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Transcendent Mind, Emergent Universe in the Thought of Michael Polanyi

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Abstract: This essay vindicates two major aspects of the science-based philosophy of Michael Polanyi: 1. His concept of tacit knowing, and 2. His concept of the multi-levelled character of reality. These two notions relate closely with one another, and together support the thesis to be argued here, that when it comes to understanding human beings, and most especially the human mind, science and religion have to meet on the common ground of the transcendent capacities of human beings, which are pointers to the transcendent character of the universe. The mind is an emergent of the universe, as are all of its other amazing characteristics, but mind is also, therefore, a clue to the character of the universe and its encompassing reality. Mind reflects reality; reality invites mind.

Keywords: Scientific materialism, tacit knowing, objectivism, Gestalt, reductionism, evolution, multi-levelled.

Both in academia and in society at large, the philosophy of scientific materialism is taken as a necessary conclusion from the discoveries of science. This presumption is so well assured in the minds of some that it is referred to as “the contemporary orthodoxy,”¹ and it often goes along with “open dismissal if not ridicule” of religious views of reality.² This “orthodoxy” accords with mechanistic views of human existence, and with such confidence in reductionism (the whole as no more than the sum of its parts) that biology often represents human life as though it were reducible to “the laws of physics and chemistry which govern their isolated elements.”³ Michael Polanyi (1891-1976), scientist-turned-philosopher, spent the last half of his life protesting against such views, and against the notions of science and of human knowing which gave rise to them.

The purpose of this essay is to vindicate, in broad terms, two major aspects of the philosophy of Michael Polanyi: 1. His concept of tacit knowing (epistemology), and 2. His concept of the multi-levelled character of reality (emergence). These two notions relate closely with one another, and together provide a foundation for the claim that all varieties of human knowledge, like all levels of reality, are intimately connected. The thesis to be set forth, therefore, is that when it comes to understanding persons, and most especially the human mind, science and religion have to meet on the common ground of the transcendent capacities of

1 Dennett, *Consciousness Explained*, 33.

2 Wright, *The Evolution of God*, 445.

3 Polanyi, “Man’s Home in the Universe,” 5.

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human beings, which are pointers to the transcendent character of the universe.⁴ The argument is primarily philosophical, and it is also avowedly theological in its interests. But, like Polanyi's entire philosophical enterprise, the argument is grounded in essentially scientific appreciations of reality.⁵

Polanyi was at heart, throughout his life, a scientist; science almost always provided the examples of knowing which guided his investigations. He turned to philosophy, however, because of what he saw as dangerous perversions of scientific knowledge in Soviet Russia and Nazi Germany, and indeed because of what he regarded as dangerously narrow views of science in the industrialized world generally.⁶ What fired Polanyi's philosophical (and epistemological) inquiries was not a love of philosophy for its own sake. His interests ranged widely across economic and political affairs.⁷ What motivated him above all was a search for a proper understanding of the nature of human beings, and an utter abhorrence of the notion that humans should be viewed as reducible to the laws of physics and chemistry.

Polanyi's Opposition to "Objectivism"

Polanyi begins his major work, *Personal Knowledge*, with a description of why objectivity is necessary in the pursuit of knowledge. Objectivity involves favouring theory over "immediate sensory experience"; Copernicus' heliocentrism, for example, properly acts "like a screen" between our senses and how they perceive the movements of the sun and planets, and thus compensates for "misleading appearances." Theory, therefore, is more objective than "raw impressions." It stands outside a person, like a map, and can provide guidance to the lost; "it has a rigid formal structure, on whose steadfastness I can depend" to keep me safe from "my personal illusions."⁸

Objectivism, by contrast, is "a mistaken ideal of objectivity,"⁹ which eliminates the "personal" (the "tacit dimension" and "intellectual passions")¹⁰ from the act of knowing. It is a view of science, which is closely related to "the mechanistic conception of the world," arising from an appropriation of the atomism of Democritus (c. 410 BC), as revived by seventeenth century natural philosophy.¹¹ Objectivism is also tied to "positivist philosophy," which insists on science as being a purely objective and formal cataloguing of facts – "a completely precise and strictly logical representation of knowledge."¹² Such a view of science is popular and seductive, and it is easy to see why it both supports, and is supported by, the mechanistic "contemporary orthodoxy," which, as articulated by Daniel Dennett, claims:

⁴ "Transcendent" is not Polanyi's word. It is an abbreviated way to designate what Polanyi describes at length (E.g. *Personal Knowledge*, 395-97) as the capacity of the mature mind, "reasoning with universal intent," to sense "the proximity of something unknown," and thereby to rise above its limiting conditions, and commit itself to a search for truth. This includes "conscious processes acting on their material substrate" (the mind acting on the brain) and, far from being defeated by it, turning it into "instruments of its own operations" (employing nature to understand nature). The transcendent mind might (though it does not necessarily) come to "knowing God" (see next note) and to belief in the sacred character of existence.

⁵ Polanyi, "Faith and Reason," 247, makes clear that "divinity and the possibility of knowing God" are tangential to his main concerns (they "lie outside my argument").

⁶ Polanyi, "Modern Mind," 12-13. E.g. "The demand that all things must be explained by the laws of physics and chemistry became more insistent and more disturbing. A sharpening of criticism to the point of questioning the very existence of intangible things led to absurd conclusions" (13). His further discussion shows that Polanyi did not regard the "absurd conclusions" as things simply of the past.

⁷ E.g. the essays in *Logic of Liberty*.

⁸ The quotations in this paragraph are from Polanyi, *Personal Knowledge*, 4.

⁹ Polanyi, *Personal Knowledge*, 7.

¹⁰ There is not space in this paper to discuss Polanyi's ideas on "intellectual passions" in detail. He provides a very full discussion in *Personal Knowledge*, 132-202. The "passions" are perhaps best understood in terms of the desire for truth, which inevitably leads to ideas about "elegance and beauty," criteria of affirmation and judgement, and to appreciation and contemplation.

¹¹ Polanyi, *Personal Knowledge*, 8 (see also 358). With respect to the history of science, I am primarily indebted to Lindberg, *The Beginnings of Western Science*, 27.

¹² Polanyi, *Personal Knowledge*, 9, and *Study of Man*, 18, respectively.

