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Is Normativity Natural?

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Why do naturalism and normativity pose a problem? What makes normativity so difficult to account for within a naturalism? I will argue that normativity is in fact a natural class of phenomena, but that to outline how that is so requires three steps: 1) A diagnosis of a conceptual barrier to the possibility of a metaphysical integration of naturalism and normativity, 2) Arguing for an alternative metaphysical orientation that removes that in-principle barrier, and 3) Sketching how an account of normativity can be grounded in a naturalistic framework. The central shift is from a metaphysical framework in which the possibility of the natural *emergence* of normativity is blocked to one in which it can be accounted for.

1 A Diagnosis

The Pre-Socratics — particularly the Parmenidean argument against change and Empedocles' and Democritus' developments of and reactions to the Parmenidean arguments — established an assumption of *substance* as the foundational metaphysical form of the world. Parmenides had argued that change among substances could not occur, and, therefore, post-Parmenidean metaphysics of substance assumed that the basic substances did not change, and, in fact, that they remained unchanging as a matter of metaphysical necessity. Apparent change, then, could be accounted for in terms of superficial changes in the mixtures or locations of substances (or

Beyond Description: Naturalism and Normativity.
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equally unchanging atoms), even though they did not themselves change (Graham, 2006).

But a world of such substances or atoms is a world of basic metaphysical realities, plus the causal interactions, and the factual relations among them. In particular, this world, or at least this realm of the world, does not include intentionality or normativity. This Pre-Socratic legacy, therefore, has three basic presumptive consequences:

1) The explanatory default is stasis. Substances do not change unless made to change: change requires special explanation.
2) Emergence is precluded. For example, it is not possible to derive a fifth substance from Empedoclean earth, air, fire, and water.[1]
3) The natural world of substances or atoms, cause, and fact, is split from the realm of normativity and intentionality. This is a necessary presupposition of the metaphysics of the substance framework.

Various forms of substance metaphysical frameworks and their consequences have dominated Western thought since the Pre-Socratics. In particular, given the split between the realm of substance and that of intentionality and normativity, there are only three possible kinds of positions to adopt:

1) Accept two metaphysical realms as basic. These could be, for example, the matter and form of Aristotle, the two substances of Descartes, the noumenal world and that of the transcendental subject of Kant, or the realm of science and the realm of conventional and tautological normativity of the logical positivists.
2) Attempt to account for the world in terms of just the intentional, normative realm. Idealists, such as Green or Bradley, exemplify this position.
3) Attempt to account for the world in terms of just the material world of substances or atoms. Hobbes, Hume, and Quine exemplify this possibility.

[1] This point is made more complex by the Aristotelian assumption that earth, air, fire, and water could change into one another, but these were not the metaphysical foundation for Aristotle. That foundation, usually called prime matter, still honored the Parmenidean necessity for an unchanging metaphysical ground (Gill, 1989; Graham, 1984, 1987).

The contemporary world, post-Quine, is dominated by this third possibility, with some form of materialistic or physicalistic "naturalism" generally assumed or argued for. This assumptive framework has permeated far beyond philosophy into even far corners of the sciences. One anecdotal illustration is the response of a major psychologist to a question about the normativity of representation: "I'm not interested in that mystical stuff". If the world is assumed to be constituted in some strictly materialistic or physicalistic way, then issues such as normativity can seem merely "mystical".

2 Why Not Emergence?

Some form of *emergence* of normative phenomena within the natural world can seem to be an intuitively attractive possibility, but such fundamental emergence is precisely one of the kinds of phenomena that substance was supposed to preclude — and it does. Two illuminating ways in which this preclusion of emergence has visited itself on modern thought can be found in arguments of Hume and of Kim.

Hume

Hume famously argued against the possibility of deriving norms from facts (Hume, 1978). Actually, he didn't fill in that argument much, but the manner in which it is usually understood is as follows: In a valid argument that begins with strictly factual premises, only factual conclusions are possible. If there are any terms in the conclusion that are not present in the premises, then they must have been introduced by definitions. These definitions might have involved still other terms not in the premises, but those too would have to have been introduced via definition, with any such hierarchy of definitions grounding out in the terms available in the premises. All of the terms in the conclusion, then, can be replaced by their defining phrases or clauses, and this back-translation through the definitions can proceed until the conclusion is stated solely using terms that were in the original premises. But these were, by assumption, strictly factual, so any valid conclusion will likewise be strictly factual. Therefore, beginning with strictly factual premises, a valid argument can arrive only at strictly factual conclusions.

