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Design Preliminaries

Initial Characterizations

Formal definitions of design are almost completely absent from the literature. Although it is evidently assumed that the concept is too simple and familiar to need explication, the term is in fact employed in widely divergent ways. One can find *design* used interchangeably with among other things *order, plan, function,* and *artificiality.*

My own usage will be as follows:

i. a *pattern* is an abstract structure which correlates in special ways to mind, or is *mind correlative.*
ii. a *design* is a deliberately intended or produced pattern
iii. to be *designed* is to exemplify a design

Pattern here is much broader than, say, geometric figure, repeated sequence, and so on. Historically, laws and other formal uniformities, as well as even such things as the adaptation of means to ends, certain types of isomorphisms, and significant sequences of events were considered to constitute patterns.

A key question concerning the above characterization, obviously, is: What is it for a structure to be mind correlative? I will have more to say about this concept later, but for the moment I will merely informally point to intuitions. Some abstract structures attract our notice, they grab our attention, they seem in varying degrees to somehow *fit* human processes of cognition, to be sense making, to bear intelligibility.[1] Some deep correlation of this kind was linked to the Greek conception of reality as *rational,* and other thinkers on up to the present have seen a presumption of such patternedness in nature as underlying the structure and prospects not only of science, but of any rational thought about the world at all.[2] This correlation to mind can be linked to other concepts crucial to our general picture of science, and some of those connections will be sketched later.

As defined, pattern will not imply the existence of any agent or cognizer, of any intent or purpose, or of any agent activity. However, design will typically suggest all

those things—designer, intention, and (possibly extremely indirect) agent activity.[3] While design refers to the intention-generated pattern, designed refers to the phenomenon (object, sequence, event, etc.)—embodying that design.[4]

There are, those who employ the term *design* in scientific contexts while refusing any commitment to (or even while denying the existence of) any designing agent. It is telling that some of the more prominant among this group are unable to dispense entirely with the *concept* of agency. Richard Dawkins, for instance, says:

> We may say that a living body or organ is well designed if it has attributes that an intelligent and knowledgeable engineer might have built into it in order to achieve some sensible purpose.[5]

I take such counterfactual references to intelligent designers to be a tacit means of capturing what I have called "mind-correlative" in the definition of pattern.

But what Dawkins intends here by "design" and what others would prefer to call "apparent design," I am calling "pattern." Other concepts in the area can now be located. *Order* I take to be a synonym of pattern. *Plan* is ambiguous between pattern and design, depending upon context and usage. In these terms, most traditional arguments from design actually argue from pattern *to* design, the specific patterns being chosen on grounds that they exemplify special characteristics—adaptation, complexity, fine turning, improbability, evident purpose, analogy to human artifacts, and so on—which are thought to support such inferences.

Counterflow

With respect to humans and aliens (or other finite beings), *designed* is roughly (although not exactly) synonymous with *artificial,* and contrasts with *natural.* Of course, natural is ambiguous, depending upon whether it is being contrasted with supernatural or with artificial. Human and alien intelligence and activity is typically classified as natural as distinguished from the supernatural (and is thus generally taken to be perfectly legitimate in science—e.g. SETI). But we would not classify, say, the Eiffel Tower as natural in the other sense, given our intuitive conviction that unaided by deliberate, intentional activity, nature would not (probably could not) produce any such entity.

Fully explicating this latter sense of 'natural' is not straightforward. In this sense, we normally classify as natural things which nature unaided by agency if given a free hand, would do or produce, and as artificial things which nature, unaided by agency, would not do or produce (or would not do via the specific means in question). But some things fall between those two categories—things that, were nature given a free hand, she *might* do or produce. The "might" here is not mere logical or physical

possibility. Suppose that you come into a room and find someone splattered flat on the ceiling. According to quantum mechanics, there is a nonzero chance of the molecules in that person's body suddenly all spontaneously heading straight up, resulting in the splattering. But although that is both logically and physically possible, we'd never believe that that was the proper explanation. Before buying that, we'd accept the *Weekly World News* explanation involving space aliens and malfunctioning tractor beams.

