Facts as Arrangement

Abstract

I develop a theory of *facts* that solves outstanding problems faced by fact theorists. A major challenge for fact theorists is to explain how facts are related to the things they seem to be about: for example, how is the fact that Tibbles is on the mat related to Tibbles and the mat? To meet this challenge, I propose a way to analyze facts as *arrangements* of the items they are about. I then fill out the theory by proposing both existence and identity conditions for facts. One advantage of the theory is that it enables a precise analysis of the notorious *negative* facts in terms of abstract arrangements. The theory also opens up a new strategy for dealing with common objections and obstacles to treating facts as combinations of things. My end goal is to advance our understanding of the things that make true propositions true.

Key Words

Facts, negative facts, combinatorial theory, truthmaker, logical atomism

Facts as Arrangements

"The chief difficulty is to find a notion of fact that explains anything."
(Donald Davidson "True to the Facts", p. 748)

1. Introduction

I will develop a new theory of *facts*. I will build upon a traditional view of facts as combinations of things. Although fact theorists have said many things about facts, detailed accounts of the nature of facts are relatively uncommon.[1] My goal, then, is to advance our understanding of facts by developing a detailed account of what facts are, how facts are formed, and what sorts of facts there can be.

We may orient our inquiry by considering what facts are good for. Facts have been posited to do a variety of things: for instance, they have been employed as "truthmakers" that explain why some propositions are true while others are not;[2] they have been characterized as the relata of causal explanations;[3] they have been treated as constituents of intentional actions;[4] they have even been identified as the things people are aware of when they are hallucinating or having

[1] Among the most detailed theories is Edward Zalta's theory of situations in "Twenty-Five Basic Theorems in Situation and World Theory". Zalta analyzes situations [facts] in terms of *states of affairs properties*. The term 'state of affairs property' is not defined further (p. 398), though Zalta does offer formal names of states of affairs properties. Incidentally, I suspect that if we were to extend Zalta's theory by explicitly defining '*x* is a state of affairs property', we would end up with a theory that is similar, at least in spirit, to the definition I will be giving.

Other helpful theories of facts have been given by Suszko, "Ontology in the *Tractatus* of L. Wittgenstein"; Fine, "First-Order Modal Theories III — Facts"; Zalta, "Twenty-Five Basic Theorems in Situation and World Theory"; and Hossack, "Facts" in *The Metaphysics of Knowledge*.

[2] See, for example, Russell's *The Problems of Philosophy*, Wittgenstein's *Tractatus*, and Armstrong's *A World of States of Affairs*.

[3] Mellor, *The Facts of Causation*.

[4] Dancy, *Practical Reality*, p. 144.

vivid dreams.[5] For the purposes of our investigation, I will treat facts as the pieces of reality—*whatever* they might be—that serve as truthmakers for true propositions.

To guide our inquiry, I will seek to develop a theory that has the following three features: (i) it posits the fewest facts necessary for their assigned roll; (ii) it is ultimately expressible in intuitively meaningful primitive terms; and (iii) it enables propositions to be made true by facts.

2. Facts and Arrangements

Combinatorial fact theorists have traditionally viewed facts as somehow "consisting" in certain things being related to one another in a certain way.[6] Put differently, they have viewed facts as *arrangements* or *combinations* of things. I will build upon this traditional understanding of facts by giving a precise definition of 'arrangement'.

An example will help orient us to the basic features of an arrangement. Suppose that Tibbles, the cat, is on a particular mat. And suppose that <Tibbles is sitting on the mat> corresponds to a fact. Call that fact 'THE TIBBLES FACT'. I propose that THE TIBBLES FACT is an *arrangement* of things: it consists of certain things bearing certain relations to one another. THE TIBBLES FACT, like every arrangement, is characterized by the following two features: (i) having parts, and (ii) being arranged. I will next say a bit about what I have in mind by (i) and (ii), but readers who are familiar with combinatory theories may wish to skip ahead to section 2.3, where I give a more detailed definition of 'arrangement'.

[5] See, for example, Fumerton, *Epistemology*, pp. 62–66. Cf. Johnston, "The Obscure Object of Hallucination".

[6] See Russell, "On the Nature of Truth", p. 88. See also, Stenius, *Wittgenstein's Tractatus: A Critical Exposition of its Main Lines of Thought*, p. 31.

2.1 Having Parts

Ordinary language suggests that 'part of' is a pre-philosophical term that common folk use regularly. We hear people say such things as, "this is my favorite part of the song"; or, "wear a helmet because your brain is an important part of your body"; or, "I disagree with that part of your argument"; or, "I love this part of the movie"; and so on. So, I will not attempt to define 'part of' here. I will instead treat the term as primitive. (That is not to say, of course, that the nature of parthood cannot be further analyzed or investigated.[7])

In keeping with ordinary usage of the term 'part', I will assume that nothing is part of itself. Thus, I will restrict the extension of 'part' to *proper* parts.

There might be different senses of the term 'part of' depending on the context. If there are, then I have in mind the most general meaning that encompasses all species of parthood or parthood-like relations. So, for example, I include "pieces," "constituents," and "ingredients" as parts. You could think of 'part of' as expressing a disjunction of all part-like relations expressible in ordinary language. Or you could think, as I do, that there is a basic, determinate meaning of 'part of' that is common to all its uses.

I should point out that I am not committed to the principles of classical mereology, for some of those principles plausibly don't apply to arrangements.[8] So, for example, if

[7] For a survey of historically significant theories of parthood see Simons, *Parts*. See also, Casati and Varzi, *Parts and Places: the Structure of Spatial Representation*.

