The Succubus of Theory and Process Realism

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Abstract

This paper considers the metaphysical roots of the current crisis in Western historiography by addressing the contentious issue of objective theory. It looks at the problematic status of objectivism in terms of a philosophical discussion of the mind-body problem, which is here represented to be an artifact of the European Enlightenment's ontological representation of things as isolated entities that are reduced to their intrinsic empirical qualities. This paper offers a metaphysical alternative to this tradition, which is drawn from and synthesizes certain trends in the current philosophy of science: scientific realism, process theory and probabilistic causality. This synthesis is here called a process realism. In conclusion it is argued that a process realism addresses the usual objections to objectivism and offers an alternative to the Enlightenment ontology.

Introduction

Theory weighs heavily on the shoulders of historians, and this paper will attempt to define the problem and hint at a possible solution. The "theory" referred to here is objective theory rather than the role that theory plays in epistemology.[2]

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While the problem of historiographic theory is usually discussed in epistemological terms, it is generally understood that one can't really begin to address epistemological questions until the ontological ones have been resolved. There is an extensive literature today dealing with epistemological theory in historiography, but since our concern here is primarily ontological, we will merely illustrate the existence of the problem and not put the cart before the horse to engage this literature seriously. This should not be understood to imply that these epistemological issues are unimportant or uninteresting, but only that they remain intractable until there is a resolution of ontological matters.

The history of western historiography is marked by a growing skepticism concerning the correspondence of our knowledge of the past with the actual past and particularly its theoretical content.[3] This issue is most seriously discussed in philosophical terms as the "mind-body problem." It will be argued that the problematic relation of consciousness and the world arises from a hypostatization individual consciousness (*cogito ergo sum*), with the result that objective theory becomes a encumbrance to understanding rather than its aid. It is this difficulty which makes theory

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[2] Peter Novick, *That Noble Dream: The "Objectivity Question" and the American Historical Profession* (Cambridge: Cambridge University Press, 1998) is a classic discussion of the objectivity problem, but is rather dated. It is also too superficial because his focus is sociological (impact of professionalism) and because he accepts a dialectic of hypostatized entities that this paper rejects. For the need and function of theory for any inductive explanation, see Carl G. Hempel, "The Theoretician's Dilemma," in *Philosophy of Science*, ed. Marc Lange (Oxford: Blackwell, 2007), pp. 210-215. For theoretical and philosophical justifications for general social theory, Edgar Kiser and Michael Hechter, "The Debate on Historical Sociology: Rational Choice Theory and its Critics," *The American Journal of Sociology* 104, no. 3 (1998): 785-816. On need for theory specific to historical study, Gareth Stedman Jones, "From Historical Sociology to Theoretical History," *British Journal of Sociology* 27, no. 3 (1976): 295-305. On the relation of history, theory and practice, Alan Ward, "E. P. Thompson and 'Poor Theory,'" *The British Journal of Sociology* 33, no. 2 (1982): 224-237.

[3] Postmodernism firmly rejects any meta-narrative that would depend on the inclusion of objective theory. See the excellent overview of Willie Thompson, *Postmodernism and History* (Hampshire: Macmillan, 2004). While he appreciates the critical insights offered by postmodernism, he feels it offers nothing basically new, and for this reason postmodernism will not be an explicit concern of this paper. For the tension between postmodernism and action theory, see Michael L. Fitzhugh and William H. Leckie, Jr., "Agency, Postmodernism, and the Causes of Change," *History and Theory* 40 (2001): 49-81. Also on the issue of a need to recover a notion of action and causality is Adrian Jones, "Word and Deed: Why a Pot-Post-Structural History is Needed, and How It Might Look," *The Historical Journal* 43, no. 2 (2000): 517-541. For postmodernism as a continuation of Enlightenment contradictions, see Ernst Breisach, *On the Future of History: The Postmodernist Challenge and its Aftermath* (Chicago: University of Chicago Press, 2008), pp. 6ff.

a succubus, and it continues to haunt us. We cannot simply dismiss objective theory out of hand, as Roger Collins once did, as merely "a German vice."

So we start with the epistemological difficulties in historiography in order to illustrate the problem, turn to its purely philosophical discussion to show why the problem arises from metaphysical presuppositions, and end by offering an ontological solution that draws on the philosophy of science. These last sections of the paper introduce some metaphysical principles that are commonplace in the contemporary philosophy of science and which appear to hint at a solution to the relation of mind-body problem. However, this will require not only a synthesis of some current notions in the philosophy of science, but the introduction of some novel features. Therefore I have called it a "process realism" to signal that I will go a bit beyond the current consensus.

Because of a common view that the natural and the social worlds are fundamentally different, we will have to justify our procedure in the conclusion. The alternative metaphysical system presented here obviously represents only one of any number of possibilities, and so there should be some justification for process realism other than its internal logic and conformity to scientific realism. The justification here will remain philosophical and will bring up several binary concepts that represent familiar conceptual contradictions (for which the Enlightenment is frequently blamed) to show that they are resolved through the adoption of a process realism.

These philosophical issues should not obscure the practical utility of including real theoretical objects in our explanations. For example, it is widely understood that there are kinds of social systems that do not reduce to their empirical traits and that these systems behave in a way that depends on their age.[4] In quite naturalistic terms, general systems theory offers the notion of system "aging" (or, more properly, a deepening systemic contradiction), in which the behavior and properties of a system are a function of the length of time it has existed. Historians have found such a notion attractive when applied, for example, to the evolution of civilizations or empires, but they rely on an intuitive sense of system age rather than explain why this aging takes place and how relative time is manifested in empirical terms. However, it will not be our purpose to evaluate the practical utility of objective theory such as this for historiography, although it is surely a crucial aspect of the issue. Instead, the aim here is the modest one of offering an alternative way of representing the world free of Enlightenment conceptual contradictions. We focus instead on the metaphysical presuppositions that lead to a

[4] Alex Callinicos, *Social Theory*, 2nd ed. (Cambridge: Polity Press, 2007) brings up a non-modern and a non-Western example of people (Ibn Khaldun, Bodin) who held such views. However, being aware of other instances (if we can put aside the issue of naturalism), I would prefer to see an intuition that history is an emergent process that does not reduce to its constituents as being unexceptional. If so, it may be that it was the Enlightenment's naturalistic tendency that could not be reconciled with such traditional presumptions. Indeed, as Callinicos himself shows, the Enlightenment view was in crisis and contested right from the start, and postmodernism is very much part of that instability.

