

VALERIA ASCHERI¹

**SCIENTIFIC DISCOVERY: THE ROLE OF IMAGINATION
RAISING INVENTION
ACCORDING TO MICHAEL POLANYI'S THEORY OF
KNOWLEDGE**

Abstract

In the development of scientific theories, imagination emerges as a fundamental and indispensable methodological tool. Michael Polanyi (1891–1976), a scientist and philosopher of science, particularly emphasizes this point in his principal work, *Personal Knowledge: Towards a Post-Critical Philosophy*. Polanyi highlights the significance of the ‘personal component’ that influences the cognitive process in a distinctive and decisive manner. Ultimately, the hypotheses formulated by scientists are shaped by both their prior knowledge – encompassing educational background and past experiences – and their individual worldview (*i.e.*, *cosmovisión* or *Weltanschauung*). According to Polanyi, knowing is an integrated human act, wherein imagination plays a crucial role: this act of cognition, while not irrational, is inherently linked to the capacity to generate ‘creative intuition’, a faculty that endows human intelligence with its unique and exceptional qualities.

Keywords: Polanyi, creative intuition, imagination, discovery, tacit knowledge.

Descoberta científica: o papel da imaginação no fomento da invenção, segundo a teoria do conhecimento de Michael Polanyi

¹ School of Philosophy and Higher Institute of Religious Sciences (ISSR) at Apollinare — Pontificia Università Santa Croce — Rome (Italy) — ascheri@pusc.it.

Resumo

No desenvolvimento de teorias científicas, a imaginação emerge como um ferramenta metodológica fundamental e indispensável. Michael Polanyi (1891-1976), cientista e filósofo da ciência, enfatiza em especial este ponto na sua obra principal, *Personal Knowledge: Rumo a uma Filosofia Pós-Crítica*. Polanyi destaca a importância da ‘componente pessoal’ que influencia o processo cognitivo de forma distinta e decisiva. Em última análise, as hipóteses formuladas por cientistas resultam do seu conhecimento anterior – que engloba tanto a formação educacional como as experiências passadas – e as suas concepções do mundo (i.e. cosmovisão ou *Weltanschauung*). Segundo Polanyi, conhecer é um acto humano integrado, no qual a imaginação desempenha um papel fundamental: este acto de cognição, apesar de não ser irracional, está inerentemente ligado à capacidade de gerar “intuição criativa”, uma faculdade que dota a inteligência humana com as suas qualidades únicas e excepcionais.

Palavras-chave: Polanyi, intuição criativa, imaginação, descoberta, conhecimento tácito.

1. Introduction. Michael Polanyi from science to philosophy of science

Michael Polanyi was born into an upper-class Jewish family (later baptized and a frequent participant in English Methodist circles). He studied medicine and, in 1913, as a scientist in the Austro-Hungarian army, participated in World War I. Subsequently, Polanyi specialized in physical chemistry, earning a doctorate for his research on the chemical foundations of life. Following his interests and political events, he moved to Berlin (Germany) and in 1929 became a lifetime member of the Kaiser Wilhelm Institute. However, in 1933, concerned about the political situation in Germany and the growing antisemitism, he moved to the University of Manchester (Great Britain), where he taught physical chemistry and continued his laboratory research, publishing more than two hundred specialized articles during his scientific career.

In the 1930s, Polanyi broadened his studies beyond the scientific realm, focusing on the relationships between the scientific community and political culture, prompted by the events that were shaking Europe, such as the persecution of scientists in Stalinist Russia. Consequently, starting in the late 1930s and then in the 1940s and 1950s, he published several essays on the organization of science in society and on the relationships between economics, science, and political philosophy, such as *Science, Faith and Society* (1946) and *Logic of Liberty* (1951).

