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Emergent Computing and the Embodied Nature of Computation

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Abstract: If we define computing as the typical activity of computers – in contrast to other approaches that define computation as an abstract mathematical process – it will become evident that in some cases the result of computation is not only a function of the algorithm executed but also of certain physical processes. For example, random numbers, which are used in many algorithms, are usually generated by sampling the physical environment of the computer. This may sound trivial, but as we will see some philosophical arguments around emergence seem to rely on some sort of platonic conception of computation and thereby draw conclusions that do not apply to real-world computation. In other words, we should not forget that computing is embodied, and different embodiments lead to different computation results. This article investigates what can be said about the question of emergent computing in light of computation's embodied nature.

Key words: computers, emergent computing, epistemic emergence, *Game of Life*, ontological emergence.

1. Introduction

The aim of this article is to explore what does *emergent computing* mean, and in what circumstances can computing be said to be *emergent*. Emergence is a centuries-old philosophical problem. In addition, in the last one or two decades, engineers, while trying to solve hard computational problems, invented a solution which they called *emergent computing*. This coinage was not based on a dialog between philosophers and engineers. It was the result of the internal evolution of computer science independent of the philosophical

debates. Thus, there were, at least, two main approaches to be considered in this inquiry about emergence and computing. But this does not necessarily mean that *emergent computing* and the philosophical notion of *emergence* are incompatible with each other.

There is some literature discussing how emergent computing fits into the original philosophical debate. Most of these accounts drew the conclusion that computing can be *epistemically* emergent (e.g. Cariani 1991), but not *ontologically*. For most of the authors, the epistemic nature of emergent computing meant that, for an observer, the computation produces a surprising, complex phenomenon. But this phenomenon was identical with a set of more primitive building blocks, which were manipulated by simple operations. So, for these authors, the complex phenomenon was not a novel entity existing on its own, no matter what the impression of the observer was.

This view was best summarized by Barry S. Cooper (2011). He described emergent computing in the following way: 1) An engineer creates a computation, using a program on level L1. 2) An observer recognizes a complex phenomenon, or behaviour, like the typical complex dynamics of a stock market. Cooper called this an L2 level observation. 3) For the observer, it is not evident how the instructions of the L1 program lead to the phenomenon on L2. Moreover, sometimes the connection between L1 and L2 is not immediately apparent, even to the engineers themselves. What follows is that an L2 phenomenon is nothing more than an arrangement of elements on L1, hence a phenomenon on L2 does emerge in an *epistemic* sense.

But the discussion of emergent computing began much earlier. Cariani (1991) characterized emergent computing as a process in which global forms are created through micro-deterministic computations. This means that the emergent phenomenon is formed from bottom to top following certain

construction rules. Thus, the result is fully determined by the building blocks. Still, the result can be said to be emergent in the sense that the creator only had a model at the basic level. The complex phenomenon, that is, the result of the computation, is not part of the model and cannot be expressed by its elements and operators. In other words, this theory also described epistemic emergence.

A good case in point explaining Cariani's theory was an experiment published by Walshe et al. (2008). The authors created a simplified computational model that represented the inner workings of cells, cell-cell relations and cell-active substance relations in the human body. The model did not contain the majority of the known parameters of a cell – each cell was expressed by a vector, in which the first dimension described the cell's position in space, and some additional dimensions described how the cell interacted with active substances. In this way, a simple, multi-dimensional vector space was created in which the distance between two cells could be calculated based on their positions and chemical properties. With the addition of a set of rules that describes what should happen when cells are within a certain distance of each other, the model was ready to simulate cell population dynamics.

This model was used to simulate what happens in a human body when it is infected with the HIV virus. They ran the simulation with many different parameter sets, and found that the function of the number of Killer-T immune cells over time changes in very similar ways to those few real infections that have been documented since their very early stages. The shape of these functions is quite non-trivial, yet the numbers are very similar in the simulation and the real cases. This suggests that the researchers were able to create a simulation that behaves like a real cell population; therefore, it is possible to use the simulation to test different medications. According to Walshe et. Al., the behaviour of the simulated cells is emergent – one can best

understand what they mean by referring to Cariani's emergence-to-a-model theory.

According to other approaches, the term *emergent computing* describes the processes that occur in distributed and decentralized computing architecture, a long known, but only recently trending method of computer engineering. Relying on the work of Stephanie Forrest (Forrest 1990), Wim Hordijk (Hordijk 1999) defined emergent computing as global information processing that takes place in decentralized systems that extend in space. In a special issue of *ERCIM News*, Ruskin and Walshe gave another definition of *emergent computing*, calling it a complex process that is a "non-linear" combination of more simple processes (Ruskin and Walshe 2006).

There were additional computations that were claimed to be emergent in one way or another. For instance, in Conway's *Game of Life*, a simple binary matrix can exhibit exciting self-maintaining creatures, forms that shoot other forms, by using only three basic rules (Gardner 1970). By using evolutionary algorithms, a simple fitness function, and the basic rules of selection, mutation, and recombination, useful applications can be made. For example, according to a NASA plan described by Curtis et al. (2003), about 1000 micro-satellites could map an asteroid field in a concert of effort, yet each satellite would follow only a simple set of rules.

This quick review of the applications of emergent computing and their results also reveals a stereotypical view of computing itself. This view suggests that, the computer can be paused at a certain step, and its internal state can be accessed. Moreover, it is often said that the operation of a computer is nothing more than the execution of a chain of formalized commands, each one being determined by the previous one. In this model, emergence can, indeed, only occur in the sense that the appearance of a complex behaviour or form

surprises the observer. Such surprise can either come from a limited knowledge about the momentary working of the system or from a limited knowledge about how the mass of basic elements affect the operation of the system.

This article will argue that this view of computers and computation is inaccurate. It will suggest that, replacing our current view of computers with a more accurate one would enable a richer and more exciting interpretation of emergent computing. I will show that, a computer, at a given time, cannot be fully described by the contents of its memory and the architecture thereof. The physical state of the computer and its environment should also be taken into account when describing computers and computation, because these factors contribute to the working of computers. This does not mean that one could not reduce a complex phenomenon to the bits of a computer's internal state at a given time. (We can call this *synchronous reduction*, following Paksi's (2011) terminology). However, one could not reduce the bits of the current state to the bits of the previous state and the architecture (*diachronous reduction*). This will be important in the evaluation of evolutionary computations.

2. Embodied computation

Let us start with the axiom that every computation that has actually been carried out is embodied somehow, either in a living organism, or in a machine. The next question is, if one calculates the computation $2 + 2$ in her head, and then, by pressing "2", "+", "2" on a calculator, are the two computations identical or not? If they are identical, what does exactly create the connection between them? In the philosophy of mathematics, it is well known that many mathematicians think that, there are abstract mathematical calculations that are governed by abstract principles. The actual calculations are implementing

the abstract $2 + 2$ in one way or another. This is the Platonist understanding of mathematics in a very small nutshell (for more, see James Robert Brown 2008). Of course, the same abstract calculation can be realized multiple times, and the result is always the same if the realization is done right (of course, other properties of the computation, e.g. its speed, might vary). As a corollary, the mathematical analysis always describes the abstract calculation or computation, and not the physical realization.

But actual calculations are not only implementations of abstract mathematical calculations. They can be extremely useful in analyzing physical processes. If we can interpret a certain feature of a physical process as a number, and a related physical operation as a mathematical operator, then we can predict that, for instance, by mixing 1 dl of water with 4 dl of wine, we get 5 dl of liquid. That is, we can make predictions, analyses, and plans about the physical world using mathematics.

The connection between an abstract calculation and its physical realization is not always as close as in the case of simple addition. For example, a *stable Markov chain*¹ cannot predict the specific state of the process at a given time in the future, only the possibilities of certain states.

Following this train of thought, one quickly recognizes that the examples of emergent computing discussed above are very different from each other in the sense of mathematical definability. In case of the *Game of Life*, we should get the same results with every implementation as long as the implementation

¹The *Markov chain* is a common tool in computing theory for describing certain stochastic processes that are characterizable by discrete states, and in which future states are only dependant on current states but not on past ones. The *Markov property* is the memoryless property of these stochastic processes.

follows the same rules. But the case of emergent computing (as we will see in the next part) is entirely different. The possible mathematical descriptions offer very limited descriptions which only address the results of computation. Still, these computer applications are dedicated to the creation of artifacts with very specific properties.

The problem of embodied computing – like the problem of emergence – was explored by computer scientists independently from the philosophical discussion of embodiment. One reason that scientists' attention turned to embodied computing was that certain problems have arisen that endangered the fast pace of the evolution of computing hardware in recent decades. As MacLennan (2008) described the situation, while earlier every bit was represented by a very large number of physical particles, this ratio has started to decrease in the latest systems. Systems in which the number of bits and the number of particles that store the bits are increasingly close have become a real prospect in the near future.

For researchers working on such a small scale and tackling the properties of matter that allow the storage and manipulation of more bits, the idea of different computer architectures quickly surfaced. The core of the idea is that strictly adhering to the Church-Turing computational principles is not always rational, especially if these principles do not fit the capabilities of the matter we want the computer to be made of. Maybe it is more rational to make computers that do not qualify as Church-Turing implementations, but are quicker or more energy efficient than their Church-Turing counterparts. One approach for doing this, is to tolerate a certain rate of error in the computation in order to gain dramatic improvements in speed. Certain applications do not need perfectly accurate calculations anyway (for example, in a fast-paced flight simulator, who would notice tiny errors in the movement of the water in

the ocean below the plane?), and in other applications error prevention can be added at higher levels of the architecture (IEEE Spectrum, 2009).² Quantum computing also exploits the nature of matter to go beyond the Church-Turing computation. And last, but not least, one might be motivated to investigate non-Church-Turing computation because certain problems are hard to solve on Church-Turing machines. For example, path planning in a labyrinth can be computed by exploiting the diffusion of liquids (Heiko Hamann and Heinz Wörn 2007).

The next chapter discusses computation that can be made on everyday computers. This example will help to explore the nature of embodied computing, which, in turn, will enable us to find answers to some original questions about emergent computing.

3. Evolutionary Computing

There are many applications that run evolutionary computations and genetic algorithms. One such application is *Tierra*, created by the biologist Thomas Ray. He defined a virtual computer architecture that used a 5-bit instruction set, meaning that there were 32 different instructions.

For this architecture, he wrote a program that was able to copy itself repeatedly to different memory locations. In this way, the copies of the small program slowly consumed the available memory space. However, sometimes the system modified a random bit during its operation. This represents a mutation. Most of the time the modified bit makes the program dis-functional. But sometimes the modified code is functional, and rarely it is even more viable than the original (e.g., the program is made of less instructions but has

² <http://spectrum.ieee.org/semiconductors/processors/cpu-heal-thyself/4>

the same behavior). In other words, a process of artificial evolution starts (Ray 1991). A similar experiment is *Nanopond*³, which uses a 4-bit instruction set and contains no initial program – the initial program itself is created by modifying random bits in a huge memory space.⁴

4. Evolutionary *Game of Life*

For the sake of a simpler analysis, instead a 4- or 5-bit architecture, let us investigate the much simpler system of the *Game of Life*.

“Life” is John Conway’s classic “recreational” mathematical game, which became widely known as *Game of Life* because of a *Nature* article (Gardner 1970). The game is played in a 2 dimensional grid, like a sheet in a math exercise book. Cells are marked with two different colors, one for “live” cells, the other for the “dead” cells⁵. The gameplay is divided to “generations,” according the following simple rules:

- 1. Survival.** Every living cell that has two or three living neighbours survives.
- 2. Death.** Every cell that has four or more living neighbours dies (“over-population”). Every cell that has one or zero neighbours dies (“isolation”).
- 3. Birth.** Every dead cell with exactly three neighbours becomes alive.

Figure 1 shows how the game works⁶.

³ <http://adam.ierymenko.name/nanopond.shtml>

⁴ For an 8 hour long Nanopond run, see:

<http://video.google.com/videoplay?docid=4775386042852459808>

⁵ Conway had other rules to limit the initial patterns that are irrelevant to us.

⁶ The patterns are the same as the ones published in the original *Scientific American* paper.

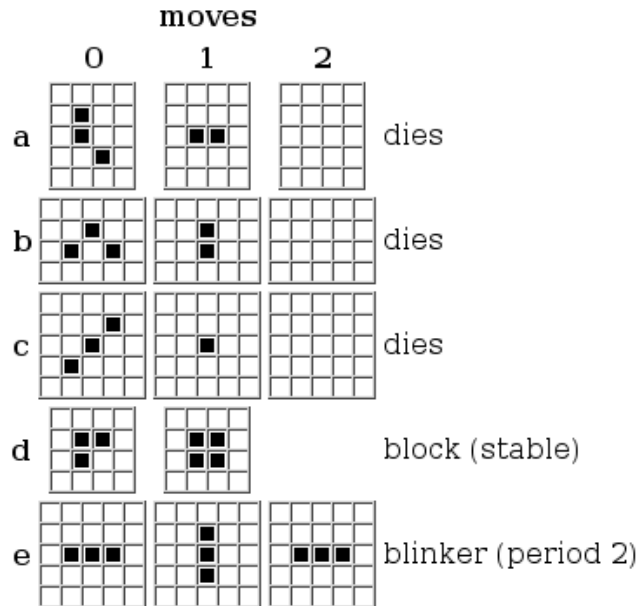


Figure 1. Game of Life patterns

Let us run a genetic algorithm on this universe in a thought experiment!⁷ Let the goal be the creation of “interesting” *Game of Life* patterns. We will try to invoke evolution to solve the problem: we generate a number of random patterns, and then we select the fittest to achieve our goal. On the patterns selected, we execute *genetic operators*: mutation and crossing. This way the next generation is created, with which we will start the whole process again.

Let us define “interesting” patterns as the ones that are able to maintain the following properties for the largest number of generations:

1. They do not exceed an $n \times k$ size rectangle.
2. They do not die completely.
3. They do not stabilize (get “frozen”).
4. They do not repeat previous properties, or in other words, they do not

⁷ Wim Hordijk reports on similar experiments in his PhD dissertation (Hordijk, 1999).

enter infinite loops.

The *fitness* itself will be the number of generations for which a pattern can maintain the properties above. In everyday terms, we are looking for the patterns that are able to transform themselves as long as possible without exceeding the size limits or getting into a loop.

Let us say that after running the experiment for several millions of generations, finally we get a pattern that slowly but steadily grows until reaching the size limits, and then starts to shrink. Let us call this pattern a *pulsar*!

Now, let us try to analyze exactly how a pulsar is created. First, we ran *Game of Life* for billions of generations. This computation, even though it had a physical realization in the computer, was a strict implementation of the abstract algorithm of the game. Therefore, these parts of the calculation were independent of the actual computer we ran it on. They could have been executed by any computer, or even by a group of diligent school kids with math exercise books. Should we run these parts again, we would get the same results.

But the case of the genetic operators is different. Naturally, these too were executed by a computer algorithm. In the case of the mutation, we generated an (r,t) pair of coordinates i number of times. Then we changed the status of the designated cell from dead to alive or vice versa. In the crossing step, we crossed random parts of two patterns. The algorithms of these two genetic operators, however, are parameterized using random numbers.

So the next question concerns the generation of random numbers. There are many methods to solve this problem. One approach is using Pseudo Random

Number Generators (PRNG). These are mathematically fully defined algorithms, which, using a certain set of initial parameters, can give numbers that approximate the properties of good random numbers: that is, they do not start to give the same numbers again for a long number of generations, and the generated numbers are nicely distributed between a minimum and the maximum value, instead of forming a tight pack around a certain number. One important initial parameter for PRNGs is the “seed” that is used to generate all the random numbers. If one inputs the same seed and the same additional parameters to the same PRNG algorithm in two different instances, the exact same numbers will be generated. The seed is usually provided by a programmer or system administrator, who randomly presses 20-30 keys on the keyboard or enters a favourite poem (which is also converted to a number). In other cases, certain properties of the hardware that are accessible within the system are used, like the serial number of the motherboard. It is also possible to generate a seed from a readable input like the temperature gauge of the processor.

PRNGs have many problems. The biggest one is that with certain (*a priori* unknown) seeds, the period in which the random numbers do not repeat can be surprisingly short. With other seeds, the distribution is uneven. Because of these problems, no current mainstream operating system uses PRNGs on their own. Instead, they use input from the environment of the computer to generate random numbers: the key presses of the user; the network interrupts that are generated by the user and the others communicating with her, e.g. in chat; certain properties of the physical layer of the network (e.g. the variations in strength of the wifi signals). Sometimes the spinning characteristics of the hard drive are used, which depend on the temperature and the position of the device; various temperature gauges that measure the processors, the discs, or the temperature of the palm rest can also be used; audio and video input

devices or even the user's file names or creation times might be used. These inputs fill up an "entropy pool" in the system. Of course, the distribution of such input data can be uneven, but that can be solved in algorithmic ways, e.g. by PRNGs. On the *Linux* operating system, the inner workings of the entropy pool are publicly known. In other operating systems the code is not publicly known, but a similar system is likely to be used.

Additionally, there are dedicated hardware components that are able to generate random numbers by measuring quantum effects such as the breakdown effect of a P-N junction. These solutions are mainly used computer cryptography applications, where large numbers of unpredictable random numbers are required, e.g. in banking servers.

This means that if I run an evolutionary *Game of Life* experiment on my laptop right now, then the keys I press at this moment, as well as the speed of my typing, will affect the random numbers used in the genetic operators. Similarly, the temperature of this room, the angle at which I hold the laptop, the quality of my wifi signal, etc. might also be factors in random number generation. The examination of *Tierra's* or *Nanopond's* source code reveals that they do not have their own methods for generating random numbers and rely on the operating system's function made for this purpose – meaning that they also rely on the external factors just described.

As a consequence, we know that Thomas Ray's interesting results were affected by the environment of his computer, as well as the results of the *Nanopond* experiments.

We can conclude that the result of running a genetic algorithm is a product of many physical processes. Some of these processes are just the realizations of

well-defined algorithms, and the particular manner of the physical realization does not affect the result. Other processes involved are, apparently, completely outside the realm of mathematics. These might very well be perfectly deterministic processes on their own, but they should be in a *random relation* to the computer that executes the computation (for the definition of randomness used here see Paksi 2012).

Moreover, these processes are selected exactly on the basis that they are hard to describe mathematically and are contingent on the computer's internal state. This makes it impossible to predict the random numbers, which increases security.

To summarize, the result of the evolutionary computation is a product of many processes, and only a few of them are algorithmically described.

Following this line of thought, we can recognize that not only the special case of evolutionary computation behaves like this, but most of our real life applications. For example, the state of the word processor I'm using right now is a product of its code, but even more of my intentions.

However, the popular view of computing is completely different, and is dominated by the image of an uninterrupted algorithm executed by a Turing machine, with a pre-filled input tape. But the applications that fit this view are exceptional cases: long, time consuming simulations of air or liquid flows around a building; the final rendering of animated movies created by 3d technology; computing the next digit of pi; or finding the next prime number are examples that come to mind. Therefore, cases in which the result of a computation is fully determined by its initial parameters and algorithm are exceptions rather than the rule.

5. Emergent computing

Why is it so important to discuss the embodied nature of computation before analyzing emergent computing? Because, in the popular view of computing, computations are mostly treated as algorithm realizations, and they are thus analyzed by using algorithm theory.

Let us return to the argument discussed in the first part: that the central element of emergent computing is surprise which occurs when engineers create a computation program on level L1, and an observer recognizes a complex phenomenon on a higher level, L2. However, the argument continues, the observation on L2 is nothing more than a set of the elements of L1, which are, in turn, determined by any given state of the program.

But the example of the evolutionary *Game of Life* showed that the pulsar pattern cannot be derived from the algorithm itself. The pattern is the product of the algorithm *and* other physical processes.

Similarly, it is not true that a given state of a computation is always reducible to the previous state, and, through a finite number of steps, to the initial state. Also, a given state of a computation is not deducible from the initial state itself.

If we want to explain the current state of a computation in general, then we have to record and take into account all of the input from physical processes since the initial state. And, what we will see, is that certain physical processes independent of the algorithm will push the computation into a certain direction, for example by creating a pulsar.

Another property that is often mentioned in connection to irreducibility is unpredictability. If we consider a computation that takes initial parameters only and then works without any additional input, we will find that every state

really is deducible from the initial state; as a corollary, every state is predictable – by a faster execution of the same program on a different computer. This also means that the computation in question can have multiple realizations. This is not the case with evolutionary *Game of Life*, *Nanopond*, *Tierra*, or a word processor. Predicting the state of a given future step would involve not only calculating the algorithm faster, but also predicting the states of the physical processes relevant for computing, that is, the processes used in random number generation (or, in the case of the word processor, my sentences). However, it was our intention that the processes in question should be un-predictable.

This does not mean merely that prediction is impossible due to some practical epistemic limitation. Neither the algorithm nor the external physical processes determine the outcome of the computation *per se*, and their relation is random. Unpredictability is only a symptom of indeterminacy in this case.

