Distributed Ontologies and Systems Ontologies

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Abstract

The paper generalizes one aspect of Heidegger's Zuhandenheit and finds it in beings other than tools, specifically human action, but not in beings that are approached as "systems" in the natural sciences. We distinguish two kinds of ontologies, or modes of being (among others): distributed ontologies and systems ontologies. In a distributed ontology, what a thing is depends on other things "out there" in the world. In a systems ontology, what a thing is can be defined apart from the rest of the world. Concepts in the sciences, prototypically mathematical physics, deal with systems, that have states, and whose states are functions of time. What a system is cannot be changed by changing things outside it. Rather than being an ontology unto itself, distributedness is a feature of some ontologies and not of others. Examples of things with a distributed ontology other than tools are noted, principally human action, whose conceptual structure has already been explored some by Alasdair MacIntyre, Herbert Fingarette, and Paul Ricoeur, without, however, focusing on its distributed character for its own sake.

Keywords: Human action, Heidegger, MacIntyre, Fingarette, Ricoeur, distributed ontology, systems

With some things, what the thing is can be defined and determined quite independently of anything else in the world. With other things, what the thing is can be changed by changing other things in the world, "off-stage," if you will. The first, in which things have a constitution independent of the rest of the world, is the ontology typical of the sciences. The second, in which other things "out there" matter, was found by Martin Heidegger in tool-being. I would like to generalize aspects of the second. The first kind of being has a *systems* ontology, named for a term common in the sciences. The second we shall call a *distributed* ontology, for reasons to follow. The distinction might seem a small thing, but overlooking it leads to confusion, whereas awareness of it opens up phenomena that would otherwise remain hidden. Distributedness is more a feature of some ontologies (and not of others) than it is an ontology unto itself. It is not coextensive with Heidegger's Zuhandenheit or with the mode of being of tools, which are its first instances.

This paper is not a general typology of ontologies but rather merely a distinction about a feature that appears in some of them. Distributedness appears as an *aspect* of the ontologies of quite various things. Even in Heidegger, tools, human existence, and works of art all have distributed features, but are not thereby the same kind of beings.

1 Heidegger's Tool-Being

Of the many surprises for newcomers to Heidegger's *Being and Time* not the least is the difference between the being of the ready-to-hand, the Zuhanden, and the merely present, the present-at-hand, the Vorhanden. Typical of the ready-to-hand is the being of tools. Typical of the present-at-hand is the familiar ontology of physical presence: what takes up space, has a position and velocity, etc. Readers tend to note the ready-to-hand only in passing, on the way to Dasein, the being of human beings, which is the real focus of the book. All the other sorts of being are derived with respect to Dasein. Yet there is more than meets the eye in the ready-to-hand. It can be explained easily enough to beginning students by merely showing them a tool whose function they do not know. Even one they do recognize will work as well, sometimes better: what makes a key be a key? The existence of locks *someplace else*, of a lock that this particular key fits, and beyond those locks, of course, the world of human beings in which keys and locks are useful. When students are asked, of an unrecognized tool, "What *is* this?" they know that there is something "out there" someplace that explains it, but what, and where, they do not know. There is more to the thing than the physical object you can hold in your hand. They know they don't know what the thing *is* until they can say what it is *for*.

When considered under the aspect of tool-being, the being of the key is constituted by things that are "off-stage," not physically part of the key "itself." As vorhanden, merely present, it has a chemical and physical constitution that is unsurprising and familiar. That sort of being, the being of just taking up space, can be understood without existential involvements in the rest of the world, i. e., without the messiness of the human world that constitutes tools *as* tools.

The distinction that I would like to elaborate in this paper pivots here, at the difference between sorts of being that have their foundation in the wider world and those that are separable from the wider world. The first we may call *distributed* ontologies, for the ontological constitution of the thing involves other things: it is distributed over the world. The "distributed" moniker comes by analogy with distributed computing: the job gets done, but not all on one processor. A thing with a distributed ontology gets constituted as whatever it is, but not just by the physical matter in the thing "itself." The things that make it be whatever it is are distributed over the world.

"Non-local" is a term that might come to mind, but it is already used for other purposes in theoretical physics, and physics, even quantum mechanics, is typical of the contrasting kind of ontology, what we shall call *systems* ontologies. Distributedness is existential, a matter of human involvements; non-locality is about geometry, physical space. In a non-local quantum electronic system, the thing itself (the electron) is spread out over the world. In the distributed ontology of a tool, the tool is not in the least spread out over the world, but the other things that make it be a tool are scattered over the world, and the human involvements that make it be a tool are not spatial concepts at all. It would be highly confusing to import the term "non-locality" here and try to give it a new meaning.