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problematic relation of cognizant Self and the historical Other and offer a metaphysical alternative.

The Mind and the World

Writing an account of past events is certainly an old tradition in the West. However, something new occurred in the seventeenth and eighteenth centuries, which was a development of the notion that "history" itself is an object of thought and not merely a framework in which events are described in chronological order. That is, the historical past was represented as a whole, having its own dynamic and properties distinct from those of the actions or institutions that constitute it (the extent this was really a novelty or merely took new form is not of concern here). Enlightenment historians recognized that there was a truth about the historical past that was not apparent to its participants, which Popper calls "theoretical history." There is something about history that goes beyond merely a record of deeds or description of institutions and has features that do not reduce to the action of individuals. Not surprisingly, this study of irreducible wholes found a parallel in other sciences such as geography, embryology and economics, which made them objects of thought and therefore a science.

One manifestation of this new insight into history itself was the development of a periodization that was at once naturalistic and progressive. The movement of human history was represented as passing from savagery, to barbarism and finally to civilization, and this pattern had little to do with any change in factors external to a historical system, such as human nature or natural circumstances. These stages were differentiated by the degree to which they were the expressions of the relation of human "rationality" to circumstance, which the Scottish Enlightenment defined as those choices we make that result in an increase in our "talents" (wealth).[5]

The Enlightenment posited the individual as having cognition of an object of cognition ontologically separate from the cognizant. Both the individual and the historical past were essentially closed systems, defined by their intrinsic properties. Their interaction and mutual influence is spoken of as a dialectic. This dialectic was meaningful because it was an interaction of intrinsic or essential natures isolated from the confusion of outside influence (as in optimal choice theory, which is a relation between a rational individual and opportunities accessible to him in his environment). Arguably, the bourgeois revolution removed both god and feudal law as the source of power for the

[5] Because of Popper, it might seem easy to dismiss the notion of historical stages as mere myth-making, but certainly Marx and perhaps even the Enlightenment represented historical stages in terms of Markov Chains, which is quite different from Popper's characterization of a stage theory, for the future is determined by the present, not by forces or an attractor external to the present.

individual, and put in their place the individual's possession of property which came to define him. At the same time, history was no longer seen as a manifestation of an externally imposed theodicy, but as a system effect of the interaction of its constituents (such as the wealth of nations arising from "trucking and bartering"). The self-contained Self takes cognizance of the self-contained Other through their causal relation.

However, this relation of mind and world proved to be problematic right from the start, and in the course of the nineteenth century positivism came to prevail. Positivism held that our knowledge is based on sense experience, and the metaphysics of the Enlightenment was best avoided, for it opened the way for dangerous speculation. The aim was to develop rigorous scientific methods to deduce from the data of experience the theoretical content of the object of study. In European historiography, the figure that best exemplifies this trend was Leopold von Ranke. For him, the core of historiography was the application of highly developed methods to the documentary and philological sources, in order to acquire history's meaning.[6] While Ranke did not in fact reduce social wholes to the empirical facts, these non-empirical properties of social systems (such as Europe as a whole emerging from a contest among its constituent national states) remained only implicit assumptions or mere inferences of uncertain status.

This "classical European historicism," as it is called, was challenged by a new "historical science" early in the twentieth century that held that the truth of unobservable social structure could be justly and explicitly inferred from the data of observation.[7] It held that society as a whole emerged from the interaction of an array of determinations such as economic and social factors. Rather than assume the theoretical content of the past was implicit in the empirical data, historical science held that the theoretical content was itself a suitable object of study. While the result was a much broader view of historical realities, it left problematic the relation of these objective forces associated with the whole to the creative individual. This tension between hypostatized entities had been implicit since the Enlightenment and is in part the reason for oppositional currents that rejected an historical science and emphasized instead the creative power of the individual in shaping the course of history. Examples might be German Romanticism, Maistre, Nietzsche, Henri Bergson, and Heidegger.

In historiography an important expression is a diverse philosophical movement that addressed the inherent tension between cognizant Self and objective Other by moving away from objectivism in order to prioritize epistemology over ontology. It seems this was due to a new awareness of the extent to which reality is actively constructed by the mind and also to a pessimistic view of rationality that came with the two world wars. For example, from the 1860s there arose a neo-kantian tendency that turned from the presumed experience of reality as it actually is to the concepts used to

[6] Novick, *That Nobel Dream*, pp. 26-30.

[7] Terms employed, for example, by Georg G. Iggers in *Historiography in the Twentieth Century* (Middletown: Wesleyan University Press, 1997), although "historical science" is contested because it can imply the truth value of objective theory.

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represent it in thought. Doubts about the mind having immediate experience of the world are also seen in phenomenalism, in which Ernst Mach played a key role. He held that scientific laws are only summaries of experimental data and served to comprehend that data and do not correspond to reality itself. Scientific laws have more to do with describing our sensations than with the reality that lay behind them. The logical positivism of the Vienna Circle owed much to Mach, and the final outcome of this trend is the linguistic turn that represented language as being the only intelligible world and the proper object of historical study.

The Retreat from Objective Theory to Epistemological Theory

Although phenomenalism didn't fare well in the philosophy of science, where metaphysical speculation is constrained by practice, a skepticism regarding the relation of knowledge and the world had a profound impact on historiography, where "brute facts" appeared to some to be the only solid foundation on which to stand, while others felt that history does not reduce to such facts.

I begin with a side issue by way of illustration to consider the distinction often made between long- and short-range historical explanation, for it allows one to escape having to confront the problem.[8] In U.S. historiography, this seems to explain the tension between historians of Western Civilization (which is short-range history writ large) and those of long-range world history. The historian of Western Civilization tends to favor the tangible features that distinguish a social whole, while the other historians lay emphasis on unobservable relations that bind the whole together. This is not simply an effect of professional territoriality, but arises from a contradictory metaphysics that either reduces truth to a direct experience of the Other or powers of the mind to represent the Other. A tendency to believe that consciousness simply reflects the world can be explained as the result presuppositions natural in daily life that can be left implicit and unexamined because they are shared in the dominant culture. The opposite pole of this contradiction is more appropriate to academic insularity, in which the life of the mind looms large.[9]

The example next to be discussed clearly shows that even in short-range history a subjective intervention to construct the facts of history is inevitable. The widespread

[8] For this distinction, see Keith Windschuttle, Keith, *The Killing of History: How Literary Critics and Social Theorists are Murdering Our Past* (San Francisco: Encounter Books, 1996).