Let us see what role do certain elements play in the evolutionary *Game of Life*'s computation! The algorithm controls the direction of the computation and sets the conditions that a certain state must fulfill. For example, one requirement might be that the fitness in generation n should always be higher than in generation $n-1$ (in this case, the less fit will always be left out), which results in a monotonous improvement, but has the danger of getting stuck at a local optimum.

However, on a relatively small 100x100-sized grid, the number of possible patterns is 10^{3009} (the number of all particles in the universe is estimated as 10^{87}), and the algorithm itself is not able to compute which directions are promising. This is why we use the principle of evolution, and we include external processes to generate the required random numbers. These physical processes would, of course, not be able to create the pulsar in themselves either.

The principle of the computation is realized by an algorithm, and the goal of the computation is also expressed as a fitness function that is used by this algorithm. The limits and boundaries of the states the computation can reach are also controlled by the algorithm.

However, the success of the algorithm also requires a different set of (otherwise deterministic) processes that bear a random relation to the algorithm.

The pulsar is thus reducible to the algorithm, to the processes, and to their random relation, and all three elements are required to make this reduction. This means that a holistic view of the nature of computing should be accepted, in which the computation is something more than its components. This is certainly more than epistemic emergence.

The next question is whether all these three components are reducible to the principles of one unified worldview, e.g. physicalism? Naturally, the evolutionary algorithm at work has a similar physical realization to the external processes. But can the algorithm completely described by these processes and nothing more?

The evolutionary algorithm is created by a human. If we want to show that problem solving processes can only be emergent in the epistemic sense, we have to show that the human mind itself (which is the cause of the algorithm and the fitness function that sets its goal) does not transcend the level of physical processes. If we want to show that computational processes can be emergent in the ontological sense, we have to show that the results of computation *do* transcend physical processes. But, in order to be able to show this, we first need to argue that the human mind does transcend physical processes, perhaps by arguing that the biological evolution that led to the human is an emergent process itself.

In other words, a resurgence of the traditional debate over the emergence of

the mind and biological evolution is needed to move forward, which lies outside the scope of this paper. What is important to us here is that inquiries into emergent computing are related to inquiries into emergence in general, and thus, any development in the latter debate will be relevant for a better understanding of emergent computing, since in reality, there is no decisive difference between generic (e.g. biological) and computational processes and behaviour.

6. Conclusion

The aim of this article was to show that emergence in emergent computing is not necessarily to be understood in a merely epistemic sense, as the result of the computation cannot be reduced to the processes that are involved in its production. This is due to the embodied nature of computation. The question of emergent computing is also connected to the question of the emergence in general through the human mind which develops algorithms and sets goals for computing

However, the inquiry into the emergence of the human mind and emergent computing could work in various directions. By experimenting with emergent computing applications like machine evolution, we might gain a better understanding of the questions of emergence in biological evolution and the human mind and vice versa. What this paper argues for is that both classes of these processes share the feature of being embodied with all of the consequences.

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Michael Polanyi and the Study Group on Foundations of Cultural Unity

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Abstract: This essay provides an historically oriented account of the Study Group on Foundations of Cultural Unity (SGFCU). The SGFCU sought and received Ford Foundation funding to sponsor international conferences in 1965 and 1966 whose aim was to transform the mainstream intellectual ethos, using Michael Polanyi's philosophical ideas as a catalyst. Polanyi chaired the organizing committee for this project but Marjorie Grene, with help from Edward Pols and guidance from sympathetic Ford Foundation officers, put together these conferences that generated a set of interesting publications. Discussion focuses on Polanyi and Grene's effort to plan the conferences, on Ford Foundation support, on the role Polanyi plays in each conference and on the ways in which Polanyi's participation in the SGFCU project contributed to his late philosophical interests and ideas.

Key words: Edward Pols, Ford Foundation, Marjorie Grene, Michael Polanyi, Sigmund Koch, Study Group on Foundations of Cultural Unity.

I. Introduction

Convinced that there is an unsuspected convergence of ideas separately developed in various fields, we propose a meeting of a number of persons who actively oppose in their work the scientism, and the related methodological and ontological oversimplifications, which in one or another form are ascendant in every field of scholarly and creative endeavor. The realization on the part of those attending this meeting that they are participating in one common movement of thought could

strengthen each of them. It would help any attempts at systematizing the principles they perhaps unwittingly share, and would make it possible for the general ideas that emerge to receive criticism from workers in widely different fields (Appendix A, Ford Grant 6500113).⁸

This is a key paragraph in a 1965 Ford Foundation project proposal seeking funding for an August 23-28, 1965 meeting at Bowdoin College in Brunswick, Maine. This interdisciplinary conference was to bring together a carefully selected group of 26 European and North American scholars and artists who were critical of dominant ideas in the cultural mainstream and were beginning to articulate ideas which seemed to be re-shaping important elements in the mainstream. Ford funded this 1965 Bowdoin conference coming from the Study Group on Foundations of Cultural Unity (SGFCU) and also “extended” the grant to support a similarly organized 1966 Bowdoin conference.

Michael Polanyi was at the center of work initiating, shaping, and

⁸ Many of the references following are to materials from the Ford Foundation archive. Most of these materials are for Ford Grant 6500113, a grant that covers the funding for 1965 and 1966 programming of the Study Group for the Unity of Culture (SGFCU). Archival materials include a grant proposal which has several appendices, the 1966 “extension” materials for the original grant, internal review documents, narrative evaluations, and an extensive correspondence file. As in this reference, citations will be in the text when it is possible to make sources clear there. With longer block quotations, we include the source in parenthesis at the end, even though the text preceding also provides the source. Since most references hereafter are to materials from Ford Grant 6500113, we do not include the grant number in citations unless materials come from the successor Ford Grant 6700128 discussed below. Cited correspondence from the Michael Polanyi Papers or other sources is clearly distinguished from Ford Foundation materials (see the discussion in notes below). We appreciate the assistance of Mary Ann Quinn, Archivist for the Rockefeller Archive Center (15 Dayton Ave., Sleepy Hollow, NY 10591) in locating materials used here.

seeking funding for the SGFCU proposal leading to these interdisciplinary Bowdoin conferences. He also played an important role in the conferences themselves. However, this project would never have come together without the energy and organizational savvy of Marjorie Grene, as well as several other important people, including Sigmund Koch, a Duke faculty member who worked with Polanyi at Duke in the spring of 1964 but moved to the Ford Foundation in the fall of 1964, and Edward Pols, a philosopher at Bowdoin College. The SGFCU project began as a deliberate attempt to encourage an intellectual “movement”—a term used throughout the SGFCU correspondence—based in Polanyi’s thought, but which would galvanize “convergent” voices. The SGFCU and to some degree the follow-up Study Group on the Unity of Knowledge (SGUK) project (discussed below) show how Polanyi’s ideas were promulgated. Also some of Polanyi’s philosophical ideas visible in late articles and the Meaning lectures were in important ways shaped by his participation in the 1965 and 1966 SGFCU meetings and in three later SGUK meetings. As many of the Ford documents and letters suggest, the SGFCU organizers—and the very cooperative funding agent (see the discussion below)—saw Polanyi as the key figure whose philosophical views could be used to stimulate a broader convergence of ideas. It is, of course, much less clear how to evaluate the impact of this ambitious program to spread Polanyi’s ideas and use them as a catalyst in an emerging cultural movement.⁹

⁹ Discussion below, based on 1965 and 1966 conference publications and Ford Foundation documents, shows how Polanyi’s views interfaced with ideas of other conference participants. In most cases, we have limited knowledge about the post-conference scholarly and artistic work of the 1965 and 1966 conference participants. Others will perhaps later offer assessments of this project’s success in relation to particular scholars and fields. We do not attempt a broad assessment of the relative success of the project’s general goal of using Polanyi’s perspective to galvanize a broader convergence of ideas countering the cultural and philosophical mainstream. Nevertheless, it seems clear that the dominant ideas about science

Anyone familiar with Polanyi's cultural criticism and his alternative "post-critical" philosophical stance will quickly recognize (in the SGFCU grant proposal and correspondence) that Polanyi's writing provided important background for the SGFCU project. The Ford proposal identifies the misguided "ideal" that has emerged in Western culture after the seventeenth century, an ideal which "carries with it a new conception of the nature of things: all things whatsoever are held to be intelligible ultimately in terms of the laws of inanimate nature." This "reductionist program" has made anomalies of "the finalistic nature of living beings, the sentience of animals and their intelligence, the responsible choices of man, his moral and aesthetic ideals, [and] the fact of human greatness." The existence of these anomalies and "even the existence of science itself—has no legitimate grounds; our deepest convictions lack all theoretical foundation" (Appendix A, Ford 6500113).

The Ford Foundation funded not only the SGFCU's two Bowdoin conferences; the SGFCU grant was succeeded by a much larger Ford grant to the Study Group on the Unity of Culture (SGUK) that supported a series of about twenty conferences in North America and Europe held from 1967 to 1972.¹⁰ Polanyi and Grene and some of the other principal players in the

in philosophy of science and sociology of science have significantly shifted since the mid-sixties. Many dimensions of positivism, objectivism and reductionism criticized by Polanyi at the time have been more widely attacked in various fields. See the general discussion of Polanyi and his context and influence in Nye, 2011 and in her new "Foreword" to the 2015 reprint of *Personal Knowledge* (Nye, 2015 xi-xxv).

¹⁰ The SGUK was supported by Ford Foundation grant 6700128. The grant request was for \$209,000 but the award for the five-year term was \$220,000. There are a few references hereafter to archival materials for Ford 6700128 since these materials sometimes do comment on matters such as the delay in the publication of the earlier SGFCU materials. The text and/or parenthetical references to Ford 6700128 make clear our sources.

SGFCU were involved initially in launching the SGUK project. The SGUK began as a re-modeled continuation of the SGFCU, but this later and larger project developed in ways somewhat different than the earlier Bowdoin conferences project, although the SGUK also sponsored conferences. Polanyi did participate in three of the SGUK meetings in 1968 and 1969 and this participation had a significant impact on late Polanyi publications focusing on topics in philosophy of biology, on several other late Polanyi articles on historical topics and on the Meaning lectures which became the basis of the Polanyi and Prosch book, *Meaning* (1974). But as the aging Polanyi became more fragile, the SGUK clearly became a project of which Grene and the SGUK Steering Committee took charge. Some of Polanyi's correspondence in the late sixties suggests that Polanyi did not find some SGUK discussions illuminating.¹¹ Nevertheless, as late as June 1970, correspondence suggests that some officials at the Ford Foundation continued to think of the SGUK as "the Polanyi project."¹²

¹¹ Polanyi wrote to Grene in June of 1969: "I am getting a bit doubtful whether to attend the meeting of the Study Group in October. On second thought I find none of the questions or remarks at the Austin meeting to have been of use to me. Such a meeting exhausts me without corresponding benefits. And in any case this kind of discussion can be conducted more freely and effectively in my absence" (Polanyi to Grene, June 10, 1969, Box 16, Folder 4, Michael Polanyi Papers). When possible, subsequent citations of material in the Michael Polanyi Papers in the Department of Special Collections at the University of Chicago (hereafter MPP) will be, as in the preceding sentence, in parenthesis in the text in foreshortened form.

¹² Edward Pols, in a late May, 1970 letter to W. McNeil Lowry, Vice President and Director of the Ford Foundation's Division of Humanities and Arts, wrote that he had "felt obliged to resign entirely from the group [SGUK] as of March 25, 1970" and that in fact he had "not been a member of the Steering Committee since the spring of 1969" (Pols to Lowry, 29 May 1970). Lowry responded to Pols noting, "I remember you very well and the importance Sigmund Koch attached to your interest in the Polanyi project." (Lowry to Pols, 5 June 1970). These letters are included in archival materials of Ford Foundation Grant 6700128.

This essay provides an historically-oriented account of the SGFCU project which sponsored the Bowdoin conferences of 1965 and 1966; it concludes with exposition and analysis of some major Polanyian themes of these important meetings. Those with interests in the development and promulgation of Polanyi's philosophical ideas will find materials in our discussion that are not well covered elsewhere in the Polanyi literature. But we hope also that our account will be worth review by those with more general interest in the intellectual history of the last decades of the twentieth century. The SGFCU project is, of course, not altogether separable from the succeeding SGUK project which Ford also funded, and which clearly grew out of the earlier SGFCU project. However, as a practical matter, the focus here is on the SGFCU; perhaps a follow-up essay will treat Polanyi's limited but important participation in the SGUK project.

II. The Deep Background of the SGFCU Program of the Mid-Sixties

In the forties and early fifties, Michael Polanyi made the shift from doing research in chemistry to work on his "fiduciary" philosophy in his Gifford Lectures. This was followed by six years of work on his magnum opus *Personal Knowledge* (Polanyi, 1958/1964, hereafter PK) based on his 1951 and 1952 Gifford Lectures. In 1948, soon after Polanyi received the invitation to give the Gifford Lectures, Polanyi exchanged his chair in Chemistry for a position as Professor of Social Studies (with the help of colleagues and university administrators) in order to work on his upcoming lectures (Scott and Moleski, 2005, 204). Polanyi had by this time, already been lecturing and writing on topics in economics and social and political philosophy for more than a decade. In the forties and early fifties, Polanyi had the good fortune to become involved in several different intellectual discussion groups which

examined and debated pressing issues of the day. Two groups especially important for Polanyi were the Moot (and successor Moot-like discussion groups) organized by the ecumenical religious leader J. H. Oldham and the Congress for Cultural Freedom.¹³ Although these groups were quite different, each sponsored discussion-oriented programs in which Polanyi became deeply engaged. Discussions in these groups helped shape Polanyi's ideas; Polanyi often made presentations (which became later publications) that were the focus of attention of other intellectuals. Further, Polanyi's involvement in these groups shaped Polanyi's ideas about the importance of carefully organized discussion among informed and thoughtful intellectuals. Polanyi came to see such discussion groups as a catalyst to initiate cultural change. Here we sketch only a few historical details about the Moot and the Congress for Cultural Freedom and the contours of Polanyi's participation; his experience is clearly a prelude for the Ford Foundation project of the mid-

¹³ The Mont Pèlerin Society, organized by F. H. Hayek, is another important discussion group that Polanyi participated in from its inception in 1947. Many of its original members, like Polanyi, also participated in the 1938 "Good Society" Conference (inspired by Lippman's *The Good Society*) in Paris where Polanyi apparently met Hayek and showed an early version of his economics education film "Unemployment and Money." The Mont Pèlerin Society brought together for discussion intellectuals who were interested in restoring liberalism in post-World War II societies. According to the Mont Pèlerin Society meeting programs (<http://www.liberaalarchief.be/MPS2005.pdf> accessed August 15, 2016), Polanyi seems to have played an active role in the first April 1-10, 1947 meeting. He is occasionally thereafter listed in the programs (e.g., the Venice meeting of September 6-11, 1954), but Polanyi apparently attended a number of meetings in the Society's early years. The Polanyi-Hayek letters mention Mont Pèlerin meetings and it is clear that Polanyi at times does not think his brand of liberalism fits into the Society's mainstream. Hayek, however, encouraged Polanyi not to resign from the Society, although at some point Polanyi apparently either does resign or simply drops out (see the discussion in Jacobs and Mullins, 2016). As Polanyi became involved with Congress for Cultural Freedom programs (beginning in 1953), he seems to have participated in fewer Mont Pèlerin Society meetings.

sixties and in fact Polanyi was in 1963 and 1964 working with the Congress for Cultural Freedom on what became the 1965 Ford-funded SGFCU project.

A. The Moot

Polanyi was invited by J. H. Oldham, convener of the Moot, to be a guest at the Moot's June, 1944 meeting (Mullins, 1997). The Moot was a discussion group that Oldham formed just before the outbreak of World War II and it included a small but prestigious set of literary and religious intellectuals who were Oldham's friends, including Karl Mannheim, T. S. Eliot, Walter Moberly, John Middleton Murry, H. A. Hodges, John Ballie, and Hector Heatherington. Oldham himself was a politically active and well-connected intellectual who had been significantly involved in international ecumenical and political affairs from before World War I. Oldham set up the Moot in 1938 and it met once or twice each year in a retreat setting for a long weekend of vigorous discussion of pre-circulated papers on an announced topic for the meeting. Discussion topics varied, but Keith Clements captures the general orientation when he says that the Moot discussed, during and after the war, "the nature of modern society, the relationship between social planning and freedom, and the role of religiously-based values in shaping society" (Clements, 2010, 1). Meetings rarely included more than a dozen participants (members and guests); not only were papers pre-circulated, but the discussion of material was very carefully planned and conducted since Oldham was deaf. He used a horn-like hearing aid and moved around among speakers to follow the discussion.

An almost verbatim set of minutes for the first twenty Moot meetings has recently been published (Clements, 2010). These show that Polanyi was quite outspoken at his first meeting in 1944 and challenged ideas about science put forward by Karl Mannheim who was perhaps the central figure in the Moot. Subsequently, Polanyi was invited back to a late 1944 Moot

meeting and provided a response (along with Mannheim) to a paper by T.S. Eliot as well as a paper of his own, “Scientific Materialism and the Modern Crisis.”¹⁴ Polanyi became a regular Moot participant thereafter. Karl Mannheim unexpectedly died in early 1947 and Oldham then officially disbanded the Moot, but less than a year later he put together the first of a set of Moot-like discussion groups (which included some original Moot members) and Polanyi was involved in many of these meetings for more than a decade. Clements suggests that after Mannheim’s death Polanyi’s writing, particularly about science, frequently became a topic for meetings (Clements, 2010, 17). In 1962, Polanyi acknowledged to Richard Gelwick that Oldham and his circle influenced the development of his ideas more than anything except his experience as a research scientist (Gelwick, 1962, p. 11, note 8).¹⁵

¹⁴Eliot’s paper, “On the Place and Function of the Clerisy,” and Mannheim and Polanyi’s responses as well as a discussion of this material can be found in Jacobs and Mullins, 2006. Polanyi’s response which emphasized the importance of tradition and the clerisy (i.e., the intellectual elite or vanguard) in science is particularly interesting. “Scientific Materialism and the Modern Crisis” is the title Polanyi gave to Oldham in his 16 November 1944 letter (Box15, Folder 4, MPP) but a later Oldham postcard dated 30 November 1944 (Box15, Folder 4, MPP) gives the title as “Science and the Modern Crisis.” This Moot paper was likely Polanyi’s lecture “Science and the Modern Crisis” delivered 14 November 1944 as one component of a Manchester Literary and Philosophical Society program, “Science, the Universities and the Modern Crisis,” with several lectures and comments covering two meetings. Polanyi’s 1944 lecture was published in 1945 in *Memoirs and Proceedings of the Manchester Literary and Philosophical Society* (Polanyi, 1945) and is one of his first essays sketching in broad terms his critique of modernity. See the discussion below concerning the use made of Polanyi’s macroscopic cultural analysis in the SGFCU proposal.

¹⁵ Fitting with Polanyi’s remark to Gelwick, is Clements’ comment that after Mannheim’s death, Oldham’s discussion groups reflect “the decease of Mannheim and the advent of Polanyi” (Clements, 2010, 17). Oldham was one of the five readers of the draft of PK; his incisive criticisms were much appreciated by Polanyi and led him to re-write the final chapter of PK. See Mullins, 1997 for discussion. Polanyi’s 1958 Lindsay Memorial Lectures were published as *The Study of Man* (Polanyi, 1959b) and this book is dedicated to Oldham.

B. The Congress of Cultural Freedom (CCF)

Michael Polanyi had a long history of involvement with the CCF and that experience contributed even more directly than his participation in Oldham's groups to the shaping of the 1965 and 1966 SGFCU Bowdoin conferences funded by the Ford Foundation. Although many who are interested in Polanyi's thought seem largely unaware of this, there is a clear overlap between Polanyi's political engagements in the fifties and sixties and his philosophical writing.

The Polanyi biography (Scott and Moleski, 2005, 222-234) and Nye's *Michael Polanyi and his Generation* (Nye, 2011, 210-213) treat Polanyi's involvement with the CCF, but other scholarship has more broadly discussed the CCF and Polanyi's involvement with the CCF.¹⁶ The CCF first emerged in the early phase of the Cold War and, speaking very generally, the CCF was an organization that gathered and mobilized Left-inclined intellectuals after World War II who were critical of Stalinism and Marxist ideas and experiments. The CCF was a counter to the Soviet effort to influence intellectuals to support the Soviet Union and the communist movement; the CCF was something like a covert cultural arm of US and other Western nations' foreign policy.

Polanyi was a natural fit for CCF programs because he was early critical of the Soviet Union and opposed "planned" science. He was a prominent leader in the Society for Freedom in Science in the UK. He

¹⁶ Nye's concise discussion (2011, 210-213) also very helpfully integrates Polanyi's involvement in the Society for Freedom of Science and his work on the Lysenko affair. The discussion here draws rather freely from Scott and Moleski and Nye. For a broader discussion of the CCF, see Saunders, 1999, and Coleman, 1989. Coleman, 2006 is an article published in *Polanyiana* (<https://polanyiana.org/volumes/11> accessed January 10, 2020) which summarizes many points in his book and focuses on Polanyi's involvement in the CCF.

publicized Soviet persecution of scientists, plus some of his friends (e.g., Koestler and Shils) were affiliated with the CCF in its earliest days. In the mid-sixties, the US CIA funding of the CCF programs was publicized and became a matter of public controversy (see the April 27, 1967 “New York Review of Books”). Some, by the early sixties, suspected there was governmental funding supporting anti-communist endeavors such as the CCF projects (Nye, 2011, 212), but this did not blow up until the mid-sixties as the covert role of the CIA in various programs and controversies became a matter of public interest.