Another set of terms that could come to mind for the contrast we seek would be "closed" and "open": as in things that are closed to the world or open to the world. It is true that I have often over the years written of the "openness and ambiguity" of human action, but openness here means (and travels with) ambiguity. There is nothing in the least ambiguous about an open *system* in physics, and trying to use the word "open" both in the systems ontology of the sciences and for the non-systems ontology of Zuhandenheit won't work. Speaking of open and closed ontologies would be even more confusing than speaking of the "non-local," for established usage in mathematical physics (among other sciences) distinguishes between closed and open *systems*. We are trying to distinguish between systems and things that are not systems *at all*.

The second kind of ontology, what we are calling a "systems" ontology, is found in the natural sciences. The word *system* is already common there. A system is ontologically constituted without reference to the wider world, in the sense that its state is defined without reference to the wider world. The fact that it may later interact with that wider world (and so change its state because of other systems in the world) does not make its state definable with respect to things in the world. Quantum systems qualify. Even though they are sometimes not localized, they are, conceptually if not instrumentally, distinguishable from the rest of the world.

The easy way to tell the difference between a distributed ontology and a systems ontology is to ask whether you can change what the thing *is* just by changing something else beyond the thing "itself." If you can, it has a distributed ontology. If you can't, it has a systems ontology. Of course one and the "same" thing (or better, its focal material substrate) can have both kinds of ontologies for different purposes. As a tool, a key has a distributed ontology. For purposes of classical physics, it has a systems ontology. If you take away all the locks in the world, the key is no longer a key, though its physical properties are unchanged.

Heidegger's tool-being was the first of the distributed ontologies. We shall see others momentarily. Heidegger drew on tools as exemplary of kinds of being other than Dasein but related in their constitution to Dasein. There are many kinds of distributed ontologies, not just that of tools. This paper focuses on kinds other than tools. Tool-being stood as a representative of kinds of being between Dasein and the vorhanden, but even in Heidegger's writing, there were kinds other than just tool-being.

The Vorhandenheit of the modern natural sciences appears to be all of a systems-ontological character. There may or may not be kinds of both Vorhandenheit and natural being other than those with systems ontologies; this paper takes no position on that question.

2 Some Contrasts

Some illustrations will help distinguish the two kinds of ontologies. The first difference is in the "location" of the ontological constituents of things in systems and distributed ontologies. We begin with the familiar, in order to prepare the contrast with distributed ontologies.

In a systems ontology, the thing of interest can be conceived without reference to the world. That, at least, is the appearance, and the appearance is not entirely wrong, though I shall qualify it in what follows. To continue with the appearance, a system is *conceptually* isolatable, even if it interacts with the larger world. A system has a *state*, and its state is a *function of time*. The state of a system can be specified precisely and exhaustively — often by just a few numbers in physics. In other natural sciences it can be specified in principle. This exhaustive precision of definition is the whole point of conceptually isolating the system from the rest of the world. Systems are subdividable into part-systems, sub-systems. They are combinable: systems interact, in ensembles of systems. There is traffic in matter, energy, momentum, etc., between systems, and in other quantities as appropriate to other natural sciences. The state of the system does not depend on the world, even when its future time-evolution depends very much on interactions with the world. What goes for the state applies, under some views, to the ontological constitution of the system. The natural sciences are the home, and in the modern world, the origin, of systems ontologies.

In a distributed ontology things are constituted in a different way. Other things "out there" in the world contribute to the ontological constitution of the thing of interest *as* whatever it is. It may not have a state in the sense that the term state is used in the natural sciences. The ontological constitution of the thing is distributed over things in the world even if its focal material substrate is quite localized. The physical substrate of the key "itself" fits within a small closed surface, but the physical substrate of the things that constitute it *as* a key can be found indefinitely far away, beginning with locks, but extending to all the artifacts of a culture. The key-lock pair gets its tool-being from its usefulness to human beings in a human world. We shall see further differences between systems ontologies and distributed ontologies after working through some examples.

The thesis of this paper will be that distributed ontologies extend well beyond mere tool-being. Vorhandenheit may extend beyond systems ontologies, but that does not matter for the present paper. Systems ontologies are the pertinent contrast for distributed ontologies.

Return briefly to the notion of a state: the Shorter Oxford English Dictionary defines it as "condition, manner of existing." The notion of a state is then connected closely to the ontology of the thing; and the initial dictionary meaning is broader than it may seem. In the modern world, the default meaning of "state" was quickly restricted to those aspects of a system that are well-defined at any point in time. The manner of existing of things with distributed ontologies goes well beyond such restrictions.

3 Examples of Systems Ontologies

Consider first the familiar, from the world of physics. The notion of a system emerged and was reshaped in the seventeenth century. The earliest attestations in the *Shorter Oxford English Dictionary* are from that century. The pertinent meaning is "A set or assemblage of things connected, associated, or interdependent, so as to form a complex unity; a whole composed of parts in orderly arrangement according to some scheme or plan." The English is from the French, *système*, and Latin, *systema*, and both from the Greek, $\sigma\acute{\upsilon}\sigma\tau\epsilon\mu\alpha$, from $\sigma\upsilon\varsigma$ + the $\sigma\tau\alpha$-root of $\H{\iota}\sigma\tau\eta\mu\iota$: to stand with or stand together. The pertinent meaning is "A set or assemblage of things connected, associated, or interdependent, so as to form a complex unity; a whole composed of parts in orderly arrangement according to some scheme or plan; ... The whole scheme of created things, the universe 1619." The meanings in physics and astronomy are unsurprising. "The system of a planet (the planet with its attendant satellites) 1690." This meaning is older than its occurrences in thermodynamics. Meanings in biology also appear in the eighteenth century.