There is only one sort of stuff, namely *matter* – the physical stuff of physics, chemistry and physiology – and the mind is somehow nothing but a physical phenomenon. In short, the mind is the brain ... we can (in principle) account for every mental phenomenon using the same physical principles, laws and raw materials that suffice to explain radioactivity, continental drift, photosynthesis, reproduction, nutrition and growth.¹³

Dennett's philosophy postdates Polanyi's death by more than twenty years, but it articulates precisely the views of the world, science and human beings which Polanyi opposed. The general features of this worldview are well known, and the questions raised by it play a central role in the science-theology dialogue. For Polanyi, the weakness of such a view lay in its diminishing of human personhood; as he saw it, it is stunningly obvious that "the rise of [humanity] can be accounted for only by other principles than those known today to physics and chemistry."¹⁴

The "Personal Coefficient" in All Knowledge

The major problem with objectivism is that it diminishes the "personal coefficient"¹⁵ in the act of knowing; it exalts the theory over the thinker, the map over the map-reader. Early in *Personal Knowledge*, Polanyi takes on the popular view that Copernicus' theory demoted humans from the center of the cosmos. He knows well enough how insignificant in time and space humans are, but he rejects completely the notion that this should mean any attenuation of "the human perspective from our picture of the world."¹⁶ The Copernican view of the universe is no less anthropocentric than the Ptolemaic; it merely favours the "human affection" for theory over the affection for immediate sensory perception. However, such vindicating of "abstract theory" over "the evidence of our senses"¹⁷ "is not a counsel of self-effacement, but the very reverse." It demonstrates the power of the human mind, as the thinkers who followed in Copernicus' path demonstrate. Galileo, Kepler and Newton took Copernicus' theory as "making contact with reality," and therefore as offering the promise "of an indefinite range of possible future confirmations" and insights.¹⁸ Their achievements, and the achievements of human thought and exploration generally, exhibit simultaneously "the power of impersonal truth [the objective pole of knowledge] and the greatness of a mind upholding it [its subjective pole]."¹⁹

The human mind has the power to reach out for reality, "for what is rational in nature."²⁰ When it does so, it can discover that reality is, in a sense, inviting the mind's inquiries. This is why, to use one of Polanyi's favourite ideas, "we can know more than we can tell." To quote him at length:

We can account for this capacity of ours to know more than we can tell if we believe in the presence of an external reality with which we can establish contact. This I do. I declare myself committed to the belief in an external reality gradually accessible to knowing, and I regard all true understanding as an intimation of such a reality which, being real, may yet reveal itself to our deepened understanding in an indefinite range of unexpected manifestations.²¹

This means that "[t]he participation of the knower in shaping ... knowledge" is to be "recognized as the true guide and master of our cognitive powers." And thus:

¹³ Dennett, *Consciousness Explained*, 33. See also Wilson, *On Human Nature*, *Consilience* and other books.

¹⁴ Polanyi, *Personal Knowledge*, 390. It should be stressed, in light of this last quote, that Polanyi in no way denied that physics and chemistry are the essential *conditions* for the rise and evolution of life; he simply denied that they were *sufficient* of themselves to account for life and mind.

¹⁵ Polanyi, *Study of Man*, 25-26. Already in the Preface of *Personal Knowledge*, viii, Polanyi says: "I have shown that into every act of knowing there enters a passionate contribution of the person knowing what is being known, and that this coefficient is no mere imperfection but a vital component of [the person's] knowledge."

¹⁶ He goes so far as to say (*Personal Knowledge*, 3) that eliminating the human perspective "must lead to absurdity."

¹⁷ Polanyi, *Personal Knowledge*, 1.

¹⁸ *Ibid.*, 5.

¹⁹ *Ibid.*, 396.

²⁰ *Ibid.*, 6.

²¹ Polanyi, *Knowing and Being*, 133.

The ideal of a knowledge embodied in strictly impersonal statements now appears as self-contradictory, meaningless, a fit subject for ridicule. We must learn to accept as our ideal a knowledge that is manifestly personal.²²

It is appropriate before going further to examine a little more closely what Polanyi found so “contradictory” and “meaningless” – what he was arguing against in the mid-decades of the twentieth century, and to bear in mind that the same notions are still very much at large in the second decade of the twenty-first century. Polanyi named “the programme of behaviourism”²³ as an instance of “positivistic empiricism,” which distorts understanding of both science and humanity. Behaviourism is reluctant to admit to the reality of “the consciousness of a human being,” preferring “to eliminate all references to the human mind” and focusing only on “facts that are directly observed,” like “the sound of human speech when telling about a state of mind”²⁴ or some other signal that experimenters can measure in response to a stimulus. What such a programme fails to recognize is that a comprehensive entity, like the human mind, can never simply be reduced to its particulars, which in reality can function as no more than clues to the entity of which they are a part.²⁵ *Methodological* reductionism is essential in science, but when it devolves into *ontological* reductionism – presuming that entities truly *are no more than* the sum of their parts – then the self-contradiction is reached in which “scientists ... urge us to assume that consciousness does not exist [but] do not believe this themselves.”²⁶

More recent protests against such reductionism include Raymond Tallis, *Aping Mankind* (2011), and Thomas Nagel, *Mind and Cosmos* (2012).²⁷ Further recent instances of such reductionism include Richard Dawkins, *The Selfish Gene* (1976); E. O. Wilson, *On Human Nature* (1978; Rev. Ed. 2004), and *Consilience* (1999 – the chapter on “Mind”), and Sam Harris, *The Moral Landscape* (2011), and *Free Will* (2012).²⁸ The major questions in these books include whether mind is more than simply the brain, whether consciousness in some sense transcends the brain, and whether humans have a meaningful capacity for free will. For Polanyi, the answer to all of these questions is a resounding yes.

The Creative Powers of the Mind v. Extreme Reductionism

Polanyi begins his account of tacit knowing with an insight that goes back at least as far as Plato: *We can know more than we can tell*. More recently, Gestalt psychology “has demonstrated that we may know a physiognomy by integrating our awareness of its particulars without being able to identify those particulars.”²⁹ The parade example is how we recognize a familiar face from among even many thousands of faces. When asked to tell how we do so, we cannot tell. As originally conceived, Gestalt envisages the particulars of a thing being simply “impressed on the retina or on the brain,” with the observer being

²² Polanyi, *Study of Man*, 26-27. Polkinghorne – a scientist (quantum physics) and theologian – follows Polanyi in emphasizing the essentially *personal* character of all knowing within a framework of “critical realism.” Polkinghorne, *Faith*, 33-34 and *Science*, 8-9.

