Guide to Personal Knowledge

The Philosophy of Michael Polanyi:
Tacit Knowledge, Emergence and the Fiduciary Program

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Foreword

C. P. Goodman

Epistemology is the study of knowledge claims. Some assert we ought to put two baskets in front of us. In the left basket, we should put logic, reason, and thought and call it the context of justification. Into the right basket, we should put history, psychology, and experience and call it the context of discovery. Polanyi rejects the assumption that the context of justification can be isolated from the context of discovery. While he endorses the epistemological turn which characterizes modern philosophy, he qualifies it by denying that we can isolate epistemological claims from metaphysical assumptions. The Logical Empiricists declared that any claim which cannot be derived from logic or experience has no epistemological value. But if this is correct, then this declaration has no epistemological value. Every intellectual journey starts from the first step. Philosophy investigates this phase. In the history of philosophy, efforts have been made to secure this first step. In "The Unity of Philosophical Experience" (1937), Etienne Gilson notes that various Western thinkers have sought to replace philosophy with knowledge derived from other disciplines, such as logic or mathematics, history or psychology, theology or physics. But philosophy always buries its undertakers. Every attempt to secure a foundation relies upon philosophical assumptions. Nor should these assumptions be ignored. As thinking beings, we ought to reflect upon the foundations of our beliefs. Michael Polanyi (1891-1976) was a Christian, a scientist, and a liberal. Many (but not all) of those who have written about his ideas have been Christians, scientists, and liberals, sometimes all three. But Polanyi was also a pantheist, a humanist, and a conservative. Maybe these claims do not hold together, and while he is one of the most important philosophers writing in English in the middle years of the C20th, his ideas are rarely studied as a whole, rather he is mentioned in footnotes as somebody who has made significant contributions to discussions about polycentric spontaneous order, the acquisition of science as a moral practice, and the shifts in understanding which take place in scientific change. It is possible to detect his influence in the writings of Hayek, Kuhn, and Feyerabend. Polanyi denies that science is a practice that can simply be reduced to rule-following, but above all, he rejects the concept of knowing without a knowing subject. Knowing is neither objective nor subjective; it is personal and participatory. His epistemological approach is neither empiricist

nor idealist. All knowing is grounded in experience, but all experience is interpreted. We rely upon a body, but we also indwell within articulations. We strive to provide descriptions of what is real, but the descriptions themselves are a real experience. We rely upon more than we can say, and we say more than we can know. The assumption that there are two quite separate cultures, humanistic and scientific, is based on a false division between the subject and the object. All knowing is personal. Nor are we isolated; we exist within communities. Indwelling within articulations enables us to formulate transcendent ideals, which in turn generate communities sustained and constrained by their shared beliefs. We acquire traditions. This emphasis upon inherited practices, which can also be found in the later Ludwig Wittgenstein, influenced Charles Taylor and Alistair MacIntyre. But ideas do not exist independently of the person who thinks about them. Recognizing the power of ideas does not require us to deny the reality of the person. We are not, as John Lukacs points out in "Last Rites" (2009), simply vehicles for ideas; we make choices. Nor is Polanyi a cultural relativist. We are embodied. Every conscious being generates meanings by relying upon a hierarchy of boundary conditions.

As he lays bare the structure of our tacit awareness, Polanyi examines the phenomenology of tool use, the tacit ground of meaning, and the implications these insights have for computing. His writings influenced Hubert Dreyfus and inspired some of the engineers at Xerox Parc. We use symbols as vehicles for meaning, but for symbols to become meaningful, they have to be used by conscious embodied agents. Polanyi rejects the fact/value distinction, highlights the importance of moral passions, and repudiates the phenomena of moral inversion. Rendered homeless by a false conception of science, moral passions are diverted into utopian forms of nihilism. Instead of knowing viewed as the desire to reduce the number of untruths and justice viewed as the desire to reduce the amount of injustice, intellectual passions are viewed as expressions of nothing more than expressions of power. Polanyi rejects both idealism and materialism. His theological and teleological integration of transcendence and pantheism is a corollary of his rejection of subjectivism and objectivism. God is disclosed in emergence and is both created and discovered. Critical Philosophy is the belief that enlightened people do not pursue God; they seek to direct their passions in accordance with correct methods. This is a lineal descent of the claim that we can secure a ground for our beliefs. While denying that we can reach an absolute perspective, Critical Philosophy assumes that we can know the apparatus through which knowing becomes possible. This approach dominated Western philosophy between Locke and Kant, and despite its deconstruction by Hegel, it lives on in Analytical Philosophy. It is via an appeal to scepticism that knowledge claims are designated as nothing more than assertions of power. This claim, however, is excluded from any sceptical denunciation. This hypocrisy should not shock

