

POSTSCRIPT #5

Two Regrets

Stephen L. Talbott

This is one of a group of planned “postscripts” to a book entitled, “Organisms and Their Evolution — Agency and Meaning in the Drama of Life”, freely available at <https://bwo.life/bk/>. Currently available postscripts are listed in the table of contents at that link. Their aim is to pick up certain ideas from the book and try to carry them further than the book itself allowed. This material is part of the Biology Worthy of Life project of The Nature Institute. Copyright 2025 by Stephen L. Talbott. All rights reserved. You may freely download this article for noncommercial, personal use, including classroom use.

Since the late-2025 publication of my book, *Organisms and Their Evolution — Agency and Meaning in the Drama of Life*, I have had certain nagging misgivings about it, two of which I would like to share with readers now. They both concern not so much matters of error as a kind of culpable under-emphasis.

First regret

In the book’s Chapter 6 (“Context: Dare We Call It Holism?”) I focus on the way biologists are nowadays always citing the “context-dependence” of the organic processes they explore. To think about the meaning of “context” in general, it may help to draw on a rather homely example I give in that chapter concerning the difference between the contexts of a baseball and football field. What happens on that field can be radically different depending on the ideas, including the rules, associated with the games. The physical features of the fields, with their markings, have their own ideational significance.

In general, it seems clear that material objects and events can be woven into a significant context only by a set of ideas or concepts that relate those objects and events to each other in some meaningful way so as to make a significant whole out of them; otherwise, we have no more than a meaningless juxtaposition of unrelated things. A baseball game, like a lung or a heart, is one sort of context; a football game, like a kidney or liver, makes for a very different sort of context.

You might also think of the difference between a checkerboard and a chessboard. Same board; different governing ideas. We expect different things to happen “depending on the context”.

A search of biological literature in Google Scholar for the phrase “context-dependent” yields over a million hits. These refer to the context-dependence of just about any biological condition or interaction

you can think of. Yet biologists, in routinely invoking that term, rarely if ever explain what they mean by “context”, and seem unaware that “context” is a way of referring to the ideas and meanings that make a context what it is. The ideas and meanings must really *be there* and be operative and effective, whether in the sports world or in the organism. Either we are using the wrong term in speaking of a context (in which case we need to ask, What *are* we referring to?) or we are speaking of a meaning-formed whole.

What we say about contexts and the term “context-dependent” could also be said about “organize” and “organization”. These words, workhorses of the scientific literature, lose all their force if we strip them of the *organizing ideas* that are always being assumed — ideas that give their own peculiar shape and coherence to things. It is impossible to speak of the organization of anything without describing relations, and relations are not material things but rather ideational connections between things. It is just a fact, however overlooked, that relations belong as much to the “substance” of the world as the things we individuate as nouns. Remove the relations and you remove the character that makes for this sort of thing rather than that sort. It is hard to see the difference between this and removing the thing itself.

Look up “organize” in a dictionary and you are likely to encounter words such as “orderly”, “structured”, and “coherent”. If a thing is organized, we seek the ordering or structuring ideas — the laws, principles, and concepts — that make for coherence. These can be as diverse as the world’s presentation of itself, which is also its *speaking* to us. We may not be conscious of it, but we recognize the things in the scene before us — grass, flower, tree, cloud, house, barn, hill — only because each individual thing has a particular meaning for us. If we lost all meanings, including vague and general meanings such as “thing” and “object”, we would not perceive or be aware of the world.

Another biological category intimately related to both context and organization is that of a “whole”. A context, you might say, just *is* a relative whole. And *relative* wholes are all we ever have, since a whole is always embedded in a greater whole. Every such whole must surely be organized in its own particular way. So these terms — “context”, “whole”, and “organization” — are intimately related and bound up with structuring ideas.

Anyway, in that chapter on context I eventually come around to saying this:

It is impossible to fit the idea of context-dependence into the biologist’s usual style of causal explanation. Where do we locate a causal arrow pointing from the contextual whole to a particular part? The arrow needs to originate *everywhere*. The fact is, we cannot locate it in space at all. We recognize it, not as a link in a linear causal chain, but rather in the way we recognize a meaning or possible implication of a particular understanding. When biologists speak of context-dependence, they are speaking of a play of ideas. It is one of the ways they unconsciously import the interior of the organism as a being of meaning into their thinking “under the radar.”

