

On Structured Societies and Morphogenetic Fields: A Response to Joseph Bracken

Walter B. Gulick

ABSTRACT Key Words: Michael Polanyi, Joseph Bracken, Whitehead, cosmology, morphogenesis, field theory, evolution, operational principles.

Joseph Bracken proposes to modify Whitehead's tendency to see the comprehensive entities of everyday life as but aggregations of actual occasions. While there are resources in Polanyi's notion of an emergent cosmos to counter Whitehead's atomism and reductionism, Bracken's use of Polanyi's theory of a morphogenetic field as a corrective is argued to be only partially successful. Bracken must explain how morphogenetic fields evolve and arise. This step would require (1) replacing Whiteheadian reductionism with a principle of ontological parity that honors the reality of interaction between entities and the integration of their operational principles within basic ontological levels and (2) setting forth principles of emergence to explain how these levels and fields arise.

Joseph Bracken offers Polanyians a rare treat: a work of constructive philosophical cosmology that synthesizes ideas from Michael Polanyi and Alfred North Whitehead. His thoughtful essay can be seen as a sustained reflection on the metaphysics of process, structure, and emergence. Before embarking on the critical analysis expected of a respondent, I want to thank Father Bracken for the discriminating, imaginative, and inspiring work manifest in his essay. It models the sort of creative, constructive work that best honors and keeps viable the thought of both Polanyi and Whitehead.

While I can applaud what Bracken accomplishes in his essay, I cannot affirm the specifics of the vision he sets before us. My problems are not so much with Bracken as with the Whiteheadian framework within which he works. I'll initially focus my comments on the relationship between the thoughts of Polanyi and Whitehead before turning later to Bracken's specific proposals. I'll try to explain why the deficiencies I see in process philosophy are not eliminated by the sort of Polanyian therapy Bracken advocates.

Several brief autobiographical comments may help illuminate why I find Whitehead's cosmology problematic. My one and only class in Whitehead's thought was taught by John Cobb, a man I greatly admire as a person and as a thinker. I found much in Whitehead's creative interpretation of the philosophical tradition to be exhilarating, and I appreciated the richness of his thought in contrast to the aridity of the analytic tradition. However, I could not easily connect his cosmology to the world I experience, whereas in reading Polanyi I felt at home. The philosophies of Whitehead and Polanyi reveal more than a trace of their disciplinary backgrounds: the mathematician and logician in contrast to the physician, chemist, and economist. I find the weight of reality to reside in the latter rather than the former orientation.

There are a number of respects in which Whitehead's and Polanyi's thought are in harmony, and Bracken both comments on and relies upon some of them. For instance, Whitehead's insistence that human experience is rooted in embodied, pre-intellectual activities culminating in consciousness (*Process and Reality*

246-247) parallels Polanyi's description of how passions, skills, and indwelt frameworks of interpretation contribute to personal knowledge. Whitehead sees perceptual experience as based upon an integration of presentational immediacy (the extended world of sense data) with casual efficacy (the mode of feeling-laden inheritance from the past — see *PR* 256). Causal efficacy can be correlated with Polanyian tacit knowing, or at least with one dimension of tacit knowing. The integration of presentational immediacy and causal efficacy occurs in the mixed mode of symbolic reference (*PR* 185, 255), a notion that brings to mind Polanyi's explanation (*PK* 71-82) of how articulation builds upon a background of trick, sign, and latent learning, which are additional dimensions of the tacit realm. Whitehead's analysis of the vectorial qualities of prehension and concrescence (*PR* 28) correlates nicely with Polanyi's from-to structure of consciousness. For both Whitehead and Polanyi the culminating experience of satisfaction – of initial aims (*PR* 29, 448), of intellectual passions (*PK* 174) – is crucial. And, as has already been suggested, the process of integration is essential to the philosophical vision of each.

The similarity between the thinkers is evident when they discuss the dynamics of thought. But what distinguishes Whitehead most dramatically from Polanyi is the metaphysical underpinning of his thought. They differ dramatically with respect to what is ontologically ultimate. Whitehead claims each atom of concrescence is ultimate, whereas Polanyi defers to an open-ended inquiry into the real, understood as that which has the power to manifest itself in the future. In other words, Polanyi centers his philosophy in the person seeking knowledge, while Whitehead projects subjectivity into the smallest components of reality, actual occasions. In subscribing to what he calls the reformed subjectivist principle (*PR* 252), Whitehead flirts with an anthropocentric presumption. What is the basis for thinking that all reality works much like the way human experience arises? Does such an assumption not obscure the countless ways human consciousness is not like electrons, metal girders, pine trees, or quasars? Doesn't Whitehead's metaphysics clash so essentially with Polanyi's anti-reductionist vision that inserting Polanyian ideas into the Whiteheadian framework is like trying to mix oil and water?