us. It is not uncommon for egalitarians, for example, to declare their belief in egalitarianism while at the time assuming, on the grounds of their superior critical insight, their entitlement to a position of power. This entitlement is justified via an appeal to critical method, with other claims to privilege, such as appeals to birth or education, rejected. With revolutionary zeal, they seek to destroy every existing social and metaphysical order and replace it with a new society. In his "Plan of Scientific Studies Necessary for the Reorganization of Society" (1822), Auguste Comte (1798-1857) envisaged scientists benevolently directing society with a view to maximizing its happiness. A Post-Critical philosophy, however, takes a different approach. It points out that all knowledge is situated, but for exactly the same reason, all knowledge claims are fallible. Knowing is a process in which conscious beings rely upon and are guided by, and articulate and reflect upon, their tacit awareness, arriving at convictions they believe to be true while acknowledging that they may be false. Polanyi defends a free society not on the grounds that all claims are equally valid and that everybody is equally virtuous, but on the grounds that we do not have a philosopher's stone in our possession which enables us to infallibly distinguish between that which is true and that which is false. The good is an object of continual inquiry. Polanyi, in other words, supplies us with a heuristic philosophy. It is, I suggest, a philosophy for our time. Which is to say it is an account whose time has come. An increasing number of studies of his work are being written; this book is one such contribution. In this preface, I seek to briefly sketch out the background to some of his ideas.

Michael Polanyi was Hungarian. After a century and a half of Turkish rule, Hungary was left plundered and depopulated. A quarter of a century after the Turks left, the population of Buda, a cluster of modest houses and vineyards, was less than 13,000, and the population of Pest, which the historian John Lukacs describes as a semi-oriental fishing village, was little more than 4000. In the Eighteenth Century, the traders, financiers, and manufacturers, who lived in Buda were German-speaking, Catholic, and loyal to the Habsburgs. In the country, the Magyar-speaking gentry despised commerce, were often Calvinist, and opposed the Habsburgs. In the early years of the nineteenth century, in a mood of patriotic fervour, poets and scholars refined and enriched Hungarian into a great literary language. The Prussian defeat of the Austrians in 1866 meant that in 1867 most of the changes which Hungarian protesters had agitated for in 1848 were granted, although foreign affairs, defence, and economic policy continued to be directed from Vienna. In the last third of the nineteenth century, Budapest was the fastest-growing city in Europe. Its financiers, traders, and manufacturers were now often Jews, who Magyarised their surname, and were encouraged to emigrate from such places as Galicia in order to expand the Hungarian-speaking population. As a consequence of reforms begun under the Austrians, but continued by Hungarian ministers,

schools in Budapest, following German and French models, began to set high standards of academic excellence. There was a fascination with science. Polanyi published his first scientific paper while he was still attending the Minta, his high school gymnasium. There was also much interest in how discovery takes place in science. Plato, in his "Meno" dialogue, and Saint Augustine, with his concept of "faith seeking understanding", both sought to understand how knowing is possible. As Polanyi put it, either know what you are looking for, in which case you already know it, or you don't know what you are looking for, in which case how can you find it? Although the Greek mathematicians Pappus and Proclus in Late Antiquity, and the philosophers Descartes and Leibnitz in the Early Modern period, had written about the discovery process in mathematics, it was William Whewell (1793-1866) who coined the word heuristic. He derived it from the Greek heuriskein "to find", the first person singular perfect form of which is heureka "I have found it". In his "On the Philosophy of Discovery" (1860), Whewell sought to steer a middle path between Bacon and Leibniz, claiming that facts and theories should be characterized in terms of opposition rather than difference. They are poles that change as theories are transformed into facts. Whewell denied that science has any special method. Knowing is like learning to walk; you take a few steps, stumble, and try once again to stride forward. Charles Pierce (1839-1914), taking Whewell's side against Mill, coined the term "abduction" in 1867 to denote a non-deductive inference that is not inductive. In Austro-Hungary, Bernard Bolzano (1781-1848), in his "Theory of Science" (1837), wrote a long chapter about the art of discovery in science. In Hungary, Sandor Mikola (1871-1945) introduced heuristic thinking into the school curriculum. Imre Lakatos (1922-74) translated "How to Solve It" (1945) by George Polya (1887-85) (a school friend of Polanyi) into Hungarian. Its Hungarian title was "School for Thinking". Lakatos, who was also influenced by Hegel and Duhem, saw Polya as the father of heuristics in mathematical discovery. Because Karl Popper (1902-94) viewed Polanyi as an intellectual enemy, Lakatos corresponded with him in secret.