Polanyi first became involved with the CCF in 1953. Alex Weissberg, a physicist and former spouse of Polanyi’s niece who was incarcerated in the Soviet Union, persuaded Polanyi to chair a committee on science and freedom which would be a part of a CCF conference on free inquiry in the face of communism. Polanyi added to the original committee of Weissberg and Nicolas Nabokov (Secretary-General of the CCF) a prestigious set of scientists, including three Nobel Laureates (Scott and Moleski, 2005, 222). In his early work with the CCF, Polanyi became acquainted with Mike Josselson who headed the Paris office of the CCF and eventually became the chief figure working with people like Polanyi to set up CCF programs.

The CCF-sponsored Conference on Freedom in Science in Hamburg, Germany, held July 24-26, 1953, was co-chaired by Polanyi and attended by 119 scientists (Nye, 2011, 211); the conference had 5 sessions with 20 papers and 12 plenary speeches (Scott and Moleski, 2005, 223). Polanyi delivered a keynote address and concluding remarks, and both were later published in the 1955 proceedings volume (Polanyi, 1955a and 1955b), with Polanyi’s concluding remarks serving as the volume’s preface (Scott and Moleski, 2005, 223). The keynote, “Pure and Applied Science and Their Appropriate Forms of Organization,” also was published soon after the conference in December 1953 as an occasional paper in the *Publications of the Society for Freedom in*

Science (Polanyi, 1953). A revised form was published in 1956 in *Dialectica* (Polanyi, 1956), and the *Dialectica* version, according to the PK Acknowledgements (PK, 1964, xvi), was used in Chapter 6 of PK. As this instance illustrates, Polanyi republished, sometimes in revised versions combined with other material, things that he originally prepared for CCF events. A number of Polanyi's non-scientific publications from 1953 to 1968 originated as papers or speeches presented in CCF programs and appeared in journals or volumes subsidized by the CCF.

In July, 1954, Polanyi became the chair of a permanent Committee for Science and Freedom of the CCF. This committee became a CCF working group of 15 with 17 permanent honorary sponsors (Scott and Moleski, 2005, 225). Soon after Polanyi became chair, *The Bulletin of the Committee on Science and Freedom* and Special Supplements began to be published in Manchester and this journal survived as a CCF publication until it was replaced in 1961 by *Minerva*, which was edited by Polanyi's friend, Edward Shils. Coleman (1989, 98) suggests *The Bulletin* was edited by Polanyi's son George and his wife Priscilla with supervision by Michael Polanyi. Scott and Moleski (2005, 225) report that Polanyi arranged for a \$12,000 Rockefeller Foundation grant to support the work of his committee and publish *The Bulletin* and Supplements.¹⁷

The CCF in Sept. 1955 sponsored, in Milan, Italy, The International Congress of the Future of Freedom, a large week-long conference of 150 intellectuals (Coleman, 1989, 109, Scott and Moleski, 2005, 227). The Milan conference had as its focus the emerging economic order, and a second theme

¹⁷ Contrary to Scott and Moleski's account, Nye reports that Polanyi applied for a three-year \$30,000 grant but the Rockefeller Foundation (in part because of the involvement of George and Priscilla Polanyi) was hesitant to provide funding and in June, 1957 Polanyi finally withdrew the funding request (Nye, 2011, 212). See especially Nye's documentation in note 125 which draws on archival material of the Rockefeller Foundation (Nye, 2011, 341).

that Polanyi emphasized, the false dichotomy between socialism and capitalism, was important. Also a theme was carried over from Hamburg, creating a worldwide intellectual community akin to the global scientific community (Coleman, 1989, 109-111). Polanyi's CCF Committee put the Milan conference together and Polanyi gave the opening address "The Age of Discovery" which was published in March, 1956 in *The Twentieth Century*, a CCF subsidized journal (Polanyi, 1956a). Scott and Moleski (2005, 227) quote from Polanyi's unpublished concluding talk.¹⁸ Polanyi spent a week in the summer of 1956 working at the offices of the Congress, setting up international study groups to discuss academic freedom and responsibility (Scott and Moleski, 2005, 228). After the Hungarian Revolution in 1956, Polanyi organized a November 19, 1956 Hamburg meeting of the CCF to assist Hungarian refugees. This involved getting together a petition, signed by 1200 people, asking the Soviets and the Hungarian government to restore intellectual freedom in Hungary (Scott and Moleski, 2005, 228).

As the above suggests, some of Polanyi's CCF work involved organizing large conferences, but some of his CCF work, particularly after the Milan conference, involved setting up and participating in smaller study groups and seminars focusing on particular topics. Coleman (1989, 112) contends that the CCF, after the Milan conference, decided large conferences were not the best way to explore issues and therefore moved to sponsoring smaller seminars. Polanyi was chair of the CCF Seminar Planning Committee and the Ford Foundation funded a program of smaller seminars. In May, 1958, Polanyi spent time in Tunis as Chair of the CCF Science and Freedom Committee working on a study group (Scott and Moleski, 2005, 233) and in

¹⁸ Polanyi's unpublished concluding address, "The Strategy of Freedom" (Polanyi, 1956c) is included in *Collected Articles and Papers of Michael Polanyi*, compiled by Richard L. Gelwick, (originally a microfilm collection) which is available in the Polanyi Society web material (<http://www.polanyisociety.org/Glwk-micro/Gelwick-microfilm.htm>).

Paris in the summer of 1958 preparing for CCF seminars (Scott and Moleski, 2005, 234). He was involved in CCF seminars in 1958 in Athens and Rhodes (“Tradition and Change—Problems of Progress, Representative Government and Public Liberties in New States”) and in Tunis (“Freedom and Responsibility: The Role of the Scholar in Society”) and in these groups he presented papers. (Scott and Moleski, 2005, 234-235). Much of Polanyi’s world travel in the fifties and sixties was for CCF-related work.

Polanyi took important leadership roles in the CCF and he was in fact a member of the governing board of the CCF in 1967 at the time that the revelations of CIA funding of CCF led Mike Josselson to offer his resignation. Scott and Moleski (2005, 267-268) report that Polanyi seemed not to understand that Josselson’s role as an agent of a covert governmental agency from whom he acquired CCF funding undercut the ideals of freedom which Polanyi and the CCF promoted. Polanyi was intensely loyal to Josselson who was his friend of many years. In the Michael Polanyi Papers, there is a blunt 9 May 1967 letter (Box 6, Folder 10, MPP) addressed to Raymond Aron (who was also on the CCF governing board) asking for his support of Josselson:

How is it that we are sitting in judgment today over Mike Josselson, for whose work during fifteen years we had a profound, steadily deepening admiration? That we are considering whether or not to cast him out from the service of the organization, which his great gifts and devotion has created? . . . I fervently hope that we shall all remain united as old friends, with Mike among us and will be saved from the shame of lending a hand in the destruction of his great work. It will be another darkness at noon if we do so.

The letter indicated Polanyi would resign his position if Josselson were fired. Polanyi was one of the few governing board members who voted against

accepting Josselson's resignation. In October 1967, he resigned from the CCF board (see also Coleman, 1989, 219-234).

Insofar as many of the CCF programs Polanyi worked on were academic seminars, study groups and conferences, Polanyi's CCF work, like his involvement in the Moot, helped provide the model for the 1965 and 1966 Ford-funded Bowdoin conferences. It seems likely that Polanyi's work in organizing smaller gatherings of intellectuals after the Milan conferences was particularly important. Like the earlier Moot and CCF discussion-oriented groups, the Bowdoin conferences put together a carefully selected interdisciplinary group of intellectuals who prepared and pre-circulated materials which were used to focus discussion on a topic.

However, Polanyi's CCF involvement in the mid-sixties was also linked rather directly to the Ford funded SGFCU project. Even before the early stages of his work with the Ford Foundation, Polanyi was working with Josselson and the CCF to formulate and fund a project, which eventually seems to have morphed into the Ford-funded SGFCU project. Scott and Moleski report that Polanyi and Koestler met in London in November, 1963 to discuss putting together an anthology "from a like-minded group" drawing on diverse areas of scholarship "to show the unity of knowing in various fields"(Scott and Moleski, 2005, 258). In the summer of 1964, at the same time that Polanyi was beginning to work with Grene and Sigmund Koch to formulate a Ford project (see the discussion below), Polanyi suggested to Koestler that they ask the CCF "to support a seminar" to bring a group together "to spell out the aims of the movement under the title 'Man the Center' which later changed to the 'Unity of Culture'" (Scott and Moleski, 2005, 258).¹⁹ Through a seminar,

¹⁹ Scott and Moleski's account here often is quoting June and August Polanyi letters to Koestler that are on an Edinburgh University Library microfilm (322, notes 45 and 46). The CCF connections with the early discussion of the SGFCU project are clear from numerous references to Josselson and the CCF in 1964 letters, some of which are cited below.

Polanyi apparently hoped to articulate the central ideas of his book project which had a general aim of criticizing scientism and presenting a unifying vision of humanity.²⁰

In the last half of 1964 as the planning for the SGFCU Ford proposal to fund an interdisciplinary conference begins in earnest (discussed below), Polanyi's correspondence makes clear that he hoped to use CCF resources to jump start the work on the August, 1965 conference, which he anticipated Ford would eventually fund early in 1965. Polanyi's 15 July 1964 letter to Koch says, "The Congress for Cultural Freedom may be ready to finance such a venture (out of its Ford grant)" and he goes on to say that the CCF Secretariat could consider the matter in October. But Ford Foundation officials, as discussion below makes clear, in the fall of 1964 strictly prohibited any cooperation with the CCF on the SGFCU project.

III. Polanyi's 1964 Duke Residency and Six Months Following

Polanyi spent the spring semester of 1964 in residence at Duke University as James B. Duke Distinguished Professor in the Department of Religion. He gave a set of lectures known as the Duke Lectures in February and March which were never published (due to a publishers' dispute) but are an expanded series akin to the 1962 Terry Lectures which in revised form were published in 1966 as *The Tacit Dimension* (Polanyi, 1966c, hereafter TD; see discussion in Mead, 2010; Mullins, 2010). Reports indicate that Polanyi very much enjoyed his time at Duke and was well received. His lectures were attended by large

²⁰ Although details in Scott and Moleski are sketchy, the biography suggests Polanyi was not only in 1963 and 1964 talking and corresponding about a future project with Koestler and Mike Josselson (of the CCF) but also Edward Shils and Irving Kristol (Scott and Moleski, 2005, 258). Late in the same period Polanyi was talking to and corresponding with Marjorie Grene and Sigmund Koch and beginning to formulate the SGFCU proposal (see the discussion below).

crowds and Polanyi had an opportunity to discuss his ideas the day following the lecture with his audiences, which included students and Duke faculty.²¹ Both before and during his time at Duke, Polanyi apparently began to formulate ideas for the project that eventually became the Ford Foundation-funded SGFCU. Polanyi was in this period talking to Koestler and Josselson about a project which the CCF might sponsor and fund, but he apparently was also talking to at least some Duke faculty, including, most importantly, Sigmund Koch, the long-term Duke psychology professor who Polanyi came to know prior to his Duke residency, according to Polanyi's 28 March, 1966 letter to Koch (a later letter included in Ford Grant 6500113 correspondence). Because Koch left Duke to become the Director of Humanities and Arts program at the Ford Foundation in October, 1964, the Ford Foundation preserved Koch-Polanyi letters from the late spring of 1964 (i.e., from very soon after Polanyi left Duke); although some of these letters were written before Koch officially moved to Ford, many are concerned with "the Polanyi project" which Ford funded in January 1965, a few months after Koch officially became a program director at Ford.

A. The Polanyi-Koch-Grene Correspondence

The Koch-Polanyi correspondence suggests a number of interesting things. (1) Polanyi and Koch seem to have become close friends in the period that

²¹ The unpublished Duke Lectures are posted on the Polanyi Society web site at <http://www.polanyisociety.org/essays.htm>. See Scott and Moleski, 2005, 254-261 for general comments on Polanyi's Duke residency and the months after in which the SGFCU project comes together. The biography synthesizes several things. See also Breyspraak and Mullins, 2015 (<http://polanyisociety.org/TAD%20WEB%20ARCHIVE/TAD42-1/Breyspraak&Mullins-TAD42-1-pg18-33.pdf> accessed August 15, 2016) and Mullins' introduction to the Duke Lectures (<http://polanyisociety.org/Duke-intro.htm> accessed August 15, 2016).

Polanyi was at Duke and Polanyi began writing Koch very soon after his return to UK after his Duke semester (14 June 1964 is the date of the first letter). (2) Polanyi apparently learned at some point in his semester at Duke that Koch would move to the Ford Foundation in the fall. A late June letter from Koch to Polanyi (30 June 1964) suggested “early October” was to be the time of Koch’s move and a later letter (18 July 1964) confirmed 1 October 1964. (3) Koch was a philosophically-minded psychologist enamored with Polanyi philosophical views. Koch and Polanyi came, in the summer of 1964, to share enthusiasm for Merleau-Ponty’s ideas (and the kinship of Polanyi and Merleau-Ponty’s ideas) and Marjorie Grene was clearly the figure who was encouraging this common interest. (4) Koch heard about Marjorie Grene from Polanyi while at Duke and he began to correspond with her in the summer of 1964 as Grene begins to take a role in shaping a proposal for a Ford Foundation grant to fund an interdisciplinary conference.²²

The letters of Polanyi, Koch and Grene imply that perhaps during Polanyi’s residency at Duke there were conversations between Polanyi and Koch about a possible Ford funded discussion-centered project bringing together a small group of like-minded intellectuals, a project which would be grounded in Polanyi’s cultural criticism and his constructive philosophical ideas about how to realign Western culture. Polanyi’s earliest Ford archival letter to Koch clearly identifying his interest in this sort of project is 15 July 1964 and his letter is written apparently soon after conferring with Josselson, about a project. Perhaps Polanyi’s discussion with Josselson inspired Polanyi to think in large scale terms of a “movement.” Polanyi implies that the yet amorphous project—Polanyi dubbed it “so as to give it a handle—‘the Unity of Culture movement’”—was, at least in part, to be launched through the

²² In Koch’s initial response (16 August 1964) to his first letter from Grene, he comments, “Your name was a household word here in Durham last year. You are obviously a constant, luminous presence in Dr. Polanyi’s mental field: he quotes you for authority at every turn.”

Congress for Cultural Freedom:

I have talked at some length with Mike Josselson (Secretary of the Executive Cttee of the Congress for Cultural Freedom) about developing some program for studying the cultural problems I mentioned in my last letter. We decided that it would be best to consolidate our ideas in terms of the persons and books one would consider to pool in this movement. I think we shall call it—so as to give it a handle—“the Unity of Culture movement.” This name should cover in the first place the unity of culture menaced by the abdication of philosophy and the wilderness of scientific incursions in the humanities. Cultural coherence is menaced also by the progressive atomization of universities, which makes the best of them most incapable of dealing with broader vital issues. There is also the cultural split between the Continent and Anglo-America, closely connected with the scientific blight leading either to existentialist absurdities or positivist paralysis. Last not least, there are the great cultural divisions of the Iron Curtain and between the white haves and the coloured have-nots (15 July 1964).

Polanyi then notes that he is “inclined to regard all these divisions as a single cultural crisis, due to the self-destructive tendencies of Enlightenment. We must get back to it now in a stabilized form.” The “cultural crisis” that Polanyi identifies here (excepting the problem of race) is something he has been commenting on in more or less the same terms since the mid-forties. That is, rooting the crisis in the “self-destructive tendencies of Enlightenment” but recommending a return to the Enlightenment “in a stabilized form” is a

standard diagnosis and prescription and an architectonic in Polanyi's thought from the forties forward.²³

Much of the early correspondence between Polanyi, Koch and Grene is preoccupied with the matter of selecting a concise name for the project that appropriately summarizes the project's goals. There is an array of suggestions and some of the discussion mentions other discussion-oriented groups named for places they met or other things (e.g., Mont Pèlerin, Eranos). As planning became more concrete, questions about a name were supplanted by pressing questions about who should be invited to the project-sponsored conference. Lists were drafted and particular intellectuals and their fittingness were at times debated. Polanyi reports in one letter to Koch (10 August 1964) that Grene has gone to Basel to visit Adolph Portman and ask for suggestions.

What is quite clear in Koch's summer letters to Polanyi is his support for this emerging project which he directly links to Polanyi's philosophical ideas: "Naturally, I could not be more sympathetic to the 'movement,' the objectives of which you have described with so remarkable a combination of comprehensiveness, salience, and Madison Avenue 'zing'" (18 July 1964). Koch proposed "the hope that the [project] meetings not be oriented merely towards the discovery of a common platform, but that they also serve as both springboard and sounding board for a continuing tradition of research." He noted the project reminded him of earlier discussions with Polanyi about a "research institute" and that Polanyi can count on his support:

²³ See, for example, the last paragraph in "Two Cultures," a 1959 essay published in *Encounter* (Polanyi, 1959a), a CCF subsidized journal. But you can see a similar cultural analysis in Polanyi's 1945 "Science and the Modern Crisis" referenced above (see note 7), which was apparently the paper Polanyi discussed in the Moot and told Oldham was titled "Science, Materialism and the Modern Crisis. Elsewhere (Breytspraak and Mullins, 2015, 18) we have referred to this broad cultural diagnosis and prescription with a shorthand term, Polanyi's "grand program."

I am beginning to see the movement you propose as a possible point of departure for such enterprises as the type of “unity of knowledge” research institute that we once discussed. In any event, the immediate plans are exciting and you may count on me to do everything within my power to help (18 July 1964).²⁴

W. McNeil Lowry, Koch’s predecessor at Ford who became Vice President, is also in the loop and, like Koch, is very favorably disposed toward the emerging proposal. In an August letter to Polanyi, Koch says,

Lowry, may I add, is sharply apprised of my regard for you and is utterly sympathetic towards considering all schemes, plots, intrigues, etc., that you may wish to suggest. I mentioned that I was anticipating a visit from you...and Mr. Lowry is eager to make your acquaintance at that time (16 August 1964).

Greene began her correspondence with Koch on 1 August 1964 and her first letter advised him she had recently been in Oxford “to talk with Polanyi about his ‘Unity of X?’ idea (I agree with your aversion to ‘Culture’ but confess also that ‘knowledge’ isn’t quite right either).” Also in early August, 1964, Greene corresponded with Polanyi about his “Unity of X? idea” and other matters related to putting together what became the SGFCU project.²⁵

²⁴ Koch repeatedly refers to the emerging project as the “Movement.” He ends his 16 August letter to Greene saying “may you and the ‘Movement’ prosper.” In his 16 August 1964 letter to Polanyi he notes “It was so good to hear from you and to learn that progress is being made towards the ‘Movement.’” Other interesting terms include the “underground” and the “subversives.”

²⁵ Greene to Polanyi, 8 August, Box 16, Folder 8, MPP. This letter which Greene wrote to Polanyi from Basel does not identify the year (and thus is in the undated Greene-Polanyi correspondence folder) but it is clearly a 1964 letter since much of the content of the latter is concerned with matters relevant to the emerging SGFCU project.

By the early fall, Grene began concisely to formulate the central ideas which eventually were used as the framework for a funding proposal aimed at convening a conference or a series of such meetings:

We are concerned with two main problems of our cultures: the alienation of men both from their intellectual and “spiritual” (?) traditions and from the natural world; and the fragmentation, not only of branches of scientific knowledge, but of the kinds of human activities. Those problems, though urgent practically as well as theoretically, have conceptual roots: in the influence of Cartesianism and its offshoot mechanism, in the prevalence of a misguided conception of “scientific method”; and they demand deep-seated philosophical reform if they are to be successfully met (13 October 1964).²⁶

She says further

a scattering of people, starting from varied disciplines, have been trying for years to wrestle with these problems. Some of them seem to be hamstrung by their unknowing acceptance of the premises which originally led to the present situation; others in widely separated places and fields have begun to formulate new premises which promise more adequate handling of the problems in question. It looks at present as if the latter are producing work that converges on the kind of conceptual reform that is needed, and at this juncture it could be both encouraging and useful for them to have some regular mode of communication and contact with one another’s work. What we are all after, I suppose, is what is called on the

²⁶ This Grene letter to Polanyi is in the Ford correspondence thus Koch received a copy.

continent “philosophical anthropology”: a renewed inquiry into the nature of man and experiences which will provide an adequate foundation for the methodology of both the sciences and the humanities. The question at the moment is: how best to go about furthering this aim in the present situation (13 October 1964).

