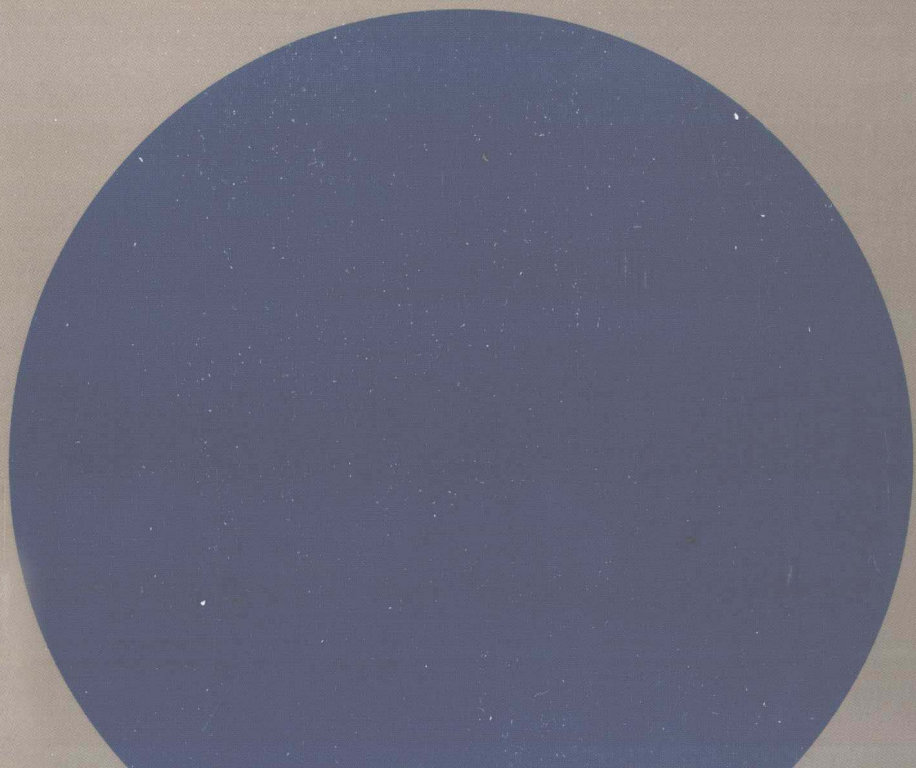


Cognitive Harmony

THE ROLE OF SYSTEMIC HARMONY
IN THE CONSTITUTION OF
KNOWLEDGE

Nicholas Rescher



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THE ROLE OF
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CONSTITUTION OF KNOWLEDGE

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For Dale Jacquette

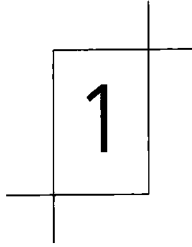
Preface

The idea of harmony is a key philosophical part of the intellectual legacy bequeathed to us by the ancient Greeks. Usually it is construed in relation to human affairs and interactions. (An eighteenth-century German religious sect known as the “Harmonists” founded a utopian community only an hour’s drive from where I now reside in Pittsburgh.) But it also plays a role in purely theoretical matters, and its role in relation to our knowledge of the world is the object of concern in these pages.

Cognitive Harmony has grown out of a lecture I was invited though in the end was unable to give in Germany in 2001 under the auspices of the Brauers Foundation of Baden Baden. I am grateful to Estelle Burris for her multifaceted help in moving the project from my hencratches into print.

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The Systemic Harmony of Fact

Harmony

While *harmony* strikes the modern ear as primarily a musical term, the basic idea it conveys is something far larger both in its origins and in its subsequent history. Its Greek root, *harmonia*, denotes a joining together of components so that the resulting whole can accomplish its natural mission—the planks of a ship, for example, or the bones of a skeleton.¹ And in a still generally similar way the classic second edition of *Webster's Unabridged Dictionary* defines *harmony* in its subsequent, more general sense as “a combination of parts into an orderly whole . . . [exhibiting an] agreement or proportionate arrangement that is pleasing . . . [through] fitting well together.” What is at issue throughout is thus a unifying coordination of elements into a comprehensive and evaluatively positive structure—an organically unified whole that is able to realize a positive function through the coordinated collaboration of its several parts.² The crux of harmony is a whole whose parts exhibit mutual accommodation under the aegis of normative principles.