[9] A contrast between a traditional empiricist and critical empiricist approaches are seen in Josef W. Konvitz, ed., *What Americans Should Know: Western Civilization or World History?* [Proceedings of a Conference at Michigan State University, April 21-23, 1985] (East Lansing, 1985).

belief that a focus on short-range history obviates the problem of objective theory seems unwarranted.

A book that students have often been assigned in order to introduce them to historiography is Edward Carr's *What is History*. It is introduced here because it usefully defines what may be a consensus view in Anglo-American historiography and not because it represents the current state in the philosophy of history. One of Carr's primary concerns was the failure of the traditional objectivism that reduced truth to brute facts and left out the creative effort of historians to make sense of them. To reconcile the objective and subjective determinations of fact he proposed three levels of facts that span the gap between what is given to us by the world and our subjective intervention. He does not call the empirical traces of past events that happen to survive into the present "facts," presumably because they have yet no relation to the investigator. However, such a relation is created by "auxiliary sciences," which develops these traces into raw materials suited to the production of history, which Carr refers to as "facts about the past." These facts about the past are then selected and arranged as citations within an historical work, and as such become "potential facts of history." However, to become an actual fact of history the fact must cease being the private creation of an individual researcher and win the support of the community of historians who thereafter accept it as a truthful "fact of history."

Carr observes that the Enlightenment's sharp distinction between subject and object no longer suits historiography, for it is clear in his mind that all three levels of fact have both an objective and a subjective component. It should be noted that the tension between subjectivity and objectivity, between the creativity of the mind and the determination of the world, is not really resolved here, but is merely obscured by his introduction of a hierarchy of categories that spans the poles of the contradiction and obviates the past as having any objective existence that is independent of subjectivity. If all facts are socially constructed, how then are we to determine their truth value in relation to the world without recourse to means external to the relation? While he speaks of this as representing a "continuous dialog" between the present and the past, it is in fact a dialog between the products of human creation in the present.[10]

Another book from about the same time that evades the problem of the relation of the objective and subjective determinations in historical representations is Marc Block's *The Historian's Craft*. Here again the problem is addressed by shifting the center of gravity to the subjective determinations of historiography. This book does not break any new philosophical ground, but reflects a growing consensus in the profession to escape the contradiction between consciousness and world by moving away from objective theory to focus on the subjective contribution to our representations of the past—a move that culminated in the linguistic turn.

[10] Edward Hallett Carr, *What is History* (New York, Vintage: 1961), p. 35.

Just as phenomenalism placed in doubt our immediate experience of the world, Bloch felt that the only thing with which the mind might enter into direct contact is the mind itself. Just as Descartes' *Cogito ergo sum* represented consciousness as constituting our existence, Bloch felt that only the mentality that we infer from our knowledge of past cultures is immediately intelligible. The written sources represent, whether or not intentionally or explicitly, the rationale of the historical actor. "In the last analysis," writes Bloch, "it is human consciousness which is the subject-matter of history. The interrelations, confusions, and infections of human consciousness are, for history, reality itself."[11]

This leaves the historian on very uncertain ground. Does history reduce to the intentions of individual actors? Just what is this rationale that lends meaning to the past? While Bloch admits that people are highly diverse in their psychology and "no two human facts are more unlike. Nevertheless, they worked together to give a society its characteristic mental attitude."[12] What is it that lends this attitude its coherence? It is "the deep-seated unity of the ego and the constant intermingling of its various attitudes."[13] Bloch is not here speaking of the ego as a real aspect of the psyche, but of an essential unity of mankind that is independent of empiria to remain a mystery, a vacuous essentialism.

A Possible Resolution in Metaphysical Terms

Unfortunately, historians have not been particularly good at metaphysics, and so for a penetrating critique of the relation of consciousness and the physical world about us, we must turn to a purely philosophical work. This is Jaegwon Kim's *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation* (1998), which may be the most important discussion of the issue to date, although it ends it with a touch of agnosticism.

Kim observes that we want a mind-body theory to offer a positive story about how mental properties and physical properties of the world are related and hopefully explain why they are so related. With the failure of positivism there arose a non-reductive materialistic monism based on emergent levels that can be characterized as a properties dualism in relation to the mind-body problem. It holds that consciousness is an emergent property of the brain that cannot be reduced to the physical properties of the brain and the world in general.

The issue, then, is what is the relation of these property levels? It is generally agreed that mental properties are supervenient on the physical properties of the brain,

[11] Marc Bloch, *The Historian's Craft* (New York: Vintage, 1953), p. 151.
[12] Bloch, *The Historian's Craft*, p. 153.
[13] Bloch, *The Historian's Craft*, p. 152.

which in its broadest sense means that a mental event requires some kind of physical event in the brain. That is, there is a dependence between these levels, but it leaves unspecified just what is the nature of that dependence. This is the dominant philosophical position today on the mind-body issue and more broadly the relation of higher- and lower-level properties in a hierarchy of levels. However, Kim insists that by not specifying this relation, supervenience ends up not really a mind-body theory; it is not explanatory.

Kim believes that a solution might be offered by not hypostatizing mind as a level having its own intrinsic properties, but by representing these mental properties in "functional" terms, by which he means that they are not properties that are intrinsic to consciousness, but are extrinsic properties representing the causal relation of the mind and brain. Two things should be noted about his position.

First, it makes a causal relations objectively real and definitive rather than merely inferences we may draw from the observation of proximate empirical events. That is, the causal relation is not *a posteriori* in relation to empiria, but ontologically *a priori*. Properties are represented as causal effects, and it is the causal relation that defines a level, not its properties or behavior. While the ontological fundamentalism of causal relations makes Kim's approach an example of scientific realism, it runs so contrary to the thinking common in daily life that it is necessary to pause and make sure its implications are clear.

We usually understand the world to consist of a hierarchy of emergent levels, where each level is a closed "entity" having certain empirical properties and behaviors that emerge from the lower level but are not reducible to them. We use the properties that belong to that level and happen to persist in time (in contrast to accidentals), to define the conceptual categories needed for thinking and communicating about the entity. For example, a "social class" in empiricist terms is a bundle of persistent empirical properties that are shared by its members, but in the realist terms employed by Kim, a social class would be defined as the causal relation to an outside source of development ("relation of production") that is shared by its members. Kim argues that a reductionist explanation of mental events becomes possible if we re-construe properties in relational or extrinsic terms.