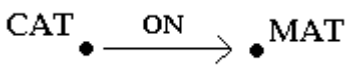
[8] I am content to classify my theory of facts as a "compositional" theory, but I should be clear that my concept of parthood may be broader than the mereological concepts expressed by standard compositional views. In "Against the compositional view of facts" (2011), Bynoe objects to compositional facts on the grounds that some of them would have exactly one proper part (for example, the fact that abstractness exemplifies abstractness), which he takes to be impossible. Nevertheless, Bynoe thinks that a *set* could have exactly one *member* (footnote 6). So, since I am content to call the "parts" of a fact "members," Bynoe's objections do not squarely target my theory of facts.

arrangements have parts, then uniqueness of "composition" does not apply: there can be different arrangements of the *same* things—for example, *a cat on a ball* and *a ball on a cat*.

That is all I wish to say about parts for now. In section 4, I will suggest that abstract things can be parts (or constituents), so that, for instance, the fact that *Ludwig is Austrian* may be analyzed as an arrangement that includes Ludwig and *being Austrian* as parts (constituents).

2.2 Being Arranged

Let us turn to the second defining feature of an arrangement: *being arranged*. An arrangement is "arranged" by virtue of certain things being related in a certain way. Consider the representation of THE TIBBLES FACT below:



As with every arrangement, we may pictorially represent THE TIBBLES FACT using a connected graph. In the graph above, each node represents a part of the arrangement, and the arrow represents a relation that holds between parts of that arrangement. The direction of the arrow indicates the direction of the relation: the cat is sitting on the mat, not the other way around. I will return to the issue of the direction of a relation soon. (I should note that if parthood is transitive, then every part of the cat and every part of the mat is also part of THE TIBBLES FACT.)

Observe that THE TIBBLES FACT has two primary parts—a cat and a mat. These parts are related by the relation of *sitting on*, which I will abbreviate as '<sitting on>$_R$'. THE TIBBLES FACT's existence depends upon the cat and the mat being related by <sitting on>$_R$. In other words, THE TIBBLES FACT cannot exist unless Tibbles stands in <sitting on>$_R$ to the mat. Furthermore, THE TIBBLES FACT's existence is guaranteed by the cat sitting on the mat: that is to say, necessarily, if the cat sits on the mat, then THE TIBBLES FACT exists. We may say, then, that

THE TIBBLES FACT is *arranged* because its existence depends upon certain things being related to one another in a certain way. The same is true of every arrangement.

I should point out here that I take 'exemplifies' to express a relation between a thing and its properties. Thus, for example, if Ludwig is Austrian, then *Ludwig* and *being Austrian* are tied together by the relation of exemplification; they thereby form an arrangement consisting of *Ludwig exemplifying being Austrian*. To be clear, I do not suppose that the fact that *x* exemplifies *y* obtains *in virtue of* a fact of the form *x bears the relation of exemplification to y*; if anything, grounding goes the other way: *x* bears exemplification to *y* in virtue of *x* exemplifying *y*. Nor do I even assume that in general, if *x* exemplifies *y*, there is a relation *r*, such that *x* and *y* bear *r* to exemplification. I do not believe, therefore, that treating exemplification as a relation results in a vicious infinite regress. If you see the matter differently, however, then I invite you to adapt my theory of arrangements so that facts of the form *x exemplifies p* count as primitive atomic arrangements.

2.3 A Precise Definition

I have conveyed at an intuitive level what an arrangement is supposed to be. The remainder of this section is devoted to the technical details. I will construct a precise definition that adequately captures and further clarifies the intuitive idea. My goal is not be to provide a *metaphysical analysis* of arrangements in terms of items that are ontologically more basic. Rather, my goal here is to find a technically precise definition that is plausibly extensionally equivalent to '*x* is an arrangement'. By doing this much, I hope to add credence to the claim that "arrangement" talk is not ultimately confused or unintelligible. (Those who are satisfied with what has already been said about arrangements are welcome to skip ahead.)

Here is a first pass at a technical definition of 'arrangement':

(A_1) '*x* is an arrangement of the *y*s' $=_{def}$ '*x* is a composition of the *y*s, and there is an *n*-term relation *R*, such that necessarily, *x* exists if and only if the *y*s stand in *R* to one another',[9] where

COMPOSITION: '*x* is a composition of the *y*s' $=_{def}$ '(i) for all *z*, if *z* is one of the *y*s, then either *z* is part of *x*, or *z* is identical to *x*, and (ii) for all *z*, if *z* is part of *x*, then there is a *w*, such that *w* is one of the *y*s, and *w* overlaps *z*, where

OVERLAP: '*x* overlaps *y*' $=_{def}$ 'There is a *z*, such that (either *z* is a part of *x*, or *z* is identical to *x*) and (either *z* is a part of *y*, or *z* is identical to *y*)'.[10]

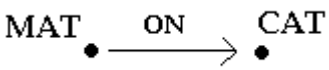
(A_1) says that an arrangement is a composition whose existence requires that its parts jointly stand in a certain relation. The definition of '*x* is a composition of the *y*s' basically says that *x*'s parts include the following items: (i) the *y*s, (ii) the parts of the *y*s, and (iii) anything composed exclusively of one or more of the *y*s or their parts. (Note that this definition permits the existence of distinct compositions of the same things, since nothing in the definition rules out a scenario in which distinct things are compositionally related to the same things. Thus, (A_1) permits the existence of distinct arrangements of the same things.[11])

Unfortunately, this definition cannot be equivalent to the intuitive idea of an arrangement because it does not take into account the *direction* in which the *n*-term relation holds. To see what I mean, suppose that Tibbles sprints off the mat and then makes his way under the mat. Now the mat is on top of Tibbles. This fact can be represented as follows:

[9] Just to be sure, there is no requirement here that the number of *y*s is the same as number of "slots" in the *n*-term relation. So, for example, we could treat 'identical to' as a *two*-term relation even if just *one* thing stands in it to itself.

