HOW TRUTH RELATES TO REALITY

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In what is the agreement of the thing and the proposition
supposed to consist, given that they present themselves
to us in such manifestly different ways?

—Martin Heidegger (1967, p. 180)

The sharing of properties across the divide
between abstract and concrete must have its limits.

—David Lewis (1986, p. 168)

I. INTRODUCTION

Many people think that *truth* somehow depends upon the way things are. Yet, it has proven difficult to precisely explain the nature of this dependence. The most common view is that truth depends upon the way things are by *corresponding to* things.[1] But this account relocates the difficulty: one now wonders what *correspondence* is. It is worth emphasizing that the question of how truth relates to reality is not only a question for correspondence theorists; theorists of all stripes may wonder how truth and reality connect.[2]

There are many reasons one might care to have an analysis of how truth relates to reality. Here are two. First, an analysis would help philosophers better understand *how* truth could depend upon the way things are. Why is it that when Joe shoves his cat off his pillow, the *proposition* that Joe's cat is on his pillow switches from *true* to *false*? It may seem puzzling that an abstract thing, such as a proposition, should be affected by physical changes to concrete particulars.[3] How does that happen? The difficulty of seeing just how true propositions are able to systematically relate to reality will be called "the Problem of Matching." A thorough analysis of the relationship between truth and reality would effectively solve the Problem of Matching.

A second benefit of an analysis is that it would explain why true propositions relate to *the things they do* rather than to other things. Why, for instance, should the proposition that the cat is on Joe's pillow link up with a parcel of reality consisting of a *cat* and a *pillow* rather than (say) a parcel of reality consisting of a tree and a shoe? It seems as though there ought to be an explanation here. By probing deeper into the nature of the link between truth and reality, one can better understand why propositions link up with certain things and not others.

The purpose of this essay is to make headway in developing a detailed analysis of the relationship between truth and reality. Since *correspondence* theories most directly interact with the question of how true propositions relate to the reality they describe, the paper begins by surveying and critiquing previous attempts to analyze this relationship in terms of correspondence. The paper then lays the groundwork for a new theory of correspondence.

2. Previous Theories
of Correspondence

Richard Kirkham (1992, pp. 119–120) divides theories of correspondence into two categories: in one category, there are theories that treat correspondence as a *structural* relation (what he calls "correspondence as congruence"); in the other category are theories that treat correspondence as a non-structural *correlation* between truth-bearers and pieces of reality. This section discusses representative examples in each category, beginning with Russell's congruence theory.

2.1. Russell's Congruence Theory

Bertrand Russell's congruence theory of correspondence is the progenitor of nearly all other structural accounts. A succinct statement of the theory is as follows: a truth-value bearer (which Russell takes to be a belief) "corresponds to" a piece of reality if and only if (i) the truth-value bearer specifies how certain objects are related to each other, and (ii) those objects are, in fact, so related.

To illustrate Russell's theory, consider the belief that Desdemona loves Cassio. Russell says this belief "has" the following objects: Desdemona, loves, and Cassio. The belief, Russell says, is a complex item that consists of these objects plus a mind bound together by a four-term relation. This belief is *true* if and only if there is another complex item that consists of those same objects united together by a three-term relation. Thus, Russell explains, "if Othello believes *truly* that Desdemona loves Cassio, then there is a complex unity, 'Desdemona's love for Cassio,' which is composed exclusively of the *objects* of the belief" (1912, p. 128).

That's a start. But the examples themselves do not constitute a general statement of the theory—a statement of the form "*x* corresponds to *y* ↔ . . .." Perhaps the clearest statement of Russell's theory comes from Kirkham (1992). Kirkham expresses Russell's theory as follows (p. 124):

(R) *b* is true [corresponds to something] ↔ There is an *x*, *y*, and *R* such that (i) *b* is the belief that *x R y*, and (ii) *x R y*.

Kirkham gives the following translation: "For any belief, the belief is true if and only if there [is] some object *x*, some object *y*, and some relation *R*, such that the belief is the belief that x has relation *R* to *y*, and *x* does have relation *R* to *y*" (1992, p. 124).

There are a couple of technical problems with (R). First, '*R*' is used as both a quantificational variable *and* as a predicate variable. One could, perhaps, avoid this syntactical problem by replacing '*x R y*' with '*x* stands in *R* to *y*.'[4] But there is a more serious problem: (R) is restricted to beliefs about exactly two things. To see why this is a problem, suppose, for instance, that Sarah has the true belief that Fido ran into a cat while chasing a Frisbee. Sarah's belief comes out *false* on (R) for the simple reason that her belief is not a belief that *just one* thing stands in a relation to *just one* other thing. Sarah's belief is more complex. One way to solve this is to replace (R) with the following:

(R_2) *b* is true [corresponds to something] ↔ There are some *x*'s, and there is an *R* such that (i) *R* is an n-place relation, (ii) *b* is the belief that the *x*'s stand in *R*, and (iii) the *x*'s stand in *R* to one another.