In its general form, this argument precludes any possibilities other than various logical re-arrangements of the original premise terms. In restricting to "nothing but re-arrangements" the argument precludes not only the derivation of norms from facts, but it precludes any form of

emergence: emergence is supposed to be a phenomenon of something more than just such re-arrangements.

But Hume's argument is unsound: Not all valid forms of definition permit the requisite back-translations upon which the argument depends. In particular, implicit definition does not permit back-translation because there is no defining phrase or clause that can substitute for the defined term — there is no phrase or clause for which the defined term is an abbreviation.

Hume didn't know about implicit definition, but it was introduced in a major way by Hilbert (and others) around the beginning of the twentieth century (Hilbert, 1971; Otero, 1970). Implicit definitions define via a pattern of interrelationships among the terms, which are initially *not* defined. The pattern then implicitly defines the class of all the ways in which the terms can be interpreted that will successfully honour the interrelationships. In Hilbert's case, for example, the patterns were given by uninterpreted axioms, and the axioms implicitly defined geometry. The terms, then, can be interpreted in ways that conform with our notions of point, line, etc. except that these have never been explicitly defined on any foundational base.[2]

The very possibility of implicit definition, then, renders Hume's argument unsound — back-translation is not necessarily possible[3] — and thereby removes this block against the possibility of emergence. Hume's argument is effectively a logical rendition of the substance metaphysical prohibition of anything other than mixtures and re-arrangements, and this logical aspect of a substance framework must be rejected.

Kim

Jaegwon Kim (1991) has elaborated a powerful argument against the possibility of emergence, at least of any form of emergence that could claim to be causally efficacious. The central intuition of the argument is that various organisations or configurations of particles do not yield any new causal power: all genuine causality is carried by the particles, and, although they will interact differently depending on their organisation, it is only the causality of the particles per se that is being manifest.

The argument is set up as a dichotomous pair of possibilities: 1) physics (i.e., whatever the basic particles turn out to be) is causally closed in

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[2] In general, implicit definitions can permit multiple satisfying interpretations, and the entire class of such interpretations is what is implicitly defined.

[3] For more on some technical issues concerning implicit definition, including the related notion of the implicit definition of single terms, see Chang & Keisler (1990), Doyle (1985), Hale & Wright (2000), Kolaitis (1990).

the sense that anything that has any cause at all has its cause in terms of such particles, or 2) new organisation will generate new causality, in which case the physical world is *not* causally closed. In the first case, any purported causality at the level of configurations or organisations of particles is pre-empted by — rendered superfluous to — the causality of the particles acting within that organisation. Configurations, then, are nothing more than the stage setting in which the genuine causality of the particles is engaged. In the second case, in which new causality does emerge, the causal closure of the (particle) physical world fails, and, therefore, naturalism fails. Therefore, either emergence is at best causally epiphenomenal, or naturalism is false.

Kim's argument, however, turns on its assumption of a particle metaphysics in a crucial way. Particles have causal power and do not have organisation, though they can participate in organisation. Thus, that which has genuine causality does not have organisation, and organisation is nothing more than initial and boundary conditions for the causal interactions of those particles. Emergence is supposed to be manifest, if at all, in new organisations, but organisation is precluded as a potential locus of causal power by the assumed metaphysical framework. Organisation is neither stuff nor thing: it is not the right metaphysical kind to have any causal power. So emergence is precluded by that assumed metaphysical framework.

But, like Hume's argument, Kim's argument is unsound, and for similar reasons. Hume's argument fails because it fails to recognise the possibility of relational organisation itself constituting a definition — relational organisation cannot, in Hume's assumptions, have definitional power. In Kim's argument, it is presupposed that that which has causal power does not have organisation, and, therefore, organisation cannot have causal power without violating physical closure, thus violating naturalism. In both cases, organisation is excluded from consideration by underlying presuppositions, and in both cases those presuppositions are false.