²³ Polanyi, “Modern Mind,” 16.

²⁴ Ibid., 15-16; *Study of Man*, 65. It should be stressed that Polanyi had a positive appreciation for neuroscience, and recognized that, on occasion, scientists *properly* ignore “the absurdity of the idea underlying their work.” For example, the “exploration of various parts of the brain by electrodes of microscopic size, which showed the nervous system operating as a machine” was “a splendid inquiry,” but it would be “hampered” by having to keep in mind how “nonsensical” it is to assume that the “whole nervous system” works “as an insentient automaton” (“Modern Mind,” 16). “[T]he machine-like functions of living beings” (14) can properly be seen, and studied, as such; the “nonsense” consists in thinking living beings and minds are no more than that. For further thoughts on both the value and the limitations of behaviourism and its “minimalism,” see Donald, *Mind*, 16-21.

²⁵ On the essential role of “the particulars” for comprehension of “the whole,” see *Tacit Dimension*, 4-12; for Polanyi’s critique of behaviourism, see *Study of Man*, 65, “Tacit Knowing,” 610, where Polanyi speaks of “the *impossibility* of behaviourism” (emphasis added), and *Personal Knowledge*, 369-73.

²⁶ Polanyi, “Modern Mind,” 16.

²⁷ It is noteworthy that both of those authors are avowedly non-religious. Other like-minded authors include Donald, *Mind So Rare*, and Kauffman, *Reinventing the Sacred*.

²⁸ For detailed analysis and critique of these exponents of reductionism, see Haight, *God and the New Atheism*, and Giberson & Artigas, *Oracles of Science*.

²⁹ Polanyi, *Tacit Dimension*, 6.

somewhat passive, but Polanyi sees the matter quite differently:

I am looking at Gestalt as the outcome of an *active shaping* of experience performed in the *pursuit* of knowledge. This shaping or integrating I hold to be the great and indispensable tacit power by which all knowledge is discovered and, once discovered, is held to be true.³⁰

The key words here are “active shaping” and “pursuit.” Mere “[p]erception, on which Gestalt psychology centered its attention,” is not the primary concern, which rather has to do with “the higher creative powers” that humans possess.³¹

It is those “creative powers” which are the major focus of Polanyi’s study. At the beginning of his final chapter of *Personal Knowledge*, he says forthrightly that his “aim [in the book] is to re-equip [people] with the faculties which centuries of critical thought have taught them to distrust.”³² By “critical thought,” he has in mind the “objectivism” described above, and the overbearing attitudes it too often produces when scientists imagine that by their command of the fullness of the facts, all reality would be laid out before them, and perhaps even subject to their control. A classic example of this, which Polanyi laments more than once in his writings, is the claim of Pierre Laplace (1749-1827) that if a great mind could know both the laws and the motions of particles of matter, then it could calculate all events of both the past and the future. Against this, Polanyi insists that in reality such a mind would know “precisely nothing” or at least nothing of interest.³³

The Laplacean error is that it identifies knowing with the wrong end of the process; it begins and ends with the accumulation of facts and the proper cataloguing of them (“a completely precise and strictly logical representation of knowledge.”). What it forgets, and where in reality true knowledge resides, is the human person which alone has the capacity to evaluate and supply meaning to the accumulated data. This critique may seem trivial, but we have to attend to what it reveals about the nature of knowing, and the wide (and potentially dangerous) consequences of a narrow vision of knowing and, consequently, of human beings. Laplace’s method and calculations were inspired by the mechanistic worldview that had its origins in the observations and calculations of Galileo, Descartes, Newton and others:

Galileo – and subsequently philosophers such as Descartes and Locke – marginalized most of the things that make up the *appearance* of material objects as being (mere) “secondary qualities.” Colours, tastes, smells, sounds and so on exist only where there are *observers* and they do not correspond to what, according to physical science, is *objectively* there.³⁴

In Galileo’s own words from *The Assayer*:

I think that tastes, odors, colors and so forth are no more than mere names so far as pertains to the *subject* wherein they seem to reside, and that they only exist in the body that perceives them. Thus, *if living creatures were removed, all these qualities would vanish and be annihilated.*³⁵

The problem is the programme of extreme reductionism, and what Raymond Tallis calls “a no person” view of reality.³⁶ Neither Galileo nor his successors envisaged such a possibility. What they were striving for was *methodological* reductionism, the need to comprehend an entity in terms of its particulars, insofar as they can be known. But, as already suggested above, methodological reductionism over time has devolved into *ontological* reductionism, so that in our age the “contemporary orthodoxy” proclaims that the sum of scientific *knowledge* is the sum of all that is – “we can (in principle) account for every mental phenomenon”

³⁰ Ibid., 6 (emphasis added); see also *Study of Man*, 28.

³¹ Polanyi, *Tacit Dimension*, 7.

³² Polanyi, *Personal Knowledge*, 381.

³³ Polanyi mentions and laments this claim of Laplace numerous times in his writings: e.g. *Personal Knowledge*, 139-142, and “Modern Mind,” 13-15.

³⁴ Tallis, *Aping Mankind*, 140 (emphasis added).

³⁵ Galileo, *The Assayer* (1623), quoted in Shea & Artigas, *Galileo in Rome*, 119 (emphasis added).

³⁶ Tallis, *Aping Mankind*, 113.

in terms of physics and chemistry, and so on, and thus, humans themselves are no more than “a chance collocation of atoms, without purpose or meaning.”³⁷

The potential disasters of extreme reductionism were, in fact, very real for Polanyi. In his own life, he had encountered the evils of both Stalinism and of Nazism. He seems to have had them in mind in the following:

Applied to human affairs, the Laplacean universal mechanics induces the teaching that material welfare and the establishment of an unlimited power for imposing the conditions of material welfare are the supreme good. ... The comprehensive claims of this movement leave no justification to public liberties, and demand that all cultural activities should subserve the power of the State in transforming society for the achievement of welfare.³⁸

To what extent Polanyi was correct in this particular analysis is, no doubt, subject to debate, but his primary point, and the point being argued here, is that a view of human knowing which is overly “objectivist,” and which can envisage that humans are reducible to physics and chemistry, quickly disavows – at least by implication, if not avowedly – the transcendent qualities of humanity. It dispenses, therefore, all at once with the desire for absolute truth (and other intellectual passions), and thus with philosophy and theology, and the entire grounding, which made science possible in the first place. Only an epistemology which affirms transcendent qualities can account for why humanity has risen to the level of what Polanyi calls “a society of explorers,” committed to the truth, to ethical action, and “a purpose which bears on eternity.”³⁹ This brings us to the issue of tacit knowing, and how it links with a recognition of the multi-levelled character of reality.