Rather than focusing on setting up a mailing list and putting together a bibliography, Grene favored organizing an annual meeting:

We could hold a meeting of not more than thirty people who would discuss—with opening papers or symposia—a stated subject relevant to the central problem. When I talked to Portmann about the project, he declared himself in favour of such a scheme, suggesting, however, that if we wanted to produce some actual work in collaboration this would be too many: not more than twelve would do. But he also thought annual meetings of invited participants more promising than a publication to be circulated among a larger group (13 October 1964).

What Grene outlined in her mid-October, 1964 letter became essentially a roadmap for organizing the first Bowdoin conference and preparing the Ford grant to support it.

B. Edward Pols, Bowdoin College and the Ford Proposal

In a midsummer letter to Koch (10 July 1964), Polanyi advised Koch that he had been invited to visit Bowdoin College on 19 October 1964, He suggested that he hoped to meet Koch in New York soon thereafter. Polanyi had accepted an invitation from Eduard Pols, the chair of Bowdoin’s Philosophy Department, to deliver a lecture, which he titled “On the Modern Mind,”

celebrating the opening of the new Senior Center at Bowdoin. Pols had read *Personal Knowledge* in 1963 and saw striking similarities with his own philosophical ideas. He added a footnote to Polanyi to a book in press and sent a copy of the book to Polanyi and later invited him to Bowdoin. In his visit, Polanyi apparently found Pols very congenial and when he a month later read Pols' book he came to see Pols as a "Doppelgänger."²⁷ Pols soon became a collaborator on the emerging SGFCU project. The Bowdoin College President James Coles was willing for Bowdoin to be the institutional sponsor for a

²⁷ The discussion here draws on Scott and Moleski (2005, 257), but the Polanyi biography itself draws on several sources, including William T. Scott's much later interview with Pols and some unavailable Polanyi letters to friends in which he mentions Pols. About Pols' philosophical work, Polanyi says in a 6 November 1964 letter to Richard Gelwick, ". . . I had a valuable experience reading at last the Recognition of Reason by Edward Pols, and meeting the author . . . It is amazing [that] Pols has duplicated the fundamental ideas of Personal Knowledge. His back-ground (sic) was entirely different than mine, with no science to speak of and a great deal of philosophy I lack. His idiom is also quite different, yet everything he says can be translated into my formulations." This letter William T. Scott acquired from Gelwick and Marty Moleski, S.J. provided a copy to the authors (e-mail to Mullins of 29 April 2013). The 1992 Scott draft of the biography chapter in which the discussion of Pols appears indicates that Polanyi was so pleased with Pols that he invited Pols to "join him and Marjorie Greene in arranging a 'Study Group on Foundations of Cultural Unity'" (Chapter 23, p. 56, Mullins personal copy). Interestingly, in our 27 May 2014 interview with George Gale (who was a Grene graduate student hired in 1967 to be the administrator for the successor Ford-funded SGUK project), he noted that Grene in fact did not think Pols was such an insightful philosopher. Although correspondence suggests Polanyi pushed the case with Ford, Grene was the force behind the scenes in moving the new large Ford grant made in 1967 for the SGUK project from Bowdoin College to University of California, Davis, where Grene was now a faculty member. As noted above (see note 5), Pols soon dropped out of the SGUK project. While we have turned up no evidence of any connections between Pols and the CCF, it is interesting to note that Pols served in military intelligence in World War II and was recalled to the Pentagon in the Korean Conflict. He may have had personal and political connections with the CCF and/or with sympathizers at the Ford Foundation.

Ford grant and Bowdoin's new Senior Center seemed a suitable site for a proposed August 1965 conference.

It is unclear if Polanyi met with Koch in New York in October or November of 1964, but letters suggest the work of putting together a Ford proposal for a meeting at Bowdoin went into high gear late in the fall; a meeting involving Koch, Pols, Grene and Polanyi, presumably to iron out final plans, did occur in early January 1965. James Coles, President of Bowdoin College, wrote to Sigmund Koch as Director, Program in Humanities and Arts of the Ford Foundation, a formal letter dated 18 January 1965 officially applying for a \$25,000 grant "in support of an interdisciplinary meeting sponsored by the 'Study Group on Foundations of Cultural Unity.'" Polanyi chaired the organizing committee for the SGFCU, which also included Grene and Pols. Coles said the members of the committee "share the belief that there is need for a deep-seated philosophical reform—one that would radically alter prevailing conceptions of the nature of knowledge, of creative achievement in general, of the human agent that inquires and creates, and of the entire fabric of culture formed by such activities." By 21 January 1965, Polanyi was back home in Oxford and wrote to Koch, "I would only like to know whether the authorization for \$25,000 has gone through." On 26 January 1965, a mere nine days after the proposal was officially submitted, Koch wrote to Polanyi with unofficial notification that "the \$25,000 grant for your 'underground' was approved." Koch signed off, "needless to say, I am very pleased that the enterprise is 'on the rails.' I am sure it will prove successful."

C. Ford Foundation Stipulations

Two further points regarding the process through which the SGFCU became a Ford-funded "Polanyi project" are of interest. Although Coles's 18 January 1965 letter to Ford emphasized the "need for a deep-seated philosophical reform," it is clear that Polanyi and Ford were interested in an interdisciplinary project and not a project overloaded with professional

philosophers. The goal was not to articulate a narrowly defined philosophical system. One of the appendices of the proposal lists many scholars and artists from a variety of areas who might be invited to the 1965 conference; the proposal identifies a need for communication among those finally selected to attend: “It would be both appropriate and strategic for Polanyi to be the focal person in any venture that might try to bring about such communication,” Lowry’s internal Ford review document of 18 January 1965 suggests. The proposal emphasizes facilitating a “convergence” of ideas among those who have provided critiques and alternatives to common problems and indeed “convergence” is the key operative term in the proposal. Lowry’s 18 January 1965 memo, sent to more than twenty staff with the grant request, locates Polanyi’s scholarship at the center of an interdisciplinary endeavor focusing on convergence: Polanyi is “perhaps outstanding among the efforts of those who have essayed reassessment of the nature of knowledge” and *Personal Knowledge* “carries out what is perhaps the most incisive and comprehensive critique of scientism in the history of thought; at the same time, he presents the outline of a new and, in the opinion of some, fertile approach to the nature of inquiry, knowledge and culture.” Going on to speak of others who have independently made recent efforts to scrutinize the “texture of our culture,” the internal review document states that “the time has for some years been ripe for the establishment of closer communication among thinkers of this cast” (Lowry, 18 January 1965). Polanyi’s philosophical perspective is praised as strikingly insightful but it was also viewed as a catalyst.

Although in the Bowdoin conferences, Polanyi does sometimes seem strongly to be promoting his own philosophical views, he seems quite wary of much of the writing of professional philosophers and even to be hesitant about too strongly promoting his own or Pols’ philosophical perspective. In the planning stages for SGFCU he warns Pols in a letter that he and Pols

must not try to produce or even to pursue exclusively the

outlines of a new philosophy. Only you and I have made this attempt and I think we would reap resistance and confusion if we tried to put it into the center of our discussion at the meeting of our conference (5 December 1964).

In a 7 December 1964 letter to Koch in which Polanyi enclosed a provisional outline of the 1965 conference program, he describes a gathering of persons who have “trouble arising from their conflict with the predominant positivistic mentality.” These persons will respond to each other and produce a “diagnosis of our time,” but Polanyi clearly indicates he does not want too many mainstream professional philosophers involved:

If you want to revolutionize philosophy, you have one set of people who are dead against you, namely professional philosophers. To suggest to them that they should write off their professional work up to this day and learn to think in different terms is surely dangerous. And even should they wish to follow you they would find their minds full of complex systems which would bar access to new ideas requiring a different approach (7 December 1964).

The single glitch in the SGFCU planning and funding process was concerned with whether the CCF could in any way support a Ford-funded conference. Polanyi apparently was already (before the Ford proposal was submitted) receiving some kind of CCF support for his secretary and he was interested in having this secretary send out early invitations to the 1965 conference, that is, invitations mailed before Ford actually officially approved the grant. Polanyi apparently wrote or met with W. McNeil Lowry who Koch had assured Polanyi he thought would support “the Polanyi project.” Polanyi’s 9 November 1964 letter to Koch thus asked what

Mr. Lowry thought of my request that your program should cooperate with the Congress of C. F. [Cultural Freedom]. So far it seems to me that I can save a great deal of time by working through them and this is absolutely essential to me. Please let me know what your Program can suggest to meet this need for local cooperation with my friends here (9 November 1964).

Polanyi apparently believed the CCF and the Ford Foundation should at least in its initial phase cooperate on this conference project, but Koch soon emphasized that this was not possible. By December of 1964, Polanyi's involvement with the CCF had become problematic for Koch, possibly at Lowry's insistence. Ford appears to have been very interested in distancing a program it was to support from any CCF connection.²⁸ On 16 December 1964, Koch wrote to Polanyi, "I must now reluctantly bring up a matter about which I am somewhat disturbed." Polanyi's "reluctance to make a clean separation between the organization we are planning and your affiliation with the CCF" cannot continue if Polanyi wants Ford support:

I am sorry that you apparently find such a constraint uncongenial, but it is an unalterable part of the framework in which I must operate...I shall quite understand (and maintain the same high level of personal sympathy with the "movement") if you decide to form the organization under their auspices rather than ours (16 December 1964).

²⁸ It is worth noting that several years later, Polanyi wrote a letter to Shepard Stone (10 June 1969, Box7, Folder12, MPP), a former Ford Foundation officer who became President of *Association Internationale pour la Liberte de la Culture* which was the Ford Foundation-funded successor to the CCF, formed after the public exposure of CIA funding of CCF led to its demise. Polanyi's letter gives a bit of the history of the effort (as Polanyi construed it) to fund the 1965 SGFCU. In his letter, Polanyi indicates that Lowry insisted that the CCF could not be involved in funding the SGFCU project if Ford funded it. Polanyi claimed Lowry vetoed CCF funding because he knew of the CIA CCF connection.

Polanyi apparently got the message.

IV. The 1965 Bowdoin Conference

A. Organization

The interesting internal Ford Foundation document prepared by W. McNeil Lowry evaluating the proposal (18 January 1965) emphasized that while contemporaries like Snow, Bronowski and Barzum had been commenting on “the science-humanities gap,” in fact what is needed is “not merely a readjustment of science-humanities relations but an attempt to throw the entire map of knowledge and inquiry into finer relief” (2). Polanyi’s writing was regarded as providing a critical and a constructive perspective that provided this “finer relief.” The Ford internal evaluation was, in sum, very positive about the prospect of a conference bringing together “for discussion some 30 people, all of whom are interested in . . . [this] type of philosophical and conceptual reform” (3). The evaluation also recognized the experimental nature of the project. The evaluation noted the list of prospects to attend included many distinguished “senior participants” likely to accept an invitation, but also several “promising younger scholars”(3). Appendix C of the original proposal listed 53 names and some of these were intellectuals with an international reputation, including M. H. Abrams, Rudolf Arnheim, Raymond Aron, Leonard K. Nash, E. Panofsky, Adolf Portmann, I. A. Richards, Paul Ricoeur, Israel Sheffler, Edward Shils, Erwin Strauss, Sir Francis Walshe, Warren Weaver, C. V. Wedgwood, W. H. Auden, Henry Cavell, Sir Kenneth Clark, Barry Commoner, Rene Dubos, Richard Ellman, Eric Erikson, Ernest Gombrich, Gerald Holton, Roman Jakobson, Bertrand Jouvenel, and Arthur Koestler. A number of these people Polanyi knew in other settings or were people with whom he had corresponded. The summary

of the Ford staff discussion of the proposal suggests that if the first Bowdoin conference is successful—a matter the Ford staff would need to scrutinize—the organizing committee “might then consider applying for a larger grant which would make possible similar conferences in the future.” It thus appears that from the beginning, as some of the correspondence suggests, that Polanyi, Grene and Pols (and likely Koch) projected—and the Ford Foundation entertained—funding for at least several years an annual conference.

After Ford approved funding in January, 1965 for the August Bowdoin conference, things shifted into high gear to implement the plan outlined in the proposal. The SGFCU budget shows that \$16,000 of the \$25,000 was to be allocated for travel expenses with the remainder being allocated for accommodations, administration, and contingencies. This projection seems more or less to have been followed. Eight of the 26 persons who attended in 1965 came from Europe. Of the 53 scholars and artists identified as prospects to attend, 12 of the 26 who attended were on this prospects’ list. Those who attended, as the proposal had projected, were an interdisciplinary group “from the academy” coming from “the humanities, the arts and the sciences,” but also including “practicing artists” from painting and literature (1965 Narrative Report, 1). However, it is worth noting that perhaps as many as half of the 1965 conference participants were persons who already knew much about Polanyi’s ideas and had worked closely with Polanyi (e.g., Eugene Wigner, William T. Scott, Marjorie Grene, William Poteat, Elizabeth Sewall, John Silber, Edward Pols, Sigmund Koch, Donald Weismann) and/or Grene (e.g., Charles Taylor, Erwin Strauss, Helmuth Plessner).²⁹ Grene, Pols, Silber, Koch

²⁹ Others Polanyi and/or Grene very likely were acquainted with and perhaps had corresponded with (e.g., C. F. A. Pantin and M. R. A. Chance). A complete list of the participants attending the 1965 and 1966 Bowdoin conferences appears at the beginning of the selection of 1965 and 1966 conference materials, edited by Marjorie Grene, but belatedly published in 1969 as *The Anatomy of Knowledge, Papers Presented to the Study Group on*

and Poteat are all figures who were very familiar with Polanyi's philosophical perspective and who were involved in the 1966 conference also. As the discussion above of correspondence shows, Grene, Pols and Koch are figures who with Polanyi put together the SGFCU project.³⁰ William Poteat set up Polanyi's 1964 Duke residency and was also involved in planning the Bowdoin conferences from the earliest stages.³¹

Foundations of Cultural Unity (Grene, 1969, xi-xii).

³⁰ Silber was a University of Texas philosopher who later became a dean and hired Grene for a temporary appointment, and also arranged for Polanyi to visit the University of Texas; he became a member of the Steering Committee of the SGUK but eventually resigned from this role.

³¹ Polanyi's letter to Koch dated 15 July 1964 indicates he will consult Grene, Koestler, and Poteat about possible participants in the 1965 meeting. Poteat was a member of the intentionally small inner circle of those doing early planning. Poteat chaired a session of the 1965 Bowdoin conference on physics and reality which focused on a paper by Eugene Wigner. He was an active discussant whose comments Grene included in the discussion sections of the monograph *Towards a Unity of Knowledge* (Grene, 1969b) which she edited. He prepared a background paper for the 1966 conference, "Myths, Stories, History and Action" (Poteat, 1966) which is part of the Ford archival material (6500113). This paper appears to be an early draft of his essay "Myths, Stories, History, Eschatology and Action: Some Polanyian Meditations" (Poteat, 1968, 198-231), which is included in *Intellect and Hope: Essays in the Thought of Michael Polanyi* (hereafter *IH*), a 1968 festschrift Poteat edited with Thomas A. Langford. Most of the essays in this volume were written by persons who attended or were invited (or were listed in Ford proposals as intended invitees) to either the 1965 or 1966 Bowdoin conferences: Grene, Pols, Scott, Walshe, Aron, Najder, Weismann, Polanyi, and Poteat. Until he withdrew from the project in a January 8, 1968 letter to Grene (Box 16, Folder 2, MPP available in Mullins, 2010), Poteat was planning to be a co-editor with Grene of what was first called "Collected Papers" (of Michael Polanyi) but eventually became *Knowing and Being: Essays by Michael Polanyi* (Polanyi 1969, hereafter *KB*). Work on *KB* occurred in roughly the same period that Grene was working on *Towards a Unity of Knowledge* and *The Anatomy of Knowledge*, the Grene-edited publications of the 1965 and 1966 Bowdoin conferences, and Poteat was working on *IH*. Although we have no tangible evidence of this, it is likely that Poteat and Grene discussed some issues about these several

The program of the 1965 Bowdoin conference included 15 papers presented in 10 sessions over six days. The 1965 Narrative Report indicates most of the papers were circulated in advance, but a few were available when participants arrived at Bowdoin. Authors simply summarized papers in sessions and the summary was followed by one or two prepared comments and then general discussion opened. Clearly, the emphasis was upon discussion. In some cases, lively discussions were extended into another time slot. The 1965 Narrative Report emphasizes that it was “agreed by all that the discussions were extraordinarily fruitful, in that a great effort was made by all to bring out the convergences that are so often hidden by the languages of the several disciplines” (1).

The program, listing the session topics, paper authors and titles and commenters, for the 1965 conference appears in the monograph *Towards a Unity of Knowledge* (Greene, 1969b, 4-6) which Greene edited but which was published three years later in 1969.³² This is a volume that includes selected

publications. Poterat probably elected not to become involved in the SGUK project which was proposed to the Ford Foundation soon after the 1966 conference. For a discussion of what seems, in the late sixties and thereafter to be Poterat’s developing interests and his criticism of Polanyi’s “grand program,” see Breyspraak and Mullins, 2015.

³² *Towards a Unity of Knowledge* (Greene, 1969b) both above and below is referred to as the “monograph” because it was in fact an invited monograph in *Psychological Issues*, vol. vi, no. 2, monograph 22. George S. Klein attended the 1965 Bowdoin conference and he was the editor of *Psychological Issues*; apparently, Klein offered Greene the option of publishing conference materials in this irregular monograph series. A later report to the Ford Foundation for the successor SGUK project (Narrative Report for Meetings March 1, 1968 through February 28, 1969, p. 16, Grant 6700128) indicates the monograph was originally scheduled for publication in 1967 but was delayed. It was in fact not published until 1969, the same year as *The Anatomy of Knowledge* (Greene, 1969a) and Greene was forced to cut in half the length of the originally submitted monograph material late in the publication process. Some of the odd aspects of sections of *Towards a Unity of Knowledge* are likely the result of Greene’s

papers from the 1965 conference (and there is some overlap of material with *The Anatomy of Knowledge*) plus Grene's edited sections of the discussions of the 9 papers in the volume and her important editor's introductions to the volume as a whole and the four rubrics under which papers are grouped in the volume. Below is a summary of what seem to have been important conference issues and conclusions as these are reflected in the 1965 Narrative Report, discussions in the monograph and other documents such as the Ford comments on a proposal to extend the grant to cover the 1966 Bowdoin Conference. Particularly we try to assess Polanyi's role in the 1965 conference.

B. The 1965 Conference Issues and Conclusions

Polanyi's paper "The Creative Imagination" was the focus of the 1965 Bowdoin Conference's opening session dubbed the "Philosophical Introduction." The paper was an initial foray setting the general parameters for the conference's discussion. It succinctly presented Polanyi's diagnosis of the problems of contemporary culture as well as his prescription to reorient contemporary culture by outlining and affirming his theory of tacit knowing. As the 1965 Narrative Report summarizes, Polanyi's paper argued, "scientism, and the consequent reduction of man to an automaton, was the product of a demand for totally explicit knowledge." What Polanyi's theory of tacit knowing does is reveal a "common 'from-to' relation" through which "we can see that all human achievements, from ordinary perception to scientific discovery and artistic creation, share a common structure" (2).

Polanyi began drafting "The Creative Imagination" in January, 1965 and he mentions his paper in his correspondence with Koch (21 January 1965). He delivered a first version of the paper in May at the University of

forced late reduction of the size of the monograph, which she comments on in her Editor's Introduction (Grene, 1969b, 3-4).

London and “a thoroughly revised version” in late May at the University of Notre Dame (Scott and Moleski, 2005, 259). Following the August 1965 Bowdoin conference, Polanyi presented a fall lecture series at Wesleyan University where he was Senior Fellow at the Center for Advanced Study. A version of “The Creative Imagination,” which differs a bit from that included in Grene’s monograph, which is purportedly what Polanyi prepared for the 1965 Bowdoin conference, is the third of five lectures.³³ Polanyi and Grene likely thought of “The Creative Imagination” as a concise and effective presentation of Polanyi’s critical and constructive philosophy. The essay was not only published in Grene’s 1969 conference monograph, but was published, probably with Grene’s approval and help, in the April 1966 issue of *Chemical and Engineering News* (Polanyi, 1966a), in 1967 in *Tri Quarterly* (Polanyi, 1967a), and in 1968 in a German translation in *Zeitschrift für philosophische Forschung* (Polanyi, 1968b), as well as, after Polanyi’s death in the anthology *The Concept of Creativity in Science and Art* (Polanyi, 1981).

