INTELLECT AND HOPE

Essays in the thought of Michael Polanyi

Edited, with an Introduction, by

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The thesis concerning the personal character of knowledge so foundly and so brilliantly defended by Michael Polanyi is, along with other parallel efforts, part of the antipositivist reaction that has developed through the years after World War II. Antipositivism, following a Western tradition which continues Cartesianism and Anglo-Saxon empiricism, has accentuated the opposition between an impersonal science which announces objective universal truths, and the totality of our value judgments, which only express subjective opinions that are variable, if not in opposition to one another, as well as irrational. In science, universal agreement about objective truths is not only possible, but actually realizable. In the realm of human action we are pulled in different directions by feelings, interests, and passions of an active nature which are at the origin of all the conflicts which characterize humanity. Science can contribute to the establishment of unanimous agreement in matters of knowledge; on the other hand, human action, which does not tend to describe that which tends to realize a future conforming to our wishes and desires, thereby escapes from reason and the universal agreement which could be established under its rule. The dislocation of the y of culture which results in a dichotomy opposing science to other aspects of human activity delivers a fatal blow to philosophy and its age-old ideal of practical reason. For—let us not forget it—philosophy since the time of the Greeks has been the love of wisdom, a rational knowledge.

The enterprise of Polanyi is, in a sense, a reaction to a trend which has characterized humanity since Descartes; but in an antirational sense, and goes back to an ancient Cartesian and Cartesianism fought for over a century. According to the conception generally shared by all the schools of antiquity, the Middle Ages. The idea that each human reason, that it is sufficient to deliver what is right and true without the use of reason, that it may be implied in Saint Augustine, but it was not until the seventeenth century when Descartes and Cartesianism were introduced into Europe, that anyone accepted without question the idea of a universal agreement which could be established under the rule of reason. This idea could be applied in Saint Augustine, but it was not until the seventeenth century when Descartes and Cartesianism were introduced into Europe, that anyone accepted without question the idea of a universal agreement which could be established under the rule of reason. This idea could be applied in Saint Augustine, but it was not until the seventeenth century when Descartes and Cartesianism were introduced into Europe, that anyone accepted without question the idea of a universal agreement which could be established under the rule of reason. This idea could be applied in Saint Augustine, but it was not until the seventeenth century when Descartes and Cartesianism were introduced into Europe, that anyone accepted without question the idea of a universal agreement which could be established under the rule of reason.

A proposition will be called self evidently true in virtue of the terms with which it is endorsed. Hence it is actual agreement which reasonable men are able to apprehend by any intelligent proper meaning of the terms and the existence of such agreement is essentially contained in the statement. The idea of a truth, and even of a proposition, is thus neatly affirmed. We all possess truths, but "because we are all chic," because it was necessary for us to be true by our appetites and perceptions, so pure nor so solid. There is, to

1. Duns Scotus, Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniense, in Opus Oxoniene

2. Descartes, Discours de la Méthode, pp. 133-134.
love of wisdom, a rational knowledge leading to happiness and virtue.

The enterprise of Polanyi is, in a sense, revolutionary, for it reverses a trend which has characterized the evolution of Western humanity since Descartes; but in another sense it is counterrevolutionary, and goes back to an ancient tradition against which Descartes and Cartesianism fought with acknowledged success. According to the conception generally held prior to Descartes, which everyone accepted without questioning, all knowledge is based on a tradition, transmitted by the master to his students, and reserved to an elite of the initiated. This is a point of view shared by all the schools of antiquity, as well as those of the Middle Ages. The idea that each human being is endowed with reason, that it is sufficient to deliver reason from the prejudices that encumber it, so that it may reach truth with evidence, is implied in Saint Augustine, but its most paradoxical consequences have been expressed by Rousseau, after being uncovered by Duns Scotus and Descartes.

Duns Scotus affirmed the existence of propositions evident in themselves:

A proposition will be called self evident when it is known as true in virtue of the terms which it contains: “ex suis terminis ut sui sunt.” Hence it is not self-evident because it is actually perceived as true by some intellect, but because it can be apprehended by any intellect which understands the proper meaning of the terms and which sees that the predicate is essentially contained in the subject.

The idea of a truth, and even of evidence, that is impersonal is thus neatly affirmed. We all possess the faculty of reason, Descartes would say, which would permit us to observe evident truths, but “because we are all children before being men, and because it was necessary for us to be governed for a long period of time by our appetites and perceptions,” our judgments are neither so pure nor so solid. There is, therefore, only one remedy for

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this situation, and it is Rousseau who furnishes it to us. One must keep the child from all contact with prejudices of a social origin. One must never teach him anything under the guise of any authority whatever:

Let him [your student] learn nothing because you have told it to him but because he has understood it himself; let him not learn science, let him invent it. If you ever substitute authority for reason in his mind he would no longer reason he would be no more than the toy of the opinion of others.