I daresay the paragraph as it stands remains correct in all its details. And it brings together the relevant facts. But that doesn’t change the fact (and this is my regret) that the paragraph is oddly understated, given that the truth it points to would, if taken seriously, turn all of contemporary biology on its head. It underscores the absurdity of the pretense among the vast majority of working biologists today that their

science is currently well understood on the basis of a materialistic manner of explanation. I should have emphasized all this much more.

In other words, the fact of context-dependence makes rather silly the reliance upon materialistic explanation, which is the all but universally demanded manner of explanation in biology. It is, after all, not an outsider but the literature of biology itself that so massively notes the “context-dependence” of just about every biological process, and it is the very biologists who invoke such phrases who have consistently ducked their responsibility to explain what exactly they mean by “context”. There is a kind of guilt here convicting the entire biological profession of misleading the public. At the very least we are owed an explanation for how a causal arrow can point from the meaning — the ideas — of the whole of a context to a particular part. And how does our answer to this question affect our understanding of the nature of biological explanation?

It is, of course, possible to narrow and control the context of an experiment enough to allow one to say, “Under these specific conditions a causal arrow seems to run from element A to element B” — say, from gene A to protein B. But this narrowing of context and neglect of contextual changes simply removes from the experiment what biologists are talking about when they refer to “context-dependence”, which has to do with the readily observed dependence of an outcome upon *changes of context*. If you decide to ignore changes of context, then you are going to miss the truth of context-dependence.

The narrowing of the context can be less severe if, like the systems biologist, you try to track as many causes as possible, treating them as a mathematical collection of the kind of point causes you are comfortable with. But, first, it will never in this way be possible to identify and track *all* the potential A's and B's of all the possible contexts. These can be virtually infinite. This requires, in effect, the running of endless experiments, each involving just one A and one B, before we can know how to incorporate either element in our mathematics.

Second, neither cells nor their contents carry out their performances in the manner of the systems biologist, nor have they been trained in the use of differential equations. So the understanding of the biologist is not tracking whatever is actually going on with the organism in its own terms.

And third, the whole point — however vaguely framed to themselves — of most of those who appeal to context-dependence is that the *meaning* of the larger whole, or context, plays a causal role in what goes on with a part. But the mathematical treatment of an array of material point causes makes no reference to that contextual meaning.

What happens very well in an animal is that every part, informed by the whole, reads the meaning of its current context and uses this to guide its activity relative to its own needs, interests, and characteristic behavior. Systems biologists know this — know that an organism at every point of its life, is an agent pursuing countless purposes governing every aspect of its being — and they cannot unknow it. So this knowledge comes into play whenever they are setting up the problems to be worked on.

And so, for example, a distinction is made between healthy cells and cancerous cells — with all

the meanings and value judgments that this distinction entails — and the researcher may therefore set about identifying factors predisposing the organism to cancer or defending against it. This tallying of factors reflects the biologist's prior recognition of the meaning for the organism of the distinction between healthy and cancerous cells. Without such a recognition there would be no problem to investigate.

The organism may not be performing the systems biologist's calculations, but we can readily see that it *is* performing according to the needs, interests, and species-character of its life. These are what biologists take account of in the background when structuring their inquiries. Wouldn't it be better to acknowledge this background (on which the work depends) in the work itself, rather than to suppress it in the interests of a defense of materialism? Avoiding the suppression seems more in line with the organism's way of being (which all are agreed does not involve sophisticated mathematical calculations). It also makes for a much more straightforward, less needlessly complex scientific understanding, even if that understanding is far different from what the biologist thirsts for, which is an understanding based solely on point causes of the sort believed to be required in physics.

Organisms, as agents, may not attend to differential equations, but they do heed the realities of their lives. We may not now know how they do this (especially since they are not self-aware as we are), but neither will we ever know so long as we cannot start by admitting the basic facts of the matter to ourselves.

A second regret

In my chapter, "Evolution Writ Small", I quote evolutionist Stephen Jay Gould to this effect:

Why was natural selection compared to a composer by Dobzhansky; to a poet by Simpson; to a sculptor by Mayr; and to, of all people, Mr. Shakespeare by Julian Huxley?

The answer, Gould said in a rather early paper of his storied career, is that the allusions to poetry, musical composition, and sculpture helpfully underscore the "creativity of natural selection":

The essence of Darwinism lies in its claim that natural selection creates the fit. Variation is ubiquitous and random in direction. It supplies the raw material only. Natural selection directs the course of evolutionary change. It preserves favorable variants and builds fitness gradually.

I then point out how puzzling this argument is. Its answer to the question how variation arises amounts to saying nothing more than "It is everywhere" ("variation is ubiquitous") — which, one might have thought, only adds urgency to the need for an explanation. Saying "variation is ubiquitous" merely buries the problem of variation beneath the commonplace.