[10] The definition of '*x* is a composition of the *y*s' is equivalent to Peter van Inwagen's definition of '*x* is a mereological sum of the *y*s' in "Can Mereological Sums Change Their Parts", pp. 616–17.

[11] Cf. *Ibid*., n. 9.



This time the arrow is pointing from the mat to the cat, rather than from the cat to the mat. Now it is the *mat* sitting on top of the *cat*. Call the resulting arrangement 'THE MAT FACT'. THE MAT FACT is obviously different from THE TIBBLES FACT, for THE MAT FACT exists only if THE TIBBLES FACT does not. Notice, however, that the cat and the mat still stand in <sitting on>$_R$—only the direction has been reversed. The problem is that (A_1) fails to take into account the direction in which the relation holds. Thus, (A_1) fails to distinguish THE TIBBLES FACT from THE MAT FACT.

To build "direction" into the definition, we might try the following:

(A_2) '*x* is an arrangement of the *y*s' =$_{def}$ '*x* is a composition of the *y*s, and there is an *n*-term relation *R* and an order *O*, such that necessarily, *x* exists if and only if the *y*s stand in *R* to one another in order *O*'.

This definition has a significant drawback, however, which results from its use of the term 'in an order'. It is not clear what it means to say that that some things stand in a relation *in an order*. What is an order? An order does not appear to be a special kind of *relation*: things stand in a relation *to* things, but things do not stand in an order to things. What, then, does it mean exactly for things to stand in a relation in an order? It has been suggested that we can convey the order of a thing's constituents using word order: for example, we convey the order of the constituents of THE MAT FACT by placing 'mat' to the left of 'cat' in the expression 'an arrangement of the mat being on the cat'.[12] Perhaps that is so for particular examples. But we are trying to give a definition of 'arrangement' that applies in general, and it is unclear how to do so merely using

[12] See Kirkham, *Theories of Truth: A Critical Introduction*, p. 122; cf. Newman, *The Correspondence Theory of Truth: An Essay on the Metaphysics of Predication*, p. 61.

word order. To make things clearer, we need a non-circular definition of 'order' or else a different definition of 'arrangement'.[13]

Keith Hossack offers an ingenious solution to the problem of 'order' by analyzing facts as "combinations" of things, where *combination* is a theoretically primitive relation that holds between a fact and the universal and particulars it combines.[14] So, for example, the fact *that Socrates is wise* is a combination of wisdom and Socrates. With the term 'combination' in hand, Hossack is able to express axioms about facts, including identity conditions, without ever using the term 'order'.

Although Hossack's theory is extremely helpful, one may wonder what exactly is meant by 'combination' in this context. It seems to me that the term 'combination' packs in much of the very mystery we are trying to unravel. We want to know how facts are related to their constituent parts. We may *call* that relation 'combination', but what relation is this? Can it be defined? We might try this definition: 'fact *f* combines the *x*s with *u*' $=_{def}$ '*f* is the fact that the *x*s instantiate *u*'. But this definition fails to specify the order in which the *x*s are related: the fact that John loves Mary, for example, displays an *order* that is not built into the fact that John and Mary instantiate loves. To account for order, we could try this: 'fact *f* combines x_1, x_2, …, x_n with *u*' $=_{def}$ '*f* is the fact that x_1, x_2, … x_n instantiate *u* in the order specified by the order of the terms'. But then we are stuck with the term 'order', and this definition is not an improvement over (A_2). Hossack

[13] Someone might wonder whether 'order' could be conveyed using *sequences* (i.e. ordered lists). For instance: '*A* is an arrangement of the *x*s' $=_{def}$ 'There is a sequence $S = \{x_1, x_2, x_3, \ldots, x_n\}$, and there is an *R*, such that (i) *R* is an n-place relation, and (ii) $x_1 \ldots x_n$ stand in *R* in the order expressed by *S*. However, 'the order expressed' is undefined, which is a problem since we do not display the order in which things are related merely by putting names of those things next to each other. We need an account of the common way in which the *x*s are related by *S* and *R*. Perhaps there is a way to spell this out. But if there is, it is unclear that the resulting definition would be any simpler than the definition I will end up giving.

[14] Hossack, *The Metaphysics of Knowledge*, chapter 2.

suggests, then, that we treat 'combination' as a primitive relation of variable arity.[15] Although Hossack offers an impressive theory *using* the term 'combination', I would like to explore the prospect of having an alternative theory that doesn't require that particular primitive. My goal, then, is to get another option on the table.

I wish to give a theory whose primitive terms are pre-philosophically familiar—or at least more familiar than the term, 'combination', as it is used in this specific, technical context. I believe such a definition will help to extend our understanding of the basic structure of facts by displaying the structure in more familiar terms.