Michael Polanyi was Jewish. Since Jews could no longer worship God in his temple, they revered him through the study of holy scripture. These texts stressed the importance of ethical behaviour. In secular Jews, this often manifested itself as reverence for learning and a belief in Leftist politics. The 1867 political settlement was not only a national liberation for Hungary; it was also a liberation for the Jews. The economic and professional flourishing of some Jews within a liberal society, however, began to be resented. While nationalism unified Germany and Italy, it divided Austro-Hungary. In Great Britain, support for Hungary began to fade as liberal writers such as R.W. Seton-Watson drew attention to discrimination against non-Magyar minorities. Some Jews began to question the patriotism which had animated earlier reformers. The Catholic Church was often anti-Semitic. Many secular Jews responded by

becoming enthusiastic defenders of the Enlightenment and the French Revolution. In 1908, his older brother Karl Polanyi (1886-1964) was the first president of the Galileo Circle, a student society that championed Social Science as a source of political reform. Radicals began to view the Anglophile liberalism of the previous generation as old-fashioned. It was asserted that Jews became financiers, traders, and manufacturers, simply because money-making was the only way they could gain respect in a world that was prejudiced against them. Inspired by Karl Marx (1818-83), some of the children of the newly flourishing Jewish middle classes speculated about the possibility of creating societies in which the inequalities generated by free markets would be replaced by centrally directed economies. Some children of wealthy Jews attacked their parents' prosperity, some children of poor Jews attacked their parents' Jewishness, and for many, rejecting the pursuit of wealth and rejecting Jewishness was the same thing. Marx looked forward to a day of violent judgement, at which the chosen people, the proletariat, will be liberated from the inequities of the market system. Expelling divine and ethical purposes from the world, Marx sought to replace them with economic determinism. Instead of the free markets, the new rulers, the enlightened, would decide who would get rewarded. Instead of a society based upon private property, autonomy would be replaced by coercion. A vision in which community takes priority, and a vision in which individual autonomy takes priority, are incompatible. Radicals and conservatives united in their opposition to liberalism. The Hungarian Jew Max Nordau, in the book "Degeneration" (1892), described the late Nineteenth century as a period of restlessness and fear of the future. Inspired by the Darwinian theory of evolution, Nietzsche declared that God is dead, and we should return to a morality based on survival of the fittest. Progressives were keen to express their contempt for the materialism of bourgeois life. Many greeted the prospect of war with enthusiasm. They saw it as an opportunity to restore comradeship and authenticity. As a reaction to the Dreyfus Affair, a Hungarian Jew called Theodor Herzel began to promote the view that there ought to be a Jewish homeland. Liberalism, he concluded, had failed, and he sought to free Jews (secular and otherwise) from the condition of being outsiders in a society which resented them. The Austrian novelist Herman Broch (1886-1951), however, wrote that it is reverence for life that is the supreme Jewish virtue. Jews torment themselves by conceiving God as transcendent, but it is incumbent upon them to embrace the pursuit of goodness, even in the absence of any hope of attaining it.

Bernard Bolzano (1781-1848) not only wrote about heuristics, he also wrote about language. He claimed that propositions exist prior to language. That they should be distinguished from the subjective acts which conceive them. The Austrian literary critic Fritz Mauthner (1849-1923) said we should purify language of its metaphysical assumptions. The reality of our experience can only be lived from moment to moment; it cannot be embalmed in words.