Or take a less spectacular case. No law of nature would be violated were the seedlings in some forest to end up precisely evenly spaced in straight rows. It could happen, both logically and nomically. But despite that possibility, despite no laws being violated, we'd never believe that it was natural. The pattern is simply too artificial, too mind correlative for us to think otherwise without extremely pursuasive reason.

On the other hand, consider the particular spacing of seedlings found in some undisturbed forest. Although nature did produce that spacing, nature might have or could have produced some slightly different spacing than she actually did (or, had the forest been disturbed, than she *would* have had it not been disturbed), but which would still have been perfectly natural.

In the splattering and the uniformly spaced seedling cases, we think that although nature could have, she wouldn't, and we thus look for other sorts of explanations. In the case in the previous paragraph, we think that although nature didn't, she could have and might have and the "might" seems powerful enough to keep such cases in the "natural" category.[6] I'll have more to say on this matter later.

Next, I will use the term *counterflow* as follows:

> iv. *counterflow* refers to things running contrary to what, in the relevant sense, *would* (or *might*) have resulted or occurred *had* nature operated freely.[7]

Obviously, things or events nature could not produce will involve counterflow.

Finite creatures (humans, aliens) operate within natural boundaries. Thus, when we redirect, restrain, or constrain nature, we leave marks—counterflow marks. Shortly, I will argue that indications of counterflow typically underlie our evidences that something has resulted from finite agent design. Our judgment that counterflow is exhibited rests in turn on our conception of what the natural flow might or could be—in short, upon our scientific and commonsense pictures of the world.

Counterflow, Agency, and Nomic Discontinuity

If indications of counterflow constitute evidence that something occurred which nature on her own would not have generated, that points to causal activity of some other agency—human, alien, or whatever. A number of matters here will depend

upon our views of finite agents. On a thoroughly deterministic view, even if finite design might be a legitimate explanatory concept, it will ultimately be shorthand for some longer but completely nomically defined account. On the other hand, any conception of the relevant agent activity as genuinely free will mean that in general, instances of counterflow (and thus, instances of either artifactuality or design) will involve a *nomic discontinuity* at exactly the point of agent activity—that is, at the point of counterflow introduction, whether that be in initial conditions, processes, or wherever.[8] That does not, of course, mean that there will be violations of law, but that there will be causal components of genuine design which any science restricted to law-bound explanations will simply be inadequate to.

There are, inevitably, complexities here.[9] But although some important qualifications will become necessary later, as a first approximation working picture, *design* (by finite agents—or *finite design*) will be taken to involve either directly or indirectly, free, deliberate, intentional agent activity, aimed at generating some phenomenon typically embodying a mind-correlative pattern, which, if left to itself, nature would not (normally) produce.[10]

Artifactuality

One more definition:

v. an *artifact* is anything embodying counterflow.

Humans (and perhaps other finite beings) sometimes generate counterflow with no relevant mindful or occurrant intention. Someone idly whittling on a stick may produce something which nature never would, but the person may even be unaware of what he or she is doing. In a case like this, there may be no pattern produced (in the sense defined) and thus there need be no design involved. But the product might still be a recognizable artifact, exhibiting clear indications of counterflow.[11]

So, pattern entails neither finite design, intention, counterflow, agency, nor artifactuality. With respect specifically to the finite realm, design does entail pattern, counterflow, intention, agency, and artifactuality. Artifact entails counterflow and agency, but not necessarily either intention or pattern (although it is obviously consistent with both). Counterflow entails artifactuality and agency, but neither pattern, design, nor intention.