What we would like, then, is a definition that (i) captures what (A_2) is intuitively designed to capture, (ii) does not contain the term 'order', and (iii) is ultimately expressible in terms that are pre-philosophically familiar and conceptually basic. I believe the following two-step definition gives us what we want:

(A_3) '*A* is an arrangement' $=_{def}$ '*A* is a composition of atomic arrangements', where

ATOMIC: '*A* is an atomic arrangement' $=_{def}$ 'there are some *x*s and some *y*s, such that:

(i) *A* is a composition of the *x*s together with the *y*s (that is, *A* is a composition of some *z*s, where (i) each of the *z*s is either one of the *x*s or one of the *y*s, (ii) each of the *x*s is one of the *z*s, and (iii) each of the *y*s is one of the *z*s).

(ii) There is some relation *r*, such that necessarily, *A* exists *if and only if* the *x*s stands in *r* to the *y*s.

This definition is designed to be extensionally adequate: every arrangement satisfies the definition, and whatever satisfies the definition counts as an arrangement. (Again, the definition is not meant to be *metaphysical* analysis in terms of more ontologically basic properties.)

[15] *Ibid.*, p. 47.

Note that (A_3) is not by itself designed to settle every important question about arrangements. One might wonder, for instance, whether necessarily existing arrangements that have the same parts can be distinguished. I will consider questions about the existence and identity conditions of arrangements in sections 3 & 5.[16]

Let us consider what the definitions say and then look at some implications. (A_3) says that every arrangement is a composition of more basic, atomic arrangements, where an atomic arrangement is a composition of things bound together by a binary relation. The key non-logical terms in the definition are 'composition', 'necessarily', and 'stands in'. The term 'composition' is defined in terms of 'part' in a standard way (as shown previously), where 'part' is taken to be a conceptually familiar pre-philosophical term (recall section 2.1). I am thinking of 'necessarily' as signifying broad logical necessity. I believe this is a familiar notion that we grasp via acquaintance with necessary truths. For instance, we intuitively understand the meaning of 'it is *necessary* that no prime minister transforms into a prime number'. Of course, *analyzing* modality leads to many challenges. But I think the notion is sufficiently intelligible for our purposes here without a metaphysical analysis. The final term is 'stands in'. That term is used to convey the way in which some things are related to others, as in "John stands in the loves relation to Mary". I will say more about this term in a moment.

Philosophers are certainly welcome to pursue deeper definitions of each of these terms. But of course, the defining of terms has to stop somewhere. I believe that stopping here leaves us with an understanding of arrangements whose basic terms are intuitively familiar to us. And the

[16] That isn't to say that nothing substantial falls out of the definition. The definition implies, for instance, that arrangements have certain parts essentially, since for each arrangement *A*, <*A* exists> entails a proposition that specifies how certain parts of *A* are related.

definition is helpful because it reveals how we might unpack a highly technical notion of 'arrangement' in terms that we understand. It is a step forward, and other steps may follow.

Let us now consider a few implications. First, the definition does not specify whether the relation that ties together the parts of an atomic fact is itself part of that fact. I leave the matter open. Hossack treats the binding relation as a part. And that is fine. Other may prefer to think of the relation as binding together parts without being one of the bounded parts. That is acceptable, too. My definition permits a variety of views about how facts relate to relations.

Second, ATOMIC uses the term '*a* stands in *r* to *b*' to express the way in which *a* and *b* are related via a two-place (binary) relation. I make use of two-place relations to avoid having to talk about the "order" in which arbitrarily complex relations hold.[17] When it comes to two-place relations, I believe it is fairly easy to express the direction of the relation. For example, to say that <sitting on>$_R$ holds *from* Tibbles *to* the mat (where '<sitting on>$_R$' expresses the relation of *sitting on*), I simply say, "Tibbles stands in <sitting on>$_R$ to the mat". More generally, I assume that for any *a*, *b*, and relation *r*, '*a* stands in *r* to *b*' is meaningful and does not merely mean the same thing as '*a* and *b* stand in *r*'. In other words, I assume that we can build "order" (direction) into the meaning of expressions of the form *a stands in r to b*.

(Even if expressions of the form *a stands in r to b* fail to express an order in which things are related, one may modify (A_3) to build in order another way by replacing clause (ii) with

(ii*) There is a proposition *p*, such that necessarily, <*A* exists> is true if and only if *p* is true.

To see how this definition works, recall THE TIBBLES FACT. We may now analyze THE TIBBLES FACT as follows: the THE TIBBLES FACT is a piece of reality *A*, such that (i) *A* is a composition of

[17] For some difficulties with specifying the order for *n*-term relations, see van Inwagen's "Names for Relations".

Tibbles and the mat, and (ii) <*A* exists> is true if and only if <Tibbles is on the mat> is true. Order gets built in by our use of <Tibbles is on the mat>, which implies a way in which Tibbles and the mat are related. The definition seems to be extensionally adequate (even if it isn't a metaphysical analysis). The point here is that a definition may be given *even if* locutions such as "Tibbles stands in <sitting on>$_R$ to the mat" fail to express the direction in which the given relation holds. We may be flexible, then, when it comes to the semantics of relations.[18])

A question springs to mind: can arrangements be bound together by relations other than two-place relations? My answer is that (A_3) does indeed allow for such arrangements, assuming that any given higher-place relation holds if and only if certain two-place relations hold. In some cases, a relation that might be thought to be non-binary may actually be treated as a binary relation between pluralities. The *between* relation is a good example. One might think *between* is three-place, as when the pen is between you and me. But consider that *between* may be instantiated by more than three things. For instance, there could be seven students between four professors. In this case, *between* is instantiated by eleven people, and it seems to link together two pluralities—the professors and the students. Hence, I suggest that we may plausibly treat *between* as a binary relation between pluralities.