In the case of Kim's argument, the assumption of a particle metaphysics is both false and ultimately incoherent. In a world of point particles, nothing would ever happen because they would have a zero probability of ever hitting each other. In a world of point particles interacting via fields (the standard contemporary naïve view), Kim's argument no longer holds: fields have causal power, and have their causal power in part in virtue of their organisation. Thus organisation cannot be excluded as a potential locus of causal power without eliminating all causality from the world.

Even worse for Kim's assumption, according to our best current physics, *there are no particles*. Everything is quantum fields, and the only remaining particle-like properties are that various properties of those fields are quantised and conserved in field interactions, and those field interactions are sometimes relatively localized (Bickhard, 2003; Cao, 1999; Clifton, 1996; Halvorson & Clifton, 2002; Huggett, 2000; Kuhlman et al, 2002; Weinberg, 1977, 1995; Zee, 2003). The quantisation of quantum field processes is akin to the quantisation of the vibrations of a guitar string, and, just as there are no guitar sound particles, there are no physical particles. There are instead quantised and conserved excitations of the processes of quantum fields.

Quantum fields, in turn, have causal power, and do so in part in virtue of their organisation. Again, organisation cannot be excluded as a potential locus of causal power without eliminating causality entirely.

But, if organisation is a potential locus of genuine causal power, and everything is (just) organisations of quantum field processes, then there is no longer any metaphysical block against the possibility of new organisation manifesting new causal power. This includes, for example, the quantum field organisations constituting Kim himself, as well as you and me.

The removal of this metaphysical block against causally efficacious emergence, of course, is just brush clearing. It eliminates a barrier to the possibility of the construction of models of emergence, and therefore, potentially, models of the emergence of normative and intentional phenomena. But it does not in itself provide any such models. That construction remains to be outlined.

3 Process

The basic metaphysical shift that is required in order to address issues of emergence has already been indicated: unlike particle and substance frameworks, a process metaphysics manifests causality, insofar as it does at all, in virtue of its organisation. Therefore, organisation becomes a potential locus of causal power, including at the macro-scales of biological organisms and central nervous systems — and, therefore, potentially for normative and intentional phenomena.[4] A process metaphysics, there-

[4] For consideration of a superficially apparent rejoinder that, even with quantum fields, all causality obtains at micro-scales, and everything above some quantum scale will be epiphenomenal, see Bickhard (2000, in preparation).

fore — a return to Heraclitus, if you wish — is required for both logical and physical reasons, and it legitimates the possibility of emergence.
In fact, a process metaphysics reverses all three of the consequences of a substance or particle metaphysics — a metaphysics of some unchanging substratum for all change:

1) Change becomes the explanatory default, and stability requires explanation,
2) Emergence in organisation becomes a metaphysical possibility, and
3) Therefore, it becomes metaphysically legitimate to explore the possibility of the emergence of normative (and intentional) phenomena *within the natural world.*

4 Normative Emergence

Viewed from the perspective of the non-normative world, the fundamental novelty manifested by normativity is an asymmetric differentiation between the positive and negative sides of normative properties: functional and dysfunctional with regard to biological function, for example, or truth and falsity for representation. Physics provides multitudinous differentiations among directions, energy levels, charges, and so on. But none of these provide anything like the asymmetry of normativity. The single major exception to this is in thermodynamics, and I will argue that that thermodynamic asymmetry provides the ground for the natural emergence of normativity.

To begin, however, we must return to the base out of which this entire metaphysical issue evolved: change. Unlike for substances and atoms, in a process metaphysics, change is the default — it's what happens if nothing prevents or modifies it. Stability requires special explanation.

Stability clearly occurs, and the first step toward normativity is to explore kinds of stability. I begin with a differentiation between two basic kinds of stable organisations of process, and these kinds are distinguished in terms of their thermodynamic character.

The first is a process organisation that is stable so long as no energy from the environment impinges on it that is sufficient to disrupt that organisation. The organisation is in a kind of energy well, and will stay there, in that organisation, unless sufficient energy to knock it out of the well hits it. This form of process organisational stability is exemplified

by atoms and molecules — it constitutes much of the basic furniture of our world.