As physics progressed, scientists devised new ways of isolating some part of the world in a system, and then modeling its future time-evolution. The first example was celestial mechanics. The systems are the sun, planets, and their satellites. Each has a state consisting of its position and momenta. They interact, but each can be conceived in isolation from the others. One has merely to abstract the local potential energy from its sources in distant masses, and then the local system can be forecast without further reference to the distant force generators. They constitute a grand system when taken together, and can be further subdivided as the needs of computational physics may require.[1]

The instincts of classical mechanics became by stages the model for every other area in physics and then for the other natural sciences as well. The notion of a system did not get much emphasis in classical mechanics, because the bodies of interest could be treated as point masses, and solid bodies could be reduced to nearly the status of point masses by adding moments of inertia and angular motion to the translational motions of a point mass. In chemistry and thermodynamics, the extended character of solid bodies begged for an overt concept of a system, which came into its own in those sciences. In both, one is dealing with an arbitrarily demarcated extended body in space. It has a boundary, typically a closed surface. The monitoring of traffic in force, matter, energy, and other thermodynamic quantities across its boundary was spelled out explicitly. Thermodynamics focuses the mind on keeping the system of interest defined and demarcated apart from the rest of the world. What was generalized from classical mechanics was the idea that the system has a state (measured in the appropriate physical quan-

[1] When JPL did a numerical integration of the solar system for the Apollo project, it was necessary to treat the Moon as an elastic-plastic body, i. e., to divide it into sub-systems, but not to subdivide more distant solar-system bodies. E. Myles Standish, private communication. How the earth itself was treated in the calculation of the standard ephemerides I don't recall.

tities) and that its state is an unambiguous function of time. The system and its state can be defined without reference to the larger world, even though the future development of the system very much depends on interaction with other systems in the world.[2] The word "system" has become quite common in the language of all the sciences, and recognition of pertinent systems is usually half the work of formulating a scientific problem. The word does not always carry this meaning, as the alert reader will eventually discover, but it is nevertheless the usual meaning.

4 Examples of Distributed Ontologies

Now look at examples of things that have distributed ontologies. We began with Heidegger's tool-being. Other things with distributed ontologies can be found easily: heirlooms and works of art come to mind first, and beyond them, history and narratives, human actions. Heirlooms are a fairly simple extension of tool-being.[3] The thing handed down may be an artifact or may be only something so simple as a rock (which is not even a tool), but what constitutes it as an heirloom is its history, its past. Somebody cared about it, and people today care about that somebody in the past. What goes for heirlooms can work not just for physical things but for practices and habits of language. Works of art Heidegger himself saw, and he appraised them as humanly-made "places" that disclose something about human life. In all of these cases, what constitutes the thing as what it is can be found beyond the thing "itself," that is, well beyond the focal physical substrate of the thing.

Both language and signs appear in *Being and Time* (sections 17 and 34), and clearly both are instances of Zuhandenheit. Treating them as tools, however, has never seemed quite right. Later on, he turned to language in depth. "Language speaks us," not the other way around.[4] Language is the presupposition of impor-

[2]Readers will naturally ask about biology, inasmuch as biology is not entirely similar to physics. Biology is not part of this paper, but it may be observed that biologists have amply found systems appropriate to their own purposes. Organisms, ecosystems, and species are all systems, even though their dynamics is not explained in terms of physics. A species can be defined differently for different purposes, and it is not localized in space, though it has a geographical habitat. Biological concepts probably rest on presuppositions that come from a distributed ontology (as will be argued in general later in this paper), but that is not something which can be explored here.

[3]Heirlooms appear briefly in *Being and Time*, section 73. See also Michael Gelven, *A Commentary on Heidegger's "Being and Time"*, revised edition (Dekalb, IL: Northern Illinois Press, 1989), p. 205.

[4]See also Hans-Georg Gadamer, *Truth and Method* (trans. Joel Weinsheimer and Donald G.

tant features of human existence, not something added on afterward. "Language is the house of Being" (in the *Letter on Humanism*).

Works of art are not tools, but neither are they Dasein nor merely vorhanden. They also have a distributed ontology.

The later Wittgenstein did not speak of ontologies at all. Nevertheless, he provides many concrete instances of distributed ontologies beyond mere tools. Games are one example, ostensive definition another.[5] Nothing about an ostensive definition makes sense without a great deal of background and prior knowledge about the world. There lies the distributed character of definition, and definition can stand metonymically for ontology. Intelligible definitions presuppose knowledge of the wider world because the things to be defined get their being from their place in the wider world.