Defining the scope of artifactuality is not completely straightforward. If one finite agent produces one small artifact, then it is true that the cosmos itself is not as it would have been had there been no agent activity. It seems obvious, however, that we should not merely on that ground alone classify the entire cosmos as an artifact.[12] On the other end of the scale, we do not want to automatically consider all constituents of actual artifacts to be artifacts themselves. For instance, a rope woven of vines is clearly

an artifact, but the vines that constitute it are not, although in this case their arrangement, relationships, configurations, and location probably would be. The same would apply to, say, the constituent atoms making up a diesel bulldozer—the bulldozer is clearly an artifact, but the atoms themselves likely are not, although their arrangement, location, and so on would be. Thus, the boundaries of artifactuality must be restricted to some intuitive but hard-to-formalize minimum so that it does not engulf too much in either direction—either the entire cosmos containing some artifact or each microconstituent an artifact contains.

The following roughly captures what I take to be the core intuition concerning the boundaries of finite artifactuality for an entity *S*. (There are some technical niceties that would require further articulation, but I will not specify them here.) Let *A* be any entity, and *S* be a subpart/constituent of *A* (*S* may or may not be a proper subpart/constituent):

S constitutes the *outer bound* of artifactuality (if any) for *A* when

a. removing *S* removes completely all the counterflow *c* which *A* embodies (if any)

and

b. there is no proper subpart *d* of *S* such that removing *d* would remove completely all the counterflow *c* which *A* embodies (if any).[13]

S constitutes an *inner bound* of artifactuality for *A* when

a. complete removal of all counterflow *c* embodied in *A* (if any) would not *materially* alter *S*[14]

Locating Counterflow

Production of nearly anything—natural or artificial—typically involves three components. A system is in some *initial state,* it then moves through some (usually causally driven) *process,* and generates some *result.* Our evidences that something involves deliberate design, or that it is not purely natural, generally involve recognition of some active injection of counterflow into one or more of those three areas.

Result

If, in crossing a heath, we should stumble across a watch, we would immediately recognize it as artifact. We would recognize that, even if we had no idea how it was

produced, who had produced it, what it was for, how it got there, or how long it had lain there. An object having the observable characteristics of a watch simply will not be natural. Merely observing some of its more obvious characteristics, we identify it as not only an artifact but as designed. (*How* we do that will be discussed a bit later.) Direct or nearly direct recognition of counterflow typically underpins our most common cases of design identification.

Process

Suppose that aliens plopped a molecularly exact duplicate of the Matterhorn where Cleveland had previously been. Obviously, natural process can produce Matterhorns, so examination of the new mountain itself would reveal no properties out of the ordinary. But we would suspect something rather unusual about the processes by which the new one had in fact been produced.

Or examination of a molecule of some familiar protein might yield no indication of whether the molecule was purely natural or had been synthesized at great cost and effort in a high-tech lab and was thus produced by intelligent intent. Here the result bears no direct clues. Thus, the fact that an object is a product of deliberate intent and activity does not entail that the object itself bears counterflow marks. But the processes giving rise to a particular artificially synthesized molecule would bristle with counterflow indications—buildings, computers, intricate instruments, lab smocks, coffee pots, grant applications, and other artificial devices for constraining nature and steering it into paths it would basically never otherwise follow.

Initial Conditions

Even in cases where the result exhibits no direct, obvious indications of counterflow, and where the production processes likewise exhibit no evident counterflow indications, the initial conditions out of which the relevant processes produced that result might be ones that nature, left to itself, would never generate. For instance, suppose that after thirty thousand years of investigation it looks as though life can indeed begin spontaneously, but only under one set of circumstances. There must be ten thousand and three gallons of six specific chemically pure substances, no molecule of which has ever been chemically bonded with any other, combined in proportions determined down to the molecule, the mixture must be sealed into a ten thousand and three gallon Tupperware container, into which one sterile Beatles record is introduced. Do all that, set up those initial conditions, and with no intervention in the subsequent process at all, life spontaneously generates and subsequently replicates by ordinary means. Spontaneous development of life within those conditions would thus be a wholly natural process.