Tacit Knowing

As already noted, *we know more than we can tell*. In the next section, I shall show how this ancient insight goes along with another that derives from at least as far back as Aristotle: *the whole is more than the sum of its parts*. To illustrate that even simple acts of knowing exhibit the “more” of both insights, Polanyi refers, early in *The Tacit Dimension*, to experiments which “have shown in isolation the principal mechanism by which knowledge is tacitly acquired.” In these experiments, a subject is presented with “a large number of nonsense syllables” and, after certain of them, is administered an electric shock.⁴⁰ After a while, the person was able to anticipate the shock-syllables and take the prescribed step to prevent the shock. But when asked how he recognized the syllables, he could not tell. The acquired ability, referred to as “subception,” is analogous to recognizing a face “by signs which we cannot tell.”⁴¹ What this and similar experiments demonstrate is that “the shock-producing particulars” were “tacit”; the subject could not tell what they were, and “yet relied on awareness of them for anticipating the shock.” But why did the particulars remain tacit? The answer is:

³⁷ As lamented by Polanyi, “Modern Mind,” 12.

³⁸ Polanyi, *Personal Knowledge*, 142. He argues these points in far more detail in other works – e.g. *The Logic of Liberty*, and in the earlier essays (1–4) of *Knowing and Being*. It goes without saying that though Stalinist Russia and Nazi Germany succeeded in establishing “unlimited power” “for the achievement of welfare,” what in reality they “achieved” was anything but “welfare.”

³⁹ Polanyi, *Tacit Dimension*, 55–92; the final quote is from 92. Strong support for Polanyi’s insistence on the active role of consciousness has come from Roger Sperry (1913–1994; neuroscientist, Nobel prize winner), who regarded Polanyi’s ideas as “closest to his own”. Sperry argued, for instance, that “subjective mental phenomena ... influence and ... govern the flow of nerve impulse traffic by virtue of their encompassing emergent properties” (“Modified Concept,” 534). Like Polanyi, Sperry rejected “the basic behaviorist philosophy of science” (Erdmann and Stover, *Beyond*, 149), and also like Polanyi, Sperry had no theological agenda.

⁴⁰ Polanyi, *Tacit Dimension*, 7–8.

⁴¹ Ibid., 8.

[T]he subject was riveting his attention on the electric shock. He was relying on his awareness of the shock-producing particulars only in their bearing on the electric shock ... [and] he learned to rely on his awareness of these particulars for the purpose of attending to the electric shock.⁴²

This illustrates “the basic structure of tacit knowing,” which always involves both the particulars of the thing to which we are attending, of which we are *tacitly* aware, and the thing itself, which we seek to recognize or to know.⁴³ What is true of faces is also true of far more complex matters we strive to know or to learn. When a physician diagnoses a patient’s complaints, her focus is on trying to discover the illness or disease in question, but her tacit awareness (which, in this case, might be quite vivid – see note 42) is on the symptoms which point to it.⁴⁴ A person listening to a lecture or reading a book has an analogous relationship to the words heard, or being read, as the physician has to the symptoms. The listener and reader have a “subsidiary (tacit) awareness” of the words while their *focal* awareness remains riveted on the *meaning* being conveyed. Indeed, should the listener pay too much attention to individual words, he may lose track of what is being said, as also if the pianist concentrates too much on the movement of any one finger, she may lose temporarily the ability to play the music.⁴⁵

In all cases, there is from “a *from-to* structure”⁴⁶ in the act of knowing or learning. Depending on what we are examining, we may (or may not) be aware of its particulars, but we are nevertheless guided by them to know the thing in its integrity. As we attend from the particulars, “it is their meaning to which our attention is directed.”⁴⁷ This is clear in the example of the doctor diagnosing illness. She may focus her attention first on particulars like temperature, blood-pressure and so on, but even so she is attending *from* them *to* what they mean, and only discovers their *meaning* when she attains an accurate diagnosis. In other words, knowing is about integration, bringing the parts together to make the whole.⁴⁸

One further aspect of tacit knowing needs to be introduced before we can consider the relation of Polanyi’s epistemology to his notion of emergence, and the multi-levelled character of reality. This is the issue of “indwelling.” As we study an object, we appropriate its particulars by an internal process of integration. We can, of course, as is often the case, move back and forth from an examination of the particulars to contemplation of the whole, and thereby (potentially) deepen our comprehension. Examination of the particulars removes them temporarily from their function as clues to the original whole, and they become, so to speak, wholes in themselves, to which we can attend only by subsidiary awareness of *their* particulars.⁴⁹ In any event, at all levels, knowing is a tacit *from-to* process.

⁴² Polanyi, *Tacit Dimension*, 9. For clarity’s sake, it is important to note that “tacit” does not denote that the awareness in question is “preconscious” or of a “fringe” character; much less does it mean “unconscious.” As Polanyi explains in a note (*Tacit Dimension*, 95-96), with reference to the psychological studies of G. S. Klein and others, “what makes an awareness subsidiary [or tacit] is the *function it fulfills*; it can have any degree of consciousness, so long as it functions as a clue to the object of our focal attention” (emphasis is original). Polanyi explains this further in “Tacit Knowing,” 602-3.

⁴³ Polanyi, *Tacit Dimension*, 9. A further illustration is our knowledge of skills. I can ride a bike or keep myself afloat in deep water, and thus I “know” how to perform these skills, but if asked to specify how I do so, I cannot. I know more than I can tell, and my knowledge of the particulars of the skill is tacit (see “Tacit Knowing,” 601).

⁴⁴ Of a particular diagnosis, Polanyi says (“Faith and Reason,” 239), “He recognized the disease by attending to it, while he was not attending to its symptoms in themselves, but only as clues. We may say that he was knowing the clues only by relying on them for attending to the pathological physiognomy to which they contributed.”