George Lakoff opened up the distributed character of many categories in natural language.[6] Lakoff names his adversary "objectivism," the thesis that *all* categories are (or should be) reducible to set-theoretical terms. Set theory seems to be the model for things with a systems ontology. Many natural language categories do not fit that model, and require various considerations distributed beyond the things of interest "themselves." He exhibits many kinds of categories whose competent employment requires considerable knowledge of the human world into which they fit. He provides structure to the distributed character of language categories far beyond Heidegger's examples.

5 The Case of Human Action

Thus far, we have seen distribution in the world, or "space."[7] The ontology of some things is distributed in time as well. The most interesting case of a dis-

Marshall, New York: Crossroad, 1989), p. 463.

[5]Ludwig Wittgenstein, *Philosophical Investigations; The English Text of the Third Edition*, translated by G. E. M. Anscombe. New York: Macmillan, 1958. See e. g., nos. 28–31. Games appeared also in Gadamer's *Truth and Method*.

[6]George Lakoff, *Women, Fire, and Dangerous Things*. Chicago: University of Chicago Press, 1987.

[7]I do not mean space in the sense of geometry or physics or differential equations or causal interactions between systems, but rather space in the sense of the world in its human involvements in a synchronic, not a diachronic sense. Heidegger specialists are rather sensitive and even touchy about this, and have sometimes thought (knowing that I am also a physicist) that I was trying to assimilate existential concepts to the systems thinking of physics. I am not. Hence the scare-quotes for "space."

tributed ontology beyond Heidegger's Zuhandenheit will be human action. This is counter-intuitive, for systems instincts run deep, often unrecognized. What follows is not even the full outline of a distributed ontology of human action, but rather merely the claim that others have observed features of human action that best make sense in a distributed ontology rather than a systems ontology.

Indeed, the notion of an ontology of action at all is counter-intuitive, but it is not new. Mircea Eliade announces in the first sentence of *Cosmos and History*,[8]

> This book undertakes to study certain aspects of archaic ontology — more precisely, the conceptions of being and reality that can be read from the behavior of the man of premodern societies.
>
> Objects or acts acquire value, and in so doing become real, because they participate, after one fashion or another, in a reality that transcends them.

Eliade does not speak of systems or distribution but of nature (i. e., archetypes) and history. Both participate in wider realities, but not in the same way.

Before we come to examples of the distributed-ontological character of human action, it will be helpful to look at the more traditional ways to make sense of human action in terms of a systems ontology. These will be familiar ways to conceive of action, even instinctive, although their systems-ontological character usually goes unrecognized. Aristotle stands at the headwaters of the tradition, in *On the Soul* and the *Nicomachian Ethics*. (Interestingly, the *Poetics* doesn't get much attention in action theory.) Aquinas in the opening questions of the Prima Secundae of the Summa Theologica provides a logic of the basic concepts of human action. Donald Davidson's essay, "Aristotle's Action," provides a short overview of the tradition. Though my agreements with Davidson are seldom complete, I heartily applaud his plea in that essay for granting *events* some ontological status. "The idea is that we must take events seriously as part of the furniture of the world, and in particular accept actions as a species of event."[9] In this, he supports Eliade's contention about the ontology of action cited above. Analytic approaches to action are all closer to Aristotle and Aquinas than to any Continental treatments of action. I think, probably against Davidson, that the ontological status of events,

[8]Mircea Eliade,*The Myth of the Eternal Return, or, Cosmos and History*. Trans. Willard R. Trask, 1954. Princeton University Press, 1971. The French original: *Le mythe de l'éternel retour: archétypes et répétition* (Paris, 1949). The quotations are from pp. 3–4.

[9]Donald Davidson, "Aristotle's Action." In *Truth, Language, and History* (Oxford: Clarendon Press, 2005), p. 285.

certainly of actions, finds its proper home in a distributed ontology rather than a systems ontology or anything like it.

The mainstream can be epitomized in an idea that is typical, though perhaps not found explicitly in all its members: An act happens as coupled changes of state in two systems. One system is the intelligent (or intentional) will of the actor, and the other system is located someplace in the world, possibly first in the actor's manipulating body. The connection is causal.[10] The language of systems and states appears in the recent analytic literature, probably influenced by the language of the sciences, but the ideas are present all the way back to Aristotle. I make no attempt, much less any claim, to a comprehensive summary of all the positions and disputes in this broad family of traditions; merely the claim that they share a family resemblance, and that few see in action the features that will appear with Heidegger, Gadamer, MacIntyre and Ricoeur. In particular, the mainstream tradition focuses on the logic of concepts like will, intention, practical reason, goals, and purposes. Indeed, it is often quite sensible in handling the problems it is interested in. It looks at human motions to reach goals, but directs no attention at all to the interpretive and editorial processes by which we pick out those motions from the amorphous unnarrated confusion of all the human and natural motions there are.

