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Source: *Soundings: An Interdisciplinary Journal*, Vol. 53, No. 1 (Spring 1970), pp. 88-94

Published by: [Penn State University Press](#)

Stable URL: <http://www.jstor.org/stable/41177772>

Accessed: 11/06/2014 06:46

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MICHAEL POLANYI

Ed. note: We are publishing this piece as a schematic statement, a credo, setting out Polanyi's philosophy of nature and of knowledge. It adds nothing new to the corpus of his writings; it is not a piece of analysis or argument which really explains and justifies Polanyi's positions. But it does introduce a reader to the important twin concepts of "hierarchical levels" in nature and "tacit knowing" through which we experience them. A list of publications by Polanyi elaborating the argument is appended. The essay was delivered at a symposium on "Transcendence and Contemporary Culture" in 1968 sponsored by the Church Society for College Work. Mr. Polanyi wishes to thank Mr. Ruel Tyson for the idea of describing his subject as transcendence and self-transcendence.

I BEGIN by recalling the claims advanced by the founders of the mechanistic world view. Speculatively mooted by Galileo, this program received its fullest elaboration by Laplace. An intelligence which possessed at one moment of time knowledge of the ultimate particles of the universe, their velocities and the forces acting between them, could calculate any future topography of the same particles. Such a topography, he claimed, would give universal knowledge. These are the essential claims as well as the implicit ideal of mechanistic programs; and they are reflected in the current claims of biologists to explain the functions of living beings in terms of physics and chemistry.

But even physics cannot be defined from an atomic topography. We could not, for example, arrive at a principle like that of entropy without introducing some additional principle, such as randomness, to this topography. And the actual achievements of biology are explanations in terms of *mechanisms founded on* physics and chemistry, which is not the same thing as explanations in terms of physics and chemistry.

Here I introduce the concept of hierarchical levels. A machine,

for example, cannot be explained in terms of physics and chemistry. Machines can go wrong and break down—something that does not happen to laws of physics and chemistry.

In fact, a machine can be smashed and the laws of physics and chemistry will go on operating unfailingly in the parts remaining after the machine ceases to exist. Engineering principles create the structure of the machine which harnesses the laws of physics and chemistry for the purposes the machine is designed to serve. Physics and chemistry cannot reveal the practical principles of design or co-ordination which are the structure of the machine.

No inanimate object is ever fully determined by the laws of physics and chemistry. Laplace in his mechanistic program of universal knowledge had to assume an initial atomic topography which was not derived from atomic data. There are always some initial conditions necessary in order to have any system at all. The laws of physics and chemistry can likewise be applied to a given set of initial conditions. This is the reason I said that even physics could not be defined from an atomic topography, and this is the case with all general principles that apply to experience. Such principles must leave indeterminate a certain range of circumstances in which they apply, and any particular application of such principles requires that these circumstances be fixed by some agency not under the control of those principles. This becomes clearer as I discuss boundary conditions and the relationships in a series of hierarchical levels. The conceptions of boundary conditions and hierarchical levels are basic to my argument about transcendence.

The higher principle of structure controls the lower principles of physics and chemistry. Here I find the first trace of something higher and something lower. Neither set of principles can be derived from the other. The laws of physics and chemistry are used by the application of engineering principles which control the boundary conditions left open by the laws of physics and chemistry.

The conception of hierarchical levels and boundary conditions, so far introduced in a simple, two-level example, can be elaborated by noticing the complex hierarchical character of speaking or composing. In this case there is an example of a multiple level hierarchy. The lowest level is voice production, sounds which leave open all kinds of uses to which the voice may

be put. The next lowest levels are vocabulary and phonetics which restrict the manner in which the voice is used while leaving open the many forms of order which are supplied by the next level, the rules of grammar and syntax. Grammar and syntax restrict the use of vocabulary by making sentences while leaving the content of sentences open. The highest level in this hierarchy is the level of content or meaning. Meaning or content exercises control over the construction of sentences and the relations among them.

This brief explication of a hierarchy may be concluded by noting that the content of our speech transcends grammar; grammar transcends vocabulary, and vocabulary transcends voice production. Every superior level in this hierarchy can be said to represent the meaning of the lower level which it controls. Each level is subject to dual control; first, by the laws that apply to its elements in themselves, and second, by the laws that control the comprehensive entity formed by them. Again, this multiple control is made possible by the fact that the principles governing the elements of a lower level leave open their boundary conditions for control by a higher principle. Consequently, and the consequences reach far beyond the example at hand, the meaning of the higher level cannot be accounted for by reductive analysis of the elements forming the lower levels. No one can derive a machine from the laws of physics and chemistry, a vocabulary from phonetics, a grammar from a vocabulary, a good style from the laws of grammar, or the meaning or content of a composition from stylistic strategies. At each consecutive level there is a state which can be said to be less tangible than the one below it.

The more intangible the matter in the range of these hierarchies, the more meaningful it is. This is my criticism of all reductionist, mechanistic programs founded on the Laplacean ideal which identifies ultimate knowledge with an atomic topography, the lowest level of the universe.

The full import of my criticism of the avowed program of biology can now be seen. The organism has a mechanism, and this mechanism is like a machine. It has operating principles which harness the powers available from the laws of inanimate matter. An organism is not reducible to these laws, for in fact its morphological principles are extraneous to the operation of these laws, though morphology controls these energies for the functions

of the organism. And of course I did not intend to exclude other controlling principles when I introduced morphology, for the organism manifests multiple controlling principles just as we detected in the use of language.