The paradigm of harmony is, of course, musical harmony—the coordinated combining of different voices in producing an overall effect (*Einklang*, or a sounding as one). *E pluribus unum* could also be the motto of harmony.

One salient feature of a harmonious whole is thus what might be termed its *systemic integrity*. The crux here is the due coordination of multilateral—and even seemingly conflicting—factors to produce a commonly engendered overall effect.³ A change that occurs in a harmonious whole becomes diffused throughout: here, when one thing is altered, everything is affected—change something, and nothing else can continue to make its contribution to the whole as effectively as before. Change in a harmonious whole is disequilibrium. Were any part of such a whole to be removed—or even merely altered in some significant way—its unity would be disturbed and its evaluative condition diminished; its integrity would be impaired in the wake of any diminution—and thereby its positivity as well. By their very nature, genuinely harmonious wholes are best off as they are—a holism both of being and of value is operative here.

With a harmony, two factors accordingly become crucial: a coordinative unification of component parts and an evaluatively positive overall result, that is, a union of constituents into a functionally unified, coherently integrated whole in a way that is evaluatively positive either by way of intellectual appreciation or of affective response. The former factor might be characterized as *systemic integrity* and the second as *evaluative positivity*. Taken together these are what a *harmony* is all about. Apart from music, other paradigm examples of harmonious wholes are, on the affective side, works of fine art and, on the intellectual/cognitive side, the elegant systematization of bodies of mathematics or of theory manifolds in natural science.

The idea of harmony became significant as a philosophical concept in the thought of Pythagoras and his school in classical antiquity. For the Pythagoreans, the elegant axiomatic unity of geometry represented the quintessence of cognitive harmony and that of music the quintessence of aesthetic harmony. And the two were fused in the functioning of a mathematicized characterization of the motion of the heavenly bodies that made for celestial harmony, the “music of the spheres.” The Pythagoreans carried this idea over into medicine as well.

Modern scholars generally characterize a system as a collection of interrelated entities, the relationships among which are such that in-

formation about them affords a basis for inferring conclusions about the structure, modus operandi, or temporal history of the system as a whole.⁴ Such a formula indicates the plurality of key features of a system: wholeness, interrelatedness of parts, functional interrelationships, all of which are present in the traditional explication of the idea. The concept of systemic harmony is itself a chain that links together many distinguishable elements into a harmonious whole. And because systemic unity is a crucial aspect of any stably perduring whole, it is no wonder that the concept of harmony has penetrated into the thought of virtually every advanced culture on nearly every complex topic.

The Systemic Integrity of Fact and Burley's Principle

Let us now narrow our focus from harmony in general to *cognitive* harmony, characteristically conceived of as the systemic manifold of truth or fact. Facts must be both compatible and consonant with one another; both consistency and coherence are necessary: facts are related in such a way that *each fact not only accommodates all the others but also interconnects into an integrated whole*. For the facts that our beliefs purport often are and ideally always should be united in a pervasively integrated systemic structure. Every determinable fact is so severely hemmed in by others that even when we erase one, it can always be restored on the basis of what remains. The domain of fact is a logical harmony: even if we abandon a particular fact, it could still be effectively recovered from this collection of others. And the reason for this lies in the logical principle of *the systemic integrity of fact*, for the fabric of fact is woven tightly: it is *inferentially redundant*; any given fact can be recovered by logical inference from others in its informative environment.