Influenced by Meister Eckhart (1260-1328), he substituted the concept of Tao for God. The Austrian satirist Karl Kraus (1874-1936) responded to Mauther, however, by asserting the reality of descriptions. All thought is language. Mauther declared that his interest in language was inspired by polyglot Austro-Hungary. The Hungarians, for a different reason, also took language very seriously. The Magyar language embodied the Hungarian spirit. Hungarians revered their poets even more than their scientists. Hungarian poets were influenced by the French Symbolist poets Baudelaire and Rimbaud. But the conception of art for the sake of art was not amenable to Hungarians, from whom literature historically was an extension of politics. In 1906 the Hungarian poet Endre Ady (1877-1919) published a book, "New Poems", which became a source of inspiration for those who believed that the process of political change begun by Nineteenth-Century reformers ought to continue. In 1908 a new literary journal called Nyugat (West) was launched, edited by the writer and literary critic Ernő Osvát, the aesthete Paul Ignotus, and wealthy patron of the arts Baron Sándor Hatvany-Deutsch, all of whom were Jewish. It defended a vision in which pursuit of the Good reconciles the ego with society and the universe. Atilla József (1905-37) captures the essence of this thought in his poem "Two Hexameters" (1936) "Why should I be good? They'll stretch out my corpse anyway! Why should I not be good! They'll stretch out my corpse anyway". In a poem commissioned by the materialist and atheist Galileo Circle, Ady declared that, life lives for sacred reasons, and if you are Hungarian, you have to strive a hundred times harder! Everybody ought to be given the opportunity to live their life to its fullest. All polarities are reconciled once we realise that God is everything. This was explained by his friend Hatvany in the following terms. Just as it is possible to reach down to the centre of the Earth from every point, so Ady seeks to reach down through every capricious idea, to the centre, God. In Ady, you find not only his system but also the opposing system because he believed that even the most encompassing system is too narrow for the universe. Ady insists on the personal character of experience and rejects conventional forms of worship "Show yourself to us, you are not Christian, you are not Jewish. You are the frightful terrible Lord." In Jewish mysticism, the potential of language to express thought, and the capacity of thought to comprehend what exists, are foundational. The principal preoccupation of Imre Madach's drama "The Tragedy of Man" (1860) is the question of whether the development of human thinking, guided by our pursuit of ideals, leads to happiness. His character Adam concludes that it does not, but he affirms life anyway. The struggle is the goal.

It was the German physicist Johan Lambert (1728-77) who introduced the term phenomenology to designate the study of appearances as distinct from the study of descriptions. In his "Psychology from an Empirical Standpoint" (1874), Franz Brentano (1838-1917) set himself the task of describing mental acts. He

divides mental phenomena into three classes. First, presentations (vorstellung) occur whenever anything is present to consciousness. He revived the medieval term intentionality to denote the act whereby a mind intends its object. Second, judgement asserts or denies the existence of the object presented. Third, what is presented is attributed a positive or negative value. This determination is not subjective. He repudiates Bolzano's doctrine of presupposition-in-themselves, but he agrees with Bolzano that ethics is neither deontological nor utilitarian. The Good arises when we contemplate the whole, and we love it regardless of its attainability. His student Christian von Ehrenfels (1859-1932) examined the intentionality of identifying a whole, for example, a melody, that is more important than the parts within which it inheres. This was developed by Max Wertheimer (1880-1943) into a Gestalt theory of perception. Max Scheler (1874-1928) comprehends phenomenology as an ethical philosophy. In "Formalism in Ethics and Non-Formal Ethics of Values" (1913-16), he notes that Kant confines personhood to rational will. Scheler agrees with Pascal that objective values can be experienced emotionally by our intuition. The most valuable communities are those that rely upon empathy, but they also provide conditions that enable the most valuable persons to contribute. The chief threat to this is ressentiment, which, contrary to what Nietzsche asserts, is not Christian in origin but arises within societies that prioritise equality. In his last years, Scheler turned against Christianity on the grounds that it lifts man out of the cosmos. Defining God as the all-embracing whole, he turned instead to Eastern religions. In an outline "The Human Place in the Cosmos" (1928) for a book he did not live to complete, Scheler claims that God-in-becoming is realised through us because man is "world-open". We are not trapped in our environment like a snail in a shell. Nicolai Hartmann (1882-1950) agrees with Scheler that persons are necessary agents for realising values, but contrary to Nietzsche, he denies that we who create values, they enter our consciousness through axiological intuitions and exist in the deed. It is the "firmament of values" which are the primary agent; the free-acting person is a point on their journey from unreality to reality. Indeed it is only through the intrusion of values as determining powers that subjects morally become persons. Unlike Scheler, however, he claims that religions sublimate values in a way that abdicates our autonomy. Aurel Kolnai (1900-73) endorses the phenomenological view of ethics pioneered by Brentano and Scheler. According to Kolnai, communism is evil because it negates the self-directed individual personality. When Polanyi emigrated to England (after being appointed a chemistry professor at Manchester University), he countered the Marxist demand that science ought to be centrally directed with a Post-Critical epistemology in which cultural expression ought to be allowed to develop autonomously in accordance with their own laws. His focus of interest shifted from science to philosophy. In this preface, I have sought to supply some of the background to this new understanding.