⁴⁵ See Polanyi, *Tacit Dimension*, 18, and “Tacit Knowing,” 604-5.

⁴⁶ Polanyi, *Tacit Dimension*, xviii – emphasis is original.

⁴⁷ Polanyi, *Tacit Dimension*, 12.

⁴⁸ For a neurological description of this phenomenon, known as “binding,” see Donald, *Mind So Rare*, 178-84. Polanyi, of course, is including the perception and *contemplation* of the “tacit dimension” (more on this below), in other words, a transcendent dimension, which is not in Donald’s purview.

⁴⁹ This back and forth examination of particulars and whole “may improve” understanding, but not necessarily. As Polanyi says it (*Tacit Dimension*, 19): “The meticulous dismembering of a text, which can kill its appreciation, can also supply material for a much deeper understanding of it. In these cases, the detailing of particulars, which by itself would destroy meaning, serves as a guide to their subsequent integration and thus establishes a more secure and more accurate meaning of them. But ... [m]eticulous detailing may obscure beyond recall a subject like history, literature or philosophy.” This is important for recognizing the limitations of reductionism: “[T]he belief that, since particulars are more tangible, their knowledge offers a true conception of things is fundamentally mistaken.”

We see this dramatically illustrated if we consider that our own bodies, and their internal processes of perception, are also a part of tacit knowing. Not only do we attend from the particulars of a thing that is *external* to us, we also – in our knowing of the world – attend *from* our bodies “to the qualities of things outside.”⁵⁰ And, as we are only tacitly aware of the features of an external thing, so also we have only a tacit (subsidiary) awareness of bodily processes that enable us to know the world, even though “our body is the ultimate instrument of all our external knowledge.”⁵¹ We can nevertheless appreciate its instrumental power when we extend its capacities through the use of instruments, like a probe for exploring a cavity or by the use of microscopes etc. By such instruments, we extend our bodies into the world, and increase our capacity to know.⁵²

In all these cases, we integrate in order to understand. Indeed, we might say that just as we “indwell” our bodies, and from them contemplate the world around us, so we indwell instruments, and the particulars of the things we investigate. What “this brings home to us [is] that it is not by looking at things, but by dwelling in them, that we understand their joint [integral] meaning.” We “indwell” the things we seek to understand, just as we indwell our bodies, and indeed society and its structures, in order both to receive and to share knowledge.⁵³ And the more complex the things we seek to know, the deeper the indwelling has to be. For the recognition of a face or the inspection of a rock, the indwelling is comparatively simple and shallow. But the more we rise through complex levels of understanding, from inanimate to animate things, from stars, galaxies and micro-organisms to complex intelligent life, and finally to the most complex level of all, the arts, sciences and minds of human beings, then indwelling is increasingly characterized, and *has to be* characterized, by participation, respect and contemplation.⁵⁴ Living things are the most complex entities we know, and “knowing life”⁵⁵ is necessarily “contemplative, rather than analytical.”⁵⁶ Once biology rises, as it must, to the level of “a biology of [persons] immersed in thought,” then it must also acknowledge the human “capacity for continually discovering ... a deeper understanding of reality,”⁵⁷ and its multi-levelled character. It is that capacity which enables science and, for that matter, theology.⁵⁸

The Multi-Levelled Character of Reality (Emergence)

Polanyi liked to refer to the *Meno* in which Plato puzzled over a paradox:

To search for the solution of a problem is an absurdity; for either you know what you are looking for, and then there is no problem; or you do not know what you are looking for, and then you cannot expect to find anything.⁵⁹

⁵⁰ Polanyi, *Tacit Dimension*, 14.

⁵¹ Ibid., 15.

⁵² Ibid., 12-16; see “Faith and Reason,” 241-42.

⁵³ Polanyi, *Tacit Dimension*, 16-20. For further discussion of “indwelling” and its philosophical implications, see “Tacit Knowing,” 605-7, and *Personal Knowledge*, 195-202. As Polanyi explains (*Tacit Dimension*, 17-18), indwelling adds considerably to the understanding of tacit knowing. It is not merely that we “know more than we can tell,” and that particulars are clues to the meaning of the whole; it is also that – especially with deeper knowing – there is an “interiorization” by the knower in the thing known and, we may say, of the thing itself within the knower.

⁵⁴ Polanyi, *Personal Knowledge*, 193–202. Note also the following (347): “[A]s we proceed to survey the ascending stages of life, our subject matter will tend to include more and more the very faculties on which we rely for understanding it ... Biology is life reflecting on itself, and the findings of biology must prove consistent with the claims made by biology for its own findings.” In other words, to claim that biology discovers the truth about life, but at the same time to accept the view that “neural circuits” can account for intelligence, and thus “even the discoveries of Kepler and Darwin” (340) is tantamount to saying that biology is brilliant, but the biologist is, at best, an automaton, and at worst, an idiot!

⁵⁵ This is the title of chapter 12 of *Personal Knowledge*.

⁵⁶ Polanyi, *Personal Knowledge*, 353.

⁵⁷ Ibid., 374.

⁵⁸ It might bear repeating that if “tacit thought forms an indispensable part of all knowledge, then ... [t]he ideal of exact science [objectivism] would turn out to be fundamentally misleading and possibly a source of devastating fallacies” (*Tacit Dimension*, 20).

⁵⁹ Polanyi, *Tacit Dimension*, 22; also *Science, Faith and Society*, 14.

Plato's solution of the paradox was in terms of "remembering of past lives," which no one has ever accepted; Polanyi's solution was the process of tacit knowing. People have an instinct, an "intimation of something hidden, which [they] may yet discover," and so "gradually penetrate to things that are increasingly real."⁶⁰ Very early in *Tacit Dimension*, Polanyi says, "My search has led me to a novel idea of human knowledge from which a harmonious view of thought and existence, *rooted in the universe*, seems to emerge."⁶¹ The words "rooted in the universe" signal the connection Polanyi saw between human knowing and the fourteen-billion-year history which has given rise to human beings. As one of his expert interpreters expresses the matter:

[Humanity] has emerged, but [humans] still have [their] history in [them], in their slowly evolved powers of understanding as in [their] physical body. Our own urge to know is traceable right back to the urge to get about and grasp and deal with their world that was shown by the earliest forms of life. Our quest, certainly, is pursued with immeasurably more powerful and accurate instruments ... all this is a tremendous achievement. But, at the same time, it is only a tool-kit. It cannot work on its own, [people] have to use the tools, and they still rely basically on the powers that grew in the swamp.⁶²

This brings us to consideration of Polanyi's ideas about emergence, which is a subject of lively debate in recent times.⁶³ For our purposes, it is not necessary to arbitrate that debate; it is only necessary to note, first, the compelling links that Polanyi sees between human evolution and human knowing (a comparatively uncontroversial point) and, second, the arguments he presents for seeing reality in hierarchical, multi-levelled terms.