Again, examining the result—life, the organisms generated—might reveal nothing outside the ordinary bounds of natural law. And the generation process once

begun requires no further input or intervention—producing life is simply what nature, under those circumstances, by itself does. But we would likely begin to suspect that the origin of life had not just happened, given the character of the required initial conditions. Those conditions involve circumventing the natural flow with a vengeance.[15]

So we typically recognize artifactuality—and get our first clues to designedness—through recognizing indications of counterflow in results, processes, or initial conditions, and we recognize such counterflow against the background of and in contrast with our understanding of the normal flows of nature. That is essentially our method whether applied to watches, TVs, houses, marbles, stands of pine trees growing in evenly spaces rows, shocks of wheat tied up with strands of twisted straw—or signals from outer space.

Identifying Counterflow

When we immediately recognize a watch or a giant Tupperware vat as artifact, or when we recognize some form of counterflow as counterflow, what exactly are the tip-offs? What properties constitute our clues? In discussions of design, whether of the traditional design arguments or of more recent cases, proposed signs of design almost invariably consist of complicated development, complex structure, coordination of components, interlocking functions, vanishingly small probabililties, adjustment of means to ends, purposelike behaviors, and the like. Those do play important roles in some situations, and will be investigated later. But the initial clues are often much simpler and far more prosaic. Surprisingly often, the clues involve geometric properties exhibited at a roughly human scale. In houses, screens, fans, Stonehenge, cars, watches, gardens, and soccer balls, we see straight edges, uniform curves, repetitions, regularities, uniform spacing, symmetries, plane surfaces, and the like. And the clues often involve regularities of other sorts also—uniformity of material (purified metal, glass, etc.), uniformity of color, uniformity of pattern (sometimes immaterial, as in algorithms), uniformity of sorting. I am not claiming any logical or invariable connection—only that these are often our de facto clues.[16]

Although nature does also produce geometric features and broad regularities, they are often on a very different scale (molecular, cosmic) than the human scale, and what nature produces on the human scale typically does not have the sharpness, angularity, and rigidity of human design.[17] Trees are not as symmetrical as cars, rivers are not as straight as fences, patches of daisies are not as uniform as wallpaper, mountains do not have the sharp boundaries of lasagne noodles, lakes do not have the regular spacing of parking meters. Indeed, over the years, manufacturers of artificial flowers have learned to make their products look more *natural* by introducing asymmetries, irregularities of color, and so forth.

It is at the very least ironic that the same geometricity recognition of which, in nature, was essential to the rise of modern science should so often be a basic key to our recognition of artifactuality. I do not, however, think that that is entirely coincidental. Early scientific investigators believed themselves to be exploring an artifact—a creation—and (as Kepler put it) to be thinking God's thoughts after Him. Even contemporary scientists are sometimes struck with similar impressions.[18]

In any case, we typically recognize artifactuality through recognizing indications of counterflow in results, processes, or initial conditions, and we recognize such counterflow against the background of and in contrast with our understanding of the normal flow of nature. That recognition of counterflow is frequently by the immediate means of middle-level geometric characteristics that are recognized (perhaps only intuitively) to be extremely reliable indicators of counterflow and finite agent activity. As will become clear, we usually recognize design only derivatively. It is counterflow and artifactuality that we often identify more immediately.

Some Counterflow Characteristics

Counterflow comes in a variety of forms. Let us begin with an example. Suppose that you found yourself playing poker with a stranger in a saloon in the Old West. The stranger is an innocent-appearing sort, seemingly all thumbs when it comes to dealing. You spot nothing outrageous or suspicious in any given deal, but you begin to notice over time that the stranger never loses when he deals. You correctly conclude that you have tangled with a shark who is somehow managing to skew the odds in his favor somewhere, that you are being made a victim of some subtle counterflow.

But this counterflow situation exhibits a number of special characteristics. Among the more important ones are the following.