Second, while Kim believes his view supports a reductionist explanation of consciousness, this is not the standard model of reduction associated with Nagel, which he finds to be irrelevant to the issue at hand. The Nagel model of reduction is in effect the Hepelian D-N model of scientific explanation applied to inter-theoretic contexts. Nagelian reduction derives a target theory from a base theory by means of bridge laws. According to Kim, while this derivational model of reduction is still the dominant standard in discussions of reductionism, actual cases of uniform reductions based on universal bi-conditional bridge laws is extremely rare if they even exist in the sciences. Besides, the Nagel model does not really explain anything. Kim feels his alternative is more appropriate in metaphysical terms because it makes the reducibility of a property

the result of its being the effect of a causal relation. I will use this suggestion later in this paper.[14]

The source of the problem, in Kim's view, is that the materialistic monism presumed in science today implies a mind-body supervenience in which the emergent properties of the mind and of the brain have a causal relation. When the mind and the body are hypostatized as self-contained levels that are treated as causal factors, supervenience means that a mental event is able to cause a subsequent mental effect only by causing a physical event that in turn is instantiated as a mental effect (that is, the brain mediates mental events). Kim goes on at some length to show that this results in an overdetermination that is at the expense of any satisfactory explanation of the relation of mind and body. In response to this metaphysical difficulty, it has been suggested that our commitment to intentional explanation is so great that we should not give it up just because of a metaphysical problem. However, Kim objects that the problem of mental causation is in fact a metaphysical problem, not epistemological, for we want to know how mental causation is possible, not whether it is possible.

Kim suggests that to functionalize a mental property is to make it non-rigid, to define it in terms of its causal/nomic relations to other properties. Since these relations are contingent (contingent on the laws that prevail in a given world), it is a contingent fact whether a given property satisfies the causal/nomic specification that is definitive of the mental property. The identity of mental and physical becomes metaphysically contingent.[15] He feels that the emergentists deny the functional nature of the properties they claim to be emergent, making these properties intrinsic and independent, with their own distinctive causal powers that are irreducible to those of the processes from which they emerged. Put simply, the problem is our representation of things as self-contained entities rather than as emergent instances of the causal powers held by the lower level, in this case the brain. While he here speaks specifically of the mind body problem, Kim makes clear that the issue is a universal one that applies to any world conceived as a hierarchy of emergent levels.

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[14] Stephan Berry, "On the Problem of Laws in Nature and History: A Comparison," *History and Theory* 38, no. 4 (1999): 121-137.

[15] Jaegwon Kim, *Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation* (Cambridge: MIT Press, 1998), p. 99. For a different approach to the same idea, see John Searle, "Reductionism and the Irreducibility of Consciousness," in *The Rediscovery of the Mind* (Cambridge: MIT Press, 1992); reprinted in *Emergence: Contemporary Readings in Philosophy and Science*, ed. Mark A. Bedau and Paul Humphreys (Cambridge: MIT Press, 2008), pp. 69-80.

The Relevance of the Philosophy of Science

In the natural sciences, it is common to suggest that the test of a theory is its empirical adequacy, sometimes referred to as "save the phenomena." The implication of making theory dependent on observational facts is that the truth of theory ceases being the issue, but rather why one theory is preferable to another. A theory may not be true, but nevertheless be sufficient in relation to the known facts, allowing one to remain agnostic about whether theoretical objects are actually real. However, the consensus today in the philosophy of science is that theory refers to things that are "real" in the sense that they have causal power ("Alexander's Dictum"), and this consensus view is known as scientific realism (note that this use of the word realism has no connection with the term in analytic philosophy).

While ontological questions are traditionally addressed by abstract philosophy, there is good reason for the historian to look instead to the philosophy of science. For one thing, after a long separation, there has in recent years been some convergence of the philosophy of science and its practice, and this interaction is proving to be fruitful at the same time that historiography appears to have entered a crisis of confidence.

Why should we, as historians, adopt the philosophical presuppositions of natural science? The principle reason, I believe, is existential. As Marx once said, "The philosophers have only interpreted the world, in various ways; the point is to change it."[16] What this suggests is that action in the world should logically precede thought. A scientific approach generally adopts this prescription, which distinguishes it from a position that would make cognition *a priori (cogito ergo sum)*. In terms of historiography, this implies a shift from merely a description and interpretation of the past to an effort to explain why events occurred as they did. Only though such explanation can historical consciousness be liberating in the sense that it informs action in the world.

The consensus in the philosophy of science holds that there is an intelligible world independent of consciousness, that consciousness is a quite natural phenomenon, and that

[16] Thesis XI, *Theses on Feuerbach* (1845). It might seem obvious that this prioritization of action and therefore change in the world is related to social class. I should note that such a prioritization of action does not imply actualism, for which see Claudio Fogu, "Actualism and the Fascist Historic Imaginary," *History and Theory* 42, no. 2 (2003): 196-221. The reason will be apparent in the final section of this paper, where the present does not obviate the past or future, but are represented as aspects of one process. For the linguistic turn, cartesian dualism, and need to make action central, see Stephen L. Colins and James Hoopes, "Anthony Giddens and Charles Sanders Peirce: History, Theory and a Way out of the Linguistic Cul-de-Sac," *Journal of the History of Ideas* 56, no. 4 (1995): 625-650; and for the centrality of action, see Christopher Lloyd, "Realism, Structuralism, and History: Foundations for a Transformative Science of Society," *Theory and Society* 18, no. 4 (1989): 451-494.

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our world has properties that are empirical and also properties that are non-empirical (theoretical) that are technically referred to as "unobservables."[17]

Traditionally the natural and the human sciences have been at odds. Why turn to the philosophy of science, when historians have long held the view that historiography and natural science occupy two different and mutually unintelligible worlds (C. P. Snow). For readers used to an Anglo-American culture, the word "science" in fact implies only the natural sciences and excludes the study of history. However it is better today to use the word less parochially and have it refer to an organized body of truthful knowledge, as in the German *Wissenschaft*. One reason is that natural scientists are coming to realize that their enterprise cannot proceed very well without taking the social sciences, including history, into account, although that attitude is usually not reciprocated by historians. What also should make the philosophy of science worthy of interest to the historian is that there is agreement that it is far more mature than the philosophy of the social sciences.

The language of science is a universal language, which stands in sharp contrast to those philosophers of history who would make modern historiography a property of Western Civilization rather than merely having appeared in its modern form initially in the West. This universality arises from a notion of reality as consisting of emergent levels, with the base level being the physical world shared by all mankind and from which we acquire causal power. After the Second World War it was believed that the study of world history would encourage global accord, but it was never clear how a knowledge of the Other would encourage such unity without its having a material basis. One of the characteristics of contemporary science, despite the esoteric nature of its highly specialized disciplines, is that it speaks a universal language because it addresses action in a world that engages us all.

