

5. Rethinking Causality

One of the major novelties—indeed, *trademark*—of the modern scientific perspective was its radical re-visioning of Aristotle’s understanding of causality, which had dominated the philosophy and science of the Middle Ages. In modern times— especially in the “hard” sciences—science has operated on the assumption that all of the important characteristics of nature are measurable, that all qualities can be reduced to quantities, and that causation unfolds with the inexorable inevitability of a mathematical calculation. This assumption, which opened up the possibility of modern technology, has conferred a terrible power on those who hold it, with the disastrous environmental and social consequences we now see unfolding in the world around us.

Those of us alive today digested this modern view of actuality with our mother’s milk, and it can be difficult for us even to imagine that other valid modes of understanding actuality could exist. I want to discuss, then, the historical evolution of the modern position. If we can appreciate that there was an intelligible, interesting, and even valid way of understanding causality before the scientific era, then we might also appreciate that a new intelligible, interesting, and even *useful* understanding of causality might be arising now.

Aristotle, way back in the early days of Western philosophy, proposed four different types of causes that account for the existence of any finite natural being. I will begin my discussion of the evolution of thinking about causality with Aristotle’s four-fold division, and show how our understanding of each of these four causes changed during the transition to modernity, and is, again, being transformed today. In Table 1, I summarize the main ideas in the evolution of ideas about causation, and it might be helpful to refer to the table as we proceed.

	ARISTOTLE	CLASSICAL PHYSICS	PROCESS PHILOSOPHY
MATERIAL	<i>Substance (hylé)</i> formless and passive	Atoms, matter, always already formed, passive	Creativity, active, chooses forms according to its aims
EFFICIENT	<i>Agent</i> —the specific agency that determines the various forms of substance	Transmission of energy and the power of the past, (e.g., the gravitational (later electromagnetic) character of past atoms	The power of the past as <i>experience of past experience</i> . Propositions have causal power.
FORMAL	<i>Form</i> —the active template, or idea, that imposes its shape on matter	Natural law	The range of possibilities open to the occasion in concrescence, weighted in relation to the aim of the occasion.
FINAL	<i>Purpose</i> —that for the sake of which the entity exists	None	The maximization of value for itself and its relevant future, with further specification determining grade and style. The power to impose aims on certain other occasions

Table 1: The Four Causes in Three Metaphysical Contexts

Aristotle’s four causes are Material, Efficient, Formal and Final. It is remarkable that this formulation still holds such relevance after 2,500 years. The most famous example illustrating the four causes is that of a house: The stuff out of which it is built is the material cause, the construction worker is the efficient cause, the architect's blueprint is

the formal cause, and the final cause is “to live in it.” This example is overly simple, but it helps me, at least, to keep the four causes ordered in my mind.

What we, in modern times, think of as “cause” is just the second of Aristotle’s four causes —i.e., “efficient cause.” But when Aristotle uses the word cause, he has in mind a richer and more concrete understanding of the notion. For Aristotle, a cause is a necessary factor for the appearance of any natural being (*ousia*) in the actual world. The natural being (what we would, in our rather abstract fashion, call a “thing”), must be made out of something, and this something is the material cause. It must be impelled into being, and this is the efficient cause. No natural being can arise without a form, a shape, and a definite family of characteristics. This is the formal cause. And, finally, nothing happens without a reason, and the reason why is the final cause.

If I want to discuss the emergence of my experience in this moment, I might refer to my body as the *material* cause, my physiological functioning as the *efficient* cause, my specific feelings, my specific character, and my specific thoughts as the *formal* cause,¹ and my motives as the *final* cause. In this way we can get a feel for the relevance of this analysis of causality, even today.

Aristotle’s Understanding of the Four Causes

Aristotle’s mode of understanding these categories is very different from the modern view. He proposed that the material cause of a natural being is “substance” (*hylé*). Aristotle’s idea of substance was very different from our modern notion. He imaged substance as not having any form of its own. It was a formless something that permits itself to be formed into natural beings. The active factor in the natural world, according to Aristotle, is form itself, the idea. Forms are like possibilities that innately seek to actualize. This dynamic potential within forms is what makes actuality happen. While artificial things require an efficient cause, a formal cause, and a final cause (all external

¹ In the earlier example of the house, the blueprint was the formal cause. Here it is the character itself that is the formal cause. The difference is that the house is an artificial thing, so its formal cause is external to it, whereas for natural beings that are not artificial, the formal cause is intrinsic to the thing itself. This will be further elaborated in what follows.

to themselves), in natural beings the idea, the *form*, is the the motive power (efficient cause)—the form toward which the entity becomes (formal cause), and the reason why the entity becomes what it does (final cause).