The *to-the-left-of* relation is sometimes thought to be three-place. Yet, we may analyze it in terms of binary relations. Take, for example, the fact that the marble is to the left of the pen relative to Jack's perspective. Assume Jack has a left side *L* and a right side *R* (which may be

[18] In "Non-symmetric Relations", Cian Dorr (2004) has argued that expressions like '*A* bears *R* to *B*' (or '*A* stands in *R* to *B*') only make sense if there are no *non-symmetric* relations. I'm not wholly opposed to this result. However, one way we might escape Dorr's argument is to eliminate 'bears' (and 'stands in') talk altogether, perhaps by converting expressions of the form '*A* bears *R* to *B*' to ones of the form '*A R*s *B*' or to '*A* is *R B*': for example, 'Sue bears love to Sally' becomes 'Sue loves Sally'; 'Sue bears to the left of to Sally' becomes 'Sue is to the left of Sally'.

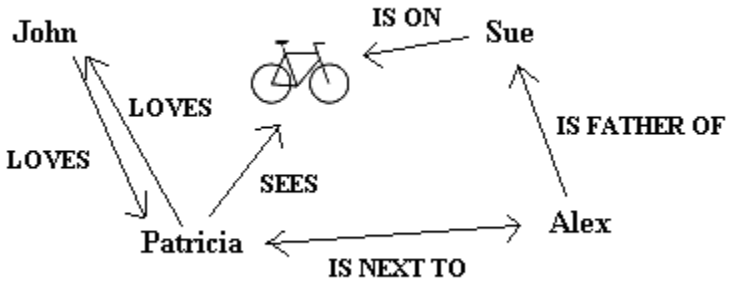
defined in terms of relations to Jack's face). Then let V_1 be the direction vector defined by *L*'s spatial coordinates minus *R*'s spatial coordinates. And let V_2 be the direction vector defined by the marble's coordinates minus the pen's coordinates. Those two vectors will have the same direction (at least roughly) if and only if the marble is to the left of the pen relative to Jack. Hence, we may analyze the "to-the-left-of" fact in terms of a binary relation between two vectors.

Take one more example. A large constellation of stars may be defined by a very complex relation holding between those stars. But the complex relation divides into simple spatial relations between individual starts. These simple, binary relations figure into *atomic* spatial arrangements. We may then analyze the constellation as a sum of certain atomic spatial arrangements. There is no problem here.

Of course, there are many candidate non-binary relations. In each case of which I am aware, a fact featuring a non-binary relation may, I believe, plausibly be analyzed in terms of facts featuring more basic, binary relations. I propose, therefore, that every arrangement can be analyzed in terms of the holding of one or more binary relations. I view this proposal as a substantial and intriguing consequence of my theory of arrangements. I realize that some philosophers may wish to challenge this consequence. But I don't think the consequence is implausible in its own right. And in fact, I would say that analyzing non-binary relations in terms of more basic binary ones yields a simpler and more appealing ontology. I am content, therefore, to leave this matter open for further debate and discussion.

Definition (A_3) is certainly closer to the mark than (A_2), and it seems to be consistent with an intuitive understanding of arrangements. I am content, therefore, to accept (A_3) as my official definition of 'arrangement'.

To solidify our understanding of arrangements, I will close this section with an example of an arrangement that is more complicated than THE TIBBLES FACT. The arrangement is represented below:



The picture represents an arrangement of people plus a bicycle standing in various relations to one another. Notice that the relation, *loves*, holds between the same people "twice over" because it holds in two different directions, so to speak. A proposition that specifies a way in which those things are arranged is this one: <John loves Patricia & Patricia loves John & Patricia sees the bicycle & Patricia is next to Alex & Alex is the father of Sue & Sue is on the bicycle>. The arrangement consists of those things related in those ways.

3 How to Form a Fact

I have explained what an arrangement *is*: roughly, it is any complex that consists in certain things bearing certain relations to one another. In this section, we will investigate how arrangements are made. A question to begin with: under what general conditions do things form an arrangement? If I have two marbles in my hand, for instance, what must I do to them to cause them to form an arrangement? Or, do they automatically form an arrangement no matter what I do?

Peter van Inwagen calls the question of what a *composite* object is 'the General Composition Question', and he calls the question of what the conditions are that determine when things compose an object 'the Special Composition Question'.[19] I will adopt van Inwagen's naming convention. I will call the question of what *arrangements* are 'the General Arrangement Question', and I will call the question of what the conditions are that determine when things form an arrangement 'the Special Arrangement Question'. I consider (A_3) to be an answer to the General Arrangement Question. Or at least (A_3) reduces the General Arrangement Question to the General Composition Question.[20] So, I will now address the Special Arrangement Question.

I take inspiration from Bertrand Russell's answer to the Special Arrangement Question. Russell says, "Given any related objects, these objects in relation form a complex object, which may be called a fact."[21] In other words, *any* related things form an arrangement. Russell's answer comes to this:

> (S) Necessarily, for any *x*s, if and only if the *x*s are related to each other, there is an *A*, such that *A* is an arrangement of the *x*s.

I leave it open whether 'the *x*s' must designate more than one thing, since I leave it open whether or not an arrangement of *x being identical to x* is an arrangement of just one thing bearing identity to itself. One option is that an arrangement of *x being identical to x* consists of *x* having the property of *being self-identical*. Such an arrangement contains two things—*x* and *being self-identical*. If, instead, facts about self-identity involve just one thing, then everything counts as an arrangement, since everything is related to itself by identity.