Preface

This book aims to help the reader understand Michael Polanyi's most important book, titled *Personal Knowledge*, and as such to grasp the essence of his philosophical thinking. In this preface, Polanyi's goals are reconstructed first, and then his main philosophical arguments are introduced. The discussion is limited to the most crucial ideas, which are indispensable for the arc of his book. Given that Polanyi never restricted himself to one discipline, and frequently his comments draw on several areas, there is no doubt that alternate lists of important ideas could be created, drawing from specific perspectives such as those of epistemology, social theory, biology, etc.

The thirteen chapters of this book explain the essence of the thirteen chapters of *Personal Knowledge*. At the beginning of each of our chapters, we summarize Polanyi's goals and then provide a summary of the arguments. We include text boxes that provide background and other helpful information about scholars, concepts, or historic events cited by Polanyi. Also, we quote key passages from every chapter. Our book ends with an index and a list of quotations.

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Polanyi's goal in writing *Personal Knowledge*

It is far from an overstatement to claim that Michael Polanyi's *Personal Knowledge*: *Towards a Post-Critical Philosophy* presents a unique worldview. Among other things, he touches on natural science, the arts and culture, evolution, social theory, history, engineering, mathematics, and religion. His expansive aim to cover almost the entirety of the human endeavor was a thing of the past even in 1958 when the book was first published, and his book did not resemble the more focused works common in the twentieth century. From Polanyi's perspective, however, work touching on such a diversity of disciplines was a consistent effort because, in his view, not only scientists but all modern people have a controversial and deeply troubling relationship with their own surroundings, goals, and ideals. The crisis of science, Polanyi's starting point, is not limited to science itself, since the origins of the scientific

methods and the ideals of scientific discovery are not contained within science but are commonly present everywhere.

The phenomenon in Polanyi's focus is rooted in the distant past, and therefore it is important to give a historic dimension to the argument. Polanyi provides a description of the efforts of Western civilization to achieve knowledge of final and indisputable certainty, beginning in antiquity and continuing until the present in an array of changing manifestations. The most important of these changes, of course, happened in the early modern period, when modern science as the champion of objective investigations and certainty is created. The goal of modern science is to eliminate every personal element from knowledge; such personal elements are deemed subjective and thus should be discarded. This modernist epistemology provided extraordinary results if we compare the state of affairs to the centuries of the pre-Enlightenment era. And yet, a perfectly impersonal knowledge is a nonsensical ideal, in Polanyi's view. He believes that this development of the impersonal ideal of knowledge is the reason that modern human beings are so uniquely morally sensitive and are frequently morally outraged; modern moral passion is combined with excessive modern skepticism, and this undermines trust and traditional ideals such as truth and is responsible for the totalitarianism of the twentieth century. Moreover, the modern, free Western person is unprotected, both emotionally and intellectually, against totalitarianism, which after the Second World War means mainly Marxist-communist systems.

Polanyi's goal in writing *Personal Knowledge* was precisely to answer this twentieth-century trap by providing a concept of knowledge that enables modern persons to develop acceptable forms of relationship with older inherited traditions, and, at the level of the individual, self-acceptance, which includes a harmonic relationship to our human possibilities. Polanyi aims to help modern persons become at home in our universe.

Part of the effort of *Personal Knowledge* is to create and make acceptable a new idea of the human that is entirely consistent with the concept of evolution. Polanyi tries to persuade us to view ourselves not through ideologies but as beings who have been shaped by evolution. We, therefore, must learn to accept the skills provided by our animal past, including our capability to have personal knowledge.

The structure of *Personal Knowledge*

The book has a spiral structure. Polanyi, switching back and forth between the epistemological and ontological dimensions, progresses in an ever-widening arc. The two dimensions are not independent because from his naturalizing

approach; it follows that the observer is the integrated part of nature and reality. Polanyi constantly reflects on this situation. Whenever he reaches some conclusion about knowing, he applies that to the knowing of living beings and humans, which immediately leads to new ontological findings and perspectives. Nonetheless, the main focus is always on knowing.

The book consists of four parts and altogether thirteen chapters. The titles of the parts are: "The art of knowing"; "The tacit component"; "The justification of personal knowledge"; and "Knowing and being." The segmentation function of the parts is not as important as the role of the chapters. The parts do not have their own introductions and conclusions; they merely divide the book into thematic segments. Chapters are much more coherent units; their numbering does not restart in each part but is continuous. An overview of each chapter can also be found at the end of this book.