Notice that (R_2) allows true beliefs to be about more than two things. However, there is now a new problem of specifying the *order* in which the *x*'s stand in *R*. Take a simple example: the belief *b* that the cat is sitting on the mat. According to (R_2), *b* is true if and only if there is a certain relation *R*, such that the cat and the mat stand in *R*. The problem now is in identifying what *R* could be. One might have thought that *R* was the relation of *sitting on*. But it is not: the cat and the mat would stand in the *sitting on* relation *even if* the mat and the cat were to switch places so that the mat is now sitting on the cat. Hence, *sitting on* is not a relation that the cat and the mat stand in just

if *b* is true. This is the problem of order.[5] And Russell offers no clear directions for solving it.[6]

Russell does say that one can specify the order of items by the order of words in a sentence (1912, p. 126). For example, one indicates the order in which the cat and the mat stand in the *sitting on* relation by saying "the cat is sitting on the mat." That is true. But the examples do not add up to a statement of what it means *in general* for things to be related to each other in a certain order.

To give a general statement that expresses *order*, one might try something like this:

> (R₃) *b* is true [corresponds to something] ↔ There are some *x*'s, there is an *R*, and there is an *O* such that (i) *R* is an n-place relation, (ii) *b* is the belief that the *x*'s stand in *R* to one another in order *O*, and (iii) the *x*'s stand in *R* to one another in order *O*.

This definition could work if one takes "order" as a primitive. However, ordinary talk about order seems to be translatable into talk about relations: when people say "the names are in alphabetical order," they mean "the initial letters of each name on the list appear *earlier* in the alphabet than the initial letters of the names below"; when people say "get in line in order of height," they mean "get in line so that you are *shorter than* [or: taller than] the person behind you"; when people say "consider the order of events," they mean "consider which event came *earlier than* [or: later than] which." It seems that in general, talk of "order" can be unpacked as talk about relations. If that's so, then one should be able to unpack (R₃) into talk about relations. But that hasn't been done, and it is far from clear how it could be done.

One might try to unpack "order" in terms of *sequences* (i.e., ordered lists), perhaps as follows:

> (R₄) *b* is true [corresponds to something] ↔ 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, (ii) *b* is the belief that $x_1 \ldots x_n$ stand in *R* in the order expressed by *S*, and (iii) $x_1 \ldots x_n$ stand in *R* in the order expressed by *S*.

However, "the order expressed" is still undefined. According to Russell's congruence theory, a belief is true because the order of the things in the world matches the order of the things in the belief. The problem is that one cannot discover the order in which things in the world are related merely by writing names of those things next to each other in a sequence. Perhaps there is a way around this. But if there is, it is not easy to identify. (Incidentally, the theory to be given in this paper might be thought to be an extension of Russell's basic idea.)

2.2. Neo-Russellian Theories

There have been various proposals for how to modify Russell's theory.[7] Consider an example given by Andrew Newman (2002), which is representative of other neo-Russellian proposals. Newman expresses his theory in this way (p. 119):

> A subject's predicative belief is true if and only if:
>
> (1) The particulars that the subject is thinking about and the relation that the subject thinks of them actually form a fact [alternatively: the particles instantiate the relation *R* that the subject thinks of them].
> (2) In the case of an asymmetric relation, the order of the particulars that the subject is thinking about in the belief fact reflects the order of the particulars in the object fact.

Put a little more succinctly:

> (N) *b* is true [corresponds to something] ↔ There are *x*'s, and there is an *R* such that
>
> (i)   *b* is a belief about the *x*'s standing in *R;*
> (ii) the *x*'s form a fact [alternatively: the *x*'s instantiate *R*]; and
> (iii) *R* is asymmetric → There is an order *O*, such that (*b* is a belief about the *x*'s standing in *R* in *O*, and the *x*'s form a fact whose elements reflect *O*).

One favorable feature of this account (among others) is that it allows a belief about more than two things to be true—unlike the first formulation of Russell's account.

But notice that this account uses the term "order." As suggested earlier, "order" talk is evidently shorthand for talk about relations. Thus, it seems that people understand (N) only if they can unpack it as a statement about relations. No one has done that, however. Readers are welcome to try themselves, but as it is, (N) leaves "order" as an undefined primitive.

Newman's theory is certainly an improvement over Russell's original, rougher statement. Still, it would be more satisfying if *all* the technical terms in the analysis could be precisely defined. Moreover, the inability to define 'order" can fuel doubts about the intelligibility of "correspondence" between truth and reality. Therefore, it will be worth considering proposals that are not expressed in terms of "order."