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[19] van Inwagen, *Material Beings*, p. 20.

[20] My answer to the General Composition Question is non-reductive: a *composite* thing is anything that has parts, where "part" is taken to be a pre-philosophical, primitive term. Recall section 2.1.

[21] Russell, "On the Nature of Truth", p. 88.

One motivation behind (S) is that it provides the simplest answer to the Special Arrangement Question: every plurality of related things forms an arrangement. (Here I use the term 'thing' in the broadest sense to include any instance of any category.[22])

A second motivation for (S) is based upon the conviction that propositions should be *about* the pieces of reality that make them true.[23] Consider that if (S) is false, then there could be some related *x*s that fail to form an arrangement. Then any proposition *about* those *x*s—for example, the proposition that those *x*s are so related—would, it seems, fail to be about any arrangement that makes it true, because the *x*s it describes would not form any arrangement. Thus, aboutness considerations support (S). (This second motivation assumes that each true proposition is made true by a *single* arrangement, and some may wish to deny that.)

What about an arrangement of *everything*? Does such an arrangement include itself? Fortunately, it does not. Arrangements are (ordered) compositions, and a composition of everything is a composition of itself, since it is *identical to* itself. Moreover, just as a composition C_E of everything is identical to any sum of C_E and any of its parts, so too, an arrangement A_E of everything is identical to any arrangement of A_E and its parts. So, we need not worry that an arrangement of *all things* is included inside of itself as a proper part; it isn't.

I recommend (S), therefore, as a conceptually simple and predictively powerful answer to the Special Arrangement Question.

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[22] Thus, even if there is no such thing as *thing* (that is, there is no highest level fundamental category that encompasses all other categories—see Maitzen's "Stop Asking Why There's Anything"), we may still talk in general terms about instances (or members) of categories. Otherwise, category theory breaks down entirely; we couldn't even meaningfully say such things as "some categories have instances that others lack" or "everything falls under some category or other".

[23] See the following: Russell, *The Problems of Philosophy*, pp. 127–8; Moore, *Some Main Problems of Philosophy*, pp. 276–7; Merricks, *Truth and Ontology*, p. 173.

4. Abstract Facts among Other Kinds

A favorable consequence of the theory of arrangements is that it provides a way to account for truthmakers of propositions about abstracta. We have considered arrangements of wholly *concrete* things—such as a cat and mat. But arrangements may, in principle, also be constructed out of things that are more abstract in nature. (As mentioned earlier, I am using the term 'thing' in the broadest sense to refer to any instance of any category.) Recall from the previous section that things form an arrangement just by being related to one another. Therefore, if any abstract things are related to one another, then they, too, form an arrangement. Consider, for instance, an *argument*. It is sensible to talk about the parts of an argument: it is not uncommon to hear such things as, "the argument has several parts", "which part of the argument didn't you understand?", "some parts of the argument are more plausible than others", and so on. If arguments do have parts, they would seem to have *propositions* (bearers of truth-values) as parts. Therefore, if propositions are abstract in nature, then an argument would seem to be an arrangement of abstract things: a *valid* argument, for example, would be an arrangement of propositions bound together by logical entailment. We may call an arrangement of entirely abstract things 'an abstract structure'.

Other examples of abstract structures may include the following: an arrangement of notes in Beethoven's Eighth Symphony; an arrangement of numbers in a mathematical formula; an arrangement of lines in a shape; an arrangement of shapes and colors in a person's "visual field"; an arrangement of procedures at an annual shareholders' meeting; and so on.

At this point, some people might worry that abstract things, such as numbers, properties, and propositions, are too *abstract* to have parts or to be parts of something. Parthood applies to familiar concrete things, the worry goes, not to airy-fairy abstract phenomena.

I have two replies. First, consider that there may be different species of parthood. Remember, I am using the term 'part' in its most general sense to include constituents, pieces, ingredients, and any other part-like relation. Some philosophers may prefer to view abstract things as having *constituents* rather than as having *parts*. They are welcome to do so. If there is a part-*like* relation that abstract things can participate in, then that is good enough for our purposes.

Second, there seem to be examples of abstract things that have parts or pieces. For example, we can focus our attention on "pieces" of an argument, and when we do, we do not normally have in mind particular portions of ink on a piece of paper or chalk lines on a blackboard. We seem to have in mind something more abstract, such as something that can be expressed in different ways on different occasions. Suppose, for example, that a philosopher in China writes a book in Chinese about the first stage of John Duns Scotus' cosmological argument. If that book were translated into English, it would surely still be about the first stage of Scotus' cosmological argument. If so, then it seems that "the first stage" picks out an abstract idea or universal rather than particular concrete markings on a page. (Skeptics of abstracta will resist the considerations offered here. However, for those who already find themselves sympathetic to the reality of abstract things, my goal is to make attractive the idea that such things can have pieces, or stages, or constituents, or things that are in some significant sense part-like.)

Those who remain unconvinced may view the theory under consideration as a hypothesis about what abstract structures *would* be like were, *per impossible*, there such things.

Let us continue to catalogue different types of arrangements. Some arrangements may have a *mix* of abstract and concrete parts. Consider, for example, an arrangement in which Tom bears the exemplification relation (supposing there is such a relation) to the property of being a person. This arrangement would contain Tom and a certain property, and the arrangement would exist if and only if Tom exemplifies that property. We may call an arrangement that contains a mix of concrete and abstract things a 'heterogeneous arrangement'. Heterogeneous arrangements helpfully serve as truthmakers for true propositions of the form *x exemplifies p*, where *p* is a monadic property.