Parts vs. Systems

Given the slickness with which you are being taken, there is no readily evident counterflow (of the type you are increasingly concerned about) in any individual deal or hand. But something about the overall collection of events is clearly being deliberately manipulated. We can distinguish here between counterflow evidences in *parts* and in entire *systems or ensembles.*

Surface vs. Deep

But in exactly what does this *systemic* counterflow consist? It is nothing so simple as the familiar properties that tip us off to the artifactuality of a diesel bulldozer. It is something more complicated and less flagrant—in this case involving, among other

things, medium-run sequence probabilities. We can thus distinguish surface counterflow from deep counterflow.

Direct vs. Indirect

Surface counterflow recognition is almost immediate. For instance, recognition of artifactuality of a diesel bulldozer would be very nearly a matter of direct perception—any inferences involved would be virtually automatic. But the card-shark case is not quite like that. Recognition is more inferential, even more gradual. We can thus distinguish virtually direct identifiability of counterflow from more inferential indirect identifiability.

Synchronic vs. Diachronic

A further distinction involves temporality. With a diesel bulldozer, the properties required for recognizing counterflow are present and evident in a bulldozer at any given moment. We could detect its counterflow from a photograph. With card-shark counterflow, the counterflow is only evident over time, and the relevant indications need not be wholly present in any given time slice. Thus, some counterflow is exhibited at given moments—synchronically—whereas some counterflow is exemplified only within stretches of time—diachronically. Identification here would require a video—not a photograph.

Hard vs. Soft

In cases like a diesel bulldozer or an Eiffel Tower, all we need in order to identify the counterflow is some familiarity with nature's normal operation. Nothing else. But in some card-shark cases, something additional is required. Compare two cases—one in which a dealer gets two straight identical losing hands consisting of 7 and 2 of clubs, 4 of hearts, 10 of diamonds, and 5 of spades, and one in which a dealer gets two straight identical royal flushes in spades. In the former case there would be some surprise (if it was even noticed). In the latter case the dealer would be buried in a shallow grave behind the saloon.

The raw mathematical probabilities and other relevant "natural" features of the two types of hands are similar or identical. But the denizens of the saloon would distinguish the cases because there is a significant assigned value to the latter hand but not to the former. And that value is an important tip-off to the presence of special counterflow in the latter instance. In this sort of case, then, identifying the presence of counterflow requires more than mere familiarity with nature (e.g., probabilities, laws, etc.) It would require acquaintance with the relevant valuations. We can thus distinguish cases where recognizing counterflow requires (in principle) only the

requisite familiarity with nature—hard counterflow—from cases requiring information beyond that—soft counterflow.

Card-shark counterflow, then, is systemic, deep, indirect, diachronic, and soft, generated by finite nomic agency. Diesel-bulldozer counterflow differs most prominantly in being surface, direct, synchronic, hard, and not merely systemic—even its screws exhibit surface, direct, synchronic, hard counterflow.

Some Counterflow Correlations

There is one other distinction that is both important and harder to explicate. The above types of counterflow are nearly invariably associated with finite-agent activity and designedness—that is why they are such reliable clues. They constitute primary marks of agent activity (and can by implication be marks of artifactuality, counterflow, and design). But there are other, qualitatively different characteristics that frequently accompany agent activity, and so on, and which (as mentioned earlier) are typically appealed to in traditional design arguments—complicated development, complex structures, coordination of components, adjustment of means to ends, interlocking functions, extreme improbability, purposelike behaviors, and so forth. Characteristics of this sort constitute what I'll call "secondary" marks.

Phenomena that exhibit primary marks frequently also exhibit secondary marks (e.g., diesel bulldozers exhibit surface, direct, hard, etc., counterflow *and* they are complex, exhibit adaptation of means to ends, and the probability of nature producing one is essentially zero). But the association is by no means invariable. For instance, suppose that we found a hundred-meter perfect cube of pure, isotopically uniform titanium on Mars. Such a cube would carry obvious primary marks (and would be an obvious artifact), but would exhibit virtually no complexity of any sort. And an idly whittled stick bears primary marks, but may have no teleological end whatever, much less constitute or exemplify means adjusted to that end.