Rousseau would not like a child to study the sciences, but to discover them by himself and, according to Rousseau, in order to arrive at this, it is sufficient to observe facts, for they speak for themselves to each unprejudiced mind.

The entire tradition of the Enlightenment presupposes that science has been completely fulfilled; this could only take place in the mind of God. The role of man in that case is not therefore to invent explicit formulas, nor to elaborate a world view; it is, rather, not to deceive oneself in unveiling that which has been known by God throughout eternity. That is the reason why the rationalists first, and the positivists later (even if the latter are unaware of the presuppositions implied in their attitudes) have so strongly insisted upon the method of verifying scientific utterances, without paying attention to the problems posed by their elaboration. For Descartes it was a question, thanks to his method, of retrieving with certainty the divine truths thought by God, in a perfectly adequate language. But in order for the empiricists to adopt the same attitude, it is necessary for them deliberately to neglect the problem of expressing our sensible impressions in a particular language, as if all languages were conventionally interchangeable. But if, as Whewell convincingly showed us more than a century ago, all language is structured by the theories which elaborate it, there is in all language, as in all theories, an aspect by which they surpass the sense-data. A theory can be affirmed or invalidated only to the extent to which, in surpassing a past experience, it becomes applicable to a future experience: past experience alone is incapable of a parallel extrapolation without the intervention of the creative spirit.


INTERPRETATION

The greatest reproach that rationalists as to the empiricists made a scientific methodology, invention, scientific creativity concerns. Because they have relegated it to the domain (about which scientific method positivists have been able to be impersonal, as foreign to the formed, to the authorities who have served him as models. In the sciences, taking account of positivism which is both personal, as foreign to the minds occupy in this field, the of positivism which is both personal, as foreign to the minds occupy in this field, the.

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5. Ibid., p. 55.

6. Ibid., p. 57.

7. Ibid., p. 58.
The greatest reproach that Polanyi addresses as much to the rationalists as to the empiricists is that in their attempt to elaborate a scientific methodology they have neglected the problem of invention, scientific creativity, which he puts at the center of his concerns. Because they have failed to consider scientific creation, relegating it to the domain of psychology and subjectivity (about which scientific methodology had nothing to say), the positivists have been able to conceive of scientific activity as impersonal, as foreign to the tradition in which the scientist was formed, to the authorities he has followed, to the masters who have served him as models. But if one elaborates a methodology of the sciences, taking account of the central place which creative minds occupy in this field, the new perspective permits a critique of positivism which is both penetrating and ruthless.

In his work *Personal Knowledge* Polanyi clearly shows how at each step in the scientific process, experience, talent, and the technical skill of the scientist intervene, for neither the perception of the object nor the elaboration of hypotheses, nor even their verification, can be done in an entirely formal or mechanical fashion. How many times have the conclusions of experience been put aside or held to be negligible? The judgment of the scientist, formed through contact with an experienced tradition, his flair, and even his intuition play an indispensable role. According to Polanyi, this personal, unformalizable character of knowledge is due to the fact that all perception focused on an object (focal awareness) is accompanied by a subsidiary awareness of which we do not take account in the same way, but upon which we rely for our perception of the whole. On the other hand, as he remarks, if we focus upon the particulars, we lose the perception of the whole that these particulars constitute or express. If we pay attention to each sound in isolation the melody which they compose tends to escape us, at least partially; and, conversely, we do not notice the individual notes if we focus attention on the melody.

The result of this, Polanyi shows us, is that analytical thought, concerned as it is with immediately perceptible particulars,
makes us lose sight of the perception of the whole, and prevents us from attaining, in turn, a knowledge of a higher level—a fact which has been brought to our attention by the Gestalt theories. Thus if interest is focused only on the physicochemical aspects of living organisms, the specific character of biology is left out of account, that is, its concern with beings whose functioning is either normal or disturbed, which explains the implied teleology of this discipline, somewhat embarrassing to its practitioners. For, let us not forget, it is the role that each organ must fulfill in the functioning of an organism which makes it possible for us to distinguish between a well-developed living being and a sick or monstrous organism. The laws of physics and chemistry cannot account for the construction of a technical object (although they can explain its failures); nor can they help us understand the structure of a living being.