5. Identity Conditions

We may extend our understanding of arrangements by supplying so-called "identity-conditions." The question I will address in this section is roughly this: by what general principle can we say that arrangements *A* and *B* are one and the same thing, for any *A* and *B*? Let us call this question 'the Identity Question'. Our answer to the Special Arrangement Question does not answer the Identity Question, for it is consistent with the principles we have laid down that for any arrangement, there are exactly twelve (say) distinct arrangements that have the exact same parts and existence conditions.

I will seek an answer to the Identity Question that minimizes ontological complexity. As I stated at the beginning of this chapter, one of my aims is to develop a theory that does not multiply facts (arrangements) beyond necessity.

Let us begin by focusing on the familiar proposition that Tibbles is on the mat. That proposition corresponds to a piece of reality, let us say, which we may describe as *an arrangement of Tibbles sitting on the mat*. I propose that there is exactly one such arrangement,

since only one is needed. How shall we express this idea in the form of a general identity condition?

Perhaps the simplest answer is in terms of the parts of the arrangement: same parts, same arrangement.[24] But this answer is too simple, since there can be distinct arrangements having the same parts. For example, an arrangement of *Tibbles sitting on the mat* would seem to have the same parts as an arrangement of *the mat sitting on the Tibbles*, yet those arrangements are manifestly distinct. Moreover, *Tibbles sitting on the mat* is distinct from *Tibbles liking the mat*, since the one can exist without the other. Yet they have the same parts. So, uniqueness of composition doesn't hold for arrangements.

We might try to add an *existence* condition to the "same parts" condition. The arrangements just mentioned have different existence conditions: so, for example, an arrangement of *Tibbles sitting on the mat* exists even if an arrangement of *the mat sitting on Tibbles* does not. Maybe the difference in existence conditions helps explain why these arrangements are distinct. If so, then perhaps we can answer the Identity Question as follows: necessarily, if *A* and *B* are arrangements that (i) have the same parts and (ii) cannot exist independently of each other, then *A* is identical to *B*. Call this 'the extensional answer'.

Unfortunately, the extensional answer ultimately fails. The reason has to do with co-extensive relations. Consider, for example, the following propositions: <yellow is brighter than brown> and <yellow differs from brown>. If the correspondence theory is true, then these propositions should correspond to different arrangements, it seems, since they specify different relations. So, if <yellow is brighter than brown> corresponds to an arrangement of *yellow being brighter than brown*, and if <yellow differs from brown> corresponds to an arrangement of

[24] Recall that I am using the term 'part' to denote *proper* parts.

yellow differing from brown, then *yellow being brighter than brown* should be numerically distinct from *yellow differing from brown*. But the extensional answer predicts that these arrangements are instead one and the same, since they have the same parts and same existence conditions. This result doesn't seem right. So, I am compelled to look elsewhere for an answer to the Identity Question.[25]

Fortunately, I believe we can answer the Identity Question by considering how we identify particular arrangements. Take, for example, the arrangement of *Tibbles sitting on the mat*. Let us assume that locutions, such as 'the arrangement of Tibbles sitting on the mat' make sense. Then we may identify distinct arrangements by means of such locutions. So, for example, let '*A*' be an arrangement of *Tibbles sitting on the mat*, and let '*B*' be an arrangement of the *mat sitting on Tibbles*. We can see that *A* is distinct from *B* because these arrangements consist of things related in different ways: *A* consists of Tibbles bearing the sitting on relation to the mat, whereas *B* consists of the *mat* bearing the sitting on relation to *Tibbles*. In light of these examples, perhaps we can answer the Identity Question as follows:

> (I) Necessarily, arrangements *A* and *B* are numerically identical *if and only if A* and *B consist of* the same parts being related in the same way by the same relations.

I admit that the meaning of 'consists of' may not be as clear as we would like. What does it mean for an arrangement to *consist* of certain things standing in certain relations in a certain way? Perhaps the best one can do here is point to examples. I point, for example, to an arrangement of furniture that consists of *my armchair being two feet away from my couch*. Or, I draw attention to an arrangement of numbers that consists of *the number 4 being greater than the number 1*. Or, I

[25] You might wonder if the extensional answer could be repaired by adding the requirement that identical arrangements "involve" identical relations. But consider that for any pair of equivalent propositions *p* and *q*, an arrangement of *p entailing q* has the same existence conditions, the same parts and same relations as an arrangement of *q entailing p*. Yet they are distinct arrangements.

point to an arrangement of people that consists of *Sue being taller than Albert*. Or, I point to an arrangement of flowers consists of particular dandelions bearing certain spatial relations to each other. And so on. (We may suppose that arrangements that feature multiple relations and/or non-binary relations consist of compositions of simpler arrangements.) If such examples make sense, then the general condition expressed by (I) seems to make sense.

Suppose one understands (I) well enough. Then one can use (I) to explain why an arrangement of *yellow being brighter than brown* is distinct from an arrangement of *yellow differing from brown*. They are distinct because they consist of things related in a different way; that is to say, different relations figure into—are built into—the different arrangements. To be clear, each arrangement contains the same parts, and those parts are necessarily related by the relations featured by both arrangements. But what makes the arrangements distinct is that they *consist of* different relations. So, although they consist of the same related things, they consist of those things *standing in different relations*. If that makes sense, then condition (I) seems to give us a sufficiently fine-grained theory of arrangements.

Condition (I) is also good at minimizes complexity. There aren't twelve arrangements, say, picked out by the locution 'an arrangement of Tibbles sitting on the mat'. Rather, there is no more than one, just as (I) predicts.

