reality on which science bears" (*TD* 74–75). This, according to Polanyi, is the metaphysics of all practical science. But the actual practice of the scientist is experiential through and through, and thus phenomenological, since only on the basis of various types of experience are scientific results obtained. Such scientific findings make up the body of knowledge that is the evolving scientific consensus at any given time, a body of knowledge which is always reaching beyond the bounds of collective scientific experience by means of the faith placed in results obtained in overlapping areas of expertise as well as by means of new hypotheses which reach beyond the current state of experience and which, in physics, sometimes reach beyond all possible experience into the realm of metaphysical speculation (the postulation of the multiverse is one such example). This scientific consensus, simultaneously flowing out of phenomenological experience and reaching beyond it, is governed by "standards of plausibility…standards of beauty and originality," (Ibid., 72) standards which only have authority by virtue of the tacit metaphysical commitment of those who submit to them. Thus, "the tradition of science induces its own renewal by bearing on a reality beyond experience," (Ibid., 74) yet it can only do this by giving metaphysical weight to the phenomenological experience of scientists.

By this road Polanyi arrives at the concept of *universal intent*, which is an acknowledgement of the inescapable metaphysical weight of experience for which no non-circular justification is available, since "the scientist, having relied throughout his inquiry on the presence of something real hidden out there, will justly rely on that external presence also for claiming the validity of the result that satisfies his quest" and will thus "claim that his results are universally valid" (Ibid., 78).

Thus even though "modern science arose claiming to be grounded in experience and not on a metaphysics derived from first principles," (Ibid., 70) the growth of science and the experience and expectations of scientists can themselves only be taken seriously on metaphysical grounds residing somewhere in the vicinity of Polanyi's Copernican realism. Such a metaphysics is thus not a purely abstract or other-worldly affair, but is really quite ordinary and practically-rooted, giving rise to concrete social arrangements:

> All institutions serving the advancement and dissemination of science rely on the supposition that a field of potential systematic progress exists, ready to be revealed by the independent initiative of individual scientists. It is in view of this belief that scientists are appointed for life to the pursuit of research and permanent subsidies are granted to them for this purpose. Many expensive buildings, pieces of equipment, journals, etc. are founded and maintained in this belief. It is the most general traditional belief which a novice joining the scientific community accepts in becoming a scientist. (Ibid., 71)

The institutions of science are not unique in this regard. A great many, and perhaps in some sense all, human endeavors that become formally or informally institutionalized share some version of the idea of a field of potential systematic progress.

Yet due consideration of the ordinary, everyday nature of metaphysics will lead us naturally, argues Polanyi, to affirm metaphysical entities that are immaterial and abstract:

> …our heuristic cravings imply, like our bodily appetites, the existence of something which has the properties required to satisfy us, and that the intimations which guide our striving express this belief. But the satisfier of our craving has in this case no bodily existence; it is not a hidden object, *but an idea never yet conceived*. We hope that as we work at the problem this idea will come to us, whether all at once or bit by bit; and only if we believe that this solution exists can we passionately search for it and evoke from ourselves heuristic steps towards its discovery. Therefore, as it emerges in response to our search for something we believe to be there, discovery, or supposed discovery, will always come to us with the conviction of its being true. It arrives accredited in advance by the heuristic craving which evoked it. (*PK* 129, emphasis added)

We see here again the way in which Polanyi's heuristic phenomenology is ultimately a metaphysics of Eros, the force that propels us toward discovery. And, like Platonism, it affirms the existence of uninstantiated ideas which act as attractors, though this is to run ahead of our argument a bit.

We entertain and follow up on heuristic cravings within the context of our lives as personal centers of achievement shaped by our calling, which is "determined by our innate faculties and our early upbringing within our own culture" (*PK* 379).

3 The Ontological Aspect of Tacit Knowing

I have been arguing that, despite his renown as an epistemologist, Polanyi's philosophical program is fundamentally metaphysical. Aside from the writings on metaphysical realism examined earlier, Polanyi is perhaps clearest about this in *The Tacit Dimension* where he outlines four aspects of the structure of tacit knowing: The *functional aspect,* the *phenomenal aspect, the semantic aspect*, and *ontological aspect*.

The *functional aspect* explains "how we come to know [subsidiary] particulars, without becoming able to identify them…*we know the first term only by relying on our awareness of it for attending to the second"* (TD 10, emphasis original). The *phenomenal aspect* outlines the phenomenological structure of our from/to attentional structure, noting "that we are aware of the proximal term of an act of tacit knowing in the appearance of its distal term; we are aware of that *from* which we are attending *to* another thing, in the *appearance* of that thing" (Ibid., 11, emphasis original).

Polanyi notes that *meaning* is key to understanding the third and fourth aspects of tacit knowing. He defines it as "significance in the relation of the two terms of tacit knowing which combines its functional and phenomenal aspects" (Ibid.). By way of example, he notes that "when the sight of certain syllables makes us expect an electric shock, we may say that they *signify* the approach of a shock. This is their *meaning* to us" (Ibid.). The *semantic aspect* of tacit knowing denotes the way that "an interpretative effort transposes meaningless feelings into meaningful ones, and places these at some distance from the original feeling," as when "we become aware of the feelings in our hand in terms of their meaning located at the tip of the probe or stick to which we are attending" (Ibid., 12–13). Thus, "all meaning tends to be displaced *away from ourselves*" (Ibid., emphasis original).