Then, from 1948, Polanyi shifted to teaching social sciences, still at the University of Manchester, and began frequently traveling to the United States for seminars and courses at the most prestigious universities. In 1951-1952, he was invited to deliver the Gifford Lectures at the University of Aberdeen, from which, after some years of work, he would publish his most systematic and representative essay: *Personal Knowledge: Towards a Post-Critical Philosophy* (1958). Meanwhile, from 1955, he was appointed Senior Research Fellow at Merton College, Oxford, and a Fellow of the Royal Society. *The Study of Man* (1959) followed, in which he

presented his reflections on the concept of meaning in history, and *Beyond Nihilism* (1960). In 1962, he gave the Polanyi's Terry Lectures at Yale University, on which *The Tacit Dimension* (1966) and the collection of essays *Knowing and Being* (1969) were based. His last book, in collaboration with the American philosopher Harry Prosch, *Meaning*, was published in 1975 and developed the problems surrounding meaning in the 20th century, a question already treated synthetically in the previous *The Study of Man*, with openness to the dimensions of art and religion. He died in Northampton (Great Britain) on February 22, 1976².

Culturally, Polanyi was formed in the Hungarian branch of Habsburg culture, which, in the same time frame, had already seen the birth of great scientists and philosophers such as L. Boltzmann, E. Schrödinger, W. Pauli, L. Von Bertalanffy, L. Von Neumann, L. Wittgenstein, K. R. Popper, and the thinkers of the Vienna Circle. From a young age, based on a broad education, he cultivated interests in literature and the arts, but then turned to scientific studies and, initially, to medicine. Despite these early interests, to which he would gradually and definitively return in the second phase of his academic career, his works contain no references – as one might expect, in light of what he argued – to philosophers such as Aristotle, Thomas Aquinas, and Pascal, nor references to German philosophy and, in particular, to the idealists, or to the phenomenology of Husserl or to Jaspers³.

As Del Re (2002) explains, Polanyi occupies a unique place in the epistemology of the 20th century for several reasons. First, he was a physical chemist, but with a biological background as well, and this helped him avoid fiscalist reductionism. Furthermore, he was not attracted to the neopositivist approach because his discipline was already strongly operational in the cognitive phase. Finally, he was personally convinced of the 'unity of the person', which would lead him, in the course of his philosophical reflection, to clarify the relationship between scientific thought and religious faith. These three characteristics give a glimpse of how his epistemological reflection reveals itself to be among the most original and matured after cutting-edge scientific research that, from a very young age, had already made him known in Budapest and Berlin in the story of the discovery of the chemical bases of life⁴.

2. Knowledge as a 'personal activity'

From chemistry and his research on molecules, atoms, particles and energy transfers, Polanyi moved on to an investigation into the cognitive process and how scientific knowledge and the cogitative activities of ordinary life arise and develop, including socio-political discussions.

His discovery, then, was that knowing – the approach of a living being to

² Cfr. G. Del Re, *Michael Polanyi (1886-1976)* in *Dizionario Interdisciplinare di Scienza e Fede. Cultura scientifica, filosofia e teologia*, a cura di G. Tanzella-Nitti e A. Strumia, Urbaniana University Press - Città Nuova Editrice, Roma 2002, vol. II, pp. 2047-2054.

³ Cfr. V. Ascheri, *Interdisciplinarietà e unità del sapere nel XX secolo. Maritain, Polanyi Ladrière*, IF Press, Morolo (FR) 2014, pp. 133-137.

⁴ M. Polanyi, *Life's Irreducible Structure* in *Knowing and Being* (Edited with an introduction by M. Grene), University of Chicago Press and (UK) Routledge and Kegan Paul, Chigaco / London 1969, pp.225-239.

reality – is not reproducible in a scheme like those described by the formal sciences or hypothesized by behaviorist psychology. Rather, it is a ‘personal activity’ that encompasses all dimensions of the rational and emotional sphere: sensibility, emotionality, sociality, risk, choice, responsibility, respect for others, beliefs, etc. Thus, it becomes clear that his turn towards philosophy is the result not so much of a reflection based on the doctrines of some philosopher of the past or his contemporary, but rather of a reflection starting from science and on the identity and role of the scientist, matured in that particular century which was the 20th.