Scott and Moleski (2005, 259) are certainly on target in suggesting, in terms of the development of Polanyi’s philosophical ideas, that “The Creative Imagination” is Polanyi’s first thematized exploration of the

³³ The Wesleyan Lecture series (available at <http://polanyisociety.org/essays.htm>) was originally to be 8 lectures but due to sickness, Polanyi cut it to 5 lectures with the following titles: “Science and Reality,” “The Structure of Tacit Knowing,” “The Creative Imagination,” “The Growth of Science in Society,” and “Levels of Reality.” The first two and the last two lectures amplify what we above termed Polanyi’s cultural diagnosis and prescription. Particularly some of the things Polanyi suggests in the first and last Wesleyan Lectures about scientism’s destructive ontology and Polanyi’s alternative hierarchical ontology complement points in “The Creative Imagination.” See Mullins’ discussion in “An Introduction to the Wesleyan Lectures” at <http://www.polanyisociety.org/WesleyanLectures/WesleyanLecturesIntro.htm>. Ontology and “levels of reality” are matters treated in the Bowdoin conference discussion of Polanyi’s paper as well as other papers.

importance of the imagination in his account of tacit knowing. Polanyi outlines how in acts of discovery the imagination works with skillful integrative powers guided by a sense of emerging coherence.³⁴

Grene's *Toward a Unity of Knowledge* includes not only a version of "The Creative Imagination" but also 20 pages of edited discussion of Polanyi's paper. Some of Polanyi's initial comments providing an overview (for conference participants) of his paper emphasize that he has set forth what he called the "grammar" (74) of tacit knowledge. He meant by this that he set forth essentially what he had laid out in his Terry Lectures (1962) his Duke Lectures (1964) and later in TD (1966) as the functional or

³⁴ This essay cannot in detail chart the important developments in Polanyi's late thought which his engagement in SGFCU and SGUK programs brought. Nevertheless, as we note below, Polanyi's discussion of the importance of imagination in the 1965 Bowdoin conference is a step on the way to his effort to analyze how imagination plays a special role in works of art and, ultimately, in myth, ritual and religion. In a summer 1968 SGUK meeting, Polanyi presented "What is a Painting?" and he made use of the ideas of M. H. Pirenne who made a presentation at this first Bowdoin conference "about the philosophical applications of visual perception" (1965 Narrative Report, 7), using slides of a baroque painting. Polanyi's ideas about painting later draw from this material. A Polanyi letter from October 1963 (Polanyi to Coghill, 22 October 1963, Box 6, Folder 4, MPP) shows Polanyi was interested in some of Pirenne's work and its connection with his own ideas even before Pirenne came to be invited to the 1965 Bowdoin conference to make a presentation. By 1969, Polanyi is working on his Meaning material which grows out of his earlier work on imagination and painting; he delivers lectures and holds classes on this material at the University of Chicago and the University of Texas in 1969, 1970 and 1971. Eventually, parts of this material are pulled together by Harry Prosch and published as *Meaning*, Polanyi's last book, co-authored with Prosch (Polanyi and Prosch, 1974). See Moleski and Mullins, 2005 for a discussion of Prosch's important role beginning in 1968 in working with the increasingly fragile Polanyi. But the Meaning Lectures material does differ from the Polanyi and Prosch book *Meaning*. The 1969 version of Polanyi's Meaning Lectures was published in the 2006 English issue of *Polanyiana* (<https://polanyiana.org/volumes/11> accessed 10 January 2020).

from-to relation of tacit knowing, the semantic aspect of tacit knowing whereby meaning appears at the focus, and the phenomenal aspect of tacit knowing whereby coherence is established in integration. Together these relationships define a reality and Polanyi identified this as “the ontological aspect of tacit relations” (73-74).

Some of the discussion of Polanyi’s paper in Grene’s monograph focused in on particular aspects of his “grammar” of tacit knowing. There was further probing of the nature of skills and their growth in life. There was further exploration of the personal as fallible and as rooted in the centrality of integration and commitment. Polanyi reiterated his distinction between the subjective as merely passive and the personal. He emphasized the rather limited way in which he uses the term “intuition” in connection with fallible but generally reliable integrations of subsidiaries which establish a bearing on reality which persons hold with universal intent. Polanyi emphasized “a primacy of the *normative* over the *descriptive*” (84) in human believing. But this does not mean opinions of others are not to be considered: “we are 99% made up of what we learn and get from others” (84).

The Narrative Report for the 1965 conference reports that Charles Taylor asked about the relation of Polanyi’s account of tacit knowing and the philosophy of Maurice Merleau-Ponty. The report notes this was “one of the important convergences the study group hoped to exhibit and encourage—that between Polanyi’s philosophy of tacit knowing and the European movements of existentialism and phenomenology” (2).

The Narrative Report also suggests that one of the issues that played through the conference discussion (and first emerged in connection with Pols’ paper) was “the problem of relating levels of explanation to levels of reality” (3). Also noted, in connection with the discussion of Helmut Plessner’s paper on “the philosophical foundations of biology” (4)

is a later conference discussion “devoted to the problem of levels of existence, as presented by Professor Polanyi” (5). *Towards a Unity of Knowledge* includes what purports to be a very long Polanyi discussion comment, which in fact is an almost verbatim excerpt from Polanyi’s recently written but yet unpublished 1965 essay “The Structure of Consciousness,” an article in which he succinctly outlined his ideas about boundary control and a hierarchical ontology.³⁵ This 6.5 page comment is nowhere acknowledged as a version of Section 2 “Principles of Boundary Control” and Section 3 “Application of These Principles to Mind and Body” of Polanyi’s essay. But a comparison Polanyi’s discussion comment in *Toward a Unity of Knowledge* (Grene, 1969b, 205-212) and the second and third sections of the complete version of “The Structure of Consciousness” included in *The Anatomy of Knowledge* (Grene, 1969a, 320-325) leaves little doubt.³⁶

³⁵ Scott and Moleski (2005, 260-261) suggest that Polanyi was working on “The Structure of Consciousness” in May 1965 and he likely had at least a draft in hand by the August 1965 Bowdoin conference. The essay was an invited contribution honoring Polanyi’s long-term friend the neurologist Sir Francis Walsh (who was on the list of prospects for the 1965 conference and very likely was invited to the conference) and it was first published in a late 1965 issue of *Brain* (Polanyi, 1965b). Grene included “The Structure of Consciousness” not only in *The Anatomy of Knowledge*, but also in her edited volume of Polanyi essays, *KB*, which she was working on in the same period she was working on *Towards a Unity of Knowledge* and *The Anatomy of Knowledge*.

³⁶ There are a few differences between the monograph discussion comment and the sections of the full essay insofar as the discussion comment includes some references to the conference context. Nevertheless, we speculate that Grene simply inserted the material from “The Structure of Consciousness” into the monograph because she thought it was a concise and relevant treatment of a topic important at the conference. As noted above, she unexpectedly had to cut drastically, late in the publication process, the material in the monograph. She perhaps got the idea from Polanyi himself about inserting sections of Polanyi’s essay into the monograph. A Polanyi letter of August 1, 1966 to Grene (Box 16, Folder 1, MPP), written on

Polanyi's discussion comment setting forth his hierarchical ontology, Grene notes in the monograph (Grene, 1969b, 112), is relevant to M.R.A. Chance's paper "Man in Biology" (Grene, 1969b, 177-193, which Polanyi's comment immediately follows). But she also links Polanyi's discussion comment to papers by Helmut Plessner ("A Newton of a Blade of Grass?" [Grene, 1969b, 135-156]) and C.F.A. Pantin ("Organism and Environment" [Grene, 1969b, 113-126]) in the same section of the monograph ("Science and the Living Subject") as well as a paper by Eugene Wigner ("Epistemology of Quantum Mechanics—Its Appraisal and Demands" [Grene, 1969b, 22-36]) in another section of the monograph and the paper by Edward Pols ("Philosophical Knowledge of the Person") that Grene included only in *The Anatomy of Knowledge* (Grene, 1969a, 287-314). Grene prefaces Polanyi's long discussion comment in the monograph with an editorial comment in which she indicates Polanyi's comment is concerned with "Levels of reality: A pervasive problem which arises in connection with almost all our discussions is that of explanation in terms of hierarchies of structure as against a single principle of physical-chemical explanation" (Grene, 1969b, 205). In several papers at the 1965 conference, Grene noted in her Part III introductory remarks in the monograph, she found "the problem of levels of reality," which is "the type of metaphysical problem" that "comes up so urgently whenever the relation of physics and

the eve of the 1966 Bowdoin conference, notes that much of the upcoming conference will be at least indirectly concerned with "the bane of determinism," but "if Cartesian dualism can be disproved, as I believe to have done, determinism should vanish." Polanyi then quoted a section of "The Structure of Consciousness" (which he viewed as decisively rejecting a Cartesian ontological bifurcation and determinism) and asked what Grene thought of his statement, adding "Could you insert these lines into the book on the first Bowdoin conference?" As this comment implies, Polanyi may have had a hand in shaping the publications of the Bowdoin conferences, just as he had a hand in organizing the conferences themselves.

biology is in question” (Greene, 1969b, 112). She emphasized that “rethinking the concept of organic reality” and in particular “the conceptual structure of biology” (Greene, 1969b, 112) was important to the 1965 Study Group meeting.

To summarize, the topic of “levels of explanation” and “levels of reality” (or “levels of existence”) seems to have been probed in several papers and especially in relation to papers by scientists seeking to clarify “the philosophical foundations of biology”(1965 Narrative Report, 4) as well as tensions between disciplines like physics and psychology. The Narrative Report speculates that soon “biology in the English-speaking world may at last begin to take fruitful notice of the massive continental tradition of philosophical biology” (5)³⁷ Much of the antireductionist thrust of both the 1965 and, as we suggest below, the 1966 Bowdoin conferences seems to have been focused around questions about “what is life?” and

³⁷ It is worth noting that Greene’s *Approaches to A Philosophical Biology* was published in the same year as the 1965 Bowdoin conference (Greene, 1965). The book discusses the work of five European scientist-philosophers, Portmann, Plessner, Buytendijk, Straus and Goldstein. Her correspondence with Polanyi in the period in which she is working on the book reflects that she is strongly encouraging Polanyi to study the writings of these figures since Part IV of PK treats similar issues as do other lectures and writing of Polanyi done in the early sixties. Although Portmann was consulted about the conference, he did not attend (but was apparently invited in both 1965 and 1966). Plessner and Straus as has been noted attended the 1965 conference and presented papers (“A Newton of a Blade of Grass?” and “Embodiment and Excarnation”) that were discussed and included in *Toward a Unity of Knowledge*. Additionally, two other life scientists, C. F. A. Pantin—a figure whose work Polanyi earlier discussed approvingly in PK (351-352)—and M.R.A. Chance gave what were apparently provocative papers (“Organism and Environment” and “Man in Biology” respectively, which also were included in the monograph). The 1966 Bowdoin conference made every effort to continue the philosophy of biology discussion of 1965; in addition to carryovers Polanyi, Greene and Chance, it included new figures such as Barry Commoner, Hans Jonas, Torger Holtmark and F. S. Rothschild interested in philosophy of biology.

“how must we describe living action?”

Finally, it is important to emphasize that the 1965 Bowdoin conference was a seriously interdisciplinary effort to engage those in the arts in the conference’s conversation about cultural problems. The proposal affirmed that the proposed conference would aim for a reform not only of “prevailing conceptions of . . . creative achievements in general, but the human agent that inquires and creates, and of the entire fabric of culture formed by such activities” (2). The original proposal’s tentative program was broken into three areas of discussion and one area was “Art and Creativity” which was projected for four sessions concerned with creativity in the visual arts and literature (Appendix B). The actual program included two sessions, one on the visual arts and a second on literature, with some overlap in a third session. The 1965 Narrative Report suggests at the conference “the kinship of philosophical, scientific and artistic problems was strikingly displayed, so that the week’s program led organically up to its culmination in the arts” (9). M. H. Pirene’s paper on “philosophical implications of visual perception” was illustrated with slides of a Pozzo painting on a concave baroque church ceiling. The talk “referred back to Polanyi’s theory of perception and also brought the art historians actively into the discussion” (7). Later in the day Donald Weismann’s paper “The Collage as Model” focused on how “unexpected wholes” are created and thus collage “serves as an apposite instance of the kind of integration of incompatibles that typifies the achievements of art as well as science” (8). The poet Elizabeth Sewell read a poem “Cosmos and the Kingdom” written for the conference; the poem is an allegory concerned with the theme of the study group—that is, “the unity-in-diversity of all aspects of human endeavor, from practical enterprise to scientific thought to poetry” (8).

The 1966 Bowdoin Conference

A. The “Extension” and Its Organization

Apparently, the Ford Foundation elected simply to extend the grant for the 1965 Bowdoin Conference to cover the 1966 Bowdoin Conference. Sigmund Koch’s internal Ford memo of 10 January 1966 suggests the “organizing committee” requested such an extension to fund “a second Bowdoin conference (August 1966)—this one devoted to one of the insistent themes that emerged in the first” (4). Koch’s internal Ford memo, like documents noted above about the 1965 conference, suggests “the original intention of the study group was to apply for three years of support for a continuing organization which would pursue interdisciplinary problems concerning the nature of knowledge not only through annual conferences on the scale of the Bowdoin meeting but through a series of smaller discussion meetings during each year, and in other ways”(3). This early 1966 internal document, written by Koch—who still was Director of the Ford program under which SGFCU was lodged and who had been involved in planning the SGFCU project since the summer of 1964, and who attended the 1965 Bowdoin conference and gave a paper—is a rather amusing dance. Koch suggests that the original intended three-year project might be viewed as “favoring a special philosophic movement, and thus as overly tendentious” (3). Therefore the “Program staff” was “disposed to consider only a request for additional conferences on the pattern of the original one.” But the bottom line was that he and his staff affirmed that this extension “seems justified by the success of last year’s meeting” (4) and therefore recommended allocating \$36,000 for a second 1966 Bowdoin conference.

In a two-page document that is attached to Koch’s 10 January 1966 internal memo (which appears to be the Koch’s abstract of the request from the organizing committee to extend the 1965 grant³⁸), there is a budget

³⁸ The Narrative Report for the 1966 meeting does quote from what is identified as “Appendix

indicating \$10,500 was to be allocated to general administration, \$16,000 for travel and housing and \$10,000 allocated for honoraria, duplication, taping, transcription, editing and secretarial. The latter category suggests the 1966 conference had a better articulated publication plan. The extension request proposed 30 participants with diverse backgrounds but with a carryover of “approximately eleven members of the original conference”(1) which was envisioned as a fitting compromise such that “the range of minds which are brought to bear on the problems of the study group may be enlarged”(1). The names of six top prospects were listed as people invited to the 1965 conference but who could not attend (Adolph Portmann, Arthur Koestler, Warren Weaver, F. O Schmitt, Paul Ricoeur and Erik Erickson); included also were the names of seven persons (Ben Shahn, Bob Mallory, Otto G. von Simson, Harold Cassidy, Rene Dubos, Leonard K. Nash and Jacob Bronowski) whose work showed interest in the theme of the 1966 conference summarized as “levels of reality and of understanding.” Most of these two groups of names had appeared on the 1965 list of prospects. However, none of these people actually did attend the 1966 conference, according to the Narrative Report. The Narrative Report for the August 21-27, 1966 Bowdoin meeting reports 25 attendees representing “biology, education, history, history of art, history of science, jurisprudence, literature, mathematics, philosophy (including philosophy of science), physics, psychology, religion and sociology” plus a novelist and a sculptor (1). Ten of the 25 attended the 1965 conference (Grene, Chance, Koch, Kindred, Lucas, Pols, Polanyi, Poteat, Silber and Taylor) and most of these people and perhaps also other 1966 attendees were persons already familiar with Polanyi’s philosophical ideas.

Initially projected were 15 papers (submitted in advance and duplicated before the conference) for the 1966 conference, but only 11 papers are listed in the Narrative Report and some of these seem not to have been

A of its application to the Foundation of December 27, 1965.”

vigorously discussed papers used as the focus of a session but were secondary papers.³⁹ As in the 1965 conference, papers were summarized in conference sessions and responded to in one or two prepared comments which led into a general discussion.⁴⁰

Although it seems Grene and perhaps Pols handled most of the details for the 1966 conference (as they apparently did in 1965), Polanyi does seem to have been seriously engaged in organizing the 1966 conference. He helped shape the agenda, format and strategy of the second conference, just as he did with the 1965 conference which opened by focusing directly on Polanyi's ideas and often returned to them. In his August 1, 1966 letter to Grene (Box 16, Folder 1, MPP), Polanyi complained about Rothschild's submitted paper and proposed a substitute. In a response to a Grene letter of July 28, 1966 (attached to his August 1, 1996 letter), he addresses late changes for the August meeting that Grene has suggested. He declines to comment on a paper by Singer and suggests Charles Taylor replace him, and offers detailed suggestions about arranging the input from the artists (painters and poets) toward the end of the meeting because of the other matters that need to be

³⁹ A pre-publication copy of Polanyi's "The Message of the Hungarian Revolution," marked as forthcoming the September, 1966 issue of *The American Scholar* (Polanyi, 1966a) was a paper made available to those who attended the 1966 Bowdoin conference, according to the 1966 Narrative Report. The first page of the typescript (included in the Ford grant correspondence files) identifies "The Message of the Hungarian Revolution," as a "background paper" which is "supplementary," and the 1966 program schedule identifies the paper as one that should be relevant to the discussion of one of the three papers in the session listed under the rubric "Applications of the Concept of Levels in the Social Sciences and History."

⁴⁰ Although the program for the 1965 Bowdoin conference appears in "Toward a Unity of Knowledge" (4-6), the program for the 1966 conference was not published. It is included in abbreviated form as Enclosure 3 of the 1966 Narrative Report which also provides a list of participants and papers (Enclosure 4). Thus the Narrative Report more or less outlines the program sessions.

addressed first: "We must put all of our cards on the table, I think, before we immerse ourselves in communication with painters and poets."

B. The 1966 Conference Issues and Conclusions

The Narrative Report on the 1966 conference, signed by Pols, is a candid and revealing document. The announced topic was "Levels of Understanding" and Pols quoted Appendix A of the application which emphasizes that "modes of understanding" of different disciplines should be different but that "important similarities . . . connect the various disciplines" so "varieties of understanding" are "different dimensions of a common field." The "structure of this common field" needs to be elaborated and one key to this seems to be "human imaginative achievements" in works of art, scientific theories, and social and legal institutions. The conference planned to investigate this structure and in particular "the power of art to change society"(1-2). However, the Narrative Report suggests that "although this topic was never quite lost sight of" in the planning for and the meeting itself—and the meeting was "lively"—the "Organizing Committee" nevertheless "does not feel this year's meeting . . . brought us in sight of an adequate understanding of it" (2).