Whitehead bases his thought on a metaphysical construal of the philosophical tradition, while Polanyi takes the act of scientific discovery as paradigmatic for his epistemology and by extension his ontology. Whitehead moves from thought to reality; his cosmological vision is modeled on an axiomatic system. “The true method of philosophical construction is to frame a scheme of ideas, the best that one can, and unflinchingly to explore the interpretation of experience in terms of that scheme” (*PR* x). Polanyi, in contrast, emphasizes that knowledge is grounded in undefinable powers of thought and unproven traditional beliefs. “No rules can account for the way a good idea is produced for starting an enquiry; and there are no rules either for the verification or the refutation of a proposed solution of a problem” (*PK* ix). From the beginning of inquiry, thought and evidence are in dialectical tension.

Polanyi's entry to philosophy appeals to me because I feel I can relate his claims to my own experience and to a scientific understanding of the world, whereas I have little or no basis for assessing the adequacy of Whiteheadian metaphysics. How does one relate an actual entity to a quark? to a radioactive uranium atom in decay? to space? to antimatter? to a gene? to a dream? to the heart's functioning? This abbreviated list may suggest the difficulties that attend any attempt to connect Whiteheadian cosmology to our actual world. I must acknowledge that Whitehead and especially some of his followers (including Bracken) have built some plausible bridges from the world of actual entities to our everyday world and even – though less successfully, I think – to the micro- and macroscopic worlds. But the need continually to provide such mappings, and the fact that in order to encompass the latest finding of science and other domains of human inquiry the

Whiteheadian vision must constantly be revised to fit these findings, indicates forcefully the ontological priority of these domains and their findings.

We have seen that in the scheme of ideas Whitehead frames, concreting actual entities are his ontological ultimates (*PR* 321-323). Whitehead's cosmology is reductive and atomistic in nature (*PR* 53), as Bracken notes. All that is actual in a scientific or everyday view – atoms, rocks, human consciousness – is to be understood as an assemblage of actual entities, spread out in space-time as structured societies or strung together serially as enduring objects, of which a person is a prime example. Actual entities in their togetherness are called nexûs, but Whitehead's notion of collectivity does not go much beyond aggregation. He claims that "there is no emergent evolution concerned with a multiplicity, so that every statement about a multiplicity is a disjunctive statement about its individual members" (*PR* 45). It is entirely understandable that Bracken, thinking about the relatively stable things of common sense experience, and recognizing they "must be more than just aggregates of analogously constituted actual occasions" (p. 3), would turn to Polanyi's thought for assistance.

In agreement with Polanyi, Bracken states that "the whole is always more than (and to some extent other than) the sum of its functioning parts, an insight which seemed to elude Whitehead in his analysis of actual occasions and the societies into which they aggregate" (Bracken, p. 5). Polanyi understands that things in the universe exist in a vast range of scales, exhibit distinct operational principles, and are related in hierarchically arranged levels. How can the experienced stabilities of this vision be integrated into a Whiteheadian metaphysics?

Bracken turns to Part IV of *Personal Knowledge* for assistance. Here Polanyi discusses evolution and makes use of fields to consolidate his points. Bracken selects Polanyi's idea of a morphogenetic field as providing the best vehicle for incorporating Polanyi's holism. There is a price to be paid for this inclusion. Polanyi understands the related ideas of ontogenetic, phylogenetic and morphogenetic fields as applying to living things, but in order to use the field notion within a Whiteheadian context, the field concept must be stretched to include the non-organic world. It must be integrated into the world of actual entities. Does such an extension make sense?

To answer this question, first it is important to become clear about what Polanyi claims in Part IV of *Personal Knowledge*, the locus of his discussion of fields. There he makes the following distinctions:

1. Polanyi describes *operational principles* that follow rules of rightness. They come in two basic forms:

- a) A machine or biological component (e.g., an organ) has one or more operational principles that describe its function(s).
- b) A living being has a center that coordinates the various functions according to what Polanyi calls "regulation" (*PK* 342). Presumably a center integrates an organism's internal drives and functions (sustaining conditions) with its responses to environmental conditions (random impacts) according to a relatively inclusive set of operational principles (*PK* 401).