Because *organisms* so abundantly provide what is needed ("raw materials") for the transformation of life, we are, Gould claimed, somehow free to declare *natural selection* the transforming agent. It need only preserve all those wonderfully effective new variants, and they will somehow integrate themselves into the now-transformed and almost infinitely differentiated unity of a living being. We

need not concern ourselves with those powers of transformation and integration. After all, what could they have to do with evolution as the purely physical process we would like it to be?

One thing this overlooks is that, before natural selection can “do” anything at all, there must exist a stably maintained trait. This means that we’re not talking about raw materials in the wonderfully capable hands of natural selection, but a pre-existing power to assimilate and integrate novelties into the complex unity of an existing life. And this looks, from the standpoint of current biological theory, rather like an impossible miracle.

So, then, here is my regretted paragraph:

How easy it is, apparently, to forget that the so-called “raw materials” being preserved are never merely raw materials! At the first appearance of any substantive change, the creative work has already been accomplished — if indeed the change is truly beneficial to a living being. We find ourselves looking, not at random raw materials, but at a whole harmoniously transforming itself *as a whole*, where everything tends to affect everything else. In this way, whatever we may have falsely isolated in our minds as a “new feature” is incorporated into the tightly interwoven complexity of an organism’s life. The only power we know to be capable of such incorporation is that of the organism telling its own story, a story always reflecting the qualitative, unified character and dynamic developmental potentials of a particular species.

Again, the regret has to do with a matter of emphasis — a failure to stress just how radically this point overturns our entire approach to evolution. The problem isn’t fixed by an exclamation mark! But this requires some further explanation.

No one would claim a complete understanding of the integrated unity of any single organism. Some would say that how all the parts work together in service of the organism’s needs, interests, and species-specific behavior remains an almost total mystery for today’s biology. In any case, this integrated unity is that from which any mutational change must emerge and is also that to which any change must be assimilated in order to *be there* as a particular “trait” at all. And everyone would have to admit that this process of assimilation and integration — let alone the deeper origin of the change and associated re-organization — is largely opaque to current understanding.

In other words, the emergence of new traits — the very “substance” of evolution — is more or less hidden to us, hidden within the unexplored intricacies and wholeness and well-directed unity of the organism. Why do so many evolutionists treat this fact with such casual indifference? The references to composer, poet, sculptor, and Shakespeare certainly reflect at least a dim awareness of the profound truth of self-transformation, but this is a truth applying most immediately to the organism, and not to natural selection. The selection process must wait upon the formation of a viable trait compatible with the nature of a particular kind of organism before it can “select” that trait.

One more thing. Biologists may not have a good explanation for how evolution works upon organisms in the manner of a composer, poet, or sculptor, but the amazing thing is how few even feel a need for explanation. It seems that, as soon as one convinces oneself that natural selection just *must* account for the observed features of organisms, one can relax about the entire business. No need to worry about the interior, thoughtful, and purposive dimensions of an organism’s life because natural

selection can account for biological features that at least *look as if* they are thoughtful and purposeful. (It's best not to inquire too insistently into how we might distinguish between *looking as if* purposeful and *really being* purposeful.)

Even if a feature runs contrary to one's materialistic beliefs, it seems one only needs to believe that "natural selection accounts for it" in order to declare the feature "naturalized" and turn one's attention elsewhere. This might not work so well with claims about a questionable feature such as, say, teleportation, but, for most biologists, it works quite well enough for the thoughtful directedness of all organic activity — even though all the directed activity required for reproduction, inheritance, and the striving for life (among other things) are *prerequisites* for natural selection and therefore cannot be *explained* by natural selection.

The usual idea is that a trait requiring explanation is there because it happened to come about mutationally in the form of a bodily mechanism, and because that mechanism, preserved generation after generation (due to its usefulness to the organism), allows natural selection to continue tinkering with it until it is more or less perfected. But without identifiable mechanisms, the image of tinkering along with the entire explanation makes no sense.

There are in fact countless biological traits for which it could hardly be more obvious that no mechanisms exist. When scores of molecules cooperate in the intricately sequenced molecular "surgery" of RNA splicing or DNA damage repair — all while they freely diffuse in the watery medium of our cells — there are no wires or gears or other "mechanisms" to guide them through their elaborate participation in what could easily look like a kind of collectively managed brain surgery. The knowledge and wisdom at work is necessarily, as far as we can see, a *present* knowledge and wisdom — a response to the meaning of the present context — and it is certainly not the working of a mechanism carried over from the past. That is, we have no evidence for determining physical factors from the past coming to bear on the present activity ([Holdrege 2021](#)). And this seems to apply to just about all the molecular-level activity of an organism, the molecular level being the level from which biologists had hoped to explain all organic activity.