One reason why historians have not found the philosophy of science very congenial is that they suffer from what is called the "myth of the scientific method". Put simply, this is the assumption that the characteristic method of natural science is modeled on the laboratory experiment and presumes a positivist deductive logic. That is, if we had perfect knowledge of some initial situation, we would be able to predict unequivocally its outcome (Leibniz). In this view, observations allow us to construct hypothetical general laws, which can be tested in the laboratory and presumably serve to explain particular events. Historians know this as "covering law" explanation, but are often unaware that it has been the broadly rejected in the philosophy of science.[18] Furthermore, while historians now recognize there is necessarily a subjective element in their theories, rather

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[17] For this consensus, see Richard Boyd, Philip Gasper, and J. D. Trout, eds., *The Philosophy of Science* (Cambridge: MIT Press, 1991). Note that this volume has a section on psychology where individualism is also discussed, which illustrates the universal ambitions of the philosophy of science.

[18] Rom Harré, *The Philosophies of Science: An Introductory Survey*, 2nd rev. ed. (Oxford: Oxford University Press, 1986).

than look to how this element is handled in the philosophy of science, it has instead encouraged a skepticism regarding the truth value of anything going beyond short-range accounts. On the contrary, the aim in the philosophy of science has been to reconcile subjectivity with truth value, not to deny one or the other.

A deductive-nomological logic is atypical in natural scientific practice. Rather than a covering law explanation, there is a growing tendency these days to represent singular causation as logically *a priori*. Also there is recognition that many sciences such as cosmology, geology, evolutionary biology, and meteorology (sometimes called "evolutionary sciences"), deal with a subject for which the hypothetico-deductive method is clearly inappropriate, and general laws play no greater in them than they do in historiography. For evolutionary systems, the preferred method of analysis is abduction or retroduction, which resembles the "retrodiction" familiar to historians.[19] Simply put, abduction aims to explain a particular outcome as the actualization of a causal potency latent in some prior state of the system. The task of the scientist is to ascertain the probability distribution of these possible outcomes and why a particular possibility was actualized rather than some other. I assume this procedure, even put abstractly as it is here, should sound familiar to the historian, for that is what most historians do most of the time. It is why historians habitually employ a probabilistic language in explaining the past.

The abductive method is naturally appealing to historians because it presumes that an historical process is "emergent." That is, it manifests novel properties that were not present in its past. In history, this is associated with the creative action of individuals, but this creative activity can only be explained within the framework of society as a whole and in relation to the physical world from which causal potency arises, and natural science deals frequently with systems that create novel situations without human agency.[20] If emergence is quite natural—that is, intelligible in terms that are entirely naturalistic, the creative action of human agency can be represented as just another natural process rather than something that exists despite the natural world. If there is indeed a shift in the natural sciences to give primacy to singular causation, this might imply that the abductive method used by historians might well become the principle method of natural sciences as well.

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[19] Gilbert H. Harman, "The Inference to the Best Explanation," *The Philosophical Review* 74, no.1 (1965): 88-95.

[20] For a general discussion of emergence, see William C. Wimsatt, "Aggregativity: Reductive Heuristics for Finding Emergence," in *Emergence*, ed. Bedau and Humphreys, pp. 99-110.

Scientific Realism

Scientific realism is a position that holds a category of referents known as "unobservables" is real in the sense of their having causal power.[21] An antirealist position maintains that what is important is the empirical adequacy of a theory. It holds that a theory can be "sufficient" in a science even though it may not be literally true and even though its statements about unobservables turn out to be actually false. What works in practice is what counts. In contrast, scientific realism is not a theory of knowledge so much as one of being. It posits the nature of being rather than address a knowledge based inferences of a passive experience or one based on reason or language. In science there are unobservables that an antirealist might adopt as useful tools or convenient fictions, but they remain in principle agnostic about their reality. I suspect it might be said that the realist makes scientific activity foundational, while the antirealist looks instead to epistemology.

Unfortunately the meaning of the term "unobservable" is ambiguous because most discussions of scientific realism offer a list of examples rather than an explicit definition. In some contexts this might suffice, but otherwise we are forced to infer a definition. It seems to me off hand that the word "unobservable" has three usages. First and perhaps most conventional it refers to a theory or to concepts that presumably have truth value in relation to the world. For example, a theory enjoying the support of the professional community can serve as an axiomatic basis for further research. Such a theory might be a generalization of empirical observations, refer to explanatory causal relations, or more broadly the structure of a system. A reference to theoretical unobservable in this sense means simply that no scientific research program can start with a *tabula rasa*, but takes a range of theories as being axiomatic, such as observational theories (presumptions about instrumentation and what it tells us), the portion of received knowledge that we assume to be true, or the knowledge conveyed by auxiliary sciences.[22] This best theory interpretation of unobservables seems today to be quite useful and

[21] Among many excellent works on the philosophy of science is the brief and more popular introduction by Samir Okasha, *Philosophy of Science: A Very Short Introduction* (Oxford: Oxford University Press, 2002), which includes a discussion of scientific realism. For further discussion, see Marc Lange, "Introduction to Part IV," in *Philosophy of Science*, ed. Lange, pp. 203-209, and the more recent articles by Bunge in Martin Mahner, ed., *Scientific Realism: Selected Essays of Mario Bunge* (Amherst: Prometheus, 2001). For its defense: Larry Laudan and Jarret Leplin, "Empirical Equivalence and Underdeterminism," *The Journal of Philosophy* 88, no. 9 (1991): 449-472, and a more critical view is John Worrall, "Structural Realism: The Best of Both Worlds," in *Philosophy of Science*, ed. Lange, pp. 262-277.

[22] For a classic discussion of the subjective component in scientific theory, see Imre Lakatos, "Falsification and the Methodology of Scientific Research Programs," in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (Cambridge: Cambridge University Press, 1970), pp. 91-196.

necessary, offering a needed framework in which a particular problem can be raised. However, it does not say anything about the ontological status of a theoretical object. While utility warrants the inclusion of unobservables, this notion of scientific realism is not far removed from pragmatism or instrumentalism.

Besides this "best theory realism," there are things that are unobservable simply because they are beyond the powers of our instrumentation to detect them directly. This is sometimes called a "transcendental realism."[23] A gluon, for example, although not detectable by our instruments, is considered to be real because our understanding of what can be observed must presume its reality. However, this use of the word is not very handy, for all observation is mediated, indirect, and constrained in some way. That something falls outside our powers of observation at this time is merely an accident and does not objectively distinguish observables from unobservables.