One of the ways of exhibiting the systemic integrity of fact runs as follows. Assume (as a worst case of sorts) that we are given n truths that are entirely independent of one another: p_1, p_2, \dots, p_n . Then, of course, their overall conjunction, p_1 and p_2 and \dots and p_n , must also state a true fact. But now consider the propositional set of truths:

$$S = \{p_1, p_2, \dots, p_n, p_1 \text{ and } p_2 \text{ and } \dots \text{ and } p_n\}$$

Clearly, this is a set of true facts. But observe that this set is such that if any one member were to be deleted it could at once be restored by logical inference from the rest. Their inferential density along such lines means that facts are so closely intermeshed with one another as to form a logical network. Any change anywhere reverberates everywhere; when we fiddle with individual elements of such a system, we endanger the entire whole. In his influential *Treatise on Obligations* the medieval scholastic philosopher Walter Burley (ca. 1275–1345) laid down the rule—let us call it Burley’s principle: *Whenever a false contingent proposition is posited, one can prove any false proposition that is compatible with it.*⁵ His reasoning was as follows:

Let the facts be that

P. You are not in Rome.

Q. You are not a bishop.

And now, of course, also that

R. You are not in Rome or you are a bishop. (*P* or not-*Q*)

All of these, so we suppose, are true. Let us now posit by way of a (false) supposition that

Not-(*P*) You are in Rome.

Obviously (*P*) must now be abandoned—“by hypothesis.” But nevertheless from (*R*) and not-(*P*) we obtain

You are a bishop. (Not-*Q*)

And in view of thesis (*Q*) this is, of course, false. Thus, given a falsity, that is, not-(*P*)—we have obtained not-(*Q*) by cogent inference from acknowledged truths—where *Q* is an *arbitrary true proposition*. And it is clear that this situation prevails in general. For let *p* and *q* be any two (arbitrary but nonequivalent) facts. Then all of the following facts will also, of course, result: $\sim(\sim p)$, $p \ \& \ q$, $p \vee q$, $p \vee \sim q \vee r$, $\sim p \vee q$, $\sim(\sim p \ \& \ q)$, and so on. Let us focus on just three of these available facts:

1. *p*

2. *q*

3. $\sim(\sim p \ \& \ q)$ or, equivalently, $p \vee \sim q$

Now let it be that you are going to suppose not- p . Then, of course, you must remove (1) from the list of accepted facts and substitute

$$(1') \sim p$$

But there is now no stopping. For together with (3) this new item at once yields $\sim q$, contrary to (2). Thus, that supposition of ours that runs contrary to accepted fact (that is, not- p) has the direct consequence that *any other arbitrary truth must also be abandoned*.

On this basis Burley's principle has far-reaching implications. For giving the systemic interconnectedness of fact, any and all fact-contradicting assumptions are pervasively destabilizing. As far as the logic of the situation is concerned, you cannot change anything in the domain of fact without endangering everything. Once you embark on a contrary-to-fact assumption, then as far as pure logic is concerned all the usual bets are off. Changing one fact always requires changing others as well.

A concrete illustration will help to make the point more graphic. Consider the situation of x emplaced as follows in a tic-tac-toe configuration:

x		

Here we have the following facts:

1. There is exactly one x in the configuration.
2. This x is not in the first row.
3. This x is not in the third row.
4. This x is not in the second column.
5. This x is not in the third column.
6. This x is not on a diagonal.
7. This x is not at column-row position (3, 2).

Let it be that we erase one of the facts, say (5). Then, as we have already noted, the other facts of the situation will suffice to let us recover this by logical inference.

But now suppose that we do not simply lose sight of (5) by its *erasure* but actually *change* it, replacing it by not-(5). Then, of course, we would also have to go on to deny either (4) or (7). The fabric of fact is *logically unified*: any change in one fact will always compel further changes in other facts. And so from a logical standpoint the manifold of fact is an integral unit, a harmonious system where nothing can be altered without affecting something else.