2.3. Austin's Correlation Theory

Some theories treat correspondence as a *non*-structural link between truth-bearers and reality. Perhaps the most famous correlation theory comes from John L. Austin (1950). He proposes that the relation of correspondence should be analyzed in terms of the *reference* of words. Words refer, he says, by virtue of arbitrary linguistic conventions. Austin suggests that truth-bearers do not, in general, bear a structural relation to the things they correspond to because truth-bearers are words stated (i.e., statements), and statements of *any* complexity or structure may correspond to any given thing just by virtue of being stipulated to refer to that thing.[8] If he is right, then correspondence does not consist in a structural relation; rather, it consists in a non-structural semantic link of some sort. His theory can be put most simply as follows:

(A) s corresponds to $x \leftrightarrow s$ refers to x.[9]

What exactly might it mean for a statement to *refer to* something? It may be clear enough what people mean when they say that a particular *term*, such as "that chair," refers to something. But what does it mean to say that a *whole statement* (such as Joe's utterance of "that chair is red") refers to something? One clearly does not make a chair red merely by *stipulating* that "that chair is red" refers to something. So, what is the nature of reference here? That is not clear.

Suppose one treats "refers to" as primitive. Then the question arises as to why and how statements *refer* to the things they do. In the absence of further analysis, it seems that replacing "corresponds to" with "refers to' merely re-labels the mystery at hand.

One might try to clarify things by defining what it means for a *statement* to refer to something *in terms of* its constituent words referring to something. In that case, the theory at hand would no longer be a mere correlation theory: correspondence would involve structure. But then there is this problem: a general definition of this sort cannot be given, even in principle, since the rules governing semantic composition are themselves *contingent*, linguistic conventions. Facts about the meaning or reference of words do not sufficiently explain why any particular string of words happens to *accurately* describe reality. Accuracy and reference are different matters.

Furthermore, there is still the challenge of defining what it means for terms to relate to each other in a certain "order'" Defining "order" is necessary in order to explain how the word order helps determine the referent of the sentence containing those words. Thus, it appears that analyzing correspondence in terms of reference is no easy task, and Austin's attempt leaves key terms undefined.

2.4. Contemporary Correlation Theories

There have been important developments in correlation theories since Austin first proposed his theory. But such theories still leave open certain questions concerning how to analyze the nature of the correlation relation. Consider a few examples.

First, there is the proposal that a proposition "corresponds to" reality by virtue of bearing a certain relation to something that obtains.[10] Kirkham (1992, p. 132) suggests that this idea captures the essence of the correspondence theory. One version of this proposal is as follows:

> (K) *p* corresponds to something ↔ There is an *s* such that (*p* expresses *s*, and *s* obtains).

Here the correspondence relation has been analyzed in terms of "expresses" and "obtains."

Unfortunately, this analysis does not suffice for the purposes of this paper because (K) exchanges the mystery of *truth* for the mystery of *obtaining*. The aim of this paper is to understand how reality determines truth. Jane makes a paper airplane and sets it on her desk. Instantly, the *proposition* that there is a paper airplane on Jane's desk becomes *true*. Why is that? Why does a change in reality cause a change in a proposition? If one answers this question in terms of obtaining states of affairs, *then* the task of this paper will be to unravel why it is that when Jane puts a paper airplane on her desk the *state of affairs* of there being a paper airplane on Jane's desk instantly gains the property of *obtaining*. The link between obtaining and reality is no less mysterious than the link between truth and reality. The original question remains: how does truth ["obtaining"] relate to reality? The "states of affairs" answer does not answer the central question of this paper.[11]

Second, one could analyze correspondence in terms of *truthmakers*: *p* is true if and only if *p* has a truthmaker.[12] But doing so still leaves the mystery unresolved. The central question of this paper is "How are truths related to reality?" That question can now be rephrased: what is this truth-*making* relation? The goal of this paper is to make further progress in answering this deeper question.

As a final example, consider George Englebretsen's correlation theory (2006), which is perhaps the most helpful and detailed cor-relation theory to date. A key component of his theory is the hypothesis that a proposition is true if and only if that proposition *corresponds* to a property of the world—that is, a property that's "signified" by the sentence that expresses the proposition (pp. 123–124). But even here, Englebretsen does not provide an analysis of the correspondence relation. He offers analogies to help elucidate what he has in mind: for example, an address "corresponds" to a house. But in the end, he confesses that he takes correspondence to be primitive.[13]

Englebretsen's account does provide insight into the nature of truth and its link with reality. But the goal of this paper is to see if one can go deeper in explaining the nature of correspondence. The goal is to develop a theory that analyzes correspondence in more basic terms, if that's possible.

The heart of the problem with correlation theories in general is that they do not go far enough in explaining the *nature* of the relation between truth and reality—whether the reality in question is a truthmaker, state of affairs, trope, or something else. There is a correlation, but what is its nature?

3. PROPOSITIONS AND FACTS

To make further progress in understanding the link between truth and reality, it will help to have an account of truth-value bearers (propositions) and of the pieces of reality (the "facts") they describe.