On the other hand, secondary marks can occur in the complete absence of primary marks—indeed, in the absence of any finite agent activity (or counterflow, artifactuality or design). For instance, consider a particular silicon atom formed in a particular supernova. The improbability of that particular silicon atom being in a particular grain of sand stuck to a particular spot on your left front tire which contains a particular carbon atom formed in some other specified supernova, is overwhelming. But it happens. Nature on its own frequently does the very improbable. We feel no inclination to interpret the above improbability, enormous as it is, in terms of counterflow, agent activity, or design.

Nor is complexity necessarily an indication of counterflow, agent activity, or design. For instance, at one point in the deep past in Oklo in what is now Gabon, a number of very precise conditions came together in just the right way and the right

order to generate a small, sustained nuclear reaction in some concentrated river sediments. Generating small, sustained nuclear reactions is a highly demanding affair—our best science and technology were not equal to the complexity of the task until historically very recently. Yet, nature did it, and (given the complete absence of counterflow at Oklo) no one takes there to have been any agent activity involved. Thus, although complexity is frequently associated with agent activity and designedness, nature obviously can and does produce instances of extreme complexity quite naturally.[19]

Finite Design: Basic Recognition

Recognizing artifactuality is conceptually relatively straightforward—it requires only identification of counterflow. Of course, the "only" is deceptive. In some cases (to be examined later) such identification is not even in principle scientifically possible. In others, identification requires observation of the actual agent activity—which in some cases cannot be done.[20] But the basic principle of recognizing finite artifactuality is unproblematic.

Recognizing design, however, is potentially more difficult. Design involves deliberate production of pattern, which mere artifactuality does not. Again, an idly, unmindfully whittled stick can be a recognizable artifact, but need not be in any clear sense designed. Or an instance of obvious vandalism might exhibit evidences not only of artifactuality and agent activity but even of deliberateness. But despite the counterflow and the deliberateness of the activity, there need be nothing of designedness exhibited in the result—nothing in the destruction need involve the relevant correlation to mind. So although counterflow is in many instances obvious, making recognition of artifactuality and agent activity often trivially easy, that artifactuality does not quite establish actual designedness.[21]

Design essentially involves pattern (as defined earlier), so recognizing designedness requires recognition of that patternedness—of that essential correlation to mind. How exactly is that gap bridged? In many cases involving human design, recognition of intended pattern is not difficult for us at all. Not only do we have an inside track—being human agents ourselves—but we have a lifetime of experience with human agent activity, cognition, purposes, and designs.[22]

In other cases, the move from recognizing artifactuality to attributing design may be more indirect. This is one place where secondary marks come to the fore. To take that further step beyond mere artifactuality, we have to move from counterflow (involving things *nature wouldn't* do) to design (involving things *minds would* do). And although secondary marks do not provide the close connection to designedness that counterflow does to artifactuality, they frequently do constitute clues.

The clues in question may come in a variety of forms. For instance, in some cases extreme improbability can suggest that production of the artifact requires not

only pushing against nature but pushing against nature extremely hard. In such cases, it might be prima facie implausible to think that the required quantity of effort and resources were devoted to such production unmindfully. Or the counterflow nudges required might be of nearly unimaginable delicacy. In such cases, it might be prima facie implausible to think that the required precision in the agent activity had occurred by accident. Some types of complexity are extremely precarious in both their generation and their maintainence. In such cases, it might be prima facie implausible to credit it all to serendipity. So were we, for instance, to come upon some wildly intricate alien artifact on Pluto, that wild intricacy would probably support an inferential move from mere alien artifactuality to alien designedness, even were we utterly unable to figure out what the design was about.

Thus, while primary marks constitute evidence of artifactuality, *in the context of identifiable artifactuality* secondary marks can constitute legitimate (albeit perhaps weaker) evidence for designedness in those artifacts. Secondary marks will become even more crucial when primary marks are either invisible (as they can be even in cases involving finite agents) or completely absent (as they can be in the case of supernatural agent activity, as we will see).

