports an electronic discussion group that explores implications of the thought of Michael Polanyi. Anyone interested can join. To join yourself, go to the following address: http://groups.yahoo.com/group/polanyi_list/join. If you have difficulty, send an e-mail to James van Pelt (james.vanpelt@yale.edu) and someone will see that you are added to the list.

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