This approach leads Polanyi to reflect on and valorize his experience as a scientist, researcher, and ‘discoverer’. Lacking, therefore, a solid philosophical training, as Karl E. Sveiby notes, Polanyi was never considered a ‘true philosopher’, although his ideas influenced contemporary and subsequent philosophy of science⁵. For example, some of Polanyi’s ideas appear to have been taken up by Popper, particularly regarding the context of scientific discovery and the issue of scientific fallibilism, given that following the purely empirical-inductive scientific method does not guarantee or ensure the validity of theories, nor the eternity or immutability of discovered scientific truths⁶. And in all probability, some of his theses inspired, in addition to anticipating, certain aspects of the philosophy of science of Thomas S. Kuhn regarding the genesis of scientific theories, which fall within a historical-social and cultural framework, and of Norwood R. Hanson related to the use of *Gestalt* psychology to justify the elaboration of new scientific models and theories that may be better suited to explain a given phenomenon and are based on the so-called ‘theory-ladenness’ of experience, which argues that there are no theoretically ‘neutral’ observational data but depend on prior and sometimes ‘tacit’ theories and notions, and which depend on individual vision and reflection⁷.

3. Against pure rationality and scientific objectivism

Polanyi’s philosophical approach as a scientist has its starting point in the analysis of rationality, mostly scientific, and of the idea of ‘reasonableness’ (*Vernünftigkeit*) understood as thought dominated by reason, which is not blind and absolutist, but, on the contrary, one could say, it is illuminated and guided by all the other faculties that are very present and active in all man’s actions. From Bacon onwards, in fact, all science has placed objectivity as a constitutive characteristic, a guarantee of true and truthful knowledge, not conditioned or the result of subjective settings and elaborations that can give a distorted, if not false, vision of reality. Polanyi does not contest objectivity a priori, but the attitudes that, starting from it, have claimed to totally eliminate the human component, trying to build an ‘aseptic’ and a-personal science: the Philosopher does not argue with the neopositivists, but takes a critical position and decides to analyze the Laplacian ideal of science, which he considered

⁵ Cfr. K. E. Sveiby – T. Loyd, *Managing know how*, Bloomsbury, London 1988.

⁶ Cfr. K. R. Popper, *The Logic of Scientific Discovery*, Hutchinson & Co, London 1959.

⁷ Cfr. N. R. Hanson, *Patterns of Discovery: An Inquiry into the Conceptual Foundations of Science*, Cambridge University Press, Cambridge 1958; T. S. Kuhn, *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago 1962.

the paradigm of the ‘standard’ objective conception: even if it were possible to obtain complete knowledge of the universe, of the past, the present and the future, this would be of no use to man. It would only be a set of information on the state of the particles – the spatial coordinates and the impulses – that make up the universe, and therefore, as a sole result, the universe would be like a machine, and therefore a purely mechanistic conception.

Particularly, the Philosopher underlines that objectivism itself is put into crisis by a conception of the universe as a machine: in fact, understanding a machine requires that man evaluates its functioning and judges whether the purpose of the machine is positive or negative. The acts of the person who judges, reflects and understands, or the acts of knowledge, are not reducible to impersonality: a vision of science that wants to ignore, not only the personal and existential dimension, but also the ethical duties that the work of the scientist necessarily brings with it and any religious instances, is, according to Polanyi, to be refuted and therefore excluded⁸.

Therefore, as Torrance explicates in *Belief in Science and in Christian Life*, Polanyi contends that the scientist must adopt:

a new approach in which to overcome the harmful caesura between subject and object, mind and matter, or thought and experience, and reconstitute the natural unity of knowing and being, since without the integrative way of thinking that this rational equilibrium brings, science can only hinder its own attempts to grasp the finest and most delicate structures embedded in nature⁹.