It's true that we don't know how thought plays into the life of an organism. But we also don't know how ideal physical law plays into the cosmos, yet we accept the testimony of our senses that the thoughtfulness (lawfulness) is there, at the very root of physical manifestation.

Biologists, it seems, must come to terms with that fact that they are looking at a play of wisdom for which their materialistic training gives no preparation. Natural selection does not help here. What biology will look like when this truth is finally reckoned with is hardly visible at present.

Conclusion: The end of materialism?

The integration I've just been talking about is closely related to the formative, ideational (interior) prerequisites of a particular context. In this case the context is that of the whole organism, and the integrative ideas relate to the distinctive, unifying species-character of the organism. The problem of this interior character is the main unresolved issue of modern biology.

The historian of biology, Jan Baedke, has documented the effort by theoretical biologists in the late nineteenth and early twentieth centuries to find a “middle way” between a mechanistic biology, on one hand, with its focus on physics-approved causes, and on the other hand, vitalism, whose advocates wanted to acknowledge the organism's agency and purposiveness but also had the unfortunate tendency to invoke either human-like plans and intentions or poorly attested physical causes (“vital forces”).¹ There was, Baedke says, among the theoretical biologists he discusses, a dissatisfaction with the reigning materialism of the age as well as a movement to center a new biology around the idea of wholeness and the organism's ability to maintain its wholeness.

Unfortunately, this effort never came to fruition, and faded away in the face of the triumphs of molecular biology in the second half of the twentieth century ([Baedke et al. 2024](#)).

My own suspicion is that the middle way between mechanism and vitalism will not be found until biologists overcome their reluctance to embrace three truths, all of which, being meaning-based, are unacceptable to a materialist mind. One of these truths has been a central contention of this article: every biological context, every biological organization, and every biological whole is structured by the governing ideas giving it form. More particularly, every animal, in its physiology (which includes the RNA splicing and DNA damage repair mentioned above), in its succession of developmental stages, and in its behavior reveals itself to be a construct of a wisdom-filled archetypal idea. A long-running problem here is that the distinction between a physical force and the causal role of a governing wisdom seems to have played no prominent part in the thinking of those seeking a middle way.²

There is an inherent thoughtfulness as well as a purposiveness and agency in the organism as a body of wisdom, all of which testifies to an interior life active within or upon the organism. Importantly, this interior life may proceed in dramatically different terms from those of the human interior, a difference biologists seem to have had great difficulty imagining.

And that difference already brings us to the second truth, one which biologists need to embrace in order to see the first truth properly. This involves a fairly obvious and crucial distinction between *possessing* consciousness in the self-aware and thoughtfully reflective human sense, and *being possessed by it* or *in the grip of it* in the manner of animals.³ Think, for example, of the migrating bird. Or think of the monarch butterflies in Canada who migrate with the precision of an ICBM to a tiny territory in Mexico for overwintering. They do this by undertaking a multi-generational journey, no part of which they have ever traveled before. They are not in reflective possession of the ideas necessitating and guiding their journey, but they are certainly under their influence.

If the organism does not possess the thinking and purposiveness that acts upon it, whose thinking

and whose purposiveness are we talking about? I cannot claim to know. All I am discussing are those features of the situation anyone can recognize. We know that we ourselves think, and we know that some sort of thinking is occurring in association with animals, but we also have unimpeachable confidence that animals do not in general possess that thinking in anything like the way we possess our own thinking. Science gives us many riddles we cannot currently answer. From the point of view of science, the main thing these riddles should trigger in us is an openness to previously unimagined possibilities.

Even we humans cannot be said to possess the wisdom at work in our own bodies. We do not know, for example, how to guide the molecular processes involved in gene regulation or cellular metabolism. In our case, however, there is some “leakage” from consciousness into largely unconscious bodily processes, as when embarrassment leads to blushing or certain conscious apprehensions contribute to raised blood pressure or a more rapidly beating heart. We may also have some control over our diet, which in turn affects cellular metabolism.

The third truth may perhaps be necessary to grasp in order to see the second truth properly. It is that the physical world itself has an interior, as is already strongly implied by the existence of the above-mentioned ideal lawfulness which is the main concern of physicists. The broader point is that we live in a logos-world, which we might say is a world in which everything speaks to us. The winds and clouds, the oceans and mountains, the sun, moon, and stars overhead — we might not want to see them exactly in the manner of our ancestors, but we can be historically aware enough to recognize that our own near total deafness to the world’s speech is a learned habit of the scientific era, not the sure sign of an inherently mute world.