Finally, there is the narrower definition of the unobservable that identifies it simply with causal powers, causal potencies, or (as Wesley Salmon insists) causal processes, and sometimes force-fields. It is sometimes referred to as a "causal power realism." This accords with the general view of scientists that all things are in principle processes and therefore must have some kind of causal mechanism that we can infer through the observation of empirical change. Since there is today a broad sense that scientific explanation means the discovery of a causal mechanism, this causal power realism has become widespread. However, it still leaves unspecified the relation of between observable empiria and unobservable causal powers that makes all things processes.[24]

These areas of ambiguity should not obscure the fact that practicing scientists have on the whole always been realists, for they act on the presumption that the best theory is generally true, that phenomena are always mediated, and that the aim is to discover hidden causal mechanisms. What has changed is that scientific realism in the last few decades has now been found congenial in the philosophy of science, and those who prefer a pragmatic or critical empiricist view of things find ways to accommodate it. As a result, the path should be open for bringing epistemology and ontology together to remove the problematic status of objective theory in historiography.

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[23] See Roy Bhaskar, *Scientific Realism and Human Emancipation* (London: Verso, 1986).

[24] I do not include "critical realism" because it gets close to reducing things to the mind of an individual agent and therefore seems rather distant from scientific realism. For causal mechanisms, see, e.g., Mario Bunge, "How does it work? The Search for Explanatory Mechanisms," *The Philosophy of the Social Sciences* 34 (2003): 182-210; and James Mahoney, "Tentative Answers to Questions about Causal Mechanisms," paper presented at the annual meeting of the American Political Sciences Association, Philadelphia, PA, August 28, 2003.

Process Realism

The nub of the issue is the notion of process, for all three realist approaches sketched can or do rely upon it. Best theory realism takes the most successful causal explanation of things as being necessary to gain true knowledge of the world; the transcendental realist concern is for our powers of observation infer a real process, and causal power realism certainly presumes all things are processes by positing causal power as part of their nature. However, we must take a look at process theory, for what has been said above about causal power realism leaves unspecified the difference between the frequently used terms "causal power" and "causal mechanism." The former here will be taken to mean a real potential for change without any further specification, and a causal mechanism will refer to a causal factor that has specific causal powers.

There is agreement in the sciences that all things are in principle processes and some agreement that persistence is best explained in causal terms. This is because all systems are in principle open to outside influence, and such influence always exists: an absolutely closed system is only a hypothetical never actually encountered in nature. Even the most elementary of atomic particles represents a process, for in a sense an elementary particle is a quantum fluctuation–a probability distribution of possible states. All systems represent an array of possible actualizations, and tend to move toward a more probable state (second law of thermodynamics) unless there are certain boundary conditions allowing them to export of entropy. They are ultimately driven to do so by the fact that the universe as a whole is far from equilibrium and all things inherit a disequilibrium. Persistence is real, but it is simply the effect of a system that happens to find itself in a temporary equilibrium state.

This universal drive for change can be referred to as causal power to distinguish it from the power of specific entities to cause change. If we represent the universe as a whole as the framework of a particular situation, this distinction between causal power and causal mechanism disappears, but since our concern, particularly in historiography, is only for local situations, we need to represent the existence of a power for change that is left open ended or unexplained in any specific terms. This casual power is the causal relation of a system with a broader world that we are ultimately forced to leave unspecific. A specific system that acquires causal power from its relation to its environment is usually referred to as a causal mechanism or causal factor.

To pull this together, here is a definition of process that hopefully avoids the difficulties arising from representing the world in terms of hypostated static entities: a process is a probability distribution of possible outcomes arising from the constraint of empiria on causal power.[25] I have not found this is definition to be problematic in

[25] This kind of definition seems implied by Peter Martin, "Letter to the Editor: Probability as a physical Motive," *Entropy* 9 (2007): 42-57.

discussions in scientific circles, but I have had to synthesize it, and so it must remain hypothetical.

A causal power is not a theoretical object contained within a system, nor is it an innate property appertaining to the system itself, but it is an extensive property. That is, a process is an actualization of a universal causal power that results from the dissipation of everything, whether or not these things are in the system's immediate environment (causally related). This is a universal property in the sense that the essential nature of things includes everything beyond them, which is contrary to the usual tendency to define things solely in terms of their own properties and to limit outside influence to an object's causal environment. So a causal power can be represented as the universal dimension of a process, and its effect is observed as empirical change. In operational terms in historiography, this suggests that the empirical data from which one starts out are not persistent qualities, but changes in those qualities from which one can infer causal relations.

To explore the relation of causal potency and empirical specifics, between the universal dimension of things that ties them to a broader world and their specific qualities and location in space and time, it is useful to represent a process as having two dimensions, although this is an artificial distinction necessitated by the limitations of the mind. While one dimension is the processes' causal potency, the other as its empiria, its localization in space-time and its distinguishing features. It is important to emphasize that these are merely the two aspects of the process and are not independent ontological categories. When something is represented as a process, it is simultaneously a universal and a particular.

If everything is a process, causal effects will be “fuzzy,” or to a degree equivocal. For example, when we take a measurement or observation, it is at a particular instant of time, and so the object cannot not appear as a process, but as only having static properties. If we take another measurement at a subsequent time and obtain different values, then we may infer that we have been looking at a process, but we have not measured process itself. Another way of putting this, since a process is open to an indeterminant environment, its effect must be equivocal. It is interesting that the mind recognizes there is a process when seeing a billiard ball traversing the table, but we find it difficult to pin down in words except as a succession of static states similar to the frames of a movie film. That is, the act of observation that seeks to define a process collapses into to a static state lacking in causal power: it has become an idea.

The notion of causation here is referred to as a probabilistic causality, although there is a much discussed ambiguity in this phrase. One meaning is that our measurements are necessarily imprecise; the other is that the object observed is itself has real properties that are probability distributions. Einstein once suggested that god does not play dice, but this opinion was rejected in the natural sciences. The best known example of probabilistic causality is Heisenberg indeterminancy, where the act of measurement collapses the probability distribution of possible values to become the

unequivocal value that is read out by the measuring instrument. However, if we adopt a process view of reality, this indeterminancy applies as well to the macro-world.

The term empiria used here refers primarily to qualities in local space-time, and it constrains causal potency within a space-time framework to make it a specific probability distribution of causal potency for specific outcomes. Empiria represent the specific aspect rather than the universal aspect of a process and makes it observable. When causal potency is constrained by empiria to become a probability distribution of possible effects, that combination represents a causal mechanism.