4. The personal component of the cognitive process

Polanyi’s epistemological approach focuses on the anthropological and insists on the highly ‘personal component’ that affects the cognitive process in a unique decisive way: constructing the hypothesis, that is the starting point of making a theory which aims to explain phenomena, is the result of scientists’ previous knowledge and experience as well as his general way of thinking and seeing reality, *i.e.* his ‘*cosmovisión*’ (worldview or even *Weltanschauung*). Therefore, the hypothesis is part of the cognitive act which, without being irrational, comes out from imagination and ‘creative intuition’ proper to human act.

The fundamental Polanyian thesis presented in the book *Personal Knowledge* (1958) is that no knowledge is entirely focal or explicit, that is, there are always implicit, ‘tacit’ and subsidiary aspects, as the path that leads to knowledge develops through personal interpretation of a series of clues that point towards awareness, which will then be made explicit¹⁰. As the Philosopher explains:

⁸ Cfr. T. F. Torrance, *Il recupero del realismo nella moderna epistemologia e il pensiero di Michael Polanyi* (1984), in Th. F. Torrance (a cura di), *Senso del divino e scienza moderna*, LEV, Città del Vaticano 1992, pp. 193-281.

⁹ T. F. Torrance (ed.), *Belief in Science and in Christian Life. The relevance of M. Polanyi’s thought for Christian faith and life*, The Handsel Press, Edinburgh 1980, p. XV.

¹⁰ Cfr. M. Polanyi, *Personal Knowledge, Towards a Post-Critical Philosophy* (1958), University of Chicago, Chicago 1962; V. Ascheri, *Science as ‘Personal Knowledge’ in the Epistemology of Michael Polanyi*, *Forum Supplement to Acta Philosophica*, Vol. 10 (2024) 169-180.

I think we may distinguish between the personal in us, which actively enters into our commitments, and our subjective states, in which we merely endure our feelings. This distinction establishes the conception of the personal, which is neither subjective nor objective. In so far as the personal submits to requirements acknowledged by itself as independent of itself, it is not subjective; but in so far as it is an action guided by individual passions, it is not objective either. It transcends the disjunction between subjective and objective¹¹.

In all acts of understanding there is a decisive ‘personal participation’, which does not, however, make the cognitive activity an arbitrary act or a passive experience, but which qualifies it as a responsible act. Any possible cognitive act cannot in any case be neutral or free from suppositions and contextual implications which, aspiring to universal validity, is realized in a knowledge that is *objective*, in the sense that it establishes a contact with a hidden reality that one believes knowable and real.

It appears indubitable that no knowledge can be entirely ‘focal’ and made explicit, and completely ‘translatable’ rationally in an analytical and logically demonstrable way. There are always implicit, ‘tacit’, and subsidiary aspects, since the path leading to knowledge develops through the personal interpretation of a series of clues that orient towards awareness, which will then be made explicit.

5. Tacit dimension and *Gestalt Psychology*

Polanyi argues that it is precisely the tacit dimension that is fundamental and primary, as it precedes and grounds all knowledge, which is certainly not resolved within the realm of the expressible, the formalizable, and the linguistic – that is, on what is ‘signifiable’ within the logical-rational domain and explains that:

what is usually described as knowledge as it is formulated in written words, schemes or mathematical formulas, is only one type of knowledge; while the unformulated knowledge, which is what we have of something we are in the act of doing, is another form of knowledge. If we call the first ‘explicit knowledge’ and the second ‘tacit knowledge’, we can say that we always tacitly know, that we are the support of the truthfulness of our explicit knowledge¹².

Eliminating this tacit component, as traditional epistemology has attempted to do by considering knowledge only that which is expressible, objectifiable and perfectly controllable and verifiable, would result, according to what Polanyi states in the essay *Tacit Knowledge*: «that tacit thought forms an indispensable part of all knowledge, then the ideal of eliminating all personal elements of knowledge would, in effect, aim at the destruction of all knowledge. The ideal of exact science would turn

¹¹ M. Polanyi, *Personal Knowledge, Towards a Post-Critical Philosophy*, op.cit., p. 300.