Because Aristotle tended to see each existent entity as coming into being through the operation of its own set of individual causes (and not through the operation of other natural beings), he thought of relations among natural beings as secondary to their substantial existence. In other words, natural beings first exist and then, secondarily, they have causal relations among themselves. As a result, Aristotle's logic—while very good at analyzing the categories to which a natural being belongs and what that implies— is incapable of analyzing even simple relationships such as greater than or less than. Furthermore, number plays a secondary role in Aristotle's metaphysics, and he had no particular interest in measuring things. As a result, Aristotelian metaphysics tended to minimize the importance of mathematics in the understanding of the actual world.

The Modern Understanding of the Four Causes

The modern understanding, as we have discussed earlier, came out of an enduring Platonic and Pythagorean strain of thought that saw mathematics as the fundamental language of nature. The work of Kepler, Copernicus and Galileo found hitherto unprecedented ways of illuminating nature through mathematical forms, and so gave great impetus to the emerging modern consciousness. But once the power of number in illuminating the actual world became evident, an important question emerged: What does it say about the world if, indeed, mathematical forms are the only forms that determine the unfolding characteristics of actuality over time? Newton not only outdid his predecessors in expanding the explanatory power of the new mode of understanding, he also articulated a clear vision of the what this new, mathematically characterized world must be like.

The outlines of his understanding—framed in terms of three dimensional space, one dimensional time, and atoms—is sufficiently familiar that we need not review it here, but this new world view required an entirely new understanding of causality.

For Newton, atoms in space and time became *the material cause*. While Aristotle's material cause was formless and process was the coming to be of definite actualities through the agency of form, Newton's atoms are always and already formed, and process becomes nothing but the re-arrangement of the atoms. For Newton, an important part of the formal cause—the form of the individual atoms—is taken for granted as an element of the material cause. Every metaphysical system assumes some factors of existence, and derives everything else from those factors. Aristotle tried to account for the existence of finite entities in terms of formless substance and active forms. Newton tried to account for the characteristics of macroscopic entities through the ongoing re-arrangements of entities that are self-existing and already formed.

The efficient cause, for Newton, was actually the will of God. This position, embarrassing to the scientific sensibility that developed after Newton's time, was a necessary consequence to the absolutely passive nature of the atoms as Newton imagined them. Newton maintained that space and time were the "sensorium of God," and that all movements of atoms were Divinely ordained in accordance with the law of gravitation. The fact that Newton and his contemporaries took this quite seriously partly explains the awe in which Newton was held—he had, or so it was believed, actually read the thoughts that are in God's mind as God manages "His" universe. Very quickly after Newton, scientists dropped this Deistic conception, and began to assign gravitational fields to the atoms themselves. From that point forward, the efficient cause for any particular movement was imagined as the gravitational gradient that resulted from the positions of the atoms in the immediately preceding instant.

Although scientists ceased to discuss *formal causes*, formal cause reappeared in scientific thought under the guise of "natural law." Natural law, as understood in science, is a mathematical description of the shape of possibility. Given these circumstances, those movements are the only ones that are possible. Whereas for Aristotle, the formal cause was an active shaping factor in nature, in the Newtonian view, natural law is an immutable factor in actuality governing the atoms, the movements of which constitute the process of actuality.

Like Aristotle, Newton also accepted a doctrine of *final causes*. For Newton, the final causes of the events in nature were the aims that God has in mind for “His” creation. Newton’s followers, however, reject Deism and, with it, they rejected final causes altogether. *It is this rejection of final causes that renders the universe a meaningless hurrying about of atoms in empty space through uniformly flowing time.*

The process through which the Aristotelian world view evolved into the Newtonian understanding was gradual, and can be traced over thousands of years. Ivor LeClerc has traced this movement in his remarkable work *The Nature of Physical Existence*.² The important point here is that the scientific view is not the discovery of an ultimate truth hitherto hidden, but is rather a stage in the unfolding of human attempts to understand the world in which we live. It has advantages, but it also has significant disadvantages, that we have explored in depth in preceding chapters.