The most important elements of Polanyi's philosophy

In this part of our preface, we briefly summarize Polanyi's most important thoughts for understanding *Personal Knowledge*, with a special focus on his uniquely novel thoughts.

The new concept of objectivity

Polanyi understands the point of the early Enlightenment as an effort to reduce the subjective in favor of the objective. After the characteristic dogmatism of the Middle Ages, this new scientific attitude proved to be very fruitful. However, the efforts to achieve perfect objectivism are contradictory since they cannot account for humans' capacity for knowing as imperfect persons. Therefore, any epistemology that accepts perfectly non-subjective knowledge as a goal is necessarily unable to explain the actual process of knowing. Such efforts are labeled as "objectivist" by Polanyi, a term we will adopt in this book.

Polanyi contends that we need epistemic principles that reflect and accept the ineliminable involvement of an imperfect person in the process of discovery. This is the program *of Personal Knowledge*, but "personal" here is not the same as "subjective." Instead, personal knowledge aims for "objective" knowledge that is nevertheless grounded in the personal.

The objectivity of statements of personal knowledge derives from them being universal claims, extending beyond the actual person. Such knowledge is always necessarily fallible. Knowledge claims are motivated by the intellectual passions of the person (see below), aimed at grasping reality (but not at final certainty). The act of making a statement is an act of commitment that the statement is true, which gives the semantics of the statement. Any statement, as such, is

always a statement of a certain person. The truth of a statement is underpinned by its consequences, the anticipation of consequences, and the intuitions about that statement. If reality, understood in terms of the statement, responds in ever-novel and unanticipated ways, that is a sign of the truth of those statements. But the evaluation and connection to other statements of these developments is necessarily an act of personal knowledge again, driven by objective scientific criteria—but not boundlessly objective.

Fiduciary program

Polanyi's goal is to establish a new epistemic program that is upfront about its own limitations—and less contradictory in comparison with the objectivist approaches described above. Looking for historical connections, he finds St. Augustine, for whom a person's intellectual capabilities relied upon underlying beliefs trustingly shaped in a community of shared beliefs. This close connection between belief and knowledge was severed during the long European secularization. The term "post-critical" in the subtitle of Polanyi's book refers to re-establishing that balance by starting a new era and coming to terms with the ineliminable involvement of improvable elements in knowledge that nevertheless need to be trusted.

The term "fiduciary program" aptly summarizes this approach: through evolution, we have developed the abilities for observing and knowing the world, and also, we have developed trust in those abilities, which is a prerequisite for exercising them. This belief in our abilities is an indispensable part of personal knowledge. We must be able to commit ourselves to the truth of knowledge and act based on that while knowing well that we could be wrong at any time. This is the fiduciary act. It requires giving up the—often hidden—assumption that by removing everything that is subjective from our knowledge, what remains is some infallible core, the rational ego, or the scientific method, etc.

All of this raises the question of what guarantees that our fiduciary acts are not wrong too often, leading to a state where everybody can believe in everything, and our knowledge of reality ceases to develop. Polanyi sees this guarantee *in evolution*. Knowing reality is key to the survival of a species. He explains in detail how each of the high-level epistemic capabilities of the human has been evolved from similar but less developed animal skills. This argument makes it rational to trust our intellectual judgment, especially as there is no better option.

From the post-critical viewpoint, the modern, (boundlessly) critical philosophy or objectivism is just as constraining for science as the dogmatism of the Church was before, only in a different way. The fiduciary program is,

therefore, a precondition of freedom, and not only in science but in other dimensions of life as well.

Tacit knowledge

Personal knowledge is a self-reflexive method of knowing in both science and everyday life. Tacit knowledge is part of personal knowledge. Tacit knowledge is something that we cannot fully explicate. Also tacit is the knowledge of animals, which can barely be articulated, if at all. Articulation is really a unique capability of humans; therefore, explicit knowledge expressed in a language distinguishes humanity from the rest of the animal kingdom.

Polanyi does not make a sharp distinction between knowledge and skills. There are reasons for this, as the discussion above of the evolutionary element of the fiduciary program implies. This evolutionary origin is why the skills of a mouse remembering and finding its way in a labyrinth fall under the category of tacit knowledge. The concept of personal knowledge is the basis of an epistemic program that has wide social-cultural consequences as well. The concept of tacit knowledge, however, emphatically illuminates the knowing process from the perspective of a person, including the distinction between two modes of awareness from which one is always tacit due to the structure of knowing.