I could proceed from this point and acknowledge the necessity of dealing with other principles, namely, those that pertain to animals by virtue of their sensory-motor faculties. These sensory-motor faculties would be a further limitation on the structure of the organism by harnessing it for the purposes of sensing external life and of directional movement. Then again these faculties leave open the kind of rules which will be innate in us for our sensory and motor powers, so that they will be another harnessing and another boundary condition in this respect. Two more steps will bring us to the end of this part of my argument.

The next step is to note that living beings are possessed of intelligence, another supervening principle, which controls and directs the operations of their sensory-motor faculties. Many inquiries into these matters would stop at this point, leaving the principle of intelligence as the superior principle of living beings. But the principle of intelligence is not the ultimate principle or the highest level in the hierarchy governing the functioning of living beings. Just as the sensory-motor levels of life leave themselves open to the control of intelligence, so the principle of intelligence leaves its powers open to the still higher principles of responsible choice. Human beings exercise responsibilities within a social setting and a framework of obligations which transcend the principle of intelligence. Responsible choice in a convivial setting controls the indeterminate powers of intelligence and sets the boundary conditions for their applications.

I have elaborated in schematic fashion a multiple hierarchy which leads on to ever more meaningful levels. Each higher level is more intangible than the one below it and also enriched in subtlety. And as these more intangible levels are understood a steadily deeper understanding of life and man is gained. These understandings constitute transcendence in the world.

How do we know transcendence in the world? Clearly we cannot support our arguments if our capacities to identify these increasingly intangible levels of experience continue to be reductively undercut by a positivistic empiricism. It is insufficient to show that there is room for living functions and other higher

principles in the boundaries left open by the laws governing inanimate nature. We cannot claim the existence of higher levels of control with their accompanying ranges of subtle meanings if our powers for discerning these hierarchies in the world are not accredited.

Unbridled detailing, the ideal advocated by Laplace and his modern followers, not only destroys our knowledge of things we most want to know; it clouds our understanding of elementary perception—our first contact with the world of inanimate matter and of living beings and our initial act of self-transcendence. Against the self-destructive commitment to ultimate lucidity, I propose the theory of tacit knowing. A theory of knowledge which endorses our capacities for understanding transcendence in the world will be found to establish self-transcendence.

I look at my hand, another face, or a machine. I recognize its area by its enclosed contours, by the relation between the object itself and its background within my field of vision. While I attend to the object itself I am relying on multiple clues—shapes, colours, extensions, perhaps in changing relations to each other. But I do not focus directly on each aspect of the object in its field. I have awareness of many of these aspects of the whole. In the case of the human face I rely on an awareness of its many features for attending to the characteristic appearance of a particular physiognomy. Attending to the details implicitly while focally addressing myself to the whole, I integrate the features into the cast they jointly form. The act of perception, therefore, comprises two types of awareness. I have subsidiary awareness of multiple facial features while I integrate these aspects into the face as a whole to which I attend focally. I perceive things through the dual activity of subsidiary and focal awareness. This is, in outline, the theory of tacit knowing.

Subsidiary awareness is controlled by focal awareness. The first type of awareness leaves itself open to the integrating function of the second. I am not able to specify with distinctness the particulars of a comprehensive entity. In this sense I know more than I can tell. I rely on my subsidiary awareness of the details of an object for attending to the coherent entity which is their meaning. There is, then, a *from-to* movement in all knowing. If, in allegiance to the ideal of total lucidity, I claim to know directly and distinctly aspects I actually only rely on subsidiarily, all

comprehensive entities are destroyed; a program of self-and world-destruction results, a "world" composed of bits of matter in motion in which nobody lives. I rely not only on the several aspects of an object as I attend from these to a coherent view of the whole; I also rely on my body with its multiple and complex levels of functioning as I perceive things away from my body in the external world.

My body is the only thing in the world I normally never experience as an object. Instead I experience my body in terms of the world to which I am attending from my body. I continuously rely on my body as a subsidiary means for observing objects and other comprehensive entities outside and for using these entities for my own purposes.

The kind of knowledge I have of my body by dwelling in it is the paradigm of knowing particulars subsidiarily with a bearing on the comprehensive entity formed by them. Hence when I rely on my awareness of particulars for attending to a whole I handle things as I handle my body. In this sense I know comprehensive entities by indwelling their functional parts, as if they were parts of my body. Such is my conception of knowing by indwelling.

Through indwelling I participate in comprehensive entities, from my own body and the objects I perceive, to the lives of my companions, and the theories we employ to understand inanimate matter and living beings. I partly transform myself in that which I am observing and thereby extend my range of knowing to include knowledge of all the hierarchies—from inanimate matter to the frameworks of our convivial settings and the firmament of obligations which supervene the operations of our intelligence within these frameworks.

This is why a commitment to unbridled lucidity tends to destroy understanding of complex matters. Focus only on the particulars of a comprehensive entity and their joint meaning is effaced. Our conception of the entity is destroyed, leaving us only with bits and pieces scattered about in random meaninglessness.

Our view of life must account for how we know life; biological theories must allow for their own discovery and employment. Theories of evolution must provide for the creative acts which brought such theories into existence. Beginning with our own embodiment our theory of knowledge must endorse the ways we manifestly transcend our embodiment by acts of indwelling and

extension into more subtle and intangible realms of being, where we meet our ultimate ends.

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