When it comes to the causal relation between a causal process and an effected process, the empirical dimension of the affected process collapses the probability distribution of the cause to give rise to a specific outcome, which is a new process. We can express this by saying that the effect actualizes the probability distribution of the cause (I avoid the term "realizes" here because the causal power is already assumed to be real). The affected process collapses the probability distribution to the unequivocal effect that we see because otherwise there would result what are called multiple worlds, and only one world can be actual for us. This analysis of causality is obviously the same as our discussion above of the observation of a process, for in each case, the work done on the affected process, whether it be an instrument, the eye of the observer, or the billiard ball being struck, collapses the probability distribution to an unequivocal outcome.

It may seem a bit of technical trivia, but to avoid confusion I should distinguish the empirical boundary condition of a system (which in this context is conventionally called a mediation, wall, membrane, reactance, etc.) and the empirical dimension of an affected system. In the former case, the empiria change the probability distribution (degrees of freedom), but is not associated with empirical change; in the latter, the probability distribution collapses and as a result there is empirical change. That is, a mediation is a structure associated with change in probability distribution; a causal relation is constrained by the empirical structure of both cause and effect, and results in change in the empirical dimension of the affected process. The different dimensions of a process are being affected.

It might appear that all this theorizing only makes things impossibly difficult for the historian, and I will go on to address this issue, but it is worth noting at this point that the real question of whether the metaphysical presuppositions that we find so useful in daily life can be simply transferred to the study of history. Simply put, the answer is no. In daily life we think of ourselves as a independent agents acting within a situation defined in terms of static categories, but this is merely an effect of a narrowing of our scope to the experience of an individual. The fact is that we are social beings acting in a material world, and these must be taken into account as soon as we extend our gaze from daily life in which persistence and uniformity can usually be presumed to the wider historical framework in which change and diversity seem to prevail.

The difficulty, I believe, lies in an empiricist heritage that encourages us to think of things or emergent levels as being self-contained entities intelligible in their own terms

rather than as participants in a broader process. The inadequacy of such a view has long been recognized, such as Friedrich Engels' dialectical materialism, Henri Bergson's vitalism, Arthur Koestler's holons, and David Bohm's implicate order. But only now have conceptual tools matured to the point that an alternative can be made operational. The mind-body problem and the relation of consciousness and the world of experience, we have argued here, can be resolved by escaping the conventional constraints that are based on the experience of the daily life of the private social atom to embrace some of the contemporary insights of the philosophy of science. In offering this, I have had to articulate a synthesis of process theory and probabilistic causality that has novel features, and so I distinguish it by name as a process realism.

Process Realism in Historiography

Human activity represents an intervention in the world that is informed by our intentions. Given our egocentricity, we are inclined to represent our ability to actualize our intentions in this way as a private possession, as a self-contained power. Since the seat of intentionality is the mind, people have concluded that it is the individual mind that is a causal factor. The consequence of this hypotstatization of the mind and world is the mind-body problem.

However, such a conclusion is not foregone. Following and extending the suggestion of Kim above, it is entirely possible to see consciousness as an empirical constraint on the process we speak of as action. Practical activity brings us an immediate experience of the world, and consciousness is its effect, although as an emergent effect, the content of consciousness does not reduce to the world of experience and is only probabilistically constrained by it. If our intentions do not represent causal mechanisms or factors, but instead are represented as being only constraints on action, then the causal relation of mind and world becomes instead the constraint imposed by society (the collection of processes we will refer to as social beings) upon the dissipation of causal power of our natural environment. Our intentions only alter the probability distribution of the result without being its cause. The more we change this probability distribution away from its most likely outcome, the greater the effort that we must expend. If we sit back and allow the most probable outcome to occur, it will takes no work at all. In other words, it is not the idea that causes change, for it only constrains our expenditure of energy. Ideas are passive constraints, not active agents.

The subject-object dichotomy therefore here dissolves to become merely aspects of one process that we speak of as purposeful action in the world. Since such action is powered by environmental dissipation, we can't very well expect to understand human behavior independent of the social or natural environment in which it takes place.

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Activity consists in imposing constraints on a natural process to arrive at the improbable outcomes we know particularly as economic production and more broadly as human history. The natural process is the tendency of nature to move toward a more probable state, which is spoken of as dissipation or an increase in entropy, but if constraints are imposed that are external to that process, that is, boundary conditions that limit its degrees of freedom, the result will be an outcome that is improbable or is emergent in relation to an initial state, and it will experience a decrease in entropy. This emergent process therefore depends on a process that is opposite with respect to its change in entropy (whether the outcome is more or less probable in relation to an initial state), and so these two interdependent opposite processes form a unity known as a contradiction. Rather adventurously, let me suggest that it seems that it is the contradiction, which joins the process offering a power for change with the process that constrains it in accord with human needs, which should be our basic unit of historical analysis.

In these terms, progress in history is manifested, not as cultural progress or in terms of some kind of accumulation, but existentially as achieving improbable outcomes by constraining natural dissipation (a process known as economic production). These constraints (means of production) represent structures that are developed as a result of past production. However, because human needs are emergent, constraints inherited from the past are never sufficient to address our needs in the present. To address them there must in addition be an effort to achieve improbable outcomes (use of forces of production). That is, technological advance is not the cause of progress, but its effect. It is our bringing labor to bear through inherited structures to achieve improbable outcomes that represents progress, not progress in relation to a *Telos* or some socially constructed standard.

How, then, do we represent the past, present and future? Action takes place in the present and, as we have suggested, it is constrained by the mind. However, there are other constraints, and in particular the constraint of history. The past no longer exists, but it did leave empirical traces that constrain our behavior in the present. That is, the probability distribution of what we are able to do in the present is determined by history, and our creative action in the present aims to alter that probability distribution to arrive at an outcome that is improbable in relation to the past. The past no longer exists as a process, but the empirical dimension of that process is the empirical dimension of the present process.

And, of course, the future does not exist in the present either. And, yet, like the past, one dimension of the future is present, although it is in this case the unobservable aspect of the present process rather than the empirical aspect of the past process. The future exists in the present as its probability distribution of possible futures; its existence in the present is not observable, but is nevertheless real.

Conclusion

I would like to conclude by commenting briefly on a few of the conceptual contradictions we inherit from the Enlightenment tradition. Although as historians we might prefer to see a methodological justification, since that lies beyond the scope of this paper, we must confine ourselves here to a metaphysical justification.