If we investigate the performance of a person, for example, a knowing act, we will find that there are two kinds of awareness involved. Focal awareness concentrates on the goal of the performance, while the necessary tools, artifacts, and material conditions that we use or exploit for achieving our goals are part of subsidiary awareness. If the focal awareness of the person switches to a subsidiary element, the whole performance falls apart because the respective objects of the two types of consciousness get mixed up. If a cyclist or pianist starts to direct focal awareness to the details of their movements, the performance suffers or falls apart.

Polanyi uses the two types of awareness to explain the use of language, too. Human beings are distinguished in the animal kingdom thanks to the mastery of the complex capacity for articulation, but no knowledge can ever be fully articulated. All knowledge is at least partly tacit because even if very explicitly stated, knowledge is inseparable from the person, from their subsidiary awareness, and their tacit skills. At least when viewed in the context of tacit knowledge, different animals show different levels of development of personhood.

Intellectual passions

The acknowledgment of the role of active intellectual passions follows from the acceptance of the fact that the person is the indispensable locus of

knowing. Therefore, the epistemic processes cannot be reduced to impersonal, objective facts. According to Polanyi, the tacit powers that adult humans share with animals and small children (who cannot yet articulate) multiply because of articulation. This is why our thinking is far more advanced than that of most animals, who seem only immediately responsive to events in their environment. Intellectual passions elevated by articulation are part of this human capability. Polanyi distinguishes three kinds of passions by the role they play in science: *selective* passions decide which idea to pursue; *heuristic* passions, which Polanyi connects to creativity; and persuasive passions, which Polanyi links with personal dimensions. These passions are intertwined and work as higher-level operational principles in scientific discovery (see below). A fourth one, *moral* passion, Polanyi elevates and discusses in a different context.

Intellectual passions are present in all acts of knowing. Each time their existence or role is denied by some false epistemology, they are simply disguised by *deceptive substitutions*[1] (see below). Deceptive substitutions hide true motivations, for example, when denying that a phenomenon is interesting for so-called anthropomorphic reasons. Such a denial can be supported by claiming that there are statistical reasons behind the phenomenon's curiosity. This makes it appear that, instead of the work of personal selective passions, there are more objective, exact reasons. Polanyi is convinced that these justifications are always lacking.

Deceptive substitution

The scientist, when trying to justify a certain theory or phenomenon that is interesting and worthy of investigation, masks their true motivations (intellectual passions) with claims about the simplicity, symmetry, and richness of the said theory. These are insufficient accounts of motivations, and they fail to acknowledge the hidden, tacit commitments of the scientist.

So the scientist substitutes their real motivations with concepts better conforming to the objectivist ideal. Such substitutions are connected to the intellectual passions: the scientist pursues a path driven by their intellectual passions, but because these passions are incompatible with the expected methodological requirements, more acceptable reasons are deceptively substituted in place of them.

[1] Polanyi uses *pseudo-substitution* at times, apparently with the same meaning.

Moral inversion

Moral inversion is a concept similar to *deceptive substitution*. We may deny the existence of our moral passions, for instance, by accepting a strict materialist worldview, but these moral passions will be at work nevertheless. However, as a consequence, these unacknowledged moral passions will lose their natural place where they can be described and controlled by self-reflection and institutions and become uncontrolled and untamed. At worst, such moral passions will lead to social catastrophes if a fashionable, popular philosophy like Marxism channels those lost moral passions into revolutionary, utopian political and social causes, which in fact are underlain by a crude kind of scientism. In Polanyi's view, the totalitarian political systems of the twentieth century and other dark examples of raw power-wielding are consequences of moral passions becoming unacknowledged and hence uncontrolled due to critical philosophy. This means that Polanyi, albeit indirectly, sees critical, objectivist philosophy as responsible for those cataclysmic events. A successful post-critical philosophy, on the other hand, may lead to a state in which a member of Western culture is in harmony with itself and its cosmic place.