In putting the stress upon the creative inventive aspect of scientific activity, Polanyi shows to what extent this activity depends upon the personal decisions of the scientist and his intellectual involvement, thereby coming close to other forms of culture such as law, religion, art, morality, etc. The development of the sciences would therefore be attuned to the world-view of those societies in which they have their origin. The sciences develop only because of the commitment of the scientist to an intellectual passion analogous to that aroused by the cult of beauty or by the struggle for a noble cause.

Our vision of reality, to which our sense of scientific beauty responds, must suggest to us the kind of questions that it should be reasonable and interesting to explore. In fact, without a scale of interest and plausibility based on a vision of reality, nothing can be discovered that is of value to science; and only our grasp of scientific beauty, responding to the evidence of our senses, can evoke this vision.

Personally, I cannot but subscribe to this critique of positivism and of the objectivistic conception of science. Like Polanyi, I think that the concept of absolute doubt leads nowhere, and that all scientific research is founded upon presuppositions in which

the scientist places his trust, at least for the time being, that the mind of the scientist is inspired by considerations of beauty and rationality which lead him in his quest for yet undiscovered aspects of reality. In this way the scientist may resemble the artist and the mystic, the prophet and the philosopher. There is hardly anything more significant in this regard than the famous passage where Kepler, in the introduction to the fifth book of his *Harmonia Mundi*, extols his discoveries. However, I wonder if, in stressing the creative aspect of scientific activity, Polanyi has not underestimated that feature which nevertheless distinguishes the sciences from other activities of the mind.

It is an undeniable fact in the history of science that, at each epoch, there is a set of propositions about which the scientific community is in accord, for the time being. Even if one speaks of these propositions with scorn as of “dead science,” even if one is not entirely in agreement in enumerating them, even if they are only provisionally considered as true, even if several are expected to be called in question by some future great discovery, the existence of a body of accepted truths constitutes a fact whose importance must not be overlooked. One could possibly oppose one or another of these propositions, but only on condition of showing their incompatibility with other propositions that are more firmly established. In any case they must be presumed true until proof is offered to the contrary. In contrast, it should be noted that such a body of accepted truths does not exist in philosophy or in law, or in the domains of art, morality, or religion—at least when one crosses the boundary of a particular community. This situation cannot be explained without the existence of techniques of proof and verification, of prediction and experimentation, which are proper to the sciences, and for which there is no equivalent in the other disciplines. This is certainly not to say that verification in the natural sciences can be made entirely formal and impersonal; for the process of verification is carried out within a discipline whose presuppositions must not be taken for granted, with the help of instruments, by means of a terminology elaborated by a particular theory, and by making skilful use of techniques. When a scientific theory takes account of all the facts in a specific domain without neglecting facts left
unexplained by an earlier theory, and when it permits predictions which the earlier theory did not support, it takes very little time before it imposes itself on the world of science. It is only when no theory is entirely satisfying that several hypotheses are able to share the favor of specialists. In this context one must moreover recognize that the arguments considered relevant by the partisans of one theory may be considered irrelevant by the partisans of another. This divergence may be due to rival world views or philosophies. But in that case, one seeks, as far as possible, to eliminate disagreement in the domain of science by relegating it to the field of philosophy.

Because of this existing body of scientific truths, all past science is truly out of date. This is not the case with the other branches of culture. Just because an artistic, philosophic, or religious conception is an attractively new one, it does not disqualify works of art, philosophy, or religions from past centuries. But the science of today dispenses with the science of yesterday, however much it owes to it in terms of its language, its methods, and its problems; but our artistic, philosophic, and religious past is always present in our culture; it does not cease to contribute to its actual life. A theory of science must take account of this peculiar situation, for if it were to neglect this aspect of things, it would be as lame as a theory which neglects the creative aspect of the scientist.

More than all other disciplines, science requires invention and verification. It is not because the scientist has such a penetrating vision of reality that he cannot be mistaken. Rather, to the extent that this vision is ample and fertile, there is risk that—at least partially—it may not conform to reality. Moreover, experience may well disprove the most attractive hypotheses. Indeed, the creative activity of the scientist is not simply perception of a hidden structure; it is very often an attempt to provide an explanatory hypothesis which, by going beyond the actually perceived data, incurs the risk of being at least partially falsified by the facts. Indeed, the activity of the scientist is not simply perception of a "Gestalt"; it is an extrapolation, more or less bold, passing the boundaries of experience. Polanyi himself recognizes that scientists spend their lives making correct guesses. But how would they know this? They certainly did not admit some conjecture to which several explanations of the same order of undeniable truth which scientific a postulate to benefit them.