Causes in Transphysical Process Metaphysics

Transphysical process metaphysics presents a new understanding of causality that preserves the advantages of the Newtonian world view, while simultaneously placing causality in a larger context that is capable of supporting the five basic propositions that we have been discussing.

Material Cause

For process metaphysics, the “material” cause of actuality is not substance, rather it is process itself. In Whitehead’s version of process metaphysics, which we are following closely here, this ultimate material cause is termed “Creativity.” Creativity is the ongoing process that generates actual occasions of experience by unifying the actualities of the past into a novel experience that then becomes another actuality to be unified by subsequent experiences. It is this recursive function³ of actualizing that becomes the material cause, rather than the material cause being either a passive formless substance

² Ivor Leclerc, *The Nature of Physical Existence*, London, George Allen and Unwin, 1972

³ A recursive function is one which takes its own output for input in its next iteration. This is elaborated at the beginning of Chapter 6.

(as it was for Aristotle), or a collection of permanently formed, substantial atomic things (as it was for Newton). Notice that in this process analysis of material cause, the material cause has become the ultimate source of activity. Whereas for Aristotle, the forms themselves were the sources of action, in process metaphysics, it is the material function that is the source of activity while the forms, as we will see, have become relatively passive. It is the actualizing process itself that chooses (within certain constraints) the form that will characterize it. This makes process metaphysics more adequate to the experience of personal freedom that we so highly prize in our historical epoch.

Efficient Cause

The efficient cause in process metaphysics is the shaping power of the past. The power of the past is, however, much richer in process metaphysics than it is in the metaphysics of Newton. For Newton, the power of the past can be fully expressed as a gravitational gradient. Of course, later classical science added an electromagnetic gradient and, in certain cases, a strong and a weak nuclear gradient. But in all classical science—indeed, in quantum theory as well (though here probabilities are involved)—the power of the past can be adequately expressed entirely in mathematical form. This is not the case in process metaphysics. Here, the actualities of the past are actual occasions of expired experience, and, as such, they are characterized not only by mathematical forms, but also by subjective forms such as consciousness, appreciation, disgust and so forth—none of which are measurable in the modern scientific sense of that term.⁴

A new occasion must experience the experiences that preceded it in the creative advance of nature. In other words, as we have previously discussed, in process metaphysics the causal power of the past is the power of memory—the experience of past experiences.

Propositions in the functioning of efficient causation

Occasions of experience, in the process of their formation (concrecence), produce *propositions*. A proposition is simply a way of binding entities together. For example, in

⁴ We can, of course, ask people to “rate” their experiences on a numerical scale. For example, “how hungry are you on a scale of 1 to 10?” But this is very different from comparing hunger to a ruler or a clock. It is not an “objective” measurement of the type that can be used in scientific experiments.

the process of my own concrescence, I may form a proposition that could be verbally expressed as “that flower is yellow.” In this case, I am binding together an actuality (the flower) with an idea, or *form* (yellow).

In the process of concrescence, I sometimes bind together a potential *future* actuality with a particular form. For example, I might form a proposition that could be verbally translated as “I will now raise my arm.” If I hold this proposition with the correct attitude (the correct subjective form) then, indeed, my arm begins to rise. Somehow, the proposition I form in the course of my concrescence has a distinct, efficiently causal effect on other occasions in the next moment. In process metaphysics, the propositions that an occasion of experience forms concerning possible future occasions of experience are an important factor in the constitution of efficient causality. This shift in the understanding of efficient causation allows us to understand in more detail the causal power of personality. We will explore this issue in greater detail in the next chapter.

Formal Cause

The understanding of formal causation also undergoes a characteristic transformation in the context of process metaphysics. The material cause —Creativity— is now the primary actor in the process of actualization, and it expresses itself through actual occasions that choose the forms that will characterize them for all future occasions. But each actual occasion is presented with only a limited set of forms, or eternal objects, among which it can choose. In process metaphysics, this array of choices is held to be the formal cause of an occasion. These choices are weighted in various ways. In quantum mechanics, which studies the concrescence of very low grade actual occasions, each emerging occasion is confronted with a “probability matrix” that specifies which characteristics it may come to have, and assigns to each one a probability. Something similar happens in the case of higher grade occasions such as the moments in our personalities.