Energy well stabilities remain stable should they go to thermodynamic equilibrium. Therefore, they remain stable if they are isolated from their environments — they simply go to equilibrium and stay there.

The second kind of stability differs in these two respects. These stabilities are far from thermodynamic equilibrium. They cannot go to equilibrium without ceasing to exist, and they cannot be isolated without going to equilibrium. Far from equilibrium organisations of process will not be stable unless they are *maintained* in their far from equilibrium conditions.

Often, such maintenance is from outside of the far from equilibrium process itself: a fire maintains a temperature differential between the bottom of a pan of water and the top, or the sun maintains a flow of energy through the biosphere of the earth. As evidenced by the emergence of Bénard cells in the boiling water (and by the evolutionary processes in the earth's biosphere — Bickhard & Campbell, 2003; Bickhard, in preparation), process held in far from equilibrium conditions tend to self organise into systematic patterns.

Some such self-organised organisations of far from equilibrium processes manifest a special emergent property: they contribute to their own maintenance. They help maintain the far from equilibrium conditions upon which their existence depends. A canonical example here is a candle flame: it maintains above combustion threshold temperature, vaporizes wax in the wick so that it can burn, melts wax in the candle so that it can percolate up the wick, and induces convection that brings in fresh oxygen and gets rid of waste. Candle flames exhibit *self-maintenance* in several ways (Bickhard, 1993, 2004, 2009, in preparation).

Candle flames can only burn — they have no alternative ways of contributing to their own maintenance. But some systems do have more than one way in which they can contribute to self-maintenance, and they can switch among those ways in a manner that is appropriate to relevant changes in their environments. A canonical example here is Don Campbell's bacterium that can swim and continue swimming if it finds itself headed up a sugar gradient, but can tumble instead if it finds itself headed down a sugar gradient (Campbell, 1974, 1990). With such switches among alternatives, such a system maintains its condition of being self-maintenant in the face of changes with respect to its environment that can render what might be contributions to self-maintenance

instead as being detrimental to self-maintenance if they were to continue. Thus, swimming contributes to the self-maintenance of the bacterium under some conditions — e.g., it's pointed up a sugar gradient — but would be detrimental to self maintenance if it were to continue to swim when pointed down the gradient. Instead, however, the bacterium switches to tumbling. In this manner, the bacterium maintains its condition of being self-maintenant in differing orientations. It is in that sense *recursively self-maintenant*.

Normative Function

With these notions of self-maintenant systems — or, more generally, *autonomous* systems (Bickhard, 2004, 2009, in preparation; Christensen & Bickhard, 2002) — we already have, I claim, the framework for a model of the emergence of normativity: If what constitutes normative phenomena is given in implicit definition, then we can have a model that satisfies such (an) implicit definition(s), and thus constitutes (some kind of) normative phenomena.[5] The task, then, is to show how self-maintenant systems satisfy what is arguably an implicit definition of a kind of normative phenomena. The kind that I will be focusing on is that of normative function.

The central point is that far from equilibrium systems require maintenance in order to be stable, and such contributions are functional for that stability — they *serve the function* of helping to maintain the persistence of that organisation of process. In the simplest of cases, these functions may be served entirely from outside of the system itself. Such cases serve as a kind of primitive starting point for the evolution of more complex function-relevant systems — with self-maintenant systems the first step in which an organisation of processes is functional for itself. As such systems become more and more complex, they become increasingly

[5] Note that a model could satisfy an implicit definition of some normative phenomena whether or not the model used normative terms, and whether or not there were any recognition or understanding of the relevant implicit definition(s). This point has particular force against, for example, dynamic system or autonomous agent approaches that reject or eschew normative notions such as representation — e.g., Brooks (1991) or van Gelder (1995). If the relevant organizations of process exist in a system, then accurate models of those systems will satisfy the implicit definitions of normative phenomena, whether or not the modelers recognize or wish to accept that: if normativity is a natural aspect of the natural world, then complete models of the (natural) world will have to model normativity.

autonomous[6] in the sense that they are increasingly more competent at making use of their environments to functionally contribute to their stability.

The normativity in this model of function is strictly relative to the system, the process organisation, that is the focus of consideration. And that relativity can completely alter functionalities or lack thereof across differing systems: For example, the heart beat of a parasite may be functional for the parasite, but dysfunctional for the host, and have no functionality at all for some unrelated distant organism. There is no non-relative sense of normativity here; no God's eye view.