¹² M. Polanyi, *The Study of Man*, University of Chicago Press, Chicago 1959, p. 65.

out to be fundamentally misleading and possibly a source of devastating fallacies».¹³

Reasoning about this implicit and inexpressible aspect, one cannot fail to recall and juxtapose this central point of Polanyian epistemology to what Wittgenstein writes, in the section that concludes the *Tractatus Logico-Philosophicus* (1922), stating that there is an ineffable aspect, the so-called ‘mystical’, which cannot be expressed and therefore about which we cannot speak but only be silent¹⁴. Although the comparison between Polanyi and Wittgenstein deserves further investigation, we can say that both recognize that there is a dimension present in human beings on which not only science but not even philosophy can give an exact and expressible explanation through the ‘interpretive language’ of rationality, but this does not mean that it does not exist or that it is an aspect in some way unreliable and, so to speak, ‘optional’ in the cognitive process: on the contrary, it is an aspect that is always present and, indeed, stands as a necessary foundation for knowledge, particularly in the moment of ‘discovery’ to occur.

In explaining the tacit dimension of knowledge and the role it plays in the dynamics of the cognitive process, Polanyi focuses on *Gestalt* psychology (*Gestaltpsychologie*) – born in Germany and then developed in the United States in those years – arguing that this approach can be very useful in understanding the ways of observing the phenomena that are studied, and in their understanding or in the discovery of new properties or ways to progress in research¹⁵. As the philosopher explains:

All authentic scientific research begins by stumbling upon a profound and promising problem, and that is half the discovery. [...]. My response is to re-establish an ancient metaphysical conception in new terms, guided by *Gestalt* psychology. We give meaning to experience based on clues that we are often aware of only as indicators of their hidden meaning; this meaning is an aspect of reality which as such may yet reveal itself in an indeterminate range of future discoveries.

This is in fact my definition of external reality: reality is something that attracts our attention with clues that stimulate and entice our minds to go further and further into it and which, since it must give its attractive power to its independent existence, it can always manifest itself in still unexpected ways. If we have grasped an authentic and deeply hidden aspect of reality, then its future manifestations will be unexpected confirmations of our present knowledge of it¹⁶.

Consequently, Polanyi states in the essay *The Unaccountable Element in Science*

¹³ M. Polanyi, *The Tacit Dimension*, Routledge & Kegan Paul, London 1966, p. 20.

¹⁴ Cfr. L. Wittgenstein, *Tractatus Logico-Philosophicus*, Routledge & Kegan Paul, London 1922 (from n. 6.44 to n. 7).

¹⁵ Cfr. J. G. Benjafield, *Psicologia dei processi cognitivi*, Il Mulino-Prentice Hall International, Bologna 1995, pp. 25-33; C. Vinti, *Michael Polanyi. Conoscenza scientifica e immaginazione creativa*, Studium, Roma 1999, pp. 59-74.

¹⁶ M. Polanyi, «The Unaccountable Element in Science» in *Philosophy*, Vol. 37, No. 139 (Jan., 1962), p. 13.

that he wants «to restate an ancient meta-physical conception in new terms guided by *Gestalt Psychology*»¹⁷ because what is usually described as knowledge as it is formulated in written words, schemes or mathematical formulas, is only one type of knowledge; while the unformulated knowledge, which is what we have of something we are in the act of doing, is another form of knowledge, but of the same rank and of extreme value. Moreover, Polanyi explains:

We make sense of experience by relying on clues of which we are often aware only as pointers to their hidden meaning; this meaning is an aspect of a reality which as such can yet reveal itself in an indeterminate range of future discoveries. This is in fact my definition of external reality: reality is something that attracts our attention by clues which harass and beguile our minds into getting ever closer to it, and that, since it owes this attractive power to its independent existence, can always manifest itself in still unexpected ways¹⁸.