Correlation to Mind

It is time to try to make a bit more explicit what *correlation to mind* might come to. Under certain circumstances, something clicks into place between the shape of our cognition and the focus of our experience. Something fits. There is on some level some kind of match. The match may be simple, or may be between complex structures of cognition and complex structures or sequences in nature. For instance, Whewell, in his Bridgewater Treatise, refers to "correspondencies" in nature between, for example, prior states and final states of an organism or system, or between survival requirements of an organism and means for satisfying such requirements, and he tacitly takes those correspondences themselves as mind correlates.[23] But whatever the details of specific cases, something meshes between mind and phenomenon (whether natural or artificial), and that meshing is the core of the correlating-to-mind of pattern.

As is well known, being very explicit (in useful ways) about the nature of fittings between intensional objects in cognition and the phenomena to which they correlate is not a trivial matter. Such fits may involve direct isomorphism or even identity (on idealist schemes), some looser correspondence (e.g., conceptions of truth involving some symmetry between propositions and reality), or even some much looser relationship. (For instance, a Dickens novel may not contain a single sentence that expresses any true proposition—so the match to reality is very loose. Yet for all that, his fiction often does exemplify important realities—truths—about human nature, society, and history.)[24]

But however exactly the match constituting pattern is to be explicated, it is, I think, the fundamental component in something *making sense* to us. And the fact that something does make sense, that it is appropriately cognizable by us, or is reason-able by (and to) us, is our primary indication that the correlation obtains.

Identification of such sense-constituting correlation—that is, pattern noticing—presents itself to us experientially as a particular feel, a particular seeming, that defines our conviction that something makes sense, that we have gripped the correlation. The presence of this experiential dimension may explain why our talk in this area is so often metaphorically experiential—we "see" it, we "grasp" the matter, and so on. And we cannot get behind or underneath this experience to examine its credentials. Any evaluation of its credentials would have to employ resources and procedures whose justification would ultimately track back at least in part to that experiential dimension itself—the support for those credentials would have to strike us as themselves making sense. As with our other faculties of cognition, at some point and in some circumstances it must simply become, at least from our own perspective, a brute given of the process. This general point was behind the remark of the physicist Sir Denys Haigh Wilkinson that even on purely scientific questions, after having done all the science we can do, finally we "cannot do more than say 'this makes me feel good; this it how it has to be.' "[25]

The phenomenological presentations of sense making generated by this pattern-noting faculty play pivital roles in several foundational facets of science. Among the key tasks of the scientific enterprise, perhaps none is more fundamental than that of generating understanding. That concept is difficult to explicate precisely, but understanding involves coming to see an answer to a particular sort of "why?" question.[26]

Similar connections can be found in what are sometimes referred to as "plausibility structures." We find the same thing in evaluations of explanatory satisfactoriness. In all these cases, what is ultimately being expressed is one's having (at least temporarily) come to rest at some stable, human-mind-appropriate standing place. And such places, such correlates to mind, are what I take to be definitive of pattern.

What patterns we choose to bring about will often (perhaps nearly always) involve considerations not only of the patterns themselves, but of perceived value and other axiological factors. Thus, in at least some instances, identification of artifactuality and of pattern will not yet constitute identification of specific intent.[27] But in many cases, especially cases where basic axiological matters are not in reasonable doubt, it will be enough. This issue will be discussed in more detail later.

Design: Preliminary Picture

So design is to be understood in terms of deliberate agent activity intentionally aimed at generating particular patterns. Pattern, in turn, is to be understood in terms of

structures that have special affinities to cognition—which correlate to mind. The agent activity involved produces artifacts that are defined via counterflow and that frequently exhibit familiar primary marks of agent activity and counterflow by which that activity and artifactuality can be identified. And where the correlation to mind is sufficiently powerful, further conclusions of designedness or even of the specifics of the design and intent themselves, can be warranted.