Furthermore, there is no assumption that the persistence of a process organisation is itself good or normatively positive. If it is normatively positive, that will in its turn be relative to some other system. Functionality is normative relative to the stability of a system, but that stability need not be normative in itself at all. The crucial point is that far from equilibrium systems are the only case for which *stability requires maintenance* — thus constituting a natural property with respect to which functional maintenance is relative.

Contrast: The Etiological Approach to Function

The dominant approach to normative function today is the evolutionary etiological approach — modelling function in terms of the evolutionary origins of functional relations and systems (Millikan, 1984, 1993). For Millikan's model, an organ having a function is constituted in its ancestral organs having had the right kind of evolutionary selection history (or various ingenious ways in which function can be derivative from these selection-history functions). This model provides an illuminating contrast for the autonomy-based model of function introduced above, and helps to indicate some of the strengths of the autonomy model as well as some of the specific differences from the etiological approach. I begin with a critique of the etiological approach, and then use the contrast to develop a few additional properties of the autonomy model of function.

Etiological approaches to function make use of a design metaphor: some subsystems have been "designed" to have certain functions by evolutionary processes, and that both explains why those subsystems exist

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6 Autonomy, therefore, is a graded concept (Christensen & Bickhard, 2002; Bickhard, 2004).

and constitutes their having a function. I certainly have no objection to evolutionary processes being explanatory for the existence of biological (sub)systems (Bickhard & Campbell, 2003), and the design metaphor can enrich such accounts: evolutionary selection histories can impose important constraints on what exists, what comes into existence, and how they function.

A serious problem with such historical accounts as addressing what constitutes function, however, is that they yield a causally epiphenomenal model of function. Evolutionary history is in the past, and, if that is what constitutes having a function, then it can have causal efficacy for the present only via present states or conditions. But the etiological account is not just an account of the (evolutionary) *origins* of functional systems, it claims to provide an analysis of what *constitutes* having a function, and because that history is in the past, it can make a current causal difference only if it is somehow constituted in the current dynamics of the system, regardless of its history — causality is inherently local.[7] But it cannot be constituted in the current dynamics, as is illustrated by examples that Millikan discusses.

In particular, Millikan's thought experiment of the lion that pops into existence that is molecule by molecule identical to a lion in the zoo provides a clear example. The thought-experiment lion is dynamically, causally, identical to the zoo lion, but the zoo lion has organs that have the right evolutionary history to have functions, while the thought-experiment lion has organs that have no evolutionary history, and, therefore, cannot have functions. So here are two lions that are causally identical, yet one has functions and the other doesn't. Etiological function is causally epiphenomenal. Etiological history can explain the etiology of systems, including systems that have the right history to have functions (according to this account), but those systems having functions or not having functions is not determined by anything concerning the current dynamics of the systems: identical current dynamics can be the outcome of quite different histories, some of which may, according to the etiological account, yield function and some of which may not.

This thought experiment example (along with others such as the swampman: Millikan, 1984, 1993) might be dismissed as having no real implications for modelling function, since it is not something that could

7 Setting aside as irrelevant for these purposes potential quantum nonlocalities.

ever actually happen. But there are quite real versions of the point as well.

Consider the first time in the evolutionary history of a species that some part of an organism belonging to that species makes a contribution to the survival of the organism. This contribution, according to the etiological account, has no evolutionary history, and, therefore, cannot constitute a functional contribution. With a sufficient number of generations of the species being subject to selection pressures regarding such a contribution, that part will come to have making that sort of contribution as (one of) its functions (Godfrey-Smith, 1994). This is a scenario that *must* occur for *every* function, according to this account. Yet that part making that contribution may well be dynamically identical between the first time and some later time sufficient for "function" to have come into existence. Again, we find dynamically, causally, identical systems that differ in terms of having or not having functions. Etiological function is causally epiphenomenal.