6. The creative and the operational aspects of cognitive process

Studying the cognitive process that leads to discovery involves two aspects of the person. Polanyi distinguishes particularly two phases: the ‘creative’ phase and the ‘operational’ phase.

The first one is characterized by the free creation of man who, in order to orient himself in the reality of a thousand and more details, must try to learn it by selecting, classifying, ordering information, as the painter does when he has to represent a landscape very rich in nuances and objects. Regarding this first aspect, Polanyi explains that:

Discovery is made therefore in two moves: one deliberate, the other spontaneous, the spontaneous move being evoked in ourselves by the action of our deliberate effort. The deliberate thrust is a focal act of the imagination, while the spontaneous response to it, which brings discovery, belongs to the same class as the spontaneous co-ordination of muscles responding to our intention to lift our arm, or the spontaneous co-ordination of visual clues in response to our looking at something. This spontaneous act of discovery deserves to be recognized as the *creative intuition*¹⁹.

The second phase consists instead in verifying, through experiments and tests of various kinds, what was theorized or verified only a few times.

According to Polanyi knowing is a human act as a whole, in which imagination plays a fundamental role in the cognitive act which, without becoming irrational for this reason, is linked to the capacity of generating a ‘creative intuition’ that

¹⁷ *Ibidem*, p. 13.

¹⁸ *Ibidem*.

¹⁹ M. Polanyi, «The Creative Imagination» in *The Concept of Creativity in Science and Art*, eds. Denis Dutton and Michael Krausz, Martinus Nijhoff, 198, Hague, Netherlands, pp. 103.

qualifies human intellect in a unique and special way. We can say that imagination, as an essential element of human knowledge, is the ability that, based on previous experiences and reasoning through analogy, allows us, for example, to predict what might happen in the future or to understand a phenomenon intuitively and rapidly, without it being fully developed or studied in depth. As Polanyi explains:

Our conceptual imagination, like its artistic counterpart, draws inspirations from contacts with experiences. And like the works of imaginative art, the constructions of mathematics will tend therefore to disclose those hidden principles of the experienced world of which some scattered traces had first stimulated the imaginative process by which these constructions were conceived²⁰.

7. The role of imagination in the creative intuition

In the elaboration of scientific theories, the faculty of imagination emerges as a fundamental and irreplaceable methodological tool. Several epistemologists and philosophers of science, notably Karl Popper, Thomas Kuhn and our key author Michael Polanyi, have emphasized the crucial role of imagination, particularly within the ‘context of discovery’. The distinction between the ‘context of discovery’ and the ‘context of justification’ has significantly shaped discussions concerning discovery in 20th-century philosophy of science, establishing a clear division between the generation of a novel idea or hypothesis and its subsequent defense (testing, verification). The context of discovery encompasses the *de facto* thinking processes, whereas the context of justification pertains to the *de jure* defense of the veracity of these thoughts²¹.

According to Polanyi, imagination transcends its conventional depiction as a mere creative or fanciful faculty, functioning instead as a fundamental and indispensable constituent of the scientific epistemic process. He posits that scientific discovery is often predicated upon a moment of creative intuition, a spontaneous cognitive event wherein imagination facilitates the researcher’s discernment of latent connections and concealed significances within the fabric of reality. This capacity for insightful creation, intrinsically linked to the human activity of knowing, is neither irrational nor arbitrary; rather, it constitutes a unique and epistemologically valuable mode of engagement with the phenomenal world.

Explicitly referring to the two complementary phases of the cognitive process we already discussed in the previous paragraph, Polanyi underlines that the creative dimension encompasses imagination and innovation, while the operative dimension relies on the rigorous verification and practical application of hypotheses. The creative phase, in particular, hinges upon a form of spontaneous coordination between the cognitive apparatus and the objective world, whereby imagination serves as a catalyst

²⁰ M. Polanyi, *Personal Knowledge, Towards a Post-Critical Philosophy*, p. 46.