In each moment, we emerge out of a settled past consisting of a multiplicity of past occasions of experience. It is not the case that “anything is possible” in any given moment. In fact, only those possibilities that are logically consistent with the past are actually possible. For example, before I wrote these words I entered my office and sat down. There are many possibilities open to me now: I might, for example, keep typing, or

I might get up and open the window—but all the possibilities open to me now must be logically consistent with the fact that I have already put myself in this chair. I cannot now make a decision that would have required me to have left the house instead of walking into my office.

Furthermore, the possibilities that are open to me now are weighted. I cannot assign a numerical probability to the various possibilities open to me because the higher the grade of an occasion, the more complex and potentially divided are its aims, and the more difficult it gets to predict how various possibilities will be weighted, and which one of them will be chosen. Only when very specific and narrowly defined situations are considered, and then only when large numbers of actors are considered as well, can even statistical probabilities for diverse choices be generated for high grade personalities. Nonetheless, it is obvious that the choices open are not all equally likely. I could, for example, get up from my chair and begin attempting to stand on my head. This is possible, but it is rather less likely than my continuing to write, or my getting up to open the window. In summary, the formal cause of an actual occasion is the array of choices open to it in its concrescence, as those possibilities are variously weighted in relation to the occasion's aim.

Note that in process metaphysics, each occasion has its own, unique formal cause. In modern science, however, we have become accustomed to the idea that the formal cause under which nature operates is the one system of “natural law,” which is the same everywhere and for all time. This system of natural law that is posited by modern science can be abstracted from the notion of formal cause that is posited in process metaphysics if we restrict our attention to systems of actual occasions that are of sufficiently low grade. The lower the grade of an actual occasion, the simpler is the array of choices that it confronts, and the more similar those causes to other similar occasions. For example, all electrons that have been detected in the environment of the Earth seem to form their probability matrices in essentially the same way. When a set of occasions is chosen such that the array of choices in terms of which they all operate is sufficiently simple and uniform, we can then imagine that they are all governed by a single law that is external to any one of them. In quantum mechanics, these laws are probabilistic. If a set of occasions

is so chosen that some of the choices of its members are overwhelmingly probable, then their individual formal cause can be represented as a single “natural law” of the classical type.⁵

Final Cause

Final cause, as we have seen, is thoroughly rehabilitated in process metaphysics. Nothing happens without a “reason why.” Every concrescence begins with a settled past *and* with an aim at value. In transphysical process metaphysics, the importance of final causes is greater than it is in Whiteheadian process metaphysics. In in transphysical process metaphysics, the aim of one occasion is understood as having a direct influence on the aims of certain other occasions that take place in spatial and temporal contiguity to it.⁶

This understanding of final causes has significant ramifications. If we understand final cause in this way, it allows us to account for the fact—attested to over and over again in daily life and well established in parapsychological experiments⁷—that our aim, our purpose, or our will has noticeable effects in the world around us.

Centuries of scientific materialism have accustomed us to the idea that all interactions among entities are external, like a kinetic interaction between billiard balls. Transphysical process metaphysics while it acknowledges the existence of efficient causes, revisions them as a transmission of experience through the creative advance. But transpersonal process metaphysics also allows the purpose, or aim, of a given occasion to have an effect on other occasions under certain circumstances. This is a kind of transmission of final causes.

⁵ Note that in the context of process metaphysics, as said above, we can abstract out from the functioning of low grade occasions something approximating to what physical scientists call a “natural law.” But process metaphysics cannot support the idea that natural laws are eternal. Rather process metaphysics understands natural law as a function of the entities whose relationships are described by that law, and it holds open the possibility that those entities and, therefore, those relationships and the laws that describe them, can change over the course of the creative advance. For a deeper consideration of this issue, see Alfred North Whitehead, *Adventures of Ideas*. New York: The Free Press, 1967 - chapters VII-IX..

⁶ In Whiteheadian process metaphysics, this relationship operates between an occasion and its prehensions, which are imagined to happen in a way that is somewhat private to the concrescence involved. In Transphysical process metaphysics, the relationship between a concrescence and its prehensions is a relationship between full actual occasions.

⁷ See Chapter 1.

Recall that every new actual occasion must begin with an aim. An actual occasion does not choose its own aim because its concrescence does not begin until that aim is present. We will discuss the ultimate origin of this aim in the next chapter. What is important in this context is that the aim of an occasion can be influenced in decisive ways by the aims of higher-grade occasions in its neighborhood.⁸ We can get a sense of this by noting how it is that the aims of our society, the aims of Gaia, and the evolutionary aim itself, are all implicitly operative in our valuations and decisions. Of course, we make our own free decisions, but many of the aims that condition our decisions are inherited from the past. We find ourselves emerging into actuality moment to moment as an expression of aims that enter us through the larger systems of which we are, in some sense, an expression.