Furthermore, the original contribution that is selected for, as well as subsequent contributions, are precisely the kinds of contributions that the autonomy based model takes as constituting function — as serving a contributory function for the continued existence of the system.[8] The evolutionary etiological approach, then, presupposes the autonomy approach (even if it is not *called* function in the etiological model), and, therefore, presupposes a normative kind of phenomenon in its model of the emergence of normative function. It provides a causally epiphenomenal model of function, and is circular as an account of emergent normativity.

Serving a Function; Having a Function

One important contrast between etiological approaches and the autonomy approach to function is that etiological approaches focus on "*having* a function" as the primary property to model, while the autonomy approach takes "*serving* a function" as the focal property. An etiological approach, then, can model serving a function in terms of something that has a function successfully serving the function that it has. Conversely, it is at best

[8] Contributions to the reproductive continuation of a species are functional for the species, in this model (though not necessarily for the individual organism), and considerations of species as autonomous systems in themselves yield some interesting complexities (Bickhard, & Campbell, 2003; Bickhard, in preparation).

difficult in this approach to model serving a function when nothing has that function.

Certainly there seem to be cases in which functions are served by phenomena and (sub)systems that do not have those functions. One example would be the sense in which leg muscles can serve the function of contributing to blood flow on long airplane flights even though they do not have that function. The autonomy model has no difficulties with such examples, nor with examples in which functional contributions are distributed across many organs or organ systems, and in which one organ may have multiple functions — but these are again at best difficult to model in terms of evolutionary selection histories for specific organs (Christensen & Bickhard, 2002).

On the other hand, in taking "serving a function" as primary, the autonomy model also undertakes an obligation to account for "having a function" within the framework of the model of serving a function. Having a function must (when it exists) in some sense be derivative from serving a function.

The central property for this purpose is a relation between some activity that might be functional and the conditions under which it would in fact serve a function. Engaging in such an activity, then, involves a presupposition — a functional presupposition — that the necessary supporting conditions hold. Continued swimming in the case of the bacterium, for example, functionally presupposes that supporting conditions hold for that swimming to be making a functional contribution, such as that the bacterium is heading into higher concentrations of sugar.

Some functionally presupposed conditions will be in the environment, such as the sugar gradient, but others may be internal to the organism. In particular, some activities of some parts of a system may be functional or not depending on contributions from other parts of the system being present. Kidneys can filter blood only if the blood is being circulated, for example, and the circulatory system can circulate blood only if something in a particular location is pumping that blood. The functional activities of some parts of a system, in other words, may presuppose functional contributions from other parts. They functionally presuppose that those other parts are serving their own particular functions, making their own functional contributions upon which other contributions depend. In that sense, the other parts *have the functions* of serving the functions that are presupposed. The overall system, then, will, in its activities, presuppose

various contributions from its parts[9], which can, in turn, involve still further presuppositions. To *have a function*, then, is to be presupposed as serving that function by the other or overall organisation and functioning of the system. In this manner, having a function can be accounted for in a way that is constituted in the current dynamic organisation of the system, and, therefore, it too (along with serving a function) is causally efficacious.

A Word about Representation

The relational property of functional presupposition is central to the account of having a function. It is also central to the account of the emergence of another form of normativity: representation. Roughly, when interactive activities of the system involve functional presuppositions about the environment, those presuppositions may in some cases be correct, and in other cases not correct. That is, the presuppositions about the environment may be true or false: they constitute (implicit) contents predicated about the environment by the activities of the overall system. This, I claim, captures the emergence of the most primitive version of representational truth value. More complex kinds of representation are constructable out of this base, and these models have important consequences for higher level cognitive and representational phenomena, such as perception, rational thought, and language (Bickhard, 1993, 2004, 2009, in preparation).

5 Conclusion

The natural emergence of such normative phenomena as normative function and representation forms the foundation for multiple further normative emergences, such as memory, learning, social realities, language, and so on, up to and including ethics and morality. These further developments require their own extensive discussions and arguments (Bickhard, 2004b, 2005, 2006, 2007, 2009, in preparation). In itself, however, the model of the emergence of foundational normativity, in the form of normative function, constitutes a claim that normativity in general is emergently natural. To model normative emergence, however, requires first the possibility of metaphysical emergence, which, in turn, requires a

9 Assuming it has parts (Bickhard, 2004, in preparation).

foundational shift from a substance or particle based metaphysics to a process metaphysics.

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