Before too long I will further develop Polanyi's conception of meaning in ways that will show how it is integral also to understanding the *ontological aspect* of tacit knowing, which is our primary interest here. In affirming the ontological aspect Polanyi openly and explicitly affirms the structural metaphysical connection between knowing and being. In *Personal Knowledge* he prefigures the ontological aspect when he notes that "every comprehension of a whole acknowledges the reality of it; and whatever we comprehend both means something to us and to a certain extent at least means something also existentially, in itself" (344). In *The Tacit Dimension* he argues that

> From the three aspects of tacit knowing that I have defined so far—the functional, the phenomenal, and the semantic – we can deduce a fourth aspect, which tells us what tacit knowing is a knowledge of. This will represent its *ontological* aspect. Since tacit knowing establishes a meaningful relation between two terms, we may identify it with the *understanding* of the comprehensive entity which these two terms jointly constitute. Thus the proximal term represents the *particulars* of this entity, and we can say, accordingly, that we comprehend the entity by relying on our awareness of its particulars for attending to their joint meaning. (*TD* 13)

The tacit integration of subsidiaries into a totality grasped by an act of knowing thus renders epistemological access to an ontological structure – that of the comprehensive entity, a topic we will explore in much depth presently. Yet this structure, according to Polanyi, is not merely a mental construction nor a phenomenal mirage. He goes on to say that.

…what it is that we know by understanding a comprehensive entity, makes an *ontological* reference to it…It seems plausible then to *assume in all other instances of tacit knowing the correspondence between the structure of comprehension and the structure of the comprehensive entity which is its object.* And we would expect then to find the structure of tacit knowing duplicated in the principles which account for the stability and effectiveness of all real comprehensive entities. (*TD* 33–34, emphasis original).

This, then, is where Polanyi's Copernican realism, affirming of both philosophical and empirical approaches to reality openly affirms the metaphysical fitted-ness of mind to world. If this move be thought by

some naïve, Polanyi responds by arguing that the progress and validity of science itself (as well as all other disciplines) is wholly dependent upon just this sort of metaphysical assumption, whether this fact is openly recognized or not, since any participant in the process of scientific discovery must affirm that she holds some scientific knowledge which can serve as a basis for further discovery, and to do so is to reveal oneself to be "deeply committed to the conviction that there is something there to be discovered," and to affirm in oneself "a compelling sense of responsibility for the pursuit of a hidden truth" (Ibid., 25). This move is transparently metaphysical as well as empirical and methodological since it demands that we make a "personal judgment in relating evidence to an external reality, an aspect of which [we are] seeking to apprehend" (Ibid.).

The discoverer (and we are all discoverers on Polanyi's view) is working to comprehend *an aspect* of reality, not the whole of it. And Polanyi explicitly recognizes that "the anticipation of discovery, like discovery itself, may turn out to be a delusion" (Ibid.).

The Polanyian view is therefore not one of naïve one-to-one correspondence but rather involves a forthright acceptance of the fallibility of our ability to track reality that does not fall into nihilist pessimism. Polanyi recognizes openly that the metaphysical connection between knowing and being is indemonstrable in purely objective, non-circular terms, although tacit affirmation of such a connection is necessary for us to get on with things. This is, again, the heart of the post-critical project: "To find a stable alternative to [the] ideal of objectivity" (Ibid.). Knowledge is partial and fallible, but it does provide a route to reality by allowing us some degree of purchase on being.

Furthermore, the structure of knowing provides a guide to certain aspects of the structure of being. We will recall that knowledge for Polanyi has a from/to attentional structure whereby subsidiary particulars form integrative *gestalt* wholes, or comprehensive entities. The implication of Polanyi's view of the structural kinship of knowing and being, then, is that all of reality is metaphysically constituted by an ontology of comprehensive entities, an ontology which is flat in the sense that the structure of all beings is that of the comprehensive entity.

Polanyi, however, does not make these last two claims explicitly. As I have mentioned a number of times, his epistemology is quite systematic,

while his metaphysics go relatively undeveloped. Polanyi works out his Copernican realism to a fair extent (though not clearly enough so as to avoid significant debate over precisely what his realism amounts to, as we have seen). He also, of course, gives the explanation of the ontological aspect of tacit knowing we have just examined. In my view this is where he is clearest and most systematic metaphysically, but it is patchy, to say the least. In what follows I will attempt to draw out some of the implications of Polanyi's commitment to the connection between knowing and being, his piecemeal metaphysics, and his epistemological teachings in order to put them in more systematic order.

4 Comprehensive Entities

Phil Mullins, who has probably written more about Polanyi's concept of the comprehensive entity than anyone else, argues that

> Polanyi came to view this locution as a very useful one that served to set forth clearly some implications of his theory of tacit knowing. In the final analysis…Polanyi's comments about the "comprehensive entity" and the ontological aspect of tacit knowing need to be viewed strictly as ways to re-articulate his claims about the active shaping of knowledge. That is, Polanyi's claims regarding the "comprehensive entity" must always be seen within the context of his claims about "comprehension." Nevertheless, what Polanyi says about "comprehensive entities" helps to sketch out Polanyi's metaphysics, which as Grene points out is a metaphysics approached through epistemology. Such a metaphysics is pluralistic; it acknowledges a rich variety of realities. (Mullins 2006–2007, 27)

Over the course of several articles (1997, 1999–2000, 2006–2007 and 2018) Mullins fleshes out a history of Polanyi's use of the term. He finds one reference to comprehensive entities in the Gifford Lectures (in the lecture entitled "Living Beings" given in 1952) (2018, 1–2). The term is used in *Personal Knowledge* (1958) in a relatively restricted sense to refer to living things and machines, but Mullins demonstrates persuasively that, beginning with *The Study of Man* (1959), Polanyi expands the range