In the final two chapters of *Personal Knowledge* ("Knowing Life" and "The Rise of Man"), Polanyi discusses "knowing life" at its various evolutionary levels, and weaves together the themes of the biological knowing of life (an achievement of modern science) and biology as "life reflecting on itself,"⁶⁴ such that human culture attains to a point where it knows itself to be called to, and responsible for, "a firmament of truth and goodness."⁶⁵ This is the pinnacle of life's achievement, which has ascended from "protozoa" and their "deliberate purposive activities,"⁶⁶ through innumerable intermediate stages of life and knowing, to "the art of knowing" in humans.⁶⁷ But how did the universe accomplish this? Why does it have such potential? Martin Rees (astrophysicist) explains that but for the finely balanced character of its forces, the universe would be barren of life. The chances of the universe (*any* universe) producing life, much less *intelligent* life, are so vanishingly small that the evolution of human beings appears as a profound puzzle. Rees resorts to the concept of a "multiverse," which amounts to the claim that among countless universes, most of which are empty, this one is so constructed as to give rise to beings that can contemplate its (and their own) origin.⁶⁸ Whether the multiverse concept, with its presuppositions of blind chance, can

⁶⁰ Polanyi, *Tacit Dimension*, 22-23; *Knowing and Being*, 168, and "Faith and Reason," 243.

⁶¹ *Tacit Dimension*, 4 (emphasis added).

⁶² Scott, *Everyman Revived*, 48. This notion (intelligence being connected to the universe's history and nature) is also articulated by Davies, *Mind*, 24: "Our mental processes have evolved as they have precisely because they reflect something of the nature of the physical world we inhabit." This insight goes even further, however, when we recognize (see Davies, *Mind*, 148-50) that our mental capacity far exceeds what natural selection requires: "Our brains have evolved in response to environmental pressures, such as the ability to hunt ...etc. [But] what has this got to do with discovering the laws of electromagnetism or the structure of the atom?" (149). In other words, the mind far transcends the limited needs of survival and reproduction, and that means that the reality which the mind detects and to which it responds far transcends the swamp.

⁶³ Given the complexity of the topic, it is hardly surprising that some of Polanyi's ideas are disputed; see Clayton & Davies, Eds, *Re-Emergence of Emergence*, 14-19.

⁶⁴ *Personal Knowledge*, 347. See again note 54 above.

⁶⁵ *Personal Knowledge*, 380. For Polanyi's full discussion of "A Society of Explorers," see *Tacit Dimension*, 55-92. Polanyi's earliest articulation of these ideas was in 1946, *Science, Faith and Society*.

⁶⁶ Polanyi, *Personal Knowledge*, 387.

⁶⁷ Wilson, *Consilience*, argues that all disciplines are ultimately reducible to laws definable by biology, and thus he subsumes even religion and ethics under biology. Polanyi also sees a connection from biology "into epistemology" (*Personal Knowledge*, 387) but the contrast with Wilson could not be more dramatic. Wilson *reduces* all knowledge to biology; Polanyi sees biology – he calls it "ultrabiology" (363) – bursting its bounds, and ascending to the transcendent levels of philosophy and theology.

⁶⁸ Rees, *Just Six Numbers*; see also *Our Cosmic Habitat*.

account for the amazing properties of mind is an issue for debate.⁶⁹ The “contemporary orthodoxy,” also presupposing blind chance, thinks that evolution accounts for mind, and in the process denigrates mind, as explained above. For his part, Polanyi also was convinced of the universe’s amazing creativity, and he saw evolution as the *conditions* in which mind arose. But, in order more fully to understand both evolution and mind, he turned to the concept of emergence.⁷⁰

Emergence refers to the fact that as the universe unfolds (and as life evolves) “emergent properties” arise “that follow from the system rules but cannot be predicted from properties of the components that make up the system.”⁷¹ One might, for example, think of how biology “emerges” from physics and chemistry. Physics and chemistry are alike in that they are completely automatic; there is no agenda or teleonomy involved. Biology is another matter; it does involve teleonomy, in the sense that “all living things behave as if they have an agenda”⁷² – their “purposive activities” are precisely what distinguish them from the inanimate stuff of physics and chemistry.

The point being made here is not that there is some mystical or divine intervention from one level to another.⁷³ Emergence is a subject for the natural sciences, and is purely a physical process. It is what the *creativity* of the process suggests about the nature of reality that makes it interesting, not only in the sciences, but also for philosophy and theology. Stuart Kauffman (biologist, and philosopher of science), among many others, has recently pointed to the “robust self-organizing properties” of the systems within which biological evolution takes place as a challenge to the way evolution is usually understood. To quote him at length:

It is not that I want to ... say that Darwin was wrong ... natural selection is an overriding, brilliant idea ..., but there are parts of it that Darwin couldn’t have gotten right. One is that if there is order for free – if you have complex systems with powerfully ordered properties – you have to ask a question that evolutionary theories have never asked: ... how do we build a theory that combines self-organization of complex systems – that is, this order for free – and natural selection?⁷⁴

Kauffman could easily have invoked Polanyi for a response to his question, and an elaboration of this idea. In *Personal Knowledge*, Polanyi argues at length for the presence of “operational principles,” which enable emergent properties to arise from lower to ever higher levels of existence. He seeks “to establish an ordering principle of evolution, by distinguishing the *actions* of such a principle from the *conditions* which *release* and *sustain* its action.”⁷⁵ Thus, when it comes to thinking of the origin of life, he says:

[T]he *ordering principle* which *originated* life is the *potentiality* of a stable open system; while the inanimate matter on which life feeds is merely a *condition* which *sustains* life, and the accidental configuration of matter from which life had started had merely *released* the operations of life. And evolution, like life itself, will then be said to have been *originated* by the *action* of an ordering principle, an action *released* by random fluctuations and *sustained* by fortunate *environmental conditions*.⁷⁶

⁶⁹ See Davies, “Introduction” in Gregersen, *From Complexity to Life*, 3-16. See also Morris, *Life’s Solution*, who is far more sanguine than Rees about the value of incorporating theological notions into our understanding of the universe and of life. Morris’ thesis is that “the constraints of evolution and the ubiquity of convergence make the emergence of something like ourselves a near-inevitability” (328).