With the mainstream tradition as a contrast, now look at work that recognizes the distributed character of events in history. A. C. Danto was analytic, but he attests that even within the mindset of analytic philosophy, sometimes the distributed character of action has been seen. His analysis of history proposes what I would call a distributed ontology of action in history, though his notion of "basic actions" out of which more complex actions are constructed has no use for distributed ontologies.[11] He saw that the historian places events in their larger cultural and historical context, and indeed, the meaning of events depends on that larger context: it has a distributed ontology. Insofar as events "themselves" are constituted by their meaning, they, too, must have a distributed ontology. It is the meaning that picks out for interpreters what the events themselves *are*. Danto saw that it is impossible to describe a historical event at all except in terms of its place in its larger history. "Not to have a criterion for picking out some happenings as

[10]This was called "volokinesis" in Andrew P. Porter, *Where, Now, O Biologists, Is Your Theory? Intelligent Design as Naturalism By Other Means* (Eugene, OR: Wipf and Stock, 2008), section 5.1.

[11]Arthur C. Danto, *Analytical Philosophy of Action*. Cambridge: Cambridge University Press, 1973. Arthur C. Danto, *Analytical Philosophy of History*. Cambridge: Cambridge University Press, 1965.

relevant and others as irrelevant is simply not to be in a position to write history at all." The relationship to that larger context is ontologically constitutive. He speaks of a "retroactive re-alignment of the Past," and says that "the significance of present events is often contained in the unknown future."[12] He saw that to describe "what happens, as it happens, the way it happens" is impossible without trans-temporal references, and that the language of history and the language of action are pretty much the same at this point.[13] The notion of an "Ideal Chronicler" who describes events without their relationships to other events turns out to be incoherent, even for an analytic philosopher. When one turns to Continental thinkers, this appraisal solidifies and deepens.

There is nevertheless a persistent notion that one can attempt to write history on a systems basis, supposing it to be about human social systems that have states that are functions of time, with any changing meanings added on later, so to speak. Carl Gustav Hempel would be the technical version, and Isaac Asimov's *Foundation* series the popular version.[14] In real life, it has never worked very well, and merely throwing bigger computers at the problem (as Asimov imagined) is unlikely to solve it. Another instance of the notion is the work of Ludwig Bertalanffy.[15] It was a natural idea, the attempt to make sense of all human concerns in terms of a systems ontology. Not much came of systems analysis applied to culture because so many human concerns have their home in one or another distributed ontology.[16]

Now look at other sources: Alasdair MacIntyre, Herbert Fingarette, Hans-Georg Gadamer, and Paul Ricoeur. The elements of a distributed ontology are scattered in many places, but one good place to begin would be with Alasdair MacIntyre's *After Virtue*.[17] MacIntyre was not the first (Herbert Fingarette and

[12]Danto, pp. 167, 168, 169.

[13]Danto, p. 159.

[14]The majority of historians and philosophers were not convinced. See Harry Ritter, *Dictionary of Concepts in History* (Westport, Conn.: Greenwood Press, 1986.), in the article "Covering Laws."

[15]Ludwig von Bertalanffy, *General system theory; foundations, development, applications*. New York: G. Braziller, 1968.

[16]Alicia Juarrero, *Dynamics in Action: Intentional Behavior as a Complex System* (MIT Press, 1999), provides an analysis of role of the material substrate (i. e., the brain) in human action in the perspective of chaotic complex systems theory. She comes to narrative only in the end of her analysis, bypassing considerations that would grow from this paper but would take far more space than we have here. For present purposes, it is enough to say that she saw that analysis of the dynamics of the material substrate alone is not sufficient to make sense of human action.

[17]Alasdair MacIntyre, *After Virtue*. Second edition. Notre Dame: University of Notre Dame Press, 1984.

H. Richard Niebuhr preceded him), but he is in some ways the best place to start. Many of the features of a distributed ontology of action can be found concentrated in chapter 15.

In an example, MacIntyre imagines a man digging roses in his garden (206) asks what the man is doing, and moots "Digging; gardening; taking exercise; preparing for winter; pleasing his wife." Answers must come from knowing much that has happened "off-stage," beyond the field-of-view of this small tableau. What the act *is* is constituted, in part, by the off-stage. The whole of chapter 15 develops this idea. MacIntyre rejects the notion of "basic acts" (the analog of atoms in chemistry) out of which more complex acts are constructed, (204) choosing instead an ontology in which parts and wholes are reciprocally constituted by their relationships to each other. This idea appeared in Gadamer's *Truth and Method*. He sees that the meaning of an act is ontologically prior to the act itself: the "concept of an intelligible action is a more fundamental concept than that of an action as such" (209). He sees that one essential feature of action strictly construed is the ability of the actor to give an account of the action (209); all other "acts" (e. g., acts of nature) are acts only by analogy. He sees that action gets its being from its place in a conversational structure (210) in a social context.[18] An act gets placed by answering the question, "what is happening?"[19] MacIntyre sees that we make sense of our lives largely in terms of narrative (211). Paul Ricoeur makes the same claim in much greater depth in *Time and Narrative*.[20]