This circumstance of the systemic integrity of fact has far-reaching ramifications. It means that once we begin to make alterations in the domain of fact we embark on a process that has no end. Suppose that we make only a very small alteration in the descriptive composition of the real, say, by adding one pebble to the river bank. But which pebble? Where are we to get it and what are we to put in its place at the location we take it from? And where are we to put the air or the water that this new pebble displaces? And when we put that material in a new spot, just how are we to make room for it? And how are we to make room for the material displaced there? Moreover, the region within six inches of the new pebble used to hold N pebbles. It now holds $N + 1$. Of which region are we to say that it holds $N - 1$? If it is that region yonder, then how did the pebble get here from there? By a miraculous instantaneous transport? By a little boy picking it up and throwing it? But, then, which little boy? And how did he get there? And if he threw it, then what happened to the air that his throw displaced that would otherwise have gone undisturbed? Here, problems arise without end. Every hypothetical change in the physical makeup of the real sets in motion a vast cascade of changes either in the physical constitution of the real or in the laws of nature at large, for what about the structure of the envisioning electromagnetic, thermal, and gravitational fields? Just how are these to be preserved as was given the removal and/or shift of the pebbles? How is matter to be readjusted to preserve consistency here? Or are we to do so by changing the fundamental laws of physics?

The systemic integrity of fact indicates that we cannot make hypothetical modifications in the makeup of the real without thereby destabilizing everything and raising an unending series of questions. And not only do *redistributions* raise problems but so do even mere

erasures, mere cancellations, because reality being as it is requires that redistributions follow in their wake. If by hypothesis we zap that book on the shelf out of existence, then what is it that supports the others? And at what stage of its history did the book first disappear? And if the book just vanished a moment ago, then what of the law of the conservation of matter? And whence the material that is now in that book-denuded space? Once more, we embark on an endless journey. As such considerations indicate, it is difficult to exaggerate the larger significance and import of the systemic harmony of fact.

Some Aspects of Cognitive Harmony

The object of the cognitive enterprise is to devise a manifold of putative truth that reflects, as clearly as possible, the developments of the manifold of fact. After all, inquiry is the pursuit of *truth*. And the overall domain of truth is in itself clearly a system—*das System der Wahrheiten überhaupt*, as Lambert called it.⁶

Let us consider the way in which the idea that “truth is a system” is to be understood. Three things are at issue: the set *T* of truths must have the features of *comprehensiveness* (or completeness), *consistency*, and *cohesiveness* (unity). The first two are familiar and well understood. Let us concentrate on the third.⁷ Thus, when we formulate our knowledge claims systematically, we are endowing them with *verisimilitude* in its root sense of “resemblance to the truth.” One arrives at the inference:

KNOWLEDGE MUST REFLECT THE TRUTH.

THE TRUTH IS A SYSTEM.

KNOWLEDGE SHOULD BE A SYSTEM.

This idea—that if our truth claims are indeed to approximate the truth itself, then they too must be capable of systematic development—has historically provided one of the prime grounds for adopting the systematicity of knowledge as a regulative ideal.

Against this background, it is only normal, natural, and to be expected that cognitive theory should insist that the standing of our

knowledge should reflect the systemic harmony of fact insofar as such a parallelism is at all realizable.

From antiquity to Hegel and beyond, cognitive theoreticians have embraced the ancient ideal that our knowledge should be developed architectonically and should be organized within an articulated structure that exhibits the linkages binding its component parts into an integrated whole and leaves nothing wholly isolated and disconnected. A cognitive system is to provide a framework for linking the *disjecta membra* of the bits and pieces of our knowledge into a cohesive unity. A cognitive system is to be a *structured* body of information, one that is organized in accordance with taxonomic and explanatory principles that link this information into a rationally coordinated whole.⁸ The functional categories governing this organizational venture are those of understanding, explanation, and cognitive rationalization.

The underlying idea of a unity of knowledge has found many forms of expression over the course of time. The encyclopedia as a synoptic compendium of knowledge is historically its prime literary expression. And the university as an educational enterprise is historically its prime institutional expression. On the contemporary scene, its prime manifestation is the Internet with its powerful (though still rudimentary) search engines for effecting a coordination of information.

What counts for a cognitive system is the explanatory connection of ideas, not the particular style or format of their presentation. A system is individuated through general features relating to its structure and its rational architectonic, not through the particular manner of its expository development. Cognitive systematization is thus an epistemological notion, not a literary or rhetorical one—a matter of the organization of information, not its mode of presentation; of explanation, not of exposition.