2. Polanyi describes processes of change in the organic realm as guided by *fields* within which centers or organizers typically operate (*PK* 357). Individuals' growth is guided by *ontogenetic fields*; species

participate in *phylogenetic fields* that tend to evolve. Each field includes processes of *morphogenesis*.

3. The origin of life itself as well as the process of evolution is dependent upon an *ordering principle*. “The *ordering principle* which *originated* life is the *potentiality* of a stable open system” (PK 383-384).

Relying on these concepts, Polanyi challenges the neo-Darwinian synthesis, claiming it cannot show how new species, having operational principles discontinuous from their ancestors, could arise. Contemporary theorists of evolution use such notions as genetic drift in isolated environmental niches to answer Polanyi’s challenge without reverting to teleological concepts. Polanyi’s answer, however, has a finalistic dimension, and in this respect his thought is compatible with Whitehead’s view that each actual entity has a purpose (PR 165). That is, by making use of Part IV, Bracken may be mixing rare Polanyian oil with ordinary Whiteheadian oil.

Be that as it may, Polanyi’s ordering principle, useful enough as an indicator of systemic stability, seems unable to solve the conundrum central to his challenge to the neo-Darwinian synthesis. How does the *potentiality* of stability originate anything? Some force or process is required to initiate something. Yet there is an intriguing way to interpret Polanyi’s notion of an ordering principle, and that is to see it as a precursor of the cosmological notion of self-organizing systems, which after all do eventuate in stable open systems (PK 384). That is, Polanyi can be seen as groping his way toward complexity theory and its role within a universe of emergent novelty.

Hints of causal purposefulness infiltrate Polanyi’s discussion of fields. The paradigmatic notion of a field in physics refers to the array of forces surrounding a magnetic or charged object. The field has the power of aligning other neighboring charged particles in a certain direction. The field thus has a causal impact on certain types of objects. Polanyi uses this concept analogously to describe his experiences of feeling a gradient of approaching scientific discovery. It is as if there is a collection of clues (the field) that leads the inquirer (the aligned object) to discovery. But is it the environment alone that leads to discovery, or is it the investigator’s own repertoire of associations, skills, and integrating insight that produces the new knowledge? Surely what Polanyi terms a heuristic field requires the involvement of both the seeker and the environment explored. The heuristic field also includes a standard of achievement: success in discovering what is real.

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)

A center’s innate ability, environmental clues, plausible rules, and a standard of achievement are each necessary for there to be a heuristic field.

Bracken relies on Polanyi’s notion of a morphogenetic field to supply the structure, stability, and continuity he feels (correctly, I think) is lacking in Whitehead’s cosmology. What is a morphogenetic field? It has some of the characteristics of a heuristic field.

Comprehension and the somatic process which accompanies comprehension, represent

therefore a kind of equilibration that can be defined only in terms of *intellectual rightness*. Morphogenesis, operating under the direction of a morphogenetic field, is a somatic process of the same kind, but following morphogenetic rightness as its standard of achievement. . . . Our sense of approaching the unknown solution of a problem, and the urge to pursue it, are manifestly responses to a gradient of potential achievement; and when we identify a morphogenetic field, we see in it in fact a set of events co-ordinated by a common gradient of achievement. (PK 398)

Embryonic development and the growth of somatic forms in general (the ontogenesis of an individual) are examples of morphogenesis.

To be consistent with Polanyi's discussion of heuristic fields, a morphogenetic field should include a) an innate ability of a living center to follow a plan of development (which today would be described as genetic expression within a gene cycle), b) environmental clues as to when gene expression is appropriate, c) consistency with the center's operational principles, and d) a standard of mature development that is the target of the field. Each individual would be seen to have an ontogenetic program of morphogenesis, but more controversially Polanyi also suggests that the morphogenetic plan of a whole species exists within a phylogenetic field. Just as within a heuristic field a person is understood to be a center capable of discovering what is real, so Polanyi attributes to a phylogenetic field a center that presumably has the ability to aid the species in reaching a new level of systemic stability (PK 405). What can Polanyi mean by attributing a center to a whole species? An individual can be seen to have a center of decision making, but a species?