Herbert Fingarette describes the phenomenon of self-deception as something that happens when the actor does not spell out correctly what he himself is doing in some failed engagement with life.[21] This is not lying; the actor does not spell out even to himself, and so it is dubious to what extent the actor "intends" his actions in the traditional sense of intention, a sense that pretty much requires the intending one to know what he intends. We have superb skills of conducting engagements with life, both major and minor, without spelling out what we are

[18]In this, he was preceded by H. Richard Niebuhr, in *The Responsible Self: An Essay in Christian Moral Philosophy*. (New York: Harper and Row, 1963), pp. 61–65. Briefly, Niebuhr notes four features of acts: (1) they proceed from interpretation of what is happening; (2) they respond to what is already happening, and are responded to in turn by later acts; (3) they are accountable; (4) they presuppose a social context. The distributed character of acts is obvious.

[19]Again, Niebuhr. This is otherwise known as "emplotment." See also, of course, Aristotle's *Poetics*.

[20]Paul Ricoeur, *Time and Narrative*. Three volumes. Chicago: University of Chicago Press, 1984-88.

[21]Herbert Fingarette, *Self Deception*. London: RKP, 1969. Second edition, Berkeley and Los Angeles: University of California Press, 2000. See especially chapter 3.

doing. (We often spell out only later, if there is a problem, or if it is something we think we might like to do again.) What the actor provides instead of spelling out correctly is usually a "cover story," a true narrative of things that are happening, but which distracts attention from what is really going on. Narrative and editing are pivotal, but the main fruit of Fingarette's analysis is that it is often not at all obvious what is important about an act and what is not. Spelling out is a skill, and even wise and mature adults are sometimes legitimately uncertain how to proceed. Fingarette's view of action demonstrates that what is going on depends on what gets included in the narrative, and that can range far beyond what is immediately visible. The character of action on this view is distributed, not systems-based.

Truth and Method is an argument against taking the natural sciences as the model for the humanities, on grounds of much evidence that the humanities simply do not work the way the world does in the view of the sciences.[22] Gadamer dismantles a long history of attempts to model the humanities on the sciences. He exposes historicism as a quest for an "objective history," something akin to the objective material trajectories that science knows. No such objective history exists. Instead we get the "fusion of horizons," the involvement of the interpreter in the products of interpretation, and an ontology of history in which the events themselves in the only historical being they have are products of that fusion of horizons. And we get the hermeneutical circle, in which wholes and parts are constituted by their relationship to each other, and in which the larger context (an ever-expanding context) is the relevant 'whole'. Needless to say, Gadamer does not use the terms "distributed ontology" or "systems ontology," but what he is doing is fairly described as a distributed ontology of history and human action, and it is in opposition to instincts that take as their model the systems ontologies of the natural sciences.

Among the most intriguing short meditations on action is Paul Ricoeur's essay, "The Model of Text: Meaningful Action Considered as a Text."[23] Ricoeur details a process in which an act gets "fixed" and "saved" on analogy with the process in which conversation gets fixed and saved in text. Conversation stays very close to the intent of the conversants, has an inherent reference to them, falls back on ostentation to make meaning clear, and is addressed only to the immediate conversants. In text, all four of these close ties to the original situation are loosened

[22]Hans-Georg Gadamer, *Truth and Method*, revised translation, by Joel Weinsheimer and Donald G. Marshall. New York: Crossroad, 1989. The German original was published in 1960.

[23]Paul Ricoeur, "The Model of Text: Meaningful Action Considered as a Text." *Social Research* 38 no. 3 (Autumn 1971) 529–555. It is reprinted in Rabinow and Sullivan, eds., *Interpretive Social Science, A Reader* (University of California Press, 1979), and in several other collections also.

or broken. The meaning is transferred from intent to the text itself, reference to speakers and hearers is lost, the text itself has to make its meaning clear without help from the author, and a text addresses any who can read, not just the original bystanders. Actions get fixed in an analogous way: they are disentangled from the tics, monstrations, facial expressions, and other irrelevancies of the original situation; their meaning survives autonomously, without help from the actors, they touch anyone and everyone. What Ricoeur does not say, but well could have, is that this is in effect an editing process. This editing is not arbitrary, nor simply a work of creative writing. It happens in large part through the act's imprint on its surroundings, and on other acts that come in reply. Of all the features of the original situation, one asks, "which ones matter, and why?" The answers come in the act's effects on its later context. This moves the act from its unnarrated matrix in human motions into something narrated, or perhaps better into the reach of the communal skill of narration. The result in an act that has been "fixed" is an act that we can narrate. It is also an act that has been saved in its consequences on other acts.

One of the many surprises in the article is that just as texts grow in meaning over time, so also do acts. If an act is fixed in its consequences, those consequences are in principle unlimited. Being fixed does not limit its consequences, it enables further unending consequences. The act grows. This is a distributed ontology in time as well as in space. If acts can grow over time, they may be changeable after the "fact." A. C. Danto would applaud.