⁷⁰ On emergence as a concept of physics, see Morowitz, *Emergence of Everything*, and Davies, “The Physics of Downward Causation” in *Re-Emergence of Emergence*. In that same volume (1-28), Clayton explains the “Conceptual Foundations of Emergence Theory.”

⁷¹ Morowitz, *Emergence of Everything*, 13. Morowitz describes twenty-eight “emergences” from the big bang, through stars, apes and philosophy to the Spirit (the latter *not* being understood in a traditional religious sense).

⁷² Pross, *What is Life?* 9. Pross (a biologist) uses the word “teleonomy” here, and he regards it as “empirically irrefutable.”

⁷³ The theology presupposed in this paper is similar to the theistic naturalism, including its notion of panentheism, espoused and expounded by Peacocke, *All That Is*, and *Theology*. It is not, therefore, a matter of God intervening at special points, but of the universe reflecting and unfolding divine creativity, and being pervaded by God’s presence.

⁷⁴ Kaufmann, “Chapter 20,” in Brockman, *Third Culture*, 337; Kauffman has developed these ideas in *Origins of Order*, and more recently in *Reinventing the Sacred*. See also his “Emergence” essay in Gregersen, *From Complexity to Life*, 47-71.

⁷⁵ Polanyi, *Personal Knowledge*, 382 (emphasis is original).

⁷⁶ Ibid., 383-84 (emphasis is original).

At least three points are to be noted here. First, evolution is an aspect of emergence, and evolution was only possible because of the prior “ordering principles” which enabled the universe to come to the point of originating life.⁷⁷ Emergence – whatever it is precisely – is an amazing fact about the universe. In light of it, one might make the case that “though there has always been inanimate *matter*, there was never such a thing as an inanimate *universe*, at least in the sense that what created the universe was full of the potential for life, mind and meaning.”⁷⁸ Second, Polanyi is not to be ignored when he argues for the presence of “ordering principles,” and the “persistent creative trend”⁷⁹ they exhibit in the course of evolution, enabling even the rise of consciousness. To make this argument, Polanyi invokes “teleological principles,” which lie outside the bounds of empirical science, and which indeed are vigorously rejected by many, probably most, biologists.⁸⁰ However, in light of the evidence of emergence, and of life’s “purposeful character” (see note 80), the *philosophical* assertion of purpose as a factor in the becoming of the universe is, to say the least, reasonable. The burden of proof, surely, falls on those who wish to deny it.⁸¹

The third point to be noted is that the “ordering principles,” which have given rise to life’s increasing levels of complexity, cannot be accounted for in terms of physics and chemistry. A simple illustration of this idea is machinery, whether one is thinking of the machine-like operations of the human body or the machines which humans create. Consider a watch. Its parts function by physicochemical laws, but their interactions – the watch functioning *as a watch* – function by operational (mechanical) principles of which physics and chemistry know nothing. The point here is not that the watch is an emergent of physics and chemistry, but simply that it illustrates a level of functioning (and being) to which physics and chemistry are blind. It also illustrates top-down causation. Though the watch is utterly dependent on physicochemical laws for its functioning, those laws are not *sufficient* for the watch to be a watch. Physics and chemistry could account for the watch’s failure, but they have nothing to do with its success. The mechanical laws of the watch control “the boundary conditions” left open by physics and chemistry; the higher level controls the lower.⁸²

Emergence – minimally understood as the unfolding of increasingly complex levels of existence – explains the dynamism and creativity of the universe, which have been present from its first microseconds.⁸³ Polanyi presupposes this creativity, but keeps his focus on the emergent properties of living beings. They “comprise ascending levels of successful existing and behaving.”⁸⁴ The knowing of living beings cannot be achieved by the objectivist program which catalogues details, isolates measurable responses to stimuli, and pretends that it can account for the living organism in terms of the inanimate categories of physics and chemistry. In Polanyi’s words:

77 In the twenty-eight “steps” of emergence described by Morowitz, *Emergence of Everything*, the “biosphere,” leading to evolution, is step number eight (29). By contrast, Polanyi (*Personal Knowledge*, 394) says: “No richly endowed new reality can be seen emerging in the inanimate domain. This happens for the first time in the emergence of a living being from inanimate constituents.” He goes on to say (395): “In the course of anthropogenesis, individuality develops from beginnings of a purely vegetative character to successive stages of active, perceptive, and eventually responsible personhood.” For Polanyi, therefore, “phylogenetic emergence is continuous,” and it is not a matter of “new creative agents[s]” making their presence felt at “consecutive new stages of being.” It is rather the case that “[n]ovel forms of existence take control of the system by a process of *maturation*” (emphasis is original).

78 Smiles, *Bible and Science*, 128.

79 Polanyi, *Personal Knowledge*, 385.

80 On Polanyi’s view that “[a]ll physiology is teleological,” see *Personal Knowledge*, 359-61 (and see also his Index under “purpose” and “teleological”). Polanyi was vividly aware that this view was largely rejected by biologists (e.g. “Modern Mind,” 16). See also Clayton, *Re-emergence of Emergence*, 19. On the other hand, Pross, *What is Life?* 9-23, speaks forthrightly of “Life’s purposeful” and “dynamic character.”

81 On the reasonableness of positing purpose (teleology) as a possible factor in the becoming of the universe, see the work of Paul Davies: e.g. his two essays in Gregersen, *From Complexity to Life*, “Introduction” (3-16), and “Complexity” (72-90). See also his books, especially *The Mind of God*.

82 A further illustration is a page of writing. A physicochemical analysis of the page cannot detect, much less can it “read,” the message in the writing. The latter represents higher emergent levels to which physics and chemistry are blind. For Polanyi’s use of these illustrations, see *Modern Mind*, 13-14.