This paper shall present a *structural* account of how truths relate to pieces of reality. Therefore, as a working hypothesis, it will be convenient to treat propositions and the pieces of reality they describe as *arrangements*. At an intuitive level, the meaning of "arrangement" is perhaps clear enough. But to be clearer, the meaning of the term is stipulated as follows: an arrangement is a complex thing,[14] whose existence depends upon its parts (or constituents) bearing certain relations to one another.[15] (An exact, technical definition is given in the Appendix.) Arrangements—unlike

Armstrong's states of affairs—may contain solely abstract entities: for example, there can be a wholly abstract arrangement consisting of the number 6 bearing the greater than relation to the number 4. The hypothesis on the table is that, in general, any related things from any ontological category form an arrangement.

The next hypothesis is that propositions are arrangements of *properties* (else: concepts) of a certain sort: specifically, properties that are unique to something. To illustrate the account, consider the proposition that Tibbles is on Joe's pillow. That proposition is an arrangement consisting of a property that only Tibbles can have (such as *being Tibbles*) and a property unique to the pillow that Tibbles happens to be on (such as *being that particular pillow*). Or, take a general proposition: <every emerald is green>. That proposition reduces to <*being an emerald* implies *being green*> and so contains a property that is (essentially) unique to *being an emerald* and one that is (essentially) unique to *being green*. Or, consider this quantificational proposition: <some people are happy>. It reduces to <*personhood* is jointly exemplified with *happiness*> and so contains properties unique to personhood and happiness. An entire paper could be devoted to discussing potentially tricky cases, but working out the details is not crucial to the overall strategy of treating propositions as organizations of properties/concepts/terms.

It should be emphasized that the goal of this paper is to provide a theory of correspondence whose core components may be adapted to a variety of metaphysical frameworks. Theorists of all stripes may benefit from the thought that propositions are arrangements of things of some sort or other—be they arrangements of words, concepts, or whatever. So although this paper treats propositions as arrangements of properties, alternative accounts may work, too.

A "piece of reality" (or fact) is simply an arrangement that is describable by a proposition. The question to be addressed next is this:

how might a proposition *accurately* describe (or correspond to) a piece of reality?

4. THE NATURE OF CORRESPONDENCE

It is now time to present an analysis of the relationship between truth and reality. To begin, here is a non-technical statement of the analysis: a proposition "corresponds to" something—and so is *true*—by virtue of its exemplifiable parts being exemplified by parts of an arrangement *in the right order* (where 'the right order' is implicitly defined in the details given next). Here is an unpacked statement of the analysis just given: a proposition p corresponds to an arrangement A if and only if (i) for each exemplifiable part of p, there is a part of A that exemplifies it, (ii) the proposition that A exists entails p, and (iii) every part of A is part of a composition that overlaps exactly those things that exemplify part of p. The purpose of condition (ii) is to express the sense in which the parts are arranged in the right order (without using the term 'order'). Condition (iii) ensures that propositions correspond to at most one arrangement, in particular the *smallest* arrangement that meets (i) and (ii).

It is now time to give the precise, technical formulation of the theory. Readers who feel they understand the statements above well enough are welcome to skip ahead. The technical statement is as follows:

(C») p corresponds to $x \leftrightarrow$

(i) For all q, if q is part of p and possibly, there is something that exemplifies q, then part of x exemplifies q.

(ii) <x exists> entails p, where '< . . . >' abbreviates "the proposition that . . ."

(iii) For all z, if z is part of x, then z is part of a composition of things that exemplify part of p (where 'x is a composition of the y's' is defined in terms of 'is part of' in the Appendix, section A).

The following endnote contains a symbolic formulation.[16]

The analysis is admittedly complex. But in light of the historical struggle to analyze the relationship between truth and reality, one might expect an adequate analysis to be complex.

Consider the following terms used to express (C»): "is part of," "exemplifies," "entails," and "the proposition that . . ."[17] The term "is part of" is meant to convey a familiar relation that people express with ordinary uses of the term, as in, "Sue's brain is an important part of her body," or "this is Sam's favorite part of the song." The meaning of the term is supposed to be the most general meaning of "part" as the term is used in ordinary language: parts may include constituents, pieces, ingredients, members, or any part-*like* thing.[18] The notion of parthood appears to be a term that people grasp pre-philosophically, which is not to say that the nature of parthood cannot be further analyzed or investigated.

The term "exemplifies" means whatever people mean by "has" when they say such things as, "this painting has striking features," or "Alex's brother has almost none of the attributes of his sister." The notion of *having* (as in having attributes) also appears to be a pre-philosophical one that people readily grasp.

The third term is "entails," which means "necessitates," as in, "if twenty people just entered the bus, then that *necessitates* that more than ten people just entered the bus." It is plausible that the notion of *necessitates* is pre-philosophical. But in case that's a mistake, a further definition of "entails" will be given later (in section 7).

Finally, there is "the proposition that . . ." One may identify propositions as things that *entail* things, for every proposition entails at least one proposition, and no non-propositions entail anything (except perhaps in a derivative sense[19]). Moreover, it seems people have a pre-philosophical grasp of such locutions as "the proposition that snow is white"; so, the term "proposition" may be clear enough even without a definition.