6 Observations

Some conjectural history: The seeds of overt systems ontologies were sowed in late medieval nominalism. Whatever the problems of nominalism in the humanities, it provided the temperament necessary for seventeenth-century physics. Nothing that led to mathematical physics can be all bad, and nominalism can certainly take credit for doing that.

My guide to nominalism for present purposes is a short article in which Anthony Kenny articulated parallel differences between Aquinas and Wittgenstein and their respective contemporaries.[24] He found four differences, and while all four could be used to support the distinction between inchoate systems instincts and distributed ontologies, I shall focus on only one. It was (or now seems) ob-

[24] Anthony Kenny, "Aquinas and Wittgenstein." *Downside Review* 77 (1959) 217.

scure: whether form and matter can exist apart from each other, or only in conjunction, as aspects of wholes. This is a case of a particular approach to solving problems. One assumes that a problem can be broken up into sub-problems, which can be solved separately, and the sub-solutions can be combined into a grand solution. In mathematics, this is called linearity when it works. Problems it doesn't solve are non-linear. The moderate realist position (of Aquinas and Wittgenstein, in very different ways) is that while some things are linear, not all are, and both thinkers provided examples of non-linearity. The opposed position, on the way to nominalism, thinks it can reduce all problems to linear terms. The attempt to linearize is also an attempt to separate one problem from the rest of the world: in other words, to define a system, apart from the world, and then seek to comprehend the workings of the system insofar as possible without reference to the rest of the world. As an aside, Aristotle, at least on Aquinas's reading, supports the moderate realist position (of distributed ontologies), rather than the systems ontological instincts of his nominalist readers. But in Aristotle, these questions have not yet become visible enough to need addressing.

Clearly, the instinct of linearity is the road to mathematical physics. Not even in physics is everything linear in the mathematical sense, but in physics it is possible to break complicated phenomena into systems, parts. The success of physics and then the other sciences that came after it led to attempts in the nineteenth century to address questions in the humanities on a (natural-) scientific, i. e., systems, basis. The results were disappointing. Out of that disappointment came twentieth-century phenomenology and hermeneutics and the later Wittgenstein.

Aquinas sometimes bumped into phenomena that were not easily handled. It would be unfair to say that he wanted to treat his Aristotelian inheritance in systems terms, but he did want things to make sense, which is to say that a thing of interest should have one genus and one species, not many, wherever possible. Interestingly, the problematic case that I am aware of is human action. Concretely, the task is to appraise the *species* of an act, i. e., what the act is, or what species it fits into, and there are cases when an act may appear to have more than one species. Joseph Pilsner has scoured the texts to show that Aquinas rarely has to admit more than one species, and that he does so in ways that rarely bend and never break the logic of the concepts of action as he understands them.[25] Aquinas can do this (and Pilsner can concur) because neither one ever has to deal with narratives in the depth or richness that one finds in life or literature, in which what an

[25] Joseph Pilsner, *The Specification of Human Actions in St Thomas Aquinas*. Oxford University Press, 2006.

act is can be quite ambiguous, and multiple "species" are common because multiple narratives are possible. The problems are at the level of a redaction ontology, a narrative ontology, and both are kinds of distributed ontology, but neither Pilsner nor Aquinas see that. Aquinas is quite capable of dealing with phenomena that, on the arguments of Heidegger and this paper, belong in Zuhandenheit or with distributed ontologies. Virtue and habitus are prime examples. But Aquinas doesn't have to make Heidegger's distinction between Zuhandenheit and Vorhandenheit. That was not his problem.

It is worth noting in passing that distributed ontologies are about human involvement, but systems ontologies abstract from human involvement. Distributed ontologies accordingly attract controversy of a kind that systems ontologies are relatively immune to.

The systems instinct will defend itself against distributed ontologies, Continental philosophy, and the humanities in general, simply by demonstrating that it can always approach the material substrate of human concerns in terms of systems. Since the material substrate always moves according to naturalistic rules, this can seem very convincing, but it does not succeed in disagreeing with Heidegger's original insight: The Zuhandenheit of zuhanden things can be abstracted from, leaving only things in their Vorhandenheit, but that does not abolish the original Zuhandenheit. The problem with ambitions to reduce all phenomena to systems terms is that the material substrates of some systems cannot be identified using only systems resources. It is impossible even to produce a definition of something so simple as a chair without resorting to its useful-to-humans character.[26] Abstracting from Zuhandenheit does not abolish Zuhandenheit, nor does it reduce it either to systems thinking or to Vorhandenheit.