83 Polanyi, “Common Ground,” 13, speaks of “a creative power inherent in the universe.”

84 Polanyi, *Personal Knowledge*, 381.

We can know a successful [living] system only by understanding it as a whole, while being subsidiarily aware of its particulars; and we cannot meaningfully study these particulars except with a bearing on the whole. Moreover, the higher the level of success we are contemplating, the more far-reaching must be our participation in our subject matter. ... Accordingly, it is as meaningless to represent life in terms of physics and chemistry as it would be to interpret a grandfather clock or a Shakespeare sonnet in terms of physics and chemistry; and it is likewise meaningless to represent mind in terms of a machine or of a neural model.⁸⁵

Knowing life, contemplating its mysteries, is the most stunning capacity that the universe has produced, and it is exercised by the highest, active powers of the mind.

But the capacities of the mind no more than dimly mirror the depths of the reality which they face. Knowing has to do with “contact with a hidden reality”⁸⁶ and reality reveals itself constantly in new and unexpected ways.⁸⁷ This is why the abstract, intangible levels of reality are more real than the physical levels – problems are more real than cobblestones, since they reveal deeper levels of reality.⁸⁸ The emergent levels of the universe, and most especially the increasingly complex levels of being that are manifest in animals and humans, represent depths of reality which endlessly invite human inquiry. Knowing answers to being; being invites knowing.

It is, of course, true that knowing is fraught with error. In fact, “Everywhere the potential operations of a higher level are actualized by their embodiment in lower levels which makes them liable to failure.”⁸⁹ But in no way does this deny the capacities humans have to *strive* for knowledge, and to search for the truth. To the contrary, only the possibility of failure brings into focus the hazard and courage of accepting responsibility:

[W]hile people are by nature subject to lust, pain and pride, which makes them liable to dereliction of duty, these self-centred drives are indispensable elements of a responsible commitment. For only by staking our lower interests can we bear witness effectively to our higher purposes.⁹⁰

The very fact that humans are so fallible – physically, intellectually, ethically – highlights all the more their amazing accomplishments and their capacity to transcend those limits. All varieties of knowledge – from mathematics and the sciences to art, philosophy and theology – have their common ground in the transcendent abilities of human beings, which therefore also suggest transcendence in the universe.⁹¹

Conclusion: Transcendent Mind, Emergent Universe

Objectivism, says Polanyi, “tends to destroy the I-Thou commitment of the religious worldview and establish a panorama of I-It relations in its place.”⁹² Objectivism attempts to depersonalize knowledge, even to the point of denying the reality of mind and consciousness. The way back from this nightmare of self-contradiction is to examine again what are human beings, and what is the character of their knowing. The insights of tacit knowing, gleaned from Gestalt psychology, show that knowing is an “indwelling,” an awareness of particulars that serve as clues for knowing an entity in its integrity. As such, knowing is akin to becoming acquainted with a person, which draws the knower into the depths of reality.

The success of human projects is evidence of the human “capacity for knowing the presence of a hidden

⁸⁵ Ibid., 381-82.

⁸⁶ Ibid., vii; see also 5, 64 *et passim*.

⁸⁷ E.g. *Tacit Dimension*, 32; *Knowing and Being*, 133.

⁸⁸ Polanyi, “The Emergence of Man,” 4-5. Haught, *God*, 181, appeals to Polanyi for his view that with the appearance of living beings, and their subjectivity and “striving”, “the cosmos opens out into a kind of being clearly distinct from anything previous”.

⁸⁹ Polanyi, *Study of Man*, 67 (emphasis original).

⁹⁰ Ibid.

⁹¹ Relating human intelligence to its place in the universe, Polanyi (“Science and Religion,” 14) says: “Has [human] intelligence broken through the limits of [its] own powers? Yes and No. Inventive efforts can never fully account for their success; but the story of [human] evolution testifies to a creative power that goes beyond that which we can account for in ourselves.”

⁹² Polanyi, “Faith and Reason,” 245.

reality,” of our possessing “true intimations of the unknown.”⁹³ This is why all inquiry, whether of the scientist or the mystic, requires faith as well as reason. Success can only be achieved if the inquiry remains faithful to its quest for the truth. The faith in question might well, of course, have nothing to do with religion as such. It might be faith in the rationality of the universe, in the powers of one’s own mind or in the guidance of an expert. In any event, and in every area of endeavor, “[t]here is no other way of approaching a hidden meaning than by entrusting ourselves to our intimations of its yet unseen presence,”⁹⁴ even though its presence may remain hidden for a lifetime.

Human knowing has emerged in the universe along with, and in the same way as, all of its other emergent properties. Polanyi’s account of the rise and character of human knowing – far fuller than the few details highlighted in this essay – makes clear that there is “a continuous ascent from our less personal knowing of inanimate matter to our convivial knowing of living beings.” And indeed, just as there is a continuum of knowing from the inanimate to animate, so also there is a continuum “from our knowing the laws of nature to our knowing the person of God.” Scientific materialism can only maintain its stance by muting much of the evidence about knowing to which Polanyi points. It collapses all the disciplines of human knowing into the natural sciences, even denying the power, if not the very existence, of the human mind. Such conceptions of knowledge drive the disciplines apart, alienating the sciences not only from theology, but also from philosophy and the humanities in general.⁹⁵ Against that view, Polanyi’s philosophy poses the question: if the physical characteristics of humans are evidence for understanding reality, why are not their intangible, transcendent characteristics also evidence for the same thing?

It is a massive irony that even as it attenuates and denies the power of mind, scientific materialism claims to know the ultimate nature of the universe: “There is only one sort of stuff etc.” Even as it employs the transcendent mind, it denies its existence. But it is their transcendent abilities which enable humans to have “intimations of reality” and then to go in search of their meaning. It is those same qualities, and those alone, which have always been the fertile soil of human inquiry, and thus they alone can account for both science and religion.

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⁹³ Ibid., 243.

⁹⁴ Polanyi, “Faith and Reason,” 243. The importance of Polanyi’s observation in this regard has been noted and stressed by other writers, including Gilkey, *Religion*, 50, Haught, *Science and Religion*, 23, and Polkinghorne, *Science*, 9-10.

⁹⁵ See notes 54 and 67 above.

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