What the 1966 Narrative Report does is highlight certain papers and discussions at the conference that provided some "important illumination" (2) on the general theme. One paper which seems to have stirred up a great controversy was the biologist Barry Commoner's "Is Biology a Molecular Science?" This was a complicated, highly technical paper on theoretical biology which argued "nature is hierarchically organized in levels"(2) and Commoner offered a number of points about the relationship between levels. He asked if a cell's unique properties are in principle "predictable from the observed properties of its isolated molecular components, or are they due to some property which is not discernible in these separate constituents?" This question seems to have been debated in terms of questions about "whether the

chemistry of DNA determines the property of self-duplication in the cell” (3). Commoner said no but his main opponent, Polanyi, argued Commoner did not properly understand “the question of the relation between higher and lower levels” (4). Commoner argued “not only that the principles of life are not predictable from the principles operative in isolated physico-chemical components, but also that the entire principles of any given physico-chemical level are not predictable from principles operative in the components of that level”(4). Polanyi contended “in theory . . . on the basis of quantum mechanics and the Pauli principle,” that “reductionism was . . . presumably tenable with respect to the sub-organic levels, although not in respect of the relation between life and its physical-chemical basis” (4). This controversy was apparently quite florid and the Narrative Report says it continued in an additional evening session arranged to accommodate it. But “the differences between Commoner and Polanyi” were not settled, “although their nature was considerably clarified by the discussion” (5). Those familiar with some of Polanyi’s writing about theoretical biology in the years shortly after the 1966 conference know that Polanyi in this writing sharply criticizes Commoner’s ideas, although Commoner’s ideas seem somewhat akin to Polanyi’s own hierarchical account of life. This 1966 Bowdoin conference controversy clearly launched some of Polanyi’s late thinking and writing about biology.⁴¹

⁴¹ On April 20 and 21, 1968 there was a meeting of the SGUK (i.e., the Ford-funded successor to the SGFCU) on the “The (Ir)reducibility of Biology to Physics and Chemistry” at the University of Texas, Austin. Polanyi attended this meeting but apparently did not plan to present a paper. However, in late 1967 and early 1968 before the Austin meeting, he made public presentations of versions of “Life Transcending Physics and Chemistry” and some of these are discussed in correspondence with Grene who clearly has a hand in reworking Polanyi’s writing on this topic. At least one of the public presentations had a panel format that included Commoner. In fact what is apparently the original “Life Transcending Physics and Chemistry” was published in the August 21, 1967 issue of *Chemistry and Engineering News* (Polanyi, 1967b, 54-56). What Polanyi does in his essay is reject both Crick’s strongly

Another 1966 Bowdoin paper that is highlighted as important in the Narrative Report is that of F.S. Rothschild, “Biosemiotic Aspects of Human Evolution” (Rothschild, 1966). As its title suggests, this paper, which also excited a lively discussion that spilled over into a second session, addressed issues in theoretical biology, like the Commoner paper. Rothschild was a philosophically minded physician and neurophysiologist interested in the evolution of complex brains. His paper drew heavily on Husserl and secondarily on Peirce to argue for what he called a “triadic view” (Rothschild, 1966, 2) of the operation of signs in the central nervous system to produce consciousness. This view he presented as a counter to the mainstream dyadic view of modern neurophysiology which looks for physical (brain) events and subjective (brain) phenomena. Polanyi apparently found Rothschild’s 1966 Bowdoin paper very dense and likely to obscure more than it illuminated: after reading the paper on the eve of the 1966 Bowdoin conference, he wrote a letter to Grene (1 August 1966, Box 16, Folder 1, MPP), complaining the paper is a “torrential flow of ideas,” hard to follow, written in a breathless style and badly translated from German! He proposed to Grene to make more use at the 1966 conference of an earlier 1962 Rothschild paper (articulating

reductionistic views and Commoner’s views, although Commoner also rejects Crick’s strong reductionism. Polanyi contends Commoner wrongly holds (1) wholes can never be reduced to parts governed by physics and chemistry (i.e., Commoner’s criteria of irreducibility are not correct). But Polanyi suggests that Commoner also believes (2) the explanation of life in terms of a mechanical model is essentially an explanation in terms of physics and chemistry. At the least, Commoner does not dispute this claim, which Polanyi contends is fundamentally false. Polanyi also wants to make clear that DNA, insofar as it conveys information, is a dual control system that cannot be reduced to the terms of physics and chemistry. In sum, Polanyi’s “Life Transcending Physics and Chemistry,” as well as another essay “Life’s Irreducible Structure” (Polanyi, 1968a), which is itself a revision and expansion of “Life Transcending Physics and Chemistry,” (one which Grene eventually includes in *KB*[1969]) grow out of the Polanyi-Commoner controversy at the 1966 Bowdoin conference.

similar views) which he thought much clearer, but Grene apparently was unwilling to inject this earlier Rothschild essay. It is clear, however, that Polanyi was interested in Rothschild's ideas. As noted above, Polanyi had just finished a draft of "The Structure of Consciousness" (an invited paper for a late 1965 issue of *Brain* honoring Polanyi's friend the neurologist Sir Francis Walsh) just before the 1965 Bowdoin conference. Grene's monograph with selected papers from the 1965 conference plus discussion includes a lengthy Polanyi discussion comment, outlining Polanyi's ideas about a multi-level ontology. This comment seems simply to have been lifted from two sections of "The Structure of Consciousness," an essay that Grene apparently liked since she includes it in both *The Anatomy of Knowledge*, which has material from the 1965 and 1966 Bowdoin conferences, and in *Knowing and Being*. The final section of the published versions of "The Structure of Consciousness" is the "Retrospect" section in which Polanyi comments briefly on the ideas of Merleau-Ponty, Rothschild and Ryle. The 1962 Rothschild essay and other writing by Rothschild is cited in a footnote in this "Retrospect" discussion (KB, 222-223, note 13). Polanyi described Rothschild, as "another follower of Husserl" and a predecessor of Merleau-Ponty who arrived at the conclusion that "the mind is the meaning of the body" (KB, 222). In a footnote, he comments that Rothschild's discussion of consciousness in some respects "anticipates part of my theory of body and mind" (KB, 223, note 13). The 1966 Narrative Report on the significance of Rothschild's paper comments that "Rothschild's doctrine, with its emphasis on meaning as a key to understanding of any level, has obvious affinities with Michael Polanyi's philosophy which has provided so much material for discussion at both the 1965 and 1966 conferences" (6-7).

According to the 1966 Narrative Report, in addition to matters concerned with levels of understanding and existence, the "second leading theme of the conference" concerned "the ontological status of the person"(7)

Several conference papers and discussions took up different aspects of the person. Some analyzed human action and some human moral responsibility and legal responsibility. Iris Murdoch's relatively famous essay "On 'God' and 'Good'" was one of the conference papers and it is included in *The Anatomy of Knowledge* (233-258). As Pols puts it in the 1966 Narrative Report, Murdoch argues "an object of attention . . . if it is a proper one, enables a person to overcome that in himself which is unworthy. Our ability to act well when the time comes depends upon the quality of our habitual objects of attention." (9). Murdoch linked her "ideal for action with the idea of love" and thus "in effect enlarged our conception of the being out of which our doing comes." (10) As another 1966 conference participant Charles Taylor said thirty years later in his appreciative essay "Iris Murdoch and Moral Philosophy" (in Taylor, 2011) analyzing her philosophical importance, Murdoch was a trailblazer. She was a discerning critic of analytic ethics who opened the way for the rebirth of virtue ethics. At least in part, the paper of Murdoch and those of others on "the ontological status of the person" seem to have refocused the conference discussion on (in the words of the 1966 Narrative Report) "the 'ontic power' of the Person [which] displays itself in normative action" (11). This refocusing was taken to be "a paradigm at the personal level" of "the 'levels of reality'" ideas discussed in other conference sessions.

Like the conference the preceding year, the 1966 Bowdoin meeting included sessions led by those in the arts, including a paper on the novel and its approach to communication and comments on similar problems in the visual arts. There was also a demonstration-lecture on Goethe's theory of color and the discussion focused on differences between Goethe's and Newton's approaches. Pols' Narrative Report, however, notes that discussion of Goethe and Newton missed an opportunity to focus on "the ontological status of qualities" which might have returned to issues debated concerning

“levels of reality” (15). Pols’ report on the 1966 meeting ties a number of the sessions to themes and papers from the 1965 meeting. Polanyi’s presence, participation and ideas were influential, both as background and foci for the discussions of the gathered group of intellectuals.

Conclusion

The SGFCU project which put together the 1965 and 1966 Bowdoin conferences was an ambitious effort of the mid-sixties to promulgate Polanyi’s ideas and use them to galvanize a larger intellectual movement which would transform largely reductionistic and scientific mainstream culture. Polanyi’s earlier history as a member of Oldham’s discussion groups and his more than a decade of work with the CCF convinced him that carefully planned, high quality discussion with like-minded intellectuals could be an effective way to mobilize a vanguard committed to changing the intellectual moorings of modern culture.⁴² Polanyi was working with the CCF on an idea for a conference in the early sixties but this germ took much more definite form just after his spring 1964 semester at Duke. At Duke, he became re-acquainted with Sigmund Koch, a Duke professor who moved to direct a program at the Ford Foundation in October, 1964. When Marjorie Grene joined Polanyi’s effort to conceive a project bringing together intellectual and artistic leaders who might be sympathetic with Polanyi’s cultural criticism and his constructive post-critical philosophical outlook, this project began to be formulated in a manageable, concrete form. As in the case of Polanyi’s magnum opus, *Personal Knowledge* (see Polanyi, 1964, xv), in this project,

⁴² Essays such as Polanyi’s “On the Modern Mind” (Polanyi, 1965a) published in the same year as the first Bowdoin conference (and which was apparently the lecture, noted above, delivered at Bowdoin College in October, 1964) show how strongly Polanyi believed that redirecting the modern mind is the key to reorienting modern culture. Clearly, Polanyi believed ideas are important in society and the Bowdoin conferences are testimony to this.

Polanyi owed much to Marjorie Grene. Eduard Pols was added to the organizing committee; Bowdoin College was supportive and was suitable for the first meeting. What took shape was the SGFCU.

Sigmund Koch worked with the organizing committee and also worked inside the Ford Foundation to assure funding and that funding was extended to cover a second Bowdoin conference in 1966. Koch and others at the Ford Foundation were clearly very sympathetic and supportive of the SGFCU project. Indeed, Koch was involved in the project from its earliest stages. It is something of an understatement to note that the SGFCU had an inside track with the Ford Foundation. That these conferences (and the subsequent SGUK grant) were thought of internally at Ford as "the Polanyi project" is confirmed by several documents in the archive. One clear example of this is in the internal background memo addressed to McGeorge Bundy that V.P. Lowry circulated to more than thirty program officers and staff on January 18, 1967. This is in support of the grant proposal to fund the SGUK. Lowry provides this background:

In the fall of 1964, the Foundation was presented with an opportunity to ring into focus the efforts of scattered individuals working on perhaps the key problem in the humanities - a reanalysis of the question of the unity of knowledge. Michael Polanyi, a physical chemist and philosopher who has been perhaps the outstanding recent contributor to the developing reassessment of the nature of knowledge, proposed that the Foundation support a series of conferences and other activities which would establish collaborative contracts among those exploring this new avenue. Staff agreed on the importance of such a venture but recommended only support of initial, experimental conferences in the belief that whether a group of the necessary

heterogeneity could communicate fruitfully remained to be proved (18 January 1967, Grant 6700128).

With the two Bowdoin conference now showing how fruitful such communication could be when facilitated by Polanyi and his ideas, Lowry goes on to recommend the funding for the continuation of a new, longer term (5 years), better funded (\$220,000) project, the SGUK. The SGUK is clearly modeled on the SGFCU, although the governing structure and the organization of events was recast and evolved over the life of the SGUK grant. But as the SGUK developed, Polanyi's role and influence declined.

Michael Polanyi's pivotal role in the 1965 and 1966 Bowdoin conferences is clear. Polanyi and Grene were the chief architects of the conference programs. Polanyi's "The Creative Imagination" launched the first conference and set forth the general cultural problem—as well as Polanyi's solution to this problem—that both Bowdoin conferences considered. Polanyi's opening overture was a bold beginning conceived not only to draw attention to his philosophical ideas but to galvanize a convergence among the views of other like-minded thinkers. Two other Polanyi essays also were used in the Bowdoin conferences. The conference publications which Grene put together (one with edited discussion) are an impressive set of essays; Polanyi's writing is an important component of conference publications and Polanyi may have significantly influenced what Grene included to represent the conferences. Polanyi seems to have been a forceful—perhaps even a polite but dominating—discussant in some conference sessions. The Bowdoin conferences attracted an array of interesting and articulate intellectuals and artists. The presence and the papers from eminent figures like Eugene Wigner and Iris Murdoch mark the Bowdoin conferences as more than just garden variety academic conferences. However, it is the case that a significant number of those involved in these conferences were figures already quite

familiar with Polanyi's views. Nevertheless, these two meetings of significant intellectuals provided exposure to Polanyi's thought and marked a high point in Polanyi's influence across a range of disciplines in the mid-sixties. Did the Bowdoin conferences create a "movement" that continued to shape discourse in some fields in later years in the twentieth century? How successful were the organizers and the Ford Foundation in attaining the lofty goals outlined in the proposal and some of the Ford Foundation evaluative literature? The reports confirm that the meetings were highly stimulating, but did they transform or galvanize any of the participants' future thinking and publications? The investigation of such large questions perhaps other scholars more familiar with some of the participants and fields in question will investigate.⁴³

Whether or not the Bowdoin conferences had any discernable impact helping reshape the cultural mainstream, the conferences certainly impacted the last phase of Polanyi's intellectual life. Polanyi not only contributed significantly to the Bowdoin conferences but his participation helped shape some Polanyi interests and publications of the late sixties and early seventies. Discussion here has sketched the general parameters of how the Bowdoin conferences influenced Polanyi; this is, however, a complicated topic (one requiring a more extensive discussion) since Polanyi's participation in three later SGUK conferences in 1968 and 1969 further developed ideas that Polanyi began to work on because of his involvement in the 1965 and 1966 Bowdoin conferences. But clearly, Polanyi's post-Bowdoin publications on philosophical biology grow out of the discussions at the Bowdoin conferences, and particularly the 1966 conference is an important stimulus (see note 34).

⁴³ As noted above, Nye, 2011 and Nye 2015 provide some generalizations about Polanyi's influence in some fields, but she does not focus on the Bowdoin conferences per se or the late Polanyi ideas whose development these conferences seem to have inspired.

Polanyi's interest in the role of the creative imagination is central to his 1965 opening Bowdoin address. Although earlier Polanyi publications comment on the role of creativity in scientific discovery, several Polanyi lectures and publications after 1965 discuss ways in which creative imagination works not only in science but also in the arts, ritual and religion.⁴⁴ Polanyi's new interest in creative imagination was his path into an effort to recast elements of his post-critical philosophical perspective in terms the problems of meaning in contemporary culture. Some of the presentations and discussions of art at the Bowdoin conferences apparently were very stimulating for Polanyi. He perhaps was influenced by Donald Weismann's paper on collage which emphasized "the kind of integration of incompatibles that typifies the achievements of art as well as science" (1965 Narrative Report, 8). He was impressed with M. H Pirenne's ideas "about the philosophical applications of visual perception" (1965 Narrative Report, 7), illustrated using slides of a Pozzo painting on the concave ceiling of a baroque church. Polanyi already knew something about Pirenne's work before the 1965 Bowdoin conference (see note 27 above) and the ideas he develops after the Bowdoin conferences about painting draw from Pirenne. Polanyi put together "What is a Painting?" and this was presented at a 1968 SGUK meeting. He seems to have expanded some of the ideas developed in this paper in discussions of symbol, metaphor, ritual, archaic myth and religion. All of this eventually is worked into the several sets of Meaning lectures which Polanyi delivers in 1969, 1970 and 1971 and selections from this material become integral to Polanyi's last book *Meaning* co-authored with Harry Prosch.

⁴⁴ Polanyi's ideas about creativity or novelty in emergence in evolutionary history are not altogether independent of his ideas about creativity in scientific discovery and other human endeavors. This is a point emphasized in Part IV of PK. It is also a point that is a component of Polanyi's late writing after the Bowdoin conferences on theoretical biology.

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Understanding, not Knowing, as the Core of Polanyi's Philosophy

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Abstract: Although Michael Polanyi's magnum opus is entitled *Personal Knowledge*, I argue that "understanding" more adequately describes Polanyi's many-layered epistemic vision than knowledge or even knowing. Knowledge suggests the achieved certainty and objectivity that science is alleged to provide. Such an emphasis on knowledge thereby devalues the personally understood traditions and personal goals that make life worth living. Understanding more comprehensively acknowledges the way humans live and cope. It is grounded in tacit functions we share with other animals, but through language it helps one gain a sense of control over what one intends, means, and does. It includes an interpersonal, appreciative aspect largely missing in knowing. In sum, understanding functions as the experiential base upon which healthy social relations, truthful claims, and personal responsibility rests.

Key words: intention, knowledge, language, meaning, Michael Polanyi, schemas, understanding.

It has been suggested that, although the title of Michael Polanyi's *magnum opus* is *Personal Knowledge*, it would be more consistent with the dynamic thrust of his philosophical vision if the work were entitled *Personal Knowing*.⁴⁵ In this essay, I will argue that an even more apt title to describe his philosophy than *Personal Knowing* would be *A Philosophy of Understanding*. For Polanyi, reaching the state of understanding involves tacit acts of discerning, creating, and evaluating meanings of various sorts. This

⁴⁵ Polanyi himself recognizes this point. "Knowledge is an activity which would be better described as a process of knowing" (KB 132).

essay's aim is not only to draw out important implications of Polanyi's thought, but also to demonstrate how *understanding*, in its sensitivity to several types of *meaning*, provides epistemology with a more comprehensive, more adequate account than is offered by the traditional focus on knowing and knowledge.

Note first and primarily that the term "knowledge" often is used in society to designate either what has been demonstrated logically or scientifically or, more colloquially, what is commonly taken for granted. It manifests an aura of objectivity. "Understanding," on the other hand, is grounded in an embodied capacity of an individual to learn from experience.⁴⁶ Understanding tends to be rooted in concepts, knowledge tends to trade in language. Understanding can accommodate reasoning about a person's world orientation and values, topics about which knowledge cannot legitimately make claims. Understanding encompasses elusive psychological factors like motivation, desire, and strategy, factors that seem outside the realm of knowing. Polanyi codifies his insight into how understanding encapsulates one's personal experience and the shaping influence of environment by speaking of a person's calling. Polanyi came to see his own calling to be developing a rich, meaning-laden theory of understanding designed to heal the twentieth century's massive problems⁴⁷ and to offer individuals hope that their lives matter.

⁴⁶ During his April 25, 1967 interview with Ray Wilken, Polanyi suggests understanding is a tacit ability to make sense of the world. He indicates that this capacity has allowed him to lessen his earlier emphasis on justifying our ultimate commitments and instead attend to the tacit processes shaping human consciousness (see also his comments at PK, xi). I thank Phil Mullins for suggesting the Wilken comments and for his thoughtful comments on this essay.

⁴⁷ The claim that Polanyi's thought is designed to heal the sick modern mind and its associated social problems is convincingly argued by Harry Prosch in his book, *Michael Polanyi: A Critical Exposition* (Albany, NY: SUNY Press, 1986).

Additionally, understanding includes an interpersonal, appreciative aspect largely missing in knowing. This interpersonal aspect of understanding supports Polanyi's view that we are embedded in and shaped by our cultural milieu. We are social animals who seek to belong, who value conviviality. Understanding has a social as well as an individual character. Understanding, like knowing, can refer to comprehension of material at a given epistemic level, but more than knowledge, it is nimble and able to comprehend the relationships between materials at different epistemic levels. Similarly, it can assess and comprehend with sensitivity the diverse views of different people. Understanding is the launching site for synoptic interpretation. Using an understanding of diverse factors, an imaginative integration can produce comprehensive vision.

Finally, the notion of understanding provides unity to the various reaches of Polanyi's thought—unity that is derived from vision more than knowledge. His pre-philosophical attention to matters of reconstituting liberal politics and economics involves understanding such things as human motivations and envisioning the outcomes of different social systems in their relation to encouraging justice and peace. The outcome of his thinking about such matters is one theory among many. While based on understanding, his social thought, like his philosophy, is subject to contentious discussion; it is not a matter of knowledge.

In short, understanding is both more sensitive to diversity and more comprehensive than knowing. It draws strength and direction from tacit processes in a way that nurtures significant explicit thought and action. It functions at the very core of Polanyi's philosophical venture.

Well, since understanding is so importantly involved in living, then its nature and functioning ought to be examined closely. That is my aim in this essay.

1. Situating Understanding

In suggesting the importance of “understanding” for comprehending Polanyian thought, I am of course not imposing some concept that is foreign to his philosophical vision. Indeed, in *The Study of Man*, Polanyi’s summary statement of what he thinks he achieved in *Personal Knowledge*, Polanyi states that the one word to identify properly all the processes by which humans gain intellectual control over their experience is “understanding” (SM 20; see also PK 132). Control is achieved through tacitly reorganizing experiences into intelligible and manipulable schemas and categories. Understanding includes all the tacit processes and powers through which persons come to recognize what they *believe* or accept, and such examination comes to serve as the ultimate basis for justifying what they think and how they act. Understanding thus anchors Polanyi’s fiduciary philosophy. It is the grounding source of competence and claims of knowledge. On this basis, Polanyi states, “I have now expanded the function of understanding into that of knowing what we *intend*, what we *mean*, or what we *do*” (SM 22). Now if understanding is about personal control of thought and action and is therefore even more firmly grounded in the personal than knowing, perhaps Polanyi should have phrased the sentence just quoted to eliminate the “*knowing*” of what we intend, etc. It might better be stated as follows: “I have now expanded the function of understanding into that of *being personally in control of* what we intend, what we mean, and what we do.” This way of phrasing things aptly demonstrates that the core of personal responsibility lies in judgments expressive of our understanding and its galaxy of beliefs.⁴⁸

⁴⁸ In a perceptive article describing Polanyi’s theory of judgment, Diane Yeager notes that for Polanyi the “act (and art) of personal judgment is, in fact, the core of his distinctive conception of the nature of knowing. . .” (Yeager, “The Deliberate Holding of Unproven Beliefs,” *The Political Science Reviewer* XXXVII [2008], 101). She further observes that Polanyi considers “judgment to be an indelible power constitutive of personhood” (106).

Why doesn't Polanyi make the greater importance of understanding than knowing clearer in how he labels his thought if it is so central to his philosophical position? The certainty associated with knowing links it with the aim of Cartesian philosophy. Descartes sought to establish a methodology that would transcend the subjective uncertainty he discerned in his Jesuit education. Polanyi experienced the problematic legacy of Descartes's methodology in the Marxism, positivism, and objectivism that was widely accepted in the first half of the twentieth century. Polanyi labels his effective discrediting of those philosophical positions with the terms "personal knowledge" and "post-critical philosophy." He uses these two terms to demonstrate that he offers an epistemological alternative. Unfortunately, each term also bears connotations that are at odds with his broad intent. "Personal philosophy" sounds to the uninitiated to advocate a strictly subjective approach to philosophy, even though Polanyi goes to great lengths to disavow any such interpretation. "Post-critical philosophy" has the problem that the term "post-critical" suggests criticism no longer has a place in philosophy, which again is not what Polanyi believes.