By the same token, we begin to have a way to think intelligibly about the effects that *we* have on the occasions of our bodies. It is not just that we form propositions asking them to perform specific actions. We can form propositions asking rocks to levitate all day, but successful levitation is very rare indeed! Why is this? It is because the occasions of our bodies have already formed under the influence of our aims, and so they are predisposed to accept our suggestions whenever it is possible for them to do so.

The fact that our aims can influence the aims of other beings also helps to account for at least one subset of synchronistic events. For example, Jung's famous example of synchronicity — in which he was discussing with a client a dream about a scarab beetle and, at that precise moment, a scarab beetle began flying against his window, trying to get in — could be explained in this way. The therapeutic aims of both Jung and his client could, in this way of thinking, have influenced the aim of the beetle in such a way that it found value in approaching Jung's office. This could also account for the frequent cases of psychic contact between people who are emotionally close. People who are very close

⁸ Technically, transpersonal process metaphysics holds that the higher the grade of an occasion, the longer its duration. The final satisfaction of an occasion cannot be reached until all of its component prehensions have also reached final satisfaction. The higher the grade of an occasion, the longer this will take. Strictly, a higher grade occasion modifies the aims of those occasions that take place within its span of existence. The implications of this for the structure of time are spelled out in Eric Weiss, *Embodiment: A Frame for the Exploration of Reincarnation and Personality Survival*, 2004, <http://ericweiss.com/embodiment-an-explanatory-framework-for-the-exploration-of-reincarnation-and-personality-survival>. See especially Appendix 1.

can be imagined as influencing not only each other's behaviors, but also each other's aims. In this way, people who are emotionally close would be somewhat like cells in the same body, and thus very open to propositions formed by the other participant in the bond.

We can also extend this to account for successful cases of macroscopic psychokinesis. As we will suggest in the next chapter that the members of a personally ordered occasion will usually form a proposition concerning the location of the next member of the series. For example, I am now entertaining a proposition that I will still be seated in this same chair at the end of this sentence. These propositions formed (usually unconsciously) by such occasions are largely, though not entirely, responsible for the position of their successors in the same society. These propositions are calculated under the influence of the aims of the relevant occasion. In the case of low grade occasions, the aims are expressed by physicists in terms of conservation laws and laws of least action. This is in accordance with the process metaphysics idea that low grade occasions tend to aim at the preservation of value, so that low-grade occasions are usually quite habit bound. But if we assume that a higher grade occasion can impose its aims on a system of lower grade occasions, then the values governing the calculation of the position of their successors can be significantly modified. For example, suppose that the higher grade occasion involved is a human personality, and the lower grade occasions involved belong to a pebble. The human being attends to the pebble and the aims of the human being modify the aims of the occasions in the pebble so that they now desire the novelty of a movement against gravity. This will change their calculations regarding their next positions, and the pebble might then begin to levitate. If this is the process governing macro psychokinesis, true, then any attempt to identify *efficient* causes in causes of macroscopic levitation will fail, and we will have to learn to look to the interaction of final causes for an intelligible explanation.

As we will see in the following chapters, the power of one occasion to decisively influence the aims of other occasions allows us to explain the process through which a high-grade personality, such as ourselves, can be embodied in systems of lower-grade occasions such as our bodies. On the basis of this understanding, we will be able to

account for the difference between a live body and a dead one, and also for how it is that personalities can continue to function after the death of their bodies.

Finally, subjective aims are an important factor in governing the fullness of causal objectification among occasions. In general, the more the aim of a new occasion “resonates” with the aim of an already expired occasion, the more fully the expired occasion will objectify in the new occasion. We will explore this relationship more fully in the next chapter.

From the point of view of materialistic science, such speculation seems useless. Reductionistic scientists are reluctant even to acknowledge the existence of final causes, let alone their power beyond the individual in which they occur. Nonetheless, this way of understanding does make intelligible some of the anomalous data with which we are working. It may be that science needs to acknowledge this new form of causal interaction, and to begin working out ways of exploring it more deeply.

In the next chapter, we will look in detail at how these various types of cause play out in the creative advance.