It is surprisingly hard to keep in mind that scientific understanding is indeed *understanding*, a grasp of the thoughts, or ideas, inherent in the world’s phenomena, making sense of them. Philosophers and scientists have asked themselves whether physical laws are in the world or in our minds, as if it had to be one way or the other. But this is to overlook the entire basis for our seemingly unlimited confidence in the results of science — a confidence grounded in the evidence that what is in our minds is, or can be if our science is sound, the sense-making element of the world itself.

I can easily imagine that some day our materialistic conviction that the world consists of autonomous, mind-independent “stuff” will be the source of the uttermost amazement on the part of our successors. We are, after all, a people who celebrate the laws of physics, who frequently comment on the beauty of natural phenomena, who recognize patterns of rational, guiding, and life-preserving instinct in even the “lowest” animals, and whose technical treatises trace the almost infinite pathways of physiological wisdom in our own bodies; and we teach this wisdom to endless generations of medical students so that they can properly *interpret* — understand the *meaning* of — the symptoms they encounter in their patients. Yet the formative and causal significance of the meaning of things has gone unremarked in the modern era even when we might have thought researchers eagerly seeking a middle way were searching for just such a significance.

Those butterflies migrating from Canada to Mexico certainly do not think “Well it’s about time to be heading to Mexico” and then plan the trip in the way we get out our maps and plan a trip to Yosemite.

But they presumably have an inner urge of *some* sort. And we can also think that the "pull" toward Mexico comes as much from the air currents and atmospheric temperature, and perhaps from the stars (certainly without requiring calculations) and who knows what else, as from their own internal urges. If, as both Barfield and independent reflection suggest, there can be only one interior with no hard and fast distinction between "different" interiors (or, putting it differently: if the spiritual world, or realm of wisdom, is a unity) then we must expect that the line between the interior of the butterfly and of the world is not always clear. And this is true, we have been learning, of organisms and their environments generally.

I doubt whether any of this will appeal to biologists until they free themselves from the late nineteenth-century materialism they continue to associate with physics and which they therefore imagine themselves to be bound by. Why else would we still hear all their bizarre references to "molecular machines"? The irony is that physicists themselves have moved far beyond the nineteenth century in their own work — and in their openness to diverse points of view. That's why we hear the various fantastic interpretations of quantum physics, and why a Johns Hopkins University astrophysicist could publish in the journal *Nature* an article entitled "The Mental Universe" ([Henry 2005](#)). It is hard to see how biologists will ever productively tackle contextual issues like purposiveness and agency without realizing that, in doing so, they are presupposing an interior dimension of the world. The current way of avoiding that conclusion, centers on the almost magical word, "emergence" (a convenient supplement to the idea of natural selection discussed above), and the conviction that an interior dimension of the organic world can somehow arise ("emerge") from a basic substrate that is itself wholly foreign to interiority.

In any case, it seems likely that biologists will continue to be tormented by the back-and-forth debates between materialist advocates of mechanism and materialist advocates of vitalism until they can rise above materialism altogether and realize that we live in what might be called a logos world, an expressive world of meaning and thought — a world in which ideas have real implications, which is very different from citing the point causes that biologists as well as physicists prefer to look for.

Actually, it's not as if biologists have been strangers to meaning. It's just that the meaning of the organism's life has for a long while now been projected upon its genes, which have been assumed to carry that meaning. But with the current fading of genocentrism, the question is whether it is time to begin recognizing the meaningful interior of the organism directly, or whether we will find yet another material reality on which to project it (which may save us again from truly acknowledging it).

Notes

1. The recourse to vital forces, however subtle, testifies to the power of materialism in that period. Forces were thought to be the only explanatory factors available, even to biologists.
2. In my book chapter, "Is a Qualitative Biology Possible?" I touch on the causal role of archetypal ideas in my discussion of philosopher Ronald Brady's analysis of Goethe's notions of form and cause in the plant world ([Talbot 2025c](#)).

3. I could also mention the distinction between plants and animals, although this is not a topic for the present paper. In contrast to animals, with their internal sensations, we see the almost complete environment-dependence of plants. Plants are, you might say, fully “out there” as expressions of sun and atmosphere, soil and water, whereas animals live within their own, interior worlds, which are conjoined with the interior meanings of their environments.

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