Does the term "personal understanding" more adequately capture the essence of Polanyi's unique vision? Unfortunately, I don't think so. Understanding is generally thought to have a personal element, so the term does not hint at the wholesale shift from modernist presuppositions that Polanyi's comprehensive thought requires. Rather "personal understanding" tends to sound like a retreat into flaccid subjectivism. "Personal knowledge" more paradoxically and evocatively integrates a term that sounds subjective with a term that sounds objective, and this invites inquiry into the nature of this integration. "Post-critical philosophy" also lures one into seeking out

Judgment for Polanyi occurs at different levels, but perhaps it is most strikingly manifest in transforming tacit sensitivity into articulate expression. This act is most conducive to truth when it emerges under the guidance of understanding.

what Polanyi's intended position might be. Since I believe understanding is at the very center of that intention, my candidate to describe most accurately Polanyi's epistemic prioritizing of understanding would simply be "philosophy of understanding." I am not advocating "philosophy of understanding" replace "post-critical philosophy" or "personal knowledge;" I only suggest it is the phrase that most adequately describes his philosophical stance.

His discussion in *The Study of Man* indicates that Polanyi intends the term "understanding" to cover processes at several levels, including those he calls "tacit knowing." He roots "understanding" in innate and learned *inarticulate skills* and the nonlinguistic lessons we learn from our skillful perceptual interactions with our environments. "We may say in general that by acquiring a skill, whether muscular or intellectual, we achieve an understanding which we cannot put into words and which is continuous with the inarticulate faculties of animals" (PK 90). All skill-based transactions within and between living organisms are purposeful and are therefore triadic (A interacts with B to achieve resulting purpose C) rather than dualistic (merely mechanistic) in nature. Biosemiotics describes the various sorts of triadic processes making understanding possible insofar as these embodied activities transpire at levels chemists and biologists study. In controlling what we intend, mean, and do, the processes of understanding operate at levels psychology is best equipped to study. However, perhaps it is philosophy that ideally assumes the *systemic perspective* that can best interpret understanding as a complex phenomenon operating on many interrelated levels.

This essay interprets understanding primarily from a systemic perspective. Because some aspects of understanding are tacit, yet at another level of consciousness we are aware that we understand something, an examination of the interdependent layers of consciousness seems a promising avenue of approach to the systemic vision we seek.

Polanyi anchors his discussion of the emergence of human consciousness by speaking of the “from-to” character of consciousness. In adding a “from” dimension to the “to” aspect of consciousness emphasized by Brentano, Polanyi made an important step. Brentano stated that all consciousness is of some object or content, the “to.” Polanyi’s “from” indicates the complex, largely tacit background that gives the object or content of the “to” specific *meaning*. He uses the example of a finger pointing to an object as showing that two kinds of awareness are involved in establishing a speaker’s intent: the subsidiary finger and the focal object that is meant by pointing (see KB 181-182). Here Polanyi simplifies the complexity of the “from” and concentrates on how a subsidiary of which we are aware contributes to focal meaning (the “to”). However, passages such as the following indicate Polanyi fully recognizes that complex background features are included in the functioning of the “from.” Our acts of knowing, he says, rely on “stimuli coming from outside, from all parts of our body and from tools or instruments assimilated to our body, and . . . on a wide range of linguistic pointers which bring to bear our pre-conceptions—based on past experiences—on the interpretation of our subject matter” (KB 134).

To highlight the way the inarticulate and articulate levels of consciousness are connected through and dependent upon language in ordinary *human* experience, for many years I have advocated expanding Polanyi’s from-to model of consciousness into a triadic *from-via-to* model. This model is more consistent with Polanyi’s triadic formulation of consciousness (see KB 181-182) than his “from-to model,” which suggests duality. I have stipulated that the “via” which transforms the tacit “from” into the articulate “to” be restricted to discursive symbolism—to language in particular—as the unique contributor to human consciousness.⁴⁹ It is

⁴⁹ I recognize that at many levels of physiological functioning triadic mediation occurs, so that the notion of a “via” could be applied more generally than with respect to linguistic usage.

important to recognize that language is not simply restricted to mental processing in speech and thought, but that it may also be applied to sensation to create the level of perception that accommodates question raising and thoughtful inquiry. That is, perception becomes distinctively human when language is added to the schematized recognition of sensation so that a person can reflect upon and discuss what is perceived. More basically, I see the background-judging, framework-assembling, word-evoking, and language-using carried out at the “via” level to be one of two central components of personhood, involved in constituting the responsible individual. The second component, to be discussed later in this article, is meaning. Each component relies upon understanding.

Now the tripartite epistemic structure of human understanding has been laid out. Its processes involve a tacit background, linguistic interpretation, and resultant meaning. Let us further explore each of these aspects of understanding in order.

2. The Inarticulate Roots of Understanding

In an intriguing footnote, Polanyi elaborates on several of the tacit aspects of understanding he sees it to encompass:

Our widened use of the word ‘understanding’ makes it comprise the domain of ‘conception’ as well as that of ‘schema’, the term used by Claparede and Piaget for designating a complex motoric faculty. I shall use these words interchangeably, to stand for a kind of latent knowledge, or aspects of such knowledge, as distinct from any overt

But to highlight the distinctive form of consciousness with which language usage blesses humans, I restrict the term “via” to the various ways language (discursive symbolism) shapes human thought and behavior.

performances based on this kind of knowledge. Later on ‘intuition’ or ‘insight’ will be introduced to describe the act of understanding, particularly in mathematics. (PK 91)

Polanyi’s act of embedding inarticulate understanding in both the schemas of sensorimotor skills and sensory conception makes sense in terms of recent understanding of brain architecture. These skills are closely linked in the cerebral cortex. In addition, linguistic ability seems to have evolved as an elaboration of motoric skills in the same region of the brain. This makes sense in that talking involves skillfully moving lips, tongue, and vocal chords. Perhaps this tight connection indicates why we often cannot resist accompanying our speech with hand and body gestures. The use of language is a thoroughly embodied phenomenon.

Polanyi identifies three types of inarticulate intelligence employed by nonhuman animals: trick, sign and latent learning (PK 71-76). These involve respectively a skill in contriving things for certain purposes, observing signals that inform animals of environmental events of interest and potential response, and the reorganization of what is experienced into meaningfully connected memories, mental maps that can be utilized in purposeful behavior. Polanyi states that latent learning, the crucial third type of inarticulate intelligence, occurs “when the process of reorganization is achieved not by a particular act of contriving or observing, but by achieving a *true understanding of a situation which had been open to inspection almost entirely from the start*” (PK 74). Thus, latent learning stores the lessons of experience and functions as the ground of understanding.

Polanyi describes the realm of inarticulate understanding as constituting an ineffable domain, by which he means that while one can refer to its inarticulate contents, one cannot speak of them adequately (PK 91). “This ineffable domain of skillful knowing is continuous in its inarticulateness

with the knowledge possessed by animals and infants, who, as we have seen, also possess the capacity for reorganizing their inarticulate knowledge and using it as an interpretive framework” (PK 90).⁵⁰

It is evident that the three inarticulate types of learning are not totally unconscious, even though like all mental processes they depend upon unconscious processes. They rely upon an awareness of the world that is intelligent but not linguistic in character. Our awareness of the pointing finger is of this character. Indeed, much of the perception humans experience—all that is not at the center of attention—is of this inarticulate character. The fact that much that is tacit is simultaneously conscious distinguishes the tacit from the unconscious in Freudian and other psychological usage. I will put off exploring the tacit aspect of perception until the subsequent section.

To summarize: Understanding connotes an ability to discern relationships that help one see the big picture and feel in control. One is able to find one’s way about. The inarticulate aspect of understanding refers to mental processes in which any of the three types of inarticulate intelligence humans share with other animals are utilized in accordance with some purpose. I view latent learning as a particularly significant aspect of inarticulate understanding, because embedding learning in a map-like

⁵⁰ Polanyi’s emphasis on the inarticulate abilities we share with other animals is not an anomalous vision in conflict with contemporary understanding. Michael Tomasello, the influential co-director of the Max Planck Institute for Evolutionary Anthropology, writes (in harmony with Polanyi’s view) that “great apes, as the closest living relatives of humans, already understand in human-like ways many aspects of their physical and social worlds, including the causal and intentional relations that structure those worlds. This means that many important aspects of human understanding derive not from humans’ unique forms of sociality, culture, and language but rather, from something like the individual problem-solving abilities of great apes in general” (*A Natural History of Human Thinking* [Cambridge: Harvard University Press, 2014], 2).

structure allows one to be aware of how one's experiences fit together coherently. This in turn provides the basis for intelligent behavior.

3. The Role of Perception in Understanding

If we make intelligent distinctions when perceiving the world even though we are not making use of language, on what basis are these distinctions made? Through indwelt schemas stored in memory.

Our receptors provide the basic pre-linguistic data of perception. Environmental information seized by receptors is then conveyed as sensation by the central nervous system to a processing center, usually the brain. We are thereby bathed in a steady stream of sensation, most of which is ignored. Attention tends to be directed to that sensory material that is novel and needing to be controlled, to data of pre-existing interest, to that which satisfies desires, or to that which is viewed as threatening. Sensation tied to the routine, the already organized, is generally ignored. A person living next to railroad tracks soon ceases hearing trains rumbling past, even though the sound undoubtedly is processed aurally. That which is well understood is far less interesting than seeking to understand the mysterious, the uncertain, or the unusual.

After it is initially experienced, sensation continues to be present for a brief period as input from the real world calling for interpretation and response. The following list describes increasingly rich response to sensation : 1) sensation that never comes to awareness, 2) peripheral and background awareness that is not focused upon, 3) sensation that is schematized and consequently subject to recognition and response, and 4) schematized perception to which language serves as a focusing agent. We control interpretation of the sensation, but the independent character of what is sensed controls the adequacy of our interpretation. Throughout each of these four

levels of increased attention to sensation, the sense data itself is not altered. Rather the degree of attention to the data becomes more intense and more subject to intellectual manipulation and regulation.

How does schematization occur? Mental existence is based on the innate cognitive ability to *abstract* patterns from sensory experience. Susanne Langer describes abstraction as “the tendency to single out the salient features of experience that recur on different occasions or occur simultaneously in multiple instances, and to remember those features and recognize them as the same in each case.”⁵¹ Those remembered, repeated patterns are what I term “schemas.” I distinguish two tacitly formed types of schemas: pre-linguistic percepts based on patterns derived from sensation, and pre-linguistic concepts coagulated out from recalled repeated relationships and patterns occurring in experience. Some of these recognized patterns are so basic to intelligibility, like cause and effect or substance, that Kant regarded them as a priori categories. The abstracting act of schematizing sensation is the original act of understanding; the act of recognition based on previous schematization is a higher-level act of understanding. The activity of latent learning in categorizing and organizing recognized schemas is a yet higher-level but still pre-linguistic act of understanding.

Since most aspects of ordinary experience are repeated, one tends to dwell in a taken-for-granted perceptual world needing no linguistic attention. The schematized world attended to without linguistic attention is phenomenologically similar to the world in which non-human animals and human infants dwell. It is a world of primary understanding making use of original schematization, subsequent recognition, and latent learning. Within the holism of unitary consciousness, we humans tend not to notice the difference between the several simultaneous levels in which we often dwell. For instance, when we engage in a conversation while driving a car, we are

⁵¹ Susanne Langer, *Philosophical Sketches* (New York: Mentor Book, 1964), 64-65.

attentive in at least two levels of perception: we tacitly attend to the road and other cars while we explicitly (linguistically) attend to what our friend is saying within the course of a conversation. The adequacy of such tacit attention to driving is based on schemas—intellectually informed habits. To be sure, at some point in the past we learned how to drive a car through linguistic instruction, but over time driving became a habitual activity. Repeated actions, whether guided by language or not, tend to become routinized in schemas so that they can be performed without undue mental effort or linguistic attention. When these actions are integrated so as to perform regular chores, they become customs or skills that once learned need no higher-level attention. They can be utilized in scenarios of multi-tasking, as in talking while driving. They become second nature. Much of our time is spent cruising along in culturally saturated, habitual patterns of activity.

Schemas, it should now be evident, play a crucial role in constructing perceptual understanding. At the simplest level, they are interiorized spatial patterns (Peircean signs) that allow for visual recognition. Indeed, they underlie recognitions of many types—of the taste of cinnamon, of the aroma of Chanel No. 5, of the feel of leather, of the sound of an oboe. Thus schemas have a kinesthetic character not tied to any specific sense, although we seem most dependent on vision. Schemas can guide temporal activity as well as imprint spatial structure. Mark Johnson states that they exist “in a continuous, analog fashion in our understanding.” He notes further that schematic structures “are constantly operating in our perception, bodily movement through space, and physical manipulation of objects.”⁵² Habits are themselves often rather complex schemas in which we dwell. Concepts are intellectual schemas to which words are typically attached.

⁵² Mark Johnson, *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason* (Chicago: University of Chicago Press, 1987), 23.

The world of primary understanding based on schemas apparently served in evolutionary history as a breeding ground for conception freed from dependence on environmental signals. At some fairly advanced stage of animal development, the patterns identified in schematic recognition apparently became loosened from their attachment to empirical reality. Visual schemas then become the free-floating images of dream and fantasy. Moreover, the dynamic schemas underlying habits, cause-and-effect patterns, and other processes can also become detached from their original sites. The combination of free-floating spatial and temporal schemas melded with the drive to be pro-active can be plausibly conceived as the origin of imagination. Schemas released from attachment to empirical immediacy give birth to conception. Imagination bubbles up and flies beyond the limits imposed by given sensation. Imagination shaped by memory may represent features previously encountered in the world or can create entirely novel concoctions. The products of imagination may flit away as fantasies, they may inspire artistic expression, or they may help orchestrate technological innovations—the contrivances engendered by trick learning Polanyi mentions. Just as words properly placed in a proposition contribute to a higher level of meaning, so images of all sorts—aural as well as visual—can contribute not only to expanded consciousness, but also to invention and discovery.

Many of the skillful competencies humans share with other animals, particularly primates, are made possible through augmenting primary understanding with imagination. The apes exhibit an ability to cope with what life brings; they can plan and play, meet and mate. It is not necessary to relegate such traits of consciousness as intention and meaning to linguistic ability alone. Included within the tacit dimension are the embodied skills Polanyi mentions, such as reading the information provided by a probe, or operating a machine. Indeed, many of the operations humans learn become

second nature and do not require language-loaded thought in order to function properly.

Perception takes on its uniquely human form when words, phrases, or sentences interpret it. Often specific concepts, words, or phrases are habitually attached to the complexity of sensation. Then the danger exists that the empirical world becomes restrictively categorized in thought and the particularity of things is ignored. A depleted type of understanding emerges. Nevertheless, the linguistic interpretation of what we perceive allows for the unique power of reflection tied to imagination and intuition to be released. Imagistic meaning is particularly sensitive to aesthetic standards like harmony, beauty, balance, and coherence. Polanyi claims that at heart science is a form of augmented perception (“Creative Imagination” in SEP, 252). Scientific discovery in his recounting follows felt anticipations of increasing imagistic consolidation and beauty to a climax in intuition of coherent solution. Thus, discovery ranks as a culminating form of imagistic meaning—of a form of understanding based on perceptual insight. The climax in intuition is to experience coherence accompanied by feelings of satisfaction to which we shall return shortly. At this point, however, explicit attention to the fecundity inherent in language is needed to address still higher degrees of understanding.

4. The Articulation of Understanding through Language

Language is, of course, the primary factor that produces the uniquely human form of articulate understanding. Polanyi suggests that the three tacit powers of the mind described earlier are combined in humans, unlike other animals, to enable us to speak. “To speak is to *contrive* signs, to *observe* their fitness, and to *interpret* their alternative relations; though the animal possesses each of these three faculties, he cannot combine them” (PK 82). While Polanyi theoretically emphasizes the importance of language in human

experience, the way he treats language as but one of many tacit factors in knowing does not in practice adequately accent its uniqueness and centrality. “We may say that when we learn to use language, or a probe, or a tool, and thus make ourselves aware of these things as we are of our body, we *interiorize* these things and *make ourselves dwell in them*” (KB 148). Language is thus for Polanyi just one of many functionally tacit subsidiaries to focal knowledge in the triadic structure of consciousness. I introduced the notion of the “via” in the from-via-to structure to properly acknowledge the distinctive role language has in human experience.

Polanyi seeks to interpret how humans negotiate several types of understanding to which we are privy by telling of how a traveler writes to a reader of his experiences so that the reader may imaginatively enter into the experience. Polanyi says the communication that follows involves a sequence of three integrations.

The *first* is an intelligent understanding of sights and events, the *second* the composing of a verbal account of this experience, and the *third* the interpretation of this verbal account with a view to reproducing this experience which is reported. . . The *first* triad is more a *sense-reading*, the *second* more a *sense-giving* and the *third*, once more, a *sense-reading*. ((KB 186)

He calls the basic schematizing of sensory experience “sense-reading.” When that schematized sensory experience is translated into language, he terms this act “sense-giving.” If another person reads what the perceiver writes, this again requires sense-reading. But note that Polanyi uses the same term, “sense-reading,” to refer to activity at two different levels: one at the level of understanding what one sees and the other at the level of comprehending

human language. This can be confusing, for different processes of understanding occur at the inarticulate and articulate levels of consciousness.

I list below some of the interrelated characteristics of language—the “via”—that jointly contribute to a state of human consciousness not found in other animals. Inasmuch as the articulate level of understanding is dependent on language, increased understanding of the nature and processes of language increases our understanding of understanding itself.

1. Human language, unlike other forms of communication, has a vocabulary. Words, the elements of language, are arbitrarily rather than iconically related to what they *denote*. Their relatively fixed meanings are established by convention. As conventional, language is socially constituted and forms the basis for intersubjective communication, yet as schematically grounded in personal experience, words (and combinational flexibility) allow for personal creativity. Words singly and in combination also exhibit *connotations* reflective of the speaker’s/writer’s intention and the context in which they are used. There are often alternative ways to arrive at the same or similar meanings, some more precise or pleasing than others.
2. Words can be arranged according to syntactical and grammatical rules into propositions or other types of higher-level semantic meaning. “Language as a whole is greater than the sum of its parts. When we hear our native language we do not hear grammar or particular sounds or meanings, we hear and instantly understand what is being said as a whole, individually and together in a conversation or story.”⁵³ That is, when we speak or write, we

⁵³ Daniel L. Everett, *How Language Began: The Story of Humanity’s Greatest Invention* (New York: Liveright Publishing Corporation, 2017), 105.

create an emergent level of consciousness that is more than a mere aggregation of words. Individual words name items or events and can then function as signals. Words in proper syntactic combination, however, make possible claims of truth or falsity and help establish the whole edifice of human culture.

3. Some words or phrases are intelligibly equivalent to the meaning of other groups of words so that dictionaries can be constructed. Languages then are domesticated and allow for precision in communication.
4. Words tend to be linked to particular schemas which in turn capture commonly available objects or events. Many of these same intellectual schemas (concepts) are referred to in different languages. Lakoff and Johnson persuasively argue that this is because all languages are grounded in bodily accessible basic-level categories that are neither too abstract nor too refined.⁵⁴ Thus, one can equally call a horse a caballo, a pferd, or a cheval. That humans throughout the world share many of the same or very similar concepts provides a basis upon which translations from one language to another can be established.
5. As social animals, young humans are predisposed to learn languages (and other aspects of our cultural heritage) as part of

⁵⁴ See George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought* (New York: Basic Books, 1999), 26-30. Elizabeth Spelke's findings over two decades suggests that infants prior to six months old are able to single out objects "that are internally cohesive and separately movable: cups but not . . . doorknobs, sand piles, or block towers" (in Michael Tomasello, *Why We Cooperate*, [Cambridge: MIT Press, 2009], 158). She states (156-157) that there is evidence for at least five systems of core knowledge prior to the learning of language. A baby's ability to recognize and reason about such things as material objects, intentional agents, and situated places offers support for the significance of Polanyi's notion of latent learning.

their initiation into social reality. Parents shape the baby's babbling into language and new levels of intimacy and competence result. The young child's world expands beyond immediate perceptual experience through the imaginative reach of language (sometimes called displacement).

6. Language has great plasticity. It can be shaped into different and often nested *frameworks* of understanding so that the natural, cultural, and interpersonal worlds can be engaged from different perspectives. The most general sorts of frameworks mold specific cultural understandings of what makes sense (for instance, the Azande versus the scientific worldview). Collingwood calls such basic beliefs "absolute presuppositions" and suggests many inhabitants of a culture are not even aware of these beliefs and their influence. The various academic disciplines all tend to have specific frameworks that may separate them to some degree from other disciplines, although usually not with the incommensurability that Kuhn is often interpreted as suggesting. Then there are the very personal frameworks individuals develop. The different roles people play and the different personalities they engage each tend to induce the use of specific vocabularies that function as frameworks. Frameworks tend to be labile, changing as culture evolves.
7. Jerome Bruner distinguishes two basic modes of linguistic organization that dominate the human urge for explanation: analysis (breaking a whole into its parts to understand better how it works) and narrative exposition (story telling within which causal explanation is frequently embedded).⁵⁵ Charles Taylor offers a

⁵⁵ Jerome Bruner's *Actual Minds, Possible Worlds* (Cambridge: Harvard University Press, 1987) provides a sustained argument for the primacy of these two modes.

related distinction: those in the empiricist tradition like Locke view language as a tool for description and the communication of information, while those in the romantic tradition like Goethe employ the constitutive function of narratives to build novel “landscapes of meaning.”⁵⁶

8. Language, when married with a predisposition to contrive, has produced technological achievements that vastly expand human perception and empirical understanding into macro, micro, and ancient worlds that are unimaginable to other animals. The flexibility of language grants access to different levels and perspectives upon reality, thereby dramatically expanding the reach of understanding.
9. The most important technological achievement, writing, now augmented by the internet, has allowed for unprecedented shared communication across ethnic and generational divisions. This expanded intelligible world becomes part of the cultural legacy into which humans are socialized and which thereby shapes human experience. A kind of global orthodoxy supported by the media and involving science, history, and the various facets of globalization has thereby challenged the authority of local traditions. Shared understanding has consequently become potentially more widespread, although in practice electronic media have also spawned new forms of tribalism.