The concrete strategy of defense of a systems ontology against recovery of any and all distributed precursors that were abstracted from is fairly simple. The systems advocate merely points to the material substrate, and the obvious fact that for some purposes, it has a systems ontology, and hopes that people won't notice that the answers to the question *which* matter is part of that substrate (and *why*) all come from distributed ontologies.[27] Coupled with a widespread instinct that a thing can have only one ontology, this strategy usually works. This is a variation on equating what a thing is with what it is made of. No Aristotelian would ever

[26] Hubert Dreyfus, *What Computers Can't Do; the limits of artificial intelligence* (Cambridge: MIT Press, 1979), second edition, p. 37.

[27] To moot an example, an organism is a biological system, but can its material substrate be demarcated in purely systems terms, without reference to its mode of being as privative Dasein? My suspicion is that it cannot, but that is only a suspicion.

make that mistake (nor anyone else, as late as the sixteenth century). Actually, what something is made of is a very truncated version of what it is constituted by: all the things "out there" and "off-stage" that contribute to the ontological constitution of the thing "itself" are easily ignored if attention is distracted from them. In any case, they cannot be summoned for inspection or presented for inventory.

This instinct reduces an act to systems terms (causally and intentionally coupled changes of state) simply by tacitly assuming that everything off-stage supports the implied narrative of what's happening on-stage. When events are reduced to mere tokens for narratives, as in names for acts or propositions about them, the narratives and their editing are long forgotten and often cannot be retrieved in any case.

7 The Distributed Undergirding of Systems Ontologies

As Mircea Eliade remarked in the quotation above, to be is to be a part of a larger reality. In the case of physics, to be an electron or a proton is to be the same thing as all other electrons and protons. There is a distributed undergirding beneath the ontology of mathematical physics, but it is in the nature of that undergirding that it can be abstracted from without loss for physics. Inasmuch as all particles of one kind have the same nature, the identity with others of the shared nature can be forgotten. One might object that one electron is indistinguishable from any other, they are all interchangeable, and the wave function of any one must in principle reflect that interchangeability without distinguishability. In that sense, the electron is non-local, and its physical location is spread out. That does not mean that it is distributed in the sense that "distributed" is used in this paper. Landau (and indeed, all physicists, casually) speak of quantum "systems" and specifically of an electron as exemplary of a quantum system.[28] The electron has different ontologies for different purposes, even within mathematical physics: For some purposes, it can be treated simply as a particle that has a wave function. It can even be treated classically for some purposes. For yet other purposes, the systemhood is transferred to occupation numbers in a field that is itself quantized ("second quantization"). The boundary of the system is drawn not in configuration space but in the frequency space of the quantized field. We are still well within

[28]L. D. Landau and E. M. Lifshitz, *Quantum Mechanics: Non-Relativistic Theory*. Translation by J. B. Sykes and J. S. Bell. Third edition. Amsterdam: Butterworth-Heinemann, 1977. See e. g. pp. 1–3.

the realm of systems ontologies, and any distributed presuppositions have been abstracted from.

It is a commonplace that in the physics of the seventeenth century, two of Aristotle's four causes were banished from scientific thinking: Natural science was to think only about efficient and material causes, leaving formal and final causes to other disciplines. The commonplace is very rough, but there is enough truth in it to make it useful. Though final causes were indeed banished from physics, the situation with formal causes was different and less obvious. The concepts that scientists used to define what they were studying in the natural world filled the role that formal causes had previously played. Only a certain kind of formal causes served to isolate and define what could be studied in the natural sciences. As the modern sciences developed, natural entities became systems demarcated from the world, that have states, and whose states are functions of time, as stipulated in the contrasts above. When one knows the state of a system and its trajectory in time, one knows all that can be known about it in a naturalistic way. Material causes answer questions about what things in nature are made of. Efficient causes provide the intelligible aspect of the change in time of entities conceived in naturalistic terms.

The only formal causes acceptable in the natural sciences produce systems that have states that are a function of time. Formal causes define what it is of which one may ascertain the material and efficient causes. When formal causes cease to enable progress in physics, they are revised and replaced with other formal causes. Thomas S. Kuhn called this a "paradigm shift" in *The Structure of Scientific Revolutions*.[29]

In conclusion, we have explored one aspect of a difference that appeared in Heidegger's distinction between Vorhandenheit and Zuhandenheit. What comes as a surprise is that distributed ontologies, of which Zuhandenheit is typical, underlie the systems ontologies and Vorhandenheit of the natural sciences. How is not much explored, nor well understood. We are so used to thinking in systems terms, trained by both culture and education in the sciences, that we usually take systems as primordial, not susceptible to further analysis, without anything prior coming before them. That hides a great deal more than just the being of tools, because there are more distributed ontologies than that of tools, and distributed aspects appear everywhere in things that matter to human beings. The mode of

[29]Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed. Chicago: University of Chicago Press, 1970. The first edition was published in 1960.

being of principal interest here has been that of human action. To understand what an action is requires knowing a great deal about the larger narrative context it fits into, and that is exactly the mark of distributedness. A full exploration of the mode of being of human action would require more than we can undertake in this short paper. In particular, it would require its roots in Dasein, but more importantly its roots in the openness and ambiguity of narrative.

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