The idea of systematization is intimately intertwined with that of planning in its generic sense of the rational organization of materials.⁹ Planning, like organizing, is a mode of intellectual action, and it too exhibits the “amphibious” character of systematization. On the physical side one can have such projects as town planning, architecture, and landscape gardening; on the cognitive side, one can plan the or-

ganization for the purpose of explanatory or deductive or dialectical (persuasive) or mnemonic codification. Again, systematization is closely connected with the enterprise of design, albeit with a difference in orientation. For design—as generally understood—aims at the realization of physical forms,¹⁰ while systematization is not less concerned with intellectual ones. But the basic issues are the same on both sides: the articulation of a rational structure on the basis of “best-fit” considerations, with all the parameters of systematization—economy, efficiency, generality, uniformity, and so on—figuring in this role. A cognitive system is a “design for knowing,” and system building is pre-eminently a problem of rational design.

A painting or piece of architecture—any good design—must combine a variety of potentially conflicting elements in the conjoining synthesis of a cooperative harmony, and this sort of rational unification is exactly what a system is all about. The harmonious systematicity of knowledge is thus to be construed as a category of understanding, akin in this regard to generality, simplicity, and elegance. Its immediate concern is with form rather than matter, and it bears on the organizational development of our knowledge rather than on the substantive content of what is known, and deals with cognitive structure rather than subject-matter materials. Just as one selfsame range of things can be characterized simply or complexly, so it can be characterized systematically or unsystematically. Systematicity relates in the first instance not to *what* we know—the facts at issue in the information at our disposal—but rather to *how we proceed in organizing our knowledge*. And these two issues are, of course, going to be closely interrelated.

The Functions of Cognitive Systematization

The truth about reality must inevitably form a system, but this is more than can be said for our *knowledge* of it. Cognitive harmony consists in systematization—in fusing the sundry bits and pieces of our knowledge into a cohesively structured and rationally integrated whole. It constitutes an ideal for the rational articulation of our knowledge—alike in its formal and its factual subdomains. However,

it is well to begin by recognizing that there is no justification for issuing in advance—prior to any furtherance of the enterprise itself—a categorical assurance that the effort to systematize our knowledge of the world is bound to succeed. The systematicity of our factual knowledge is not something that can be guaranteed a priori, as prevailing on the basis of the “general principles” of the matter. The parameters of systematicity—coherence, consistency, uniformity, and the rest—represent a family of regulative ideals toward whose realization our cognitive endeavors do and should strive. But the drive for systematicity is the operative expression of a guiding aim or objective and thus not something whose realization can be taken for granted as already certain and settled from the start. There is no valid reason to assume or presume from the very outset that systematicity will ultimately emerge in the results of our inquiries. The best we can do here is to proceed in the light of a hope that we expect the wisdom of hindsight to validate eventually.

This drive for cognitive order and cohesion is informed and crucially conditioned by a coordinate cognitive drive for comprehensiveness, variety, novelty, and the like. As students of human biology have shrewdly observed, the central nervous system of humans demands a novelty of inputs to avoid boredom—exploratory behavior and novelty-tropism are a fundamental aspect of the biological outfitting of higher animals.¹¹ Clearly, the systematization of our knowledge of fact has a deep Darwinian rationalization. To make our way in a difficult world, we humans, as rational animals, need to exploit regularities for our effective functioning. Now, the rules and principles of rational procedure are easiest to grasp, master, to apply, and to transmit if they themselves are organized in as a rational structure, that is, are developed systematically. And the concern for system is nothing else than this drive for metarulishness, an effort to impart to our principles of behavioral and intellectual procedure a structure that is itself a manifold integrated by systemic principles.

A cognitive system is not just a collection of endorsed (or accepted) *theses* but also embodies the *rationale* that underwrites these endorsements. The characterization of a system-included thesis in normative terms (as “true,” “warrantably assertible,” and the like) is the