⁵⁶ Charles Taylor, *The Language Animal: The Full Shape of the Human Linguistic Capacity* (Cambridge: Harvard University Press, 2016), 332. Taylor distinguishes between “designative-instrumental” and “constitutive expressive” modes of language usage (4). Hobbes, Locke, and Condillac tend to take an atomistic and instrumental approach to what language accomplishes, while Hamann, Herder, and Humboldt emphasize the creative potential inherent in narrative and poetry—a clash between empirical and romantic tendencies.

Three aspects of language not mentioned above are significant with respect to understanding. First, primary understanding, as pre-linguistic, is clearly tacit in its functioning. But so is the process of articulate understanding. In expressing ourselves linguistically, most of our focal attention is neither directed at the words we use nor at the understanding that we feel, but rather at the meanings the words express in fragmentary form or most explicitly as propositions. This is the explicit meaning “to” which we attend. Language is translucent. Understanding is felt. In use, each is tacitly, not focally, experienced. We live in meanings.

Second, I believe much discussion of language is snared in a kind of objectivism that can be just as pernicious as objectivism in science. Words are often treated as reducible to dictionary definitions, and sentences are treated as if their meaning is factually evident to everyone. But in practice, language is a tool used to communicate a speaker’s intention(s), which resting on the various subsidiaries and feelings of individualized experience, are often not clearly related to the conventional meaning of words. The words used by a speaker may have intended *connotations* slightly different than the meanings expressed in a dictionary definition. Understanding, more than knowing, is attuned to motivation, intention, and the slipperiness of language. Knowledge desires clarity and certainty in all situations, even those where none may be possible. Understanding can accommodate some degree of ambiguity. In their commitment to clarity of discourse, thinkers in the analytic tradition cannot deal effectively with the messiness of much human interchange. Understanding is not chained to fact or linguistic precision the way knowledge is usually taken to be.

Third, another characteristic of language not stressed in the nine points above is that the human need to impose language on experience is virtually irrepressible. It takes trained sensitivity to penetrate in introspection beyond

the incessant babble of language to attend to the variety of feelings that constitute important inarticulate processes. Primary understanding is the term I have used to describe both the process and result of the harmonious encoding and situating of sensed material within long-term memory and embodied skills. Articulate understanding often is stimulated by “the unreasoned conclusions of our senses” (SM 17), but in reflection and imagination, thought soars beyond the limits inherent to the information received from receptors. Some language is far distanced from perceived reality or entirely separate from it. In poetry and fiction, for instance, as Charles Taylor has stressed, language can create new, often artistic, meanings that have no direct relation to the empirical realm. Polanyi and Prosch in *Meaning* explore ways in which linguistic meanings can both extend understanding beyond knowledge but also transcend understanding in imaginative vision and artistic creativity.

5. Meaning

The distinction I have drawn between inarticulate and articulate understanding suggests there exists within human consciousness a fundamental dichotomy. However, rarely is extreme disjunction justified when one takes, as Polanyi does, an evolutionary view regarding biological development and relationship. No doubt there have been in evolutionary history many small incremental steps between the inarticulate understanding of primates and the articulate understanding of humans that reveal underlying continuities as well as emergent discontinuities. From a phenomenological standpoint, understanding seems a felt condition happily including both inarticulate and articulate factors. At this point, I find it instructive to focus on the felt continuities by asking what the function of understanding at any of its levels might be. Here is an introductory answer: *understanding identifies,*

classifies, and assesses the significance of the challenges and opportunities afforded by one's personal, cultural, and physical environments.

The currency in terms of which understanding identifies, classifies, and assesses is *meaning*. Previous sections have explored the “from” and the “via.” Now it is time to attend to the “to,” the domain of meant objects—things, thoughts, events, conditions. Caution is required here. For meaning has to do with *purposes, relationships and values of embodied content or action as projected or interpreted by persons*; it is not properly seen as inherent in objects or qualities. The internal meaning-creating relationship always involves the “from” and the “to” of lower levels of meaning and often the full “from-via-to” of human consciousness. Here I find it necessary to depart from the account of meaning Polanyi gives in *Personal Knowledge*.

First, he claims there are two kinds of meaning: representative (or denotative) meaning and existential meaning. “We may describe the kind of meaning which a context possesses in itself as *existential*, to distinguish it especially from *denotative* or, more generally, *representative* meaning” (PK 58). I do not believe that this two-fold categorization fully captures the richness of meaning. Does any context possess meaning? In the next section, I will argue that Polanyi’s notion of existential meaning is problematic and offer a substitute version. There also seems to be meaning that is neither contextual nor representative in nature. For instance, biological functions are meaningful but not referential in any obvious sense.

Second, I reject Polanyi’s overgeneralization of gestalt thought. He claims that there are two kinds of content in all meaningful matters. “There are things in it that *have* a meaning and these things bear on something else, namely on that which *is* their meaning.”⁵⁷ This claim makes sense with

⁵⁷ Michael Polanyi, “The Lecture Series: Meaning, Lost and Regained, *Polanyiana* 15:1-2 (2006), 74.

respect to ordinary discourse. Words have conventional meanings and are deployed in a sentence to bear on what is their joint meaning. But should such a relationship be generalized to characterize all meaning, even perception? This is what Polanyi seems to attempt. “[I]n a gestalt the parts *have* a meaning and the whole which they form *is* their meaning.”⁵⁸ I do not believe the parts making up a gestalt typically have a meaning in the same sense that words have a meaning in a sentence. Imagine a picture of a mountain. What is it that creates our understanding that we are viewing a mountain? Is it an integration of the individual streaks of grey, presumably indicating rocks, with the blobs of green that must be trees? No. It is the upward jutting or rounded form that signifies the shape of a mountain. Identifiable mountains have a certain schematized pattern that enables us to identify them as such. To be sure, the context of the silhouette matters in the identification of the upward thrust as a mountain. Without such background illustrated entities as sky, rock, snow, distant trees, etc. providing a context, an upward form could be an iceberg or the graph of a company’s earnings. The useful notion to use in this case, which does come from gestalt thought, is the figure-ground relation, not integration. Using the from-via-to structure, I would describe the perception of the mountain along these lines: with the tacit intent to comprehend what I am viewing, I would recognize in the visual sensations received a familiar schematized pattern of rocky upheaval illustrated against an appropriate background (the “from”) to which the word “mountain” (the “via”) is conventionally attached and understand I am seeing a mountain (the “to”) as the explicit meaning of what I am viewing. The mountain, then, is a gestalt in the sense of fitting a foregrounded general *pattern*, a perceptual schema, not a gestalt formed by an integration of parts. Schematic pattern, appropriate background, and language, rather than integration of parts and whole, seem best suited for *understanding* what we *perceive* visually.

⁵⁸ Ibid.

On the other hand, music and language are examples of mereological structures unfolding in time. Notes function as parts of a melody; words form parts of a proposition. Understanding a comprehensive entity in such cases involves seeing how parts arranged together in proper order form a whole.

How is meaning best seen as resident within the structure and processes of understanding previously discussed? Clearly, if what we thought about or how we acted had no meaning, we would also have no understanding. Understanding and meaning are woven together in diverse ways. The inarticulate reading of environmental signs signaling danger or opportunity may be regarded as the primal origin of meaningfulness within evolutionary history. “As far down the scale of life as the worms and even perhaps the amoeba, we meet a general alertness of animals, not directed toward any specific satisfaction, but merely exploring what is there; an urge to achieve intellectual control over the situations confronting it” (PK 132). Various physiological processes including respiration and digestion provide the energy that makes understanding and meaning possible.

Most fundamentally, meaning is found wherever *purposeful functioning* occurs. Just as the human appendix serves no discernible physiological purpose, some twitches and other behaviors serve no discernible purpose and can be said to be meaningless. Meaning shows up in biological functioning as related to the purpose of survival, but since the focus of this essay is on understanding, I will not discuss meaning in the biological realm. Rather I will discriminate types of meaning as they manifest purposefulness and intention through tacit and explicit cognition. A person treats a percept, concept or linguistic element as meaningful when it reveals or illuminates some object—a thing, condition or event. Langer⁵⁹ distinguishes between two

⁵⁹ My interpretation of Polanyi’s epistemology has long been colored by my use of Susanne Langer’s account of meaning, especially her description of signals and symbols as described in *Philosophy in a New Key*, third ed. (Cambridge: Harvard University Press, 1957). See

types of revealing or illuminating: signaling when some aspect of reality is pointed out without linguistic mediation, and symboling when a mental element produces conception that may in turn be put to further usage. Signaling and symboling are referential activities. Three facilitators of referential meaning stand out: (1) the pre-linguistic schemas recognized in primary perception, (2) the images produced by imagination, and (3) language and other discursive symbols. The mediating entities creating these types of meaning are, respectively, schemas, images, and words. These function as mediators in triadic relationships, although the terminology of “via” is only applied to language.

The mediators we use and respond to are cultural artifacts that often have agreed upon meanings. Conventional meanings (4) are human constructs that can be employed by humans to have referential meaning. Signals, images, and language are carriers of different sorts of meaning. A bell in high school can signal the end of a class; a smiley face emoji can communicate a mood; the word “waterfall” denotes a certain feature of a landscape. Conventional signals and symbols, then, like their natural counterparts, may function referentially. Each of the just listed four types of meaning involved in recognizing, interpreting, and organizing internally the phenomena of experience contributes in some way to the purposeful behavior of living beings. All meaning-laden activity, from the most primitive autonomic responses to the most sophisticated creativity, bears on whether a living being flourishes or not. Mere meaningful reference, however, cannot account fully for the role of meaning in flourishing.

6. Intended and Existential Meaning

especially Chapter 3.

One aspect that makes the notion of meaning so powerful is that the term implies more than just awareness of content that is referred to. When allied with understanding, it also refers to a process of gaining control over content, control that may issue in action. Thus, when we are misunderstood, we may explain that the hearer did not understand what we mean, that is, what we intend. Imagistic and discursive meaning are grounded in speaker's intention. Moreover, when we say something is *meaningful* to us, we may mean it is significant. I believe it is not an accident that these varied meanings are designated by the same term, "meaning." I think that understanding functions as the basic epistemic process in which all these aspects of meaning have related systemic functions. Polanyi notes this interdependence when he claims that the function of understanding includes intending, meaning, and doing (citing SM 22 again).

Intended meaning (5) and existential meaning (6) are dynamic epistemic forces that contribute to understanding. Intended meaning (5) tacitly underlies but is distinguishable from the explicit meaning expressed in imagistic and discursive meaning. Humans indwell a variety of purposes during their lives. Some are connected to specific roles; some are quite vague personal and social goals. Usually our language usage is tied to mundane immediate goals: I need to call my friend about an upcoming meeting; I want to find the best reasonably priced repair service for the washing machine; I'd like to share my evaluation of a movie. These fleeting examples of (5) *intended meaning* arise out of dwelling in a rich background understanding of the society and culture in which one dwells. Satisfactions of our purposes often extend or alter our reservoir of background understanding and thereby contribute to new intentions.

We have seen that within rational human experience, language (the "via") expresses a person's largely tacit intentions at the "from" level by

formulating explicit meanings at the “to” level. The specific words and phrases required to express the meaning of a rational intention are evoked according to felt associative relationships from memorized vocabulary and inarticulate understanding. Our speech is judged for adequacy by aesthetic criteria: does the meaning expressed harmonize with and appropriately represent the intention and its grounding in latent learning? Does commonly understood explicit meaning adequately match intended tacit meaning? Neither understanding nor communication are complete unless there is an adequate match.

The successful achievement of our goals results in feelings of satisfaction. Failure of achievement results in feelings of frustration or defeat. The little victories and defeats of everyday life do not add up to much, but the more basic goals of living, such as having faithful companions, being recognized as successful in one's career, or creatively expressing oneself in a valued hobby—these do make a difference in how we view life. They relate to whether or not we experience meaning in life. Meaning in this sense has to do with feelings of significance. We are speaking here of (6) *existential meaning*, the felt assessment of the degree to which we are satisfying our goals, especially those goals we feel to be of greatest significance.

Greater understanding of *existential meaning* can be gained by returning to Polanyi's notion that understanding is rooted in embodied skills.

“What I *understand* in this manner has a meaning for me, and it has this meaning in itself, and not as a sign has a meaning when denoting an object. I have called this earlier on an existential meaning. Since animals have no language which could denote anything, we may describe all meaning of the kind that is understood by animals as existential” (PK 90).

Agreed, a skill does not have denotative meaning. But does it have a meaning *in itself*? I believe Polanyi's notion of existential meaning is flawed. As examples of things having existential meaning, he lists a physiognomy, a tune, and a pattern, and he states that "they mean something only in themselves" (PK 58). He goes on, we have seen, to "describe the kind of meaning which a context possesses in itself as *existential*, to distinguish it especially from *denotative* or, more generally, *representative* meaning. . . All kinds of order, whether contrived or natural, have existential meaning; but contrived order usually also conveys a message" (PK 90).

I believe there is a gem of insight in Polanyi's notion of existential meaning, but that it is obscured by an overlay of several problematic notions. First, does *all order* have existential meaning? No, I would strongly urge. Order manifests the *potential for meaning* that is realized only when that order is recognized and employed in relation to some purpose(s) or insight(s) of a living entity. Polanyi speaks of the actualization of that potential for meaning as an achievement. However, he generally does not consider the world of physics and chemistry alone as meaningful, even though aspects of that world are clearly ordered. The process of anthropogenesis he describes in Part IV of *Personal Knowing* describes life as bringing meaning to an otherwise meaningless universe. "While the first rise of living individuals overcame the meaninglessness of the universe by establishing in it centres of subjective interests, the rise of human thought in its turn overcame these subjective interests by its universal intent" (PK 389). In Polanyi's comprehensive vision, order in contrast to randomness can serve as a clue for new discovery, but it is not itself meaningful apart from its telic appropriation by living beings.

A similar sort of argument can be used to critique the notion of existential meaning as meaningful only in itself. Does a person's facial expression, or a tune, or a pattern have the sort of independent contextual meaning Polanyi ascribes to them? No. A person's expression becomes

meaningful only when it is observed by another person interested in ascertaining the first person's state of mind. A tune without a listener would just be noise. To be sure, there is an ineliminable contextual aspect to a tune; a single sound is not a tune. At the very least, a potential listener is needed to make a sequence of notes meaningful. Likewise, a pattern takes on meaning only when it is regarded or employed by a person for some purpose. For the world is so replete with relationships that can be seen as patterns that it is otiose to regard all patterns, all order, as meaningful.

What then is the gem associated with Polanyi's notion of existential meaning? It is the notion that a skill has a "meaning for me." It deals with something I care about. More primal than linguistic meaning, which has assumed dominance in analytic thought, is inarticulate, embodied purposefulness—felt sorts of meaning that give birth to intentions. Existential meaning (6), as properly conceived, is a *felt characteristic* of actions related to the success or failure of personally affirmed goals, purposes, or interests. Its existence becomes manifest through the expression of our emotions or our passions. In his language of passions, Polanyi gives examples of what I am here calling existential meaning. Heuristic passion, persuasive passion, the passion for justice—these represent impulses seeking existential satisfactions.

Seeking the intellectual satisfaction associated with securing understanding is an important motive driving human thought and action. This claim is central to the thesis of this essay. Polanyi speaks of the *passion to understand* as "an urge to achieve intellectual control over the situations confronting" a living being (PK 132). The satisfaction of desires is another motivating objective. Polanyi claims intellectual satisfaction is more significant than desire satisfaction. He states that "while appetites are guided by standards of private satisfaction, a passion for mental excellence believes itself to be fulfilling universal obligations" (PK 174).

In addition, when Polanyi in *Meaning* describes the importance of

interest and being carried away during the construction of different sorts of meaning, he expresses key aspects of what I mean by existential meaning. He views the act of discovery in science as an exemplary instance of experiencing existential meaning, as Richard Gelwick makes clear in his pioneering treatment of Polanyi's philosophy.⁶⁰ The discovery of a significant natural coherence produces understanding accompanied by a feeling of satisfaction. The arts and religion are taken to be especially powerful cultural vehicles for eliciting experiences of existential meaning. For instance, with respect to poetry, he writes that "a metaphor, like a symbol, carries us away, embodies us in itself, and moves us deeply as we surrender ourselves to it" (*M* 79).

Language's unprecedented capacity to envision the future facilitates the rise of anxieties and fears. But language also functions as the major tool that humans use to alleviate those anxieties and secure existential meaning. The great cultural constructions of language—religions, for instance—offer practices or formulas to counter the anxieties and dilemmas blocking people's experiences of positive existential meaning. Rhetoric is another way language is deployed in search of existential meaning. As Polanyi notes, "language is primarily and always interpersonal and in some degree impassioned; exclusively so in emotional expression (passionate communication) and imperative speech (action by speech), while even in declaratory statements of fact there is some purpose (to communicate) and passion (to express belief)" (*PK* 77)."

For Polanyi, understanding as a state of being is but a term to describe the accumulation of interrelated lessons of experience bearing differing degrees of existential meaning. Understanding thus stands for an interested mind poised to interpret and respond fruitfully to unfolding experience in pursuit of satisfactory and avoidance of negative existential meaning.

⁶⁰ Richard Gelwick, *The Way of Discovery: An Introduction to the Thought of Michael Polanyi* (New York: Oxford University Press, 1977).

7. Conclusion

Polanyi's prioritizing of understanding leads the way to a new phase of epistemology.⁶¹ To be sure, much consciousness is a fumbling stream of bits and pieces that leads to no coherent outcome. Then understanding plays little or no role in consciousness. Yet I have sought to demonstrate, in agreement with Polanyi, that understanding is more basic for comprehending human behavior than knowledge and reason. Understanding is grounded in human purposefulness. It organizes and expresses drives and interests in largely tacit intentionality. Intended meaning evokes the imagination and language to make that tacit intention explicit, available for assessment and further development. Explicit meaning is open to evaluation as to its existential meaning, its felt significance. And that felt significance functions as feedback influencing the nature and scope of our understood interests. It thereby shapes further intentionality. Identified meaning, intended meaning, expressed meaning, significant meaning—such are stages in the systemic loop fueling the advance of understanding. Understanding is both source and goal.

The way I have recast Polanyi's notion of existential meaning helps illuminate Polanyi's two most deeply felt philosophical purposes. The first is to rectify the thinking that led to the twentieth century's great disasters. The second is to move beyond nihilism by describing and supporting the various ways humans can create and enjoy meaningful lives. The latter is the goal of the final book to which Polanyi contributed: *Meaning* (see *M* 44-45, 107, 216). With respect to each of Polanyi's purposes, erroneous use of thought and language created international social catastrophes that he sought to overcome. Distorted, antisocial ways of experiencing existential meaning

⁶¹ Catherine Elgin is a contemporary philosopher who, like Polanyi, persuasively argues for the priority of understanding over knowledge. See her *True Enough* (Cambridge: MIT Press, 2017).

share responsibility for the nihilism, moral inversion, and disrespect of tradition that contributed to massive individual and social suffering. The enflamed rhetoric of Aryan superiority unleashed savage sorts of satisfaction within Nazism. The Marxist suspicion of ethical restraint as serving bourgeois interests helped legitimate Communist duplicity, tyranny, and terror. Within the Western world, the glorification of scientific objectivity devalued religion, ethics, and other humanistic views as merely subjective and arbitrary, thus encouraging nihilism while undermining the various humanistic ways of living rich, meaningful lives.

The lesson of all this begins with the recognition that language can be shaped into frameworks that promote terrible, immoral outcomes. When ideas assume power within society that undermine religious and other traditions supporting ultimate values like truth and justice, existential meaning can be misdirected, and disaster can ensue. Within such demonic frameworks, people can still experience existential meaning, even though they are supportive of catastrophic ends. The Nazi can experience satisfaction at killing those considered to be inferior. To support good world order, existential meaning must be situated within cultures constrained by what Polanyi calls the firmament of values. The basic aim of Polanyi's philosophy can be seen as ethical in the broad sense. He seeks to rectify language and properly align existential meaning with positive social goals. This requires both understanding of the dangers of wrong thought and recognition of the possibility of experiencing lives charged with positive existential meaning. It is the nature of human interpretation that knowledge of such ultimate issues cannot be demonstrated and secured. However, *understanding* of how social disasters can be avoided and how lives can flourish can be achieved and secured through committed belief. This is one of the leading reasons I find it profitable to term his overarching vision a philosophy of understanding.