An even more daunting set of questions must now be directed to Bracken. He claims that "a morphogenetic field would possess an immanent principle for the organization of its material components at any given moment" (p. 4). Where is this principle centered? If it is in the actual entities, he has essentially reverted to Whitehead's view concerning common elements of form, and the morphogenetic field is inconsequential. If there is a center to the field, and it has its own operational principles, then Bracken has a much larger task on his hands than is indicted in his essay. He must explain how morphogenetic fields arise, how they are related to actual entities, how they evolve, and how they are superseded.

On page 10 of his essay, Bracken begins to clarify his position.

What I have maintained over against Whitehead is that this common element of form has somehow to stay in existence as the principle of continuity between successive sets of actual occasions. In my judgment, as noted above, it stays in existence as a structured field of activity for those same sets of actual occasions, dependent for its form or structure on the current set of occasions and yet serving as the "ordering principle," in Polanyi's terms, for the next set of occasions. As such, it is a morphogenetic field, giving a Gestalt or recognizable shape and pattern of activity to its current members but itself in slow process of evolution toward a goal yet to be realized in its fullness. For, the field is always open to a new pattern to be achieved by future sets of actual occasions even as it provides a direction for the achievement of that goal here and now by its present mode of existence and activity.

There are a number of loose ends to be noted in this passage. How can the common element of form Bracken wants to maintain also serve as a Polyanian ordering principle, which Polanyi understands as the

potentiality of a stable open system? Can this common ordering element of form simultaneously be a morphogenetic field, as Bracken claims? Does a water molecule, which possesses a common element of form from moment to moment, exist as a morphogenetic field? Or is the morphogenetic field to be attributed to a collection of water molecules, as in a cloud or a river? Or is the whole environment to be seen as a morphogenetic field?

Bracken makes some progress toward answering these sorts of questions by replacing Whitehead's "structured societies" with hierarchically ordered fields having different degrees of independence (p. 12), and here I think he has turned to an aspect of Polanyi's thought that is truly promising. Polanyi understands different sorts of entities to have different operational principles. He also understands the biological realm to be ontologically emergent from the realm of physics and chemistry (*PK* 394), and thereby organic life is seen as existing as a higher level dependent upon but irreducible to the lower material level. This view is clearly inconsistent with Whitehead's panpsychism, and it presents Bracken with some fundamental decisions. In opposition to Whitehead's reductionism, I would challenge Bracken to consider adopting Justus Buchler's principle of ontological parity, which accords equal reality to all ontological levels and doesn't require the constant and perplexing recursion to the "decisions" of actual entities to explain anything. Change sometimes requires top-down explanation, sometimes bottom-up explanation, and sometimes explanation at a given level of existence. Bracken recognizes this (p. 5) but also is conscious that this sometimes challenges Whitehead's "ontological principle" that requires all explanations to refer to actual entities (*PR* 28; p. 11). He is especially interested in exploring the role that "divine initial aims" (referring to God as the ultimate actual entity) might play in explanation (p. 14). Moreover, by insisting that fields not be seen as exercising efficient causality (p. 11), Bracken seems to escape Polanyi's questionable attribution of some sort of agency to phylogenetic fields. In sum, I applaud Bracken's attempt, still in progress, to recognize and illuminate the important place in cosmology of structure, which too often tends to be dismissed or overlooked in process thought.

References

Polanyi, Michael. *Personal Knowledge: Towards a Post-Critical Philosophy*. New York: Harper Torchbooks, 1964 [1958].

Whitehead, Alfred North. *Process and Reality: An Essay in Cosmology*. New York: Harper Torchbooks, 1960 [1929].

WWW Polanyi Resources

The Polanyi Society has a World Wide Web site at <http://www.mwsc.edu/orgs/polanyi/>. In addition to information about Polanyi Society membership and meetings, the site contains the following: (1) the history of Polanyi Society publications, including a listing of issues by date and volume with a table of contents for recent issues of *Tradition and Discovery*; (2) a comprehensive listing of *Tradition and Discovery* authors, reviews and reviewers; (3) a digital archive containing many past issues of *Tradition and Discovery*; (4) information on locating early publications not in the archive; (5) information on *Appraisal* and *Polanyiana*, two sister journals with special interest in Polanyi's thought; (6) the "Guide to the Papers of Michael Polanyi" which provides an orientation to archival material housed in the Department of Special Collections of the University of Chicago Library; (7) photographs of Polanyi; (8) five essays by Polanyi.