Precisely because the techniques of relationship between Polanyi, the level whole they views and philosophies, must provide view must provide other disciplines. The scientist to benefit them. Moreover, even the model for the view of the adaptation of one another. The scientist in the elaboration of real plays a role in arbitrary, another. His decision is of the act in any comparable way.

The scientist that he obtains correlated with the measurement of scientific enter

10. Ibid., p. 145.
11. Ibid., pp. 25.
12. Ibid., pp. 57.
how would they know that their guesses were correct if they did not admit some criteria that would indicate when they had erred? They certainly expect that their hypotheses may be amended or sometimes even entirely abandoned. It is in this respect that the explanations of the scientists differ essentially from those of the Arande to which M. Polanyi compares them. There is a nucleus of undeniable truth in the claims of K. Popper according to which scientific activity is characterized by the capacity of the scientist to benefit from his mistakes and gradually to correct them.

Precisely because scientific activity is indissolubly linked with the techniques of prediction and verification, there is a dialectical relationship between the two levels so aptly distinguished by Polanyi, the level of the simple elements and the level of the whole which they condition. To be scientific, a comprehensive view must provide for the prediction of details; and these details must be actually observed, in order to corroborate the over-all hypothesis.

Moreover, even ordinary perception, which Polanyi takes as a model for the view of the scientists, is not immediately given: J. Piaget has proved, in his outstanding studies on child psychology, how the adaptation of perception is formed slowly by a process of correcting a number of hypotheses that are abandoned one after another. The same applies to the scientist’s view of reality where, in the elaboration and testing of hypotheses, submission to the real plays a more important role than in art, philosophy, and religion; in these latter, the creator is able to decide, though not arbitrarily, about the superiority of one point of view over another. His decision is in fact as much an expression of his personality as of the elements he seeks to organize. This is not the case, in any comparable manner, with the natural sciences.

The scientist who studies reality must bow before the results that he obtains; he is not their master. True, these results are correlated with a theory, a language, a methodology, a technique of measurement; but all these are part of the framework of our scientific enterprise and belong to the presuppositions which

11. Ibid., pp. 287-288, 284.
12. Ibid., pp. 57-58.
condition our research. As to these presuppositions, we may perhaps some time call one or another in question, but this will never happen without good reason. To abandon them, it would be necessary to show their incompatibility with others that are considered less doubtful or more fundamental. Further, one cannot discard a doubtful particular without disqualifying it in terms of a new theory, a new approach which ought in turn to be submitted to the test of experience. Now in art, philosophy, law, and religion a variety of incompatible points of view can be put forward without there being any generally accepted criteria which would permit discarding all other points of view in favor of one only.

Hence the difference which I am trying to establish between truth and rationality. In virtue of the principle of non-contradiction, a proposition and its negation cannot be simultaneously true; from this follows the rejection of pluralism in scientific matters. But when it is a question not of describing the real but of putting it in perspective, of evaluating it, of elaborating an ontology (and not a natural science), then different points of view may confront one another without any one of them imposing itself on the others; each of them may lay claim to rationality—that is to say to a universality analogous to that demanded by Kant's categorical imperative. Each philosopher may present his point of view as universally valid, at least ideally, without this point of view necessarily being admitted by all. The same holds of that kind of legislation which claims to be the only just one, but which nevertheless must be imposed by a legitimate authority in order to become obligatory. When generally admitted criteria do not permit a choice between antagonistic claims, and yet practical problems must be solved, the recourse to authority is inevitable. Hence the recourse to the judges while the legislative power has authority to decide about the obligatory character of the rules. But in a science that is independent of all political and religious presuppositions what is true and necessary.

This is the main criticism of the scientist too much. I believe there are essentials, an accord in a sense that I would like to call 'depth and interest are essential' to the critique of rationalism.

political and religious power there is no authority capable of saying what is true and no need for such authority.

This is the main criticism I would make concerning Polanyi's theory of science. To my mind, it likens the personal involvement of the scientist too much to that of the artist or the philosopher. I believe there are essential differences. Even if, like Polanyi, I am a partisan of personal knowledge integrated with a cultural tradition, I should still like to stress the particular place of science in our culture. For, in science, the techniques of proof and verification make it possible to bring about agreement in essentials, an accord inaccessible in other domains. It is in this sense that I would like to see Polanyi's ideas developed. Their depth and interest are undeniable; they make a major contribution to the critique of the foundations of contemporary positivism.

15. P.K., p. 133.