Operational principles and the logic of achievement

Polanyi's application of personal knowledge to living beings and machines creatively develops the concepts of *operational principles* and *the logic of achievement*. His fundamental claim is that machines and living beings—which he acknowledges are machine-like—perform achievements in ways that are not explicable in terms of physics and chemistry. Success in achieving goals defined by normative principles is simply irreducible to the neutral terms of these sciences. This ontological assertion about the nature of machines and living beings is a starting point for the concept of emergence, which explains how these entities come into existence. The nature of machines and living beings is beyond the reach of an analytic perspective that deconstructs everything into its parts; that is, to the standard approach of objectivism and critical philosophy. Machines and living beings and their comprehensive principles can fully be explained only in terms of personal knowledge.

Machines and living beings follow operational principles that are oriented toward achieving goals. Goals and operational principles are not merely physical. But it would be a complete misunderstanding on Polanyi's account to think that goals and operational principles, therefore, transcend the natural. All entities are subject to the laws of physics and chemistry; nonetheless, these laws leave open a degree of freedom in which operational principles become effective. The hierarchy between the two levels is clear: the level of physics and chemistry is below and is more fundamental than the level of operational principles. If the physical-chemical conditions deteriorate, operational

principles break down, and a machine fails, or a living being gets sick or dies. But while failure can be explained in terms of physics and chemistry, success cannot. Therefore, Polanyi argues, we need to acknowledge operational principles when explaining success and turn to physics and chemistry to look at the causes of failure; that is, the deteriorated conditions that prevent operational principles from working.

Polanyi's insight affirming that living beings belong to the same class as machines do does not suggest that he takes a mechanistic view of our intellect or even the functioning of the human body. On the contrary, the introduction of operational principles prevents both machines and living beings from reducing to the sum of physical-chemical processes.

Emergence

Polanyi believes that the world has a layered structure. This structure was created *by evolution*, during which higher levels of existence rise from lower levels. Eventually, everything originates from inanimate matter. The concept of *emergence* describes the processes by which higher levels come into existence from lower ones.

Polanyi distinguishes between two types of *perception* in nature. One type of order can be described by the laws of physics and chemistry. For instance, crystallography is about this (lower-level) kind of order: crystals manifest the rules of rightness of crystals. The examples of the other (higher-level) kind of order are equipotentiality in living beings and operational principles in machines. Living beings and machines also manifest rules of rightness; they cannot be described in the neutral terms of physics and chemistry but require personal knowledge.

As we have seen with the logic of achievement, operational principles can only work in the right physical-chemical conditions. In Polanyi's view, the potentiality for a stable, open system that can sustain itself is part of nature. The physical-chemical conditions on Earth were such that they made it possible for the operational principles to become instantiated; hence life emerged from primordial matter. It is important that these principles are not just epistemic concepts but proper features of nature—this is why it is not a category mistake to say, as Polanyi does, that they kick-started life. Polanyi attempts to explain this process in two ways.

Life is the result of a leap. Its predecessor is just lifeless matter. The emergence of human culture is another great leap: when the human species achieved the capacity for articulation, the operational principles of language created a self-sustaining cultural system. The fact that in Polanyi's conceptual system, these two modes of emergence are two similar steps of (emergent) evolution marks

Polanyi's account as a rich and complex account of emergence that is different from many accounts of evolution, which Polanyi criticizes.

Polanyi is committed to the view that both life and culture emerge eventually from matter. Therefore, he is anti-dualist and against any kind of transcendent or supernatural thinking. Instead, he naturalizes religion, which he sees as a system of ethics that is related to other intellectual systems like art and science. He sees statements about God as acts of operating the heuristic intellectual system of religion and not a statement of facts. His views on evolution and the origin of life and humans are incompatible with many popular religious ideas. When he claims that life originates from matter but is not purely material in nature due to the emergence of higher-level operational principles, he attempts to extend natural science to gain proper explanatory power by moving beyond an insufficient materialist account. This new science of nature would include, along with the non-teleological rules of rightness of physics, the teleological operational principles of higher levels as well. This would make natural science consistent with the actual phenomena again. He calls this extended science *ultrabiology*. However, exercising the science of ultrabiology requires the acceptance of the fiduciary program.

Polanyi is one of the most-cited philosophers. His key concepts, especially "tacit knowledge," are routinely employed in several disciplines. However, there is much misunderstanding of his thoughts. These misunderstandings expand as we move from epistemology to his concepts of evolution, emergence, and religion. These dimensions of Polanyi's thoughts are best understood by delving into his biggest achievement, a novel way of viewing the world. Yet, this worldview is hard to describe with simple concepts. At first, we should trust his perspective and absorb the comprehensive meaning of his work: human knowledge is personal. We hope that this book will help to demystify Polanyi's philosophy and provide real access to his key thoughts.

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