One pair of problematic Enlightenment binary concepts is freedom and determinism. In terms of a mind-body contradiction, the determinations of the world upon us will appear an alien intrusion that negates our being. A dialectical interaction only obscures the problem, for our effect on the world is not a mirror of ourselves, but something essentially new. If our nature is essentially self-contained, any outside determination will seem seem to alter our nature in a way that is not true to it. However, if we were to understand ourselves to be part of a broader natural process (a naturalistic equivalent of John Donne's "no man is an island unto himself"), it is the empirical specificity of circumstance that makes creative action possible because it defines for us a probability distribution of possible outcomes in terms of which we can struggle; it represents a situation in which creative action becomes possible. So, external determinations, far from inhibiting freedom, are its condition in that it defines what is possible to do and how much effort will be needed to actualize our intentions. Our action is not a struggle against constraints themselves, but against the most probable outcome they define. The exercise of freedom therefore requires knowledge of what not only is possible, but also what is probable. The former keeps us sane, and the latter offers the possibility of moral value as we struggle against the most probable outcome and assume moral responsibility. Because the probability distribution of the situation in which we find ourselves is not an observable, but unobservable, it is accessible to us only through historical understanding.

The part-whole dichotomy has long troubled historians, for there's a feeling that things really are part of larger systems, and knowledge of this broader level is necessary if we are to understand action. However, the hypostatization of part and whole has made this difficult. After the Second World War there was quite a debate over wholes and parts that didn't get very far, for while it was obvious that systems have emergent properties and the real world could be reduced in empirical terms to wholes and parts, emergent wholes seemed intractable in terms of logic, and so the debate died. A process view, however, dissolves an ontological distinction of whole and part, for a process as defined above is at once a particular at a particular time and place and with specific qualities, but at the same time it is universal in that its existence and its possible emergence are driven by what lies outside it. If an emergent level is represented as a constraint upon a lower or more basic level, one is not seen as a cause of the other. In fact, a single universal material

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process in which various levels simply represent constraints is a fairly conventional view in natural science.[26]

The same conclusion applies to the dichotomy of individual and society. In conventional thinking these are separate things, where society is merely an aggregate of individuals, or, as is generally the case today, refers to the emergent properties resulting from the interaction of individuals. This much seems agreed. However, people have been nervous about a reification of the social whole because it might imply the social whole has active powers that necessarily compromise the dignity and independence of the individual. A happier alternative is to see individual and society instead as aspects of one process. Society represents a causal potency that is manifested as the empirical development of individuation. The more developed the society, the more such an individuation is possible; the more developed is individuation, the greater is the causal potency of society.[27] When we represent individual and society, not as separate things, but as aspects of one process, the usual term for it is "social being." By working with the social being as a basic unit of analysis, which we can infer from the empirical development of individuals, we escape the problem of whether it is individuals or society that shapes history.

A social being is not an instance of the social whole, nor is it an individual simply interacting with other individuals to give rise to emergent social phenomena. Social being is a process in which social potentials emerge as the result of the constraint of individuality on the dissipation of nature and these potentials at the same time give rise to individuation. In general systems theory, this is called "deviation amplification," but rather than being a dialectic of hypostatized entities, we are here describing a singular process, although it is dependent on society's relation with the natural environment. Our relation to the world is not simply the interaction of separate entities, of mind and matter or of individual and society, but of an emergent level of matter called social being that acquires causal potency through a dissipation of its environment through labor.[28]

Finally, we mention the subject-object dichotomy, or the hypostatization of Self and Other that makes the relation difficult to understand. Rather than representing their relation as one of the causality effect of one upon the other, it makes greater sense to see

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[26] An old discussion of parts and wholes that differs somewhat from the presentation here is Herbert Simon, "Alternative Views of Complexity," in *The Sciences of the Artificial*, 3rd ed. (Cambridge: MIT Press, 1996); reprinted in *Emergence*, ed. Bedau and Humphreys, pp. 249-258.

[27] For the relationship of social relations and action, see Douglas V. Porpora, "Cultural Rules and Material Relations," *Sociological Theory* 11, no. 2 (1993): 212-229; and for relation of individual and social whole, see Keith R. Sawyer, "Emergence in Sociology: Contemporary Philosophy of Mind and Some Implications for Sociological Theory," *The American Journal of Sociology* 107, no. 3 (2001): 551-585.

[28] For deviation amplification whereby empirical distinctions are made greater, see Magoroh Maruyama, "The Second Cybernetics: Deviation-Amplifying Mutual Causal Processes," *American Scientist* 5, no. 2 (1963): 164-179.

causality in terms of actualizations of a probability distribution of causal powers.[29] Self and Other in this sense represent two constraints on one process, so that the constraint of one can be the condition for the development of the other in the sense of its movement toward an improbable outcome. Instead of social relations being contractual or even antagonistic, one's own development as a social being depends upon constraints imposed by the other. We are all probably familiar with this in the form of a family, where the bond creates potentials in which its members can individuate and develop.

As suggested initially, just how process realism pertains to historiographic method should be of primary interest, but here we can offer only a hint. It seems agreed that the first step when approaching a past situation is analysis, which is a representation in thought of constituents. But how are we to define these parts? An empiricist will employ conceptual categories based on his observation of the persistence of certain qualities and also take into account unique empirical features. This reduction of units to their empirical dimension makes unit selection and the resulting conception of the whole static and subjective. The alternative offered here is to see these basic units as processes or even as contradictions rather than as isolated entities. What this means is that what defines a unit is not its intrinsic properties, but the causal structure inferred from its empirical change that connects to a source of causal potency. The empirical objects that share such a causal relation become the units of analysis even though they may be quite different in empirical terms.

This paper has suggested that the hypostatization of entities is a feature of modern Euro-American historiography that was inherited from the Enlightenment and is at the root of its crisis. This crisis is not only because postmodernists question the very legitimacy of objective historical knowledge or because historical study seems to have lost any social function other than its value as escapist entertainment and ideological utility, but because the problem was implicit from the beginning, arising from the conceptual foundations characteristic of the modern West. Presented here was an alternative, named process realism, that is hopefully truer to the world that we experience rather than to the limitations of mind. Knowledge of history in terms of contradictory processes exposes both the limits and the possibilities for constructive action in it.

[29] This seems the implication of Mark Zangari, "Adding potential to a Physical Theory of Causation," *Proceedings of the Biannual Meeting of the Philosophy of Science Association*, Vol. 1: Contributed Papers (1992): 261-273.