Of course, philosophers may wish to have deeper definitions of all of these terms. But analysis has to stop somewhere. If one stops here, one will still have made considerable progress: one will have discovered an account of correspondence that's expressible in terms that are pre-philosophically familiar. That's a step forward. And further steps may follow.

The theory can be modified to accommodate a variety of views of propositions. This paper illustrates a general *strategy* for analyzing correspondence in terms of arrangements. Therefore, philosophers may regard (C») as an instance of a general schema for structural theories of correspondence. Those who prefer to analyze truth-value bearers as arrangements of *concepts*, for example, could adapt (C») to suit their understanding of propositions by replacing occurrences of "exemplifies" with "is picked out by"; those who prefer to analyze truth-value bearers as arrangements of *words* may replace occurrences of "exemplifies" with "is referred to by." The theory is adaptable to many frameworks.

5. Test Cases

A few examples will bring the theory of correspondence to life. Consider, first, the proposition that Tibbles is on Joe's pillow. That proposition is an arrangement consisting of a certain property of Tibbles (*being Tibbles*) and a certain property of a particular pillow (*being this pillow of Joe's*). If that proposition is true, it *corresponds to* an arrangement *A* that consists of Tibbles bearing the *on top of* relation to Joe's pillow. According to (C»), the proposition *p* that Tibbles is on Joe's pillow accurately describes (i.e., *corresponds to*) *A* because: (i) each exemplifiable part of *p* is exemplified by part of *A* (that is, Tibbles exemplifies *being Tibbles*, and Joe's pillow exemplifies *being this pillow of Joe's*); (ii) the proposition that *A* exists entails *p*; and (iii) *A* is the smallest arrangement that meets (i) and (ii).

Consider next a mathematical proposition: the proposition that 3 > 2. That proposition is

an arrangement of *essences* of the numbers 3 and 2, and the arrangement it corresponds to is an arrangement of the numbers themselves. Both arrangements are abstract (one might think), but the arrangement of numbers may be considered more fundamental because it "grounds" the truth of the proposition that 3 > 2. The proposition corresponds to the arrangement in question because: (i) the constituent parts of that proposition are exemplified by the parts of the arrangement of 3's being greater than 2; (ii) the sheer existence of that arrangement logically necessitates that 3 > 2; and (iii) the arrangement is the "smallest" arrangement that meets the first two conditions.

(C») can also handle the notorious *negative existential* propositions—propositions that report what does not exist. Take, for example, <Socrates does not exist>. One option is to reduce this proposition to <<Socrates exists> lacks truth>. Here, <Socrates does not exist> would correspond to an arrangement consisting of a *proposition* bearing the lacking relation to the property of being true. Alternatively, one may take a traditional line and suppose that negative existential propositions are true by virtue of their negations *not* corresponding to something: there are no arrangements that contain Socrates (assuming Socrates does not exist); therefore, the negation of <Socrates does not exist> fails to correspond to anything. Or, one could suppose that <Socrates does not exist> corresponds to an arrangement of the actual world bearing the lacking relation to the property of *including Socrates*. Thus, (C») enables a variety of accounts of correspondence for "negative" propositions. (Readers are invited to see how (C») might work with various other examples.)

6. Desirable Results

Consider three desirable results of (C»). First, (C») guarantees something that many truth theorists have believed (or hoped was true): it guarantees that a true proposition cor-

responds to an arrangement that has parts (or constituents) that the proposition is intuitively *about*. For example, <Tibbles is on Joe's pillow> is intuitively about a particular cat and a particular pillow. Many theorists have thought that a proposition corresponds only to things it is about—things that it, in some sense, describes.[20] These theorists will be inclined to think, therefore, that whatever <Tibbles is on Joe's pillow> corresponds to, it should, in some sense, be built out of a cat and a pillow. Principle (C») implies that <Tibbles is on Joe's pillow> corresponds to an arrangement of Tibbles and Joe's pillow because <Tibbles is on Joe's pillow> includes properties that are (essentially) unique to Tibbles and to Joe's pillow. One may then suppose that <Tibbles is on Joe's pillow> is *about* Tibbles and Joe's pillow by virtue of including properties that are (essentially) *unique* to those things.[21] Hence, the proposition corresponds to an arrangement of things it is about. By explaining how propositions can correspond to things they are about, one can thereby explain why propositions correspond to the things they do. Thus, a longstanding mystery concerning correspondence is unraveled.

Second, (C») provides a way to address the Problem of Matching. The problem, recall, results from considering how propositions might be able to correspond to things so different in nature from themselves. (C») solves that problem because it analyzes correspondence in terms of parts of a piece of reality *having* the properties included within a proposition, and people seem to have a pre-philosophical understanding of what it means for something to *have* properties. Therefore, in light of (C») it is no more (or less) mysterious that propositions should be able to link up with certain arrangements than that things should be able to have properties.