²¹ Cfr. C. Vinti, *Michael Polanyi. Conoscenza scientifica e immaginazione creativa*, Studium, Roma 1999, pp. 55-62.

in the formulation of novel hypotheses and the unveiling of previously unrecognized properties or aspects of natural phenomena. This creative intuition, sometimes contextualized within Polanyi's concept of 'tacit knowing', enables scientists to achieve paradigm-shifting breakthroughs and to propel the advancement of scientific knowledge²².

According to Polanyi, imagination is, in a certain sense, a capacity to project being into other ways in which it 'can', or 'will be able to', or 'could' be: imagination is in some way the fruit of tacit knowledge itself, which, at a certain point, can emerge and give rise to so-called 'reasonable entities' (*i.e.*, entities that do not exist in reality but only in fantasy) and of all kinds in living beings. Imagination certainly sees something deeper and more complex in reality, both in its structure and in its possible developments.

Un-Chol Shin delves very well into the roles of intuition and imagination and their mutual relationship in Polanyian epistemology, specifying that:

The roles of intuition and imagination, in acts of the human mind complement each other. Polanyi explains their functional relationship by stating that "intuition informs the imagination which in its turn releases the power of intuition."²³ The greater is the power of intuition, the greater is the power of imagination. With a greater power of imagination, our intuition can sense a deeper coherence. Our imagination carries all the available resources forward, pointing to the future manifestations of a deeply hidden coherence, while our intuition integrates those resources and recognizes the final result of our imagination to be valid. Even when our quest for a coherence has ended, our intuition and imagination are not exhausted. The inquiring mind returns again for a deeper, more profound new vision of coherence²⁴.

To conclude, Polanyi argues that imagination constitutes an essential element in the process of scientific discovery, affording researchers the capacity to transcend the limitations inherent in purely logical or deductive reasoning and to access deeper, more subtly nuanced facets of reality. As a uniquely human faculty, imagination renders science a dynamic, personalized, and creative endeavor, contributing decisively to both innovation and invention and fostering a more comprehensive understanding of the cosmos.

Conclusion: *Knowing and Being*

The central point is that a person is not an 'automaton,' and therefore their actions - their activity in general - are not automatic. This is a fundamental thesis for mechanistic doctrines, which hold that an activity is entirely determined by the initial conditions from which it arises. The concept of 'person' is closely linked to

²² Cfr. M. Polanyi, «*The Creative Imagination*», in *The Concept of Creativity in Science and Art*, *op.cit.* pp. 91-108.

²³ *Ibidem*, p. 104.

²⁴ U.-C. Shin, «*The Role of Imagination in Integrative Knowledge*», in *Tradition and Discovery*, 21 (2), (1994) 21.

that of 'living being,' and thus an agent in all actions, including those of knowledge, which cannot be considered as a set of automatisms or as processes determined solely from external factors. The specifically human ability to have ideas, to give life to new works, to have initiatives and to invent new tools or new ways of acting, require the 'unique' ability that is that of imagination and precisely from imagination comes creativity and the ability to grasp new perspectives and find the most suitable solutions to problems.

Knowing and Being, the title of the latest collection of articles published posthumously and edited by Marjorie Green²⁵, identifies these two concepts as the fundamental aspects of human existence. However, they do not merely give rise to actions such as acting, taking risks, or adapting to new or unforeseen circumstances; rather, they also involve engaging in these activities in a conscious and reflective manner. This entails understanding and executing actions within a broader perspective – one that is as comprehensive as possible – encompassing the entirety of reality and the history of the universe.

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²⁵ Cfr. M. Polanyi, *Knowing and Being*, Edited with an introduction by M. Grene. University of Chicago Press and Routledge and Kegan Paul, Chicago 1969.

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