So, it seems that (I) doesn't give us too many arrangements or too few. I suggest, therefore, that if there is a general, intelligible answer to the Identity Question, it is something in the neighborhood of (I).[26]

[26] Alternatively, readers are invited to consider Hossack's identity conditions expressed in terms of 'combination' (*ibid.*, pp. 47–55).

6. Arrangements vis-à-vis Armstrong's State of Affairs

David Armstrong gives a theory of states of affairs that is similar to our theory of arrangements. In this section, I will compare and contrast arrangements with Armstrong's states of affairs in order to showcase a certain advantage of the arrangement theory.

Let us start with Armstrong's description of states of affairs. Armstrong proposes that everything is either built up out of states of affairs or is an essential part of a state of affairs. For him, states of affairs are the basic building blocks of the world—of all that there is. He describes states of affairs in general terms as follows:[27]

> The general structure of states of affairs will be argued to be this. A state of affairs exists if and only if a particular (at later point to be dubbed a thin particular) has a property or, instead, a relation holds between two or more particulars. Each state of affairs, and each component of each state of affairs, meaning by their constituents the particulars, properties, relations, and in the case of higher-order states of affairs, the lower-order states of affairs, is a contingent existence. The properties and relations are universals, not particulars. The relations are all external relations.

Notice that Armstrongian states of affairs and arrangements are both complexes that exist by virtue of certain things being related in a certain way. Armstrong doesn't offer a precise *definition* of 'state of affairs'. Thus, he never gives a detailed answer to the General State of Affairs Question—the question of what a state of affairs is. Nevertheless, our answer to the General Arrangement Question could perhaps be given to the General State of Affairs Question.

Our theories diverge, however, when it comes to the Special Arrangement Question—the question of what things form an arrangement under what conditions. Armstrong does not think that any two related things constitute a state of affairs; thus, he does not accept the existence condition (S) as applied to states of affairs. He says, rather, that every state of affairs contains at

[27] Armstrong, *A World of States of Affairs*, p. 1.

least one *particular*, where properties and relations do not count as particulars because they are *universals*.

Why does Armstrong think that every state of affairs contains a particular? This question is important if his reasons equally apply to *arrangements*. Armstrong's central reason for infusing states of affairs with concrete particulars seems to emerge from the conviction that there is *no need* to posit states of affairs that do not contain particulars. States of affairs that contain particulars, or a mix of particulars and properties, are all that is needed to determine and thereby explain each and every truth.[28]

Should we suppose that arrangements, too, must contain particulars? I do not think we must, especially if we think that true propositions are *about* the things that make them true. Consider a true proposition that is wholly about *non*-particulars—such as the proposition that yellow is brighter than brown. That proposition would seem to be about nothing but non-particulars. So, if it is made true by something it is about, then it is presumably made true by an arrangement of nothing but non particulars. If that is correct, then there should *be* an arrangement of non-particulars. So, one important advantage of the arrangement theory is that it enables an account of *abstract* truthmakers for propositions about abstracta.

Those who are content to go without abstract truthmakers are certainly welcome to utilize a more restricted answer to the Special Arrangement Question. They may, for example, accept Armstrong's suggestion that "arrangements" must be made up of one or more concrete particulars. On the other hand, a less restricted account opens up some unique options for dealing with "negative" propositions, as we shall see next.

[28] Armstrong, "Truth and Truthmakers", pp. 8, 16.

7. Negative Facts

In this section, I will briefly survey some ways to analyze a negative fact as an arrangement. Consider this proposition: <There are no unicorns>. What arrangement might make it true? Here's one possibility. It's made true by an abstract arrangement consisting of *being a unicorn* bearing the *lacking* relation to *being exemplified*. In this case, the truthmaker is wholly abstract. It is an arrangement consisting of two properties, in which the one bears the lacking relation to the other. This account can be generalized for all negative facts: the idea is that all negative facts are relationships of things connected by the *lacking* relation.

Alternatively, one could take a more traditional line. One option is to suppose that negative existential propositions are true by virtue of their negations *not* corresponding to something. Then one could say that <There are no unicorns> is true because there are no arrangements that contain any unicorns. Another is to suppose that <There are no unicorns> is made true by an arrangement of *all* the things that are not a unicorn.[29] Or, we could make use of Armstrong's idea about *totality states* and suppose <There are no unicorns> is made true by an arrangement of all things bearing the *totaling* relation to *being a unicorn*.[30] We see, then, the theory of arrangements empowers a variety of options concerning negative facts.

8. Recap

I have presented a detailed account of the nature of facts by explaining how to think of facts as *arrangements* of things. Our account of facts has the three desirable features I mentioned at the

[29] Some will reject this option on the grounds that an arrangement of all the actual things that are not unicorns could exist even if there were unicorns outside that arrangement. This objection assumes that truthmakers must be *logically sufficient* for the truths they make.

[30] Armstrong, *A World of States of Affairs*, pp. 199–201. See also, *Truth and Truthmakers*, p 58.

start of the chapter: (i) it posits the fewest facts necessary for their assigned roll; (ii) it is expressible in ordinary and intuitively meaningful terms; and (iii) it allows true propositions to be made true by facts.[31] Moreover, by giving a theory of facts in terms of well-defined complexes of more basic items, I have eliminated the need to treat facts as a special, unanalyzable category of being. That's progress.

[31] The theory also provides a foundation for *analyzing* the correspondence between true propositions and their truthmakers, as I explain in [removed].