Third, (C») explains how there can be "truthmakers" for true propositions. A principle motivation for the correspondence theory is the feeling that truths should be

grounded in (or made true by) the existence of things in the world. (C») allows there to be truthmakers because it implies that each true proposition corresponds to an arrangement whose existence necessitates the truth of that proposition.[22]

Note that the theory given is only a first step. It does not answer every question one might have about truth's relation to reality, but it provides a fertile foundation for further progress.

7. AVOIDING CIRCULARITY

(C») analyzes "correspondence" in terms of "entails," but someone might worry that "entails" can only be analyzed in terms of "true" as follows: 'x entails y' $=_{def}$ 'necessarily, if x is true, then y is true'. Since "true" is to be analyzed in terms of "correspondence," one might worry that "true" is ultimately analyzed in terms of itself, which is circular.

One response is to suppose that the meaning of "entails" can be grasped independently of one's grasp of the meaning of "true." But to be safer, here is a stipulated definition of "entails" that is not in terms of "true":

> (E) 'x entails y' $=_{def}$ 'For all z, if z is a *maximal proposition* and x is part of z, then y is part of z', where

> 'z is a maximal proposition' $=_{def}$ 'z is possible, and for all w, if z is part of w, then w is not possible.'

(E) is expressed in terms of "is possible" and "is a part of." These appear to be ordinary, pre-philosophical terms, and so one may treat them as primitives here (even if they can be analyzed further).

Someone might object that "x is possible" is not intelligible unless it is unpacked as either "x is possibly true" or "x possibly exists." Consider, however, that "possibly true" and "possibly exists" both contain the term "possibly." This is a powerful clue that "possibly" has a meaning that's *prior to* the meaning of

those two expressions.[23] Moreover, talk of possibilities is common in ordinary language. People say "the extinction of cheetahs is possible." That's perfectly intelligible, it seems, without unpacking "is possible."[24] (None of this is to suggest that the nature of possibility cannot be further analyzed.)

(E) makes use of *maximal* propositions. An example of a maximal proposition would be the conjunction of all true propositions. Such a proposition is maximal because it includes all propositions compatible with it by including each proposition or its negation. In the Appendix, it is shown that if every proposition that is possible is indeed part of a maximal proposition, then (E) has the correct extension—that is to say, (E) predicts that for any propositions p and q, p entails q if and only if it is necessary that if p is true, then q is true.[25]

8. RECAP

This paper has articulated the first complete analysis of the relationship between truth and reality in ordinary, pre-philosophical terms. A summary of the analysis is this: a proposition p is true if and only if there is something A, such that the exemplifiable parts of p are all exemplified by parts of A, the proposition *that A exists* entails p, and nothing smaller than A meets the preceding conditions. As discussed, the analysis has the following desirable results: it (i) enables true propositions to correspond to the things they are about, (ii) explains how propositions can correspond to things so very different from themselves, and (iii) allows there to be *truthmakers* for true propositions (including negative existentials). The analysis can also be adapted to a variety of views of propositions and facts. Thus, the analysis provides a foundation for better understanding the link between truth and reality.

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NOTES

1. According to *The PhilPapers Surveys* (2009), 50.8 percent of philosophers surveyed accept or lean toward a correspondence theory of truth. http://philpapers.org/surveys/.

2. According to *coherence* theorists, truths are true by relating to other propositions or beliefs; for *identity* theorists, truths relate to themselves; for some *deflationary* theorists, truths relate to pieces of language. On each theory, one can still ask how truths relate to the things in "reality" that they seem to describe.

3. See Heidegger (1967), pp. 78–79; cf. Lewis (1986), p. 180.

4. That is not to say there cannot be a remaining worry about intelligibility: one might wonder whether such phrases as 'the *x*'s stand in *R*' makes any more sense than 'a*R*b', considering that 'the *x*'s stand in *R*' combines the relational terms, '*R*' (used as a variable) and 'stands in' (used as a predicate).

5. Nicholas Griffin calls it "the direction problem" (1985), p. 219.

6. Pincock (2008) insightfully suggests how Russell might address the order problem with respect to certain true beliefs. But the deeper problem is in stating, in general terms, a definition of '*x* is true' that expresses the order of the items in the complex that make *x* true. That has not been done.

7. Some examples include Prior (1967), p. 229; Sainsbury (1979), pp. 64–65; Griffin (1985); and Boër (2002).

8. There is already a difficulty. Suppose Pete declares that his wallet refers to the proposition that *every proposition Pete's wallet refers to is not true*. If that stipulation succeeds, then the proposition Pete's wallet refers to is true if and only if it is not true.

9. Those who think that the primary truth-value bearers are things that are expressed by sentence tokens might prefer this definition: *p* corresponds to $x \leftrightarrow \exists s$ (*s* expresses *p* & *s* refers to *x*).

10. See Kirkham (1992), p. 132; Chisholm (1977), p. 138; David (2009).

11. There are other drawbacks as well. First, (K) complicates one's ontology: it would be simpler if talk about things that obtain and talk about things that are true were both ultimately talk about things that belong to the same basic category (from two perspectives, say). The complexity here could be considered a cost of the account. Second, someone might think that propositions that describe *concrete* things should link up with *concrete* pieces of reality; that person would object, then, to the hypothesis that *all* propositions, including ones about concrete things, correspond to abstract states of affairs. (But for an opposing view, see Englebretsen 2006, pp. 107–140.) Third, (K) replaces the term "corresponds" with "expresses," and one might object that the meaning of "expresses" is no clearer than the meaning of "corresponds to." If one may treat "expresses" as primitive, why not treat "corresponds to" as primitive? The answer is far from clear.

12. Notable defenses and discussions of truthmaker theory include Armstrong (2004) and Lowe and Rami (2009).

13. E-mail correspondence, July 15, 2011.

14. A "complex thing" is something that has (proper) parts or constituents.

15. The term "part" is being used in its most general sense to include constituents, pieces, ingredients, members, and any other part-like relation. Some philosophers may prefer to view propositions as having *constituents* rather than as having *parts*. They are welcome to do so. If there is a part-*like* relation that propositions can participate in, then that is good enough for the purposes of this paper.

16. (») *p* corresponds to $x \leftrightarrow$

    (i) $\forall q$ ((*q* is part of *p* & $\Diamond \exists r$ (*r* exemplifies *q*)) $\rightarrow \exists s$ ((*s* is part of *x*) & *s* exemplifies *q*)).

    (ii)   <*x* exists> entails *p*.

(iii) $\forall z$ ((z is part of x) → ($\exists h$ (h is part of p & z exemplifies h) ∨ $\exists w \exists g$s($\forall t$ ((t is one of the gs) ↔ ($\exists i$ (i is part of x & t exemplifies i))) & w is a composition of the gs & z is part of w)).

17. No comments are given about the logical terms or the term "exists," for their intended meanings are likely clear enough.

18. Thus, the notion of "part" here is broader than mereological terms that show up in standard compositional views. Cf. Bynoe (2011).

19. For example: one may say that *shape* entails *size* because for any x, the proposition that x has shape entails the proposition that x has size.

20. See, for example, Russell (1912); Moore (1953), pp. 127–129; and Merricks (2007), p. 173.

21. More generally: 'x is about y' $=_{def}$ '$\exists p$ (p is part of x & (($\exists z$ (z exemplifies p)) → ($z = y$))'. Alternatively: 'x is about y' $=_{def}$ '$\exists p$ (p is part of x & □ (($\exists z$ (z exemplifies p)) → ($z = y$))'.

22. The account also serves as a foundation for "building block" theories of meaning and reference. A proposition may contain "meanings" of terms by containing properties. Terms joined together to express a proposition may then *refer* to things that have the properties expressed by those same terms. One avoids the modal problems of traditional descriptivist theories of meaning by requiring that the "meanings" be properties that are necessarily *unique* to a thing. One also avoids certain objections to rigidification views (that index descriptions to the actual world, for instance) since meanings have not been indexed to a world. (See Soames 2002, pp. 18–95, for some forceful objections to rigidification views.) More importantly, one will have enabled an explanation of the relationship between referents of terms and the fact to which a proposition corresponds. Thus, the account given by this paper accomplishes something Davidson (1977, p. 253) said couldn't be done: the account makes way for a non-linguistic, building block characterization of reference.

23. One may explain the relationship between "possibly true," "possibly exists," and "possible" as follows: 'x is possibly true' is short for '(x is true) is possible,' and 'x possibly exists' is short for '(x exists) is possible.'

24. Alternatively, one may unpack 'p is possible' as 'p is included in a maximal, *consistent* proposition' and then treat 'consistent' as primitive.

25. For a set-theoretic argument in support of the thesis that every proposition is contained within a maximal proposition, see Pruss (2011), pp. 157–158.

26. This definition is equivalent to Peter van Inwagen's (2006) definition of 'x is a mereological sum of the y's' in "Can Mereological Sums Change Their Parts?" (pp. 616–617).

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APPENDIX OF DEFINITIONS AND DEMONSTRATIONS

A. *Definition of "arrangement"*

(A_3) *A* is an arrangement of the *x*'s' $=_{\text{def}}$ there are some *x*'s and some *R*'s, such that:

(i) *A* is a composition of the *x*'s, and

(ii) there is a *p* and a *q*, such that *q* is the proposition that *A* exists, *p* entails *q*, *q* entails *p*, and *p* *specifies a way in which the x's stand in the R's*, where

SPECIFIES: '*p* specifies a way in which the *x*'s stand in the *R*'s' $=_{\text{def}}$

(i) for all *r*, if *r* is one of the *R*'s, then there is an *a* and a *b*, such that *a* and *b* are each one of the *x*'s, and *p* entails that *a* stands in *r* to *b*, and

(ii) for all *a*, if a is one of the *x*'s, then there is an *r* and a *b*, such that *r* is one of the *R*'s, *b* is one of the *x*'s, and either *p* entails that *a* stands in *r* to *b*, or *p* entails that *b* stands in *r* to *a*.

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

that: (a) *w* is one of the *y*'s, and (b) there is a *u*, such that (either *u* is part of *z* or *u* is identical to *z*) and (either *u* is part of *w* or *u* is identical to *w*).'[26]

B. *Summation Principles for Propositions*

(Sum) ($\forall x$'s) if the *x*'s are propositions, then $\exists y$ (*y* is a proposition, *y* is a composition of the *x*'s, and *y* is a conjunction of the *x*'s).

(Maximal) ($\forall x$) if *x* is possible, then $\exists y$ (*x* is part of *y*, and *y* is a maximal proposition), where '*y* is a maximal proposition' $=_{\text{def}}$ '*y* is possible, and for all *z*, if *y* is (a proper) part of *z*, then *z* is not possible.'

C. *The Extension of Entailment*

The stipulated definition of "entails":

(E) '*x* entails *y*' $=_{\text{def}}$ '$\forall(z)$, if *z* is a maximal proposition and *x* is (a proper) part of *z*, then *y* is (a proper) part of *z*' (where "maximal proposition" is defined in section B).

To show that (E) has the correct extension, it suffices to prove the following theorem:

Theorem 1: $\forall(x)(y)$ (*Entails*(*x*, *y*) $\Leftrightarrow$ *Entail's Extension*(*x*, *y*)), where

Entails(*x*, *y*) = $\forall(z)$ if *z* is a maximal proposition that contains *x*, then *z* contains *y*,

and

Entail's Extension(*x*, *y*) = $\forall(z)$ if *z* is a possible world that entails *x*, then *z* entails *y*, where a possible world *o* is a proposition that (i) can be true and (ii) such that $\forall w$ (if *w* is a proposition, then either *o* entails *w*, or *o* precludes *w*).

The proof of Theorem 1 begins with a proof of the following lemma:

Lemma 1: $\forall(x)\forall(y)$ *Entails*(*x*, *y*) $\Rightarrow$ *Entail's Extension*(*x*, *y*).

Proof. Suppose Lemma 1 is false. Then, there is an *x* and a *y*, such that *Entails*(*x*, *y*) is true but *Correct Extension*(*x*, *y*) is not. That is to say, for some *x* and some *y*, there is a possible world *w* that entails *x* but not *y*.

Now there is a maximal proposition *w** that contains *w* (given (Maximal)). It will now be shown that *w** also contains *x*. Suppose *w** doesn't contain *x*. Then the conjunction of *w** and *x* is impossible (given that *w** is maximal). But the conjunction of *w** and *x* is *not* impossible, as will be explained. Consider first that *w* is part of *w** (see above). This means that *w** entails *w* (because all conjunctions entail each of their conjuncts, and *w** is the conjunction of the propositions it contains). *w* entails *x* (see above). Therefore, *w** entails *x* (by transitivity of entailment). Therefore, *w** entails the conjunction of *w** and *x* (because it entails both conjuncts). *w** is possible (by definition). No possible proposition entails an impossible proposition. Therefore, the conjunction of *w** and *x* is not impossible, which contradicts the previous statement that it is impossible. Therefore, the supposition that *w** doesn't contain *x* is false. Therefore, *w** contains *x*.

Now if *Entails* is true, then every maximal proposition that contains *x* also contains *y*. Therefore *w** contains *y*. Since *w** also contains *w*, it follows that *w* and *y* are compatible. *w* either precludes *y* or entails *y* (by definition). *w* doesn't preclude *y* (because it's compatible with *y*). Therefore, *w* entails *y*. But this contradicts the supposition that *w* doesn't entail *y*. Therefore, the starting supposition that Lemma 1 is false is itself false. Therefore, Lemma 1 is true.

Next, the following lemma will be proven:

Lemma 2: $\forall(x)\forall(y)$ *Entail's Extension*(*x*, *y*) $\Rightarrow$ *Entails*(*x*, *y*).

Proof. Suppose Lemma 2 is false. Then, there is an x and a y, such that *Correct Extension* is true but *Entails* is not. Therefore, for some x and some y, there is a maximal proposition w^* that contains x without containing y. It follows that the conjunction of w^* and y is impossible (given that w^* is maximal). But it will now be shown that the conjunction of w^* and y is not impossible if *Correct Extension* is true. First, w^* contains x and therefore it entails x (because all conjunctions entail each of their conjuncts, and w^* is the conjunction of the propositions it contains). If *Correct Extension* is true, then x entails y. Therefore, w^* entails y (by transitivity of entailment). Therefore, w^* entails the conjunction of w^* and y (because it entails both conjuncts). w^* is possible (by definition). No possible proposition entails an impossible proposition. Therefore, the conjunction of w^* and y is not impossible. Therefore, that conjunction is possible, which contradicts the previous statement that it is impossible. Therefore, the supposition that Lemma 2 is false is itself false. Therefore, Lemma 2 is true.

Theorem 1 is the conjunction of Lemma 1 and Lemma 2.