

Facts: Particulars or Information Units? ¹

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June 2001

Why are the same intellectual battles fought over and over again? Why aren't there arguments good enough to settle those debates once and for good?

What are facts, situations, or events? When Situation Semantics was born in the eighties, I objected because I could not swallow the idea that situations might be chunks of information. For me, they had to be particulars like sticks or bricks. I could not imagine otherwise. The first manuscript of "An Investigation of the Lumps of Thought" that I submitted to Linguistics and Philosophy had a footnote where I distanced myself from all those who took possible situations to be units of information. In that context and at that time, this meant Jon Barwise and John Perry.

I eventually met Jon Barwise at a colloquium at MIT. When we had a drink together afterwards, he asked me: "Why did you put that footnote in your paper?" I don't remember what I replied, but Jon invited me to Stanford for a talk. I accepted the invitation. I have been ashamed about the footnote ever since. I took it out. It never made it into the printed version of my paper. However, I am sad that I was never able to pay back Jon's generosity. I want

1. This paper is a completely revised version of my "How Specific is a Fact?", which appeared in the Proceedings of the Conference on Theories of Partial Information held at the Center for Cognitive Science, University of Texas at Austin, January 25 -27, 1990. I want to thank Thomas Ede Zimmermann, Irene Heim, and in particular two anonymous reviewers for Linguistics and Philosophy for comments and suggestions that were so substantial that it took me 10 years to digest them. The topic I am dealing with here might be around forever, though. Why hurry, then?

to dedicate this paper to his memory. He should be with us celebrating the 25 years of Linguistics and Philosophy. His and John Perry's work were a big chunk of its history and the excitement that came with having that journal around.

1. Worldly Facts

I know of two areas in semantics where we seem to need a notion of 'fact' that cannot simply be identified with 'true proposition'. One is the semantics of the verb *to know*. The other is the semantics of counterfactuals. If facts are not merely true propositions, what kind of creatures could they be? Take Charles Baylis:

"In the case of ordinary empirical knowledge these facts are fully concrete and particular. Going out in a rainstorm, for example, we become acquainted with some few aspects of the highly complex fact of fully particularised rain falling in a completely particularised way. Though we notice, and perhaps talk about, only certain features of this complex particular event, we believe that it has an indefinitely large number of characteristics. It is raining at a definite rate. Each raindrop is of a definite size and composition. The condition of the clouds above and of the ground beneath is also determinate. The spatio-temporal relations of each raindrop to every other object in the world is specific. There seem always to be further questions about the rainstorm that can be asked."²

On this view, facts are particulars. The facts of our world are parts of our world. Facts, then, are not at all like propositions. Propositions apply to facts as properties apply to things. Facts exemplify propositions as things exemplify properties.

".... and these facts embody or exemplify the abstract propositional meanings they make true. The relation meant by the term "exemplify" is the one commonly signified in the literature of symbolic logic by " ". The relation symbolised by "characterise" is the converse of the epsilon relation."³

2. Baylis 1948, 459.

3. Baylis, op.cit., 460.

In this paper, I will first look at some possible motivation for having facts that are particulars. Such ‘worldly’ facts, as I will call them, seem to play a role in the semantics of the verb *to know*. The second part of the paper will then show that we cannot get away with worldly facts alone. Worldly facts have closely related propositional analogues that seem to be needed in the semantics of counterfactuals. Sometimes, then, the things we might want to call ‘facts’, might be more like information units after all.

2. Facts and the semantics of the verb *to know*

There was a time when for just about everyone, knowledge was the same as justified true belief. That view was done away with by Edmund Gettier.⁴ There is, I think, a way of rescuing the traditional view, however. We could understand ‘justified true belief’ in a slightly different way. What if justified true beliefs were justified beliefs of facts? Instead of ❶, we would have ❷, then:

- ❶ Justified true beliefs are justified beliefs of true propositions.
- ❷ Justified true beliefs are justified beliefs of facts.

If facts are simply true propositions, justified true beliefs are bound to be justified beliefs of facts, of course. But if we take the worldly view of facts, adopting ❷ will make Gettier’s threat go away. Let us see why. The earliest Gettier example I know of is by Bertrand Russell⁵:

4. Gettier 1963.

5. Russell 1912. Quoted from the 1959 Oxford University Press paperback edition, p.131 f.

“If a man believes that the late Prime Minister's name began with a B, he believes what is true, since the late Prime Minister's last name was Sir Henry Campbell Bannerman. But if he believes that Mr. Balfour was the late Prime Minister, he will still believe that the late Prime Minister's last name began with a B, yet this belief though true, would not be thought to constitute knowledge.”

Russell's example is arguably not a real Gettier example, since Russell's man is not necessarily justified in believing that the late Prime Minister's last name began with a 'B'. Satisfaction of the justification or reliability condition is an issue with the original Gettier examples as well, however, as pointed out by one of the referees for this paper. For my present concerns, the question whether Russell's example is or isn't a true Gettier example is not relevant. The justification condition is not what is at stake here, I think. Something else is going wrong. Suppose Russell's man is Jones, and look at the following sentences:

- (1) **Jones knows that the late Prime Minister's name began with a 'B'.**
- (2) **The late Prime Minister's name began with a 'B'.**

On Russell's story, (1) is false, even though Jones believes (2), and (2) is true. Jones believes a true proposition, then. Does Jones also believe (2) of a fact? To answer this question, we have to know more about just what it means to believe something of a fact. In Alvin I. Goldman's "A Causal Theory of Knowing", we find the following truth-conditions for knowledge ascriptions⁶:

③ “S knows p if and only if the fact p is causally connected in an ‘appropriate’ way with S's believing p.”

⁶. Goldman 1967. Reprinted in Davis 1983, p.150.

If facts are particulars, it is tempting to try out what happens if we depart slightly from Goldman's original definition, and reinterpret it as involving *de re* beliefs of facts. We have then:

④ S knows p if and only if S believes p *de re* of some fact exemplifying p.

What has dropped out in ④ is any explicit mention of a causal connection between S's belief that p and some fact exemplifying p. The reason why I eliminated that part from Goldman's definition is that for *de re* beliefs to be possible, some causal connection between believers and the *res* of their beliefs is required as well. David Kaplan requires some causal rapport between believer and *res*, and David Lewis posits a suitable relation of acquaintance, for example⁷. It might be, then, that the acquaintance relation that is necessary for *de re* belief ascriptions is already sufficient to give us the 'appropriate' causal connection for knowledge ascriptions. We'll see shortly that that last conjecture is false, but let us set the issue aside for a little while, and see what ④ (as is) buys us for the Russell example.

According to ④, (1) can only be true if Jones' belief is a *de re* belief about an actual fact exemplifying the proposition that the late Prime Minister's name began with a 'B'. In our case, the actual fact exemplifying the proposition that the late Prime Minister's name began with a 'B' is the fact that Henry Campbell Bannerman's name began with a 'B'. But that fact is not a fact that Jones has a *de re* belief about. Hence ④ correctly predicts that Jones doesn't know that the late Prime Minister's name began with a 'B'. Good.

7. Kaplan 1968, Lewis 1979. A useful collection of papers on causal accounts of reference, knowledge, perception, and memory is Davis 1983.

④ also does well with other Gettier examples. Here is one of Gettier's own⁸. Smith has strong evidence for the proposition expressed by (3).

(3) **Jones owns a Ford.**

Smith's evidence is that Jones has owned a Ford for many years and has just offered Smith a ride while driving a Ford. Smith has another friend, Brown, of whose whereabouts he is totally ignorant. Smith selects a place name at random and constructs the following sentence.

(4) **Either Jones owns a Ford, or Brown is in Barcelona.**

The proposition expressed by (3) logically implies the proposition expressed by (4). Smith is aware of the entailment, and accepts (4) on the basis of (3). But unknown to Smith, Jones doesn't own a Ford but is driving a rented car. And by sheer coincidence, Brown is in fact in Barcelona. On this scenario, Smith believes the proposition expressed by (4), he is justified in believing it, and it is true. Yet the proposition expressed by (5) is false.

(5) **Smith knows that either Jones owns a Ford, or Brown is in Barcelona.**

On Gettier's story, the actual fact exemplifying the proposition expressed by (4) is the fact that Brown is in Barcelona. But Smith's belief is not a *de re* belief about that fact. Consequently, ④ correctly classifies (5) as false.

⁸. Gettier 1963. Reprinted in Davis 1983,135-137.

Some notions in Goldman's definition ③ and its successor ④ need further thought. While Goldman explores possibilities for appropriate causal connections⁹, he takes the notion 'fact that p' for granted. What is a 'fact that p'? The two Gettier examples that we have just discussed revealed that the facts we need to posit to account for those examples must be very specific, while the content of the beliefs involved are very general. The 'mismatch' between highly specific facts and the much more general propositional contents of beliefs is what produces a typical Gettier example according to the account I am proposing. In knowledge ascriptions, the 'that'- clause seems to have a double function. One is to characterize the information content of the belief ascribed¹⁰. The other one is to characterize a fact that the belief ascribed is a belief of. That is, the 'that'-clause also helps pick out the *res* of the belief. This *res* is not a proposition. It is a worldly thing, a situation. Our next task, then, will be to elucidate the notion 'fact exemplifying proposition p', and this is where situation semantics comes in.

3. Facts that exemplify propositions

The situation semantics and the definitions in this section are from Kratzer 1989, 1990, and 1998, and are repeated here to make the paper self-contained. Our starting point is a set S, the set of all possible situations. Possible situations are parts of possible worlds¹¹. A subset of S is singled out as the set of possible individuals. The members of S are particulars. Consider this shirt. It is striped in a very particular way. This very particular way of being striped is an actual state of my shirt. It is a state so particular that it is a state that only my shirt can be in. Its particular way of being striped is just one of the states of my shirt. There are others.

⁹. He does not see the connection with *de re* belief, however.

¹⁰. The relationship between the 'that'-clause and the information content of the belief ascribed is not trivial. Moreover, the information content of beliefs may not be propositions at all. See Lewis 1979. I will ignore these complications in what follows.

Its very particular way of being cotton, its very particular way of being as long as it is, and its very particular way of being from Italy. All of those states are fairly permanent. But there are also more fugitive states that my shirt might be in. Its very particular spinning in the washing machine this morning. Its very particular drying on the line. Its very particular way of being folded and placed in the drawer. Particular states like these, whether actual or merely possible, I suggest, are the kind of situations that are in S .

In situation semantics, situations are assumed to stand in part-whole relations to each other. The part-whole relationship that we are interested in here is a partial ordering on S satisfying at least the following additional condition:

- ⑤ For all $s \in S$ there is a unique $s' \in S$ such that $s \leq s'$ and for all $s'' \in S$, if $s' \leq s''$, then $s'' = s'$.

Condition ⑤ says that every possible situation s is related to a unique maximal element, which is the world of s . As a consequence, no possible situation can be part of more than one possible world. Situations may be related across possible worlds via a counterpart relation as proposed in Lewis 1968 and 1986. The set of all maximal elements with respect to the ordering is the set W of possible worlds.

Propositions are sets of possible situations. Propositions, then, classify situations. They are properties of situations. A proposition p is true in a situation s if and only if s is a member of p . If p is not true in s , then p is not necessarily 'false' in s . It may be that p is 'not yet' true in s , but will become true in some situation of which s

11. For an overview of some of the choices to be considered in Situation Theory, see Barwise 1989.

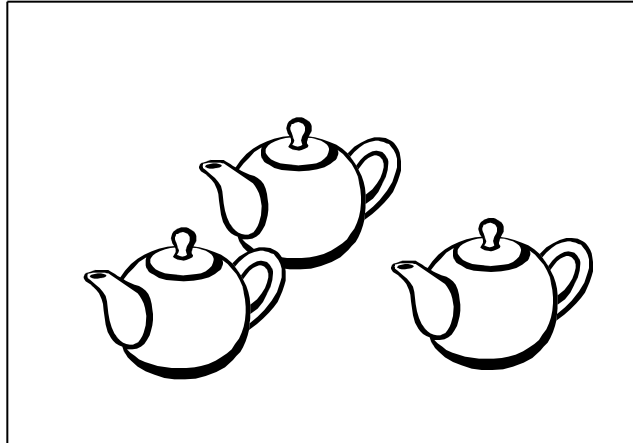
is a part. To keep the semantics classical, the logical relations depend only on the possible worlds in which propositions are true. Two propositions are logically equivalent, for example, just in case they are true in the same possible worlds. And a proposition p logically implies a proposition q , just in case $p \models W \models q \models W$. There are likely to be constraints for sets of possible situations to qualify as propositions expressed by sentences in natural languages. I suspect that persistence is such a constraint, for example. A proposition is persistent iff whenever it is true in a situation s , it is true in all situations of which s is a part.

The crucial definition we are after in this section tells us what it means to be a fact exemplifying a proposition. We have:

- ⑥ If s is a possible situation and p a proposition, then s is a fact exemplifying p iff for all s' such that $s' \sqsubset s$ and p is not true in s' , there is an s'' such that $s' \sqsubset s'' \sqsubset s$, and s'' is a minimal situation in which p is true. (A minimal situation in which p is true is a situation that has no proper parts in which p is true.)

To see how the definition works, look at the picture of a situation s_1 below. The situation s_1 contains nothing but three teapots (for a change):

s_1

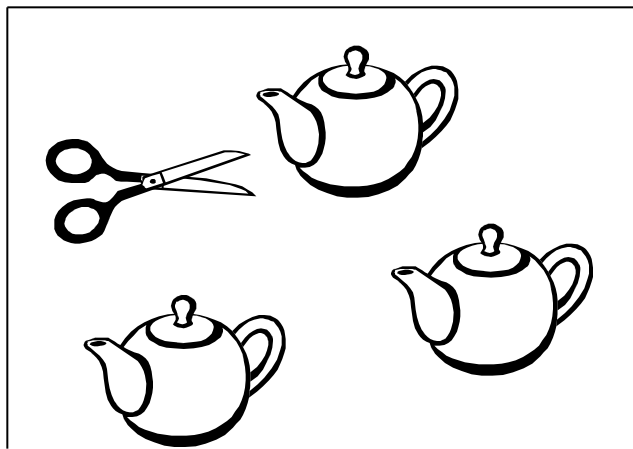


According to definition 6, s_1 is a fact that exemplifies the proposition expressed by (6):

(6) **There are teapots.**

If p is the proposition expressed by (6), then p should be the set of all possible situations in which there are two or more teapots. There are parts of s_1 in which p is not true. Situations with just one teapot, for example. But any subsituation of s_1 in which p is not true is part of another subsituation of s_1 which is a minimal situation in which p is true. Now look at the situation s_2 that has a pair of scissors in addition to the three teapots.

s_2



The situation s_2 is a situation in which p is true, but it doesn't come out as a fact that exemplifies p , since it contains the irrelevant scissors. Consider the subsituation s_2' of s_2 that has just the scissors and nothing else in it. The proposition p is not true in s_2' , and s_2' cannot be extended to a minimal situation in which p is true. Whenever you try to extend s_2' so as to include some teapots, you also have the superfluous scissors. That's why s_2 doesn't exemplify p . It has subsituations in which p is not true that cannot be extended to minimal situations in which p is true.

Definition ⑥ may appear problematic in view of propositions like the one expressed by the following sentence.

(7) **There are infinitely many stars.**

If the proposition expressed by (7) is the proposition p that is true in any possible situation in which there are infinitely many stars, we are in trouble. Definition ⑥ would predict that there couldn't be a fact that makes p true, and that in turn would mean that a proposition like p could never be known. Whenever p is true in a situation s , then s has parts in which p is not true. Situations with five or six stars, for example. But these situations are not part of any minimal situation in which p is true. I don't think that this case is beyond repair, however. Who says that the proposition expressed by (7) has to be p ? In a situation semantics, there are typically several logically equivalent ways of assigning truth-conditions to sentences with quantifiers. This range of possibilities might bring out subtle meaning differences that we do not usually pay attention to when working in a possible worlds semantics. As for (7), for example, there is a reading that the German sentence (8) brings out more clearly.

- (8) **Sterne gibt es unendlich viele.**
Stars are there infinitely many .
As for stars, there are infinitely many of them.

In (8), the common noun “Sterne” has been topicalized. (8) makes a claim about all stars there are in our world, and says that there is an infinite number of them. The proposition expressed by (8) might now be taken to be the proposition q that is true in a situation s iff (i) s contains all the stars in the world of s , and (ii) there are infinitely many stars in s . Consequently, if q is true in a world at all, there is always a minimal situation in which it is true, hence there is always a fact that exemplifies it.

The definition of knowledge that we are currently working with says that knowledge of a proposition p requires a *de re* belief of a fact that exemplifies p . Isn't that way too strong? I know that a child was born yesterday. I know it, because I know that a child is born every day in the world I live in. Suppose Ashley, Beverly, and Kimberley were the children born yesterday. I do not know about any of those births. But then I do not seem to have a *de re* belief about any fact exemplifying the proposition that a child was born yesterday. How come I still know the proposition expressed by (9)?

- (9) **A child was born yesterday.**

Again, who says that (9) has to express the proposition we thought it did, namely the one that is true in any situation s just in case s is temporally located within yesterday, and a child was born in s ? The subject of (9) is a weak indefinite, and this makes it possible for (9) to be interpreted as a *thetic* statement¹². In a *thetic* statement, the predication is about a temporal or spatial location, and in our case,

12 . For a recent discussion of *thetic* statement and relevant references, see Ladusaw 2000.

the location would be the world as a whole. On the intended reading, (9) should have a non-overt locative, then, corresponding to the overt locative in (10).

(10) **In this house, a child was born yesterday.**

Understood in this way, (9) expresses a proposition that can only be true in worlds, just like (10) expresses a proposition that can only be true in situations that contain (a counterpart of) this house. Knowing the proposition expressed by (9) would then rely on a *de re* belief about the actual world, since a proposition that is only true in worlds can only be exemplified by worlds.

We are all well acquainted with the world we live in. It's therefore easy to have a *de re* belief about it. But wouldn't it now become too easy to also have knowledge about it? What if I believed that exactly 2001 children were born yesterday and I just happened to be right? We don't yet have to worry. We knew that something is still missing in definition ④. We still have to make sure that in order for us to have knowledge, it can't be a mere accident that our beliefs are true.

4. Reliability

Goldman's 1967 definition that ④ is based on has no justification or reliability condition. That some such condition is needed independently of examples like my knowing that a child was born yesterday is shown by the following example from Goldman 1976.¹³

"Henry is driving in the countryside with his son. For the boy's edification Henry identifies various objects on the landscape as they come into view. "That's a cow", says Henry, "That's a tractor", "That's a silo", "That's a barn", etc. Henry has no doubt about the identity of these objects; in particular, he has no doubt that the last-mentioned object is a barn, which indeed it is. Each of the

¹³. Goldman 1976. Reprinted in Davis 1983, p. 175 f. Barn examples exist in many varieties in the philosophical literature. The original barn example seems to have been due to Carl Ginet.

identified objects has features characteristic of its type. Moreover, each object is fully in view, Henry has excellent eyesight, and he has enough time to look at them reasonably carefully, since there is little traffic to distract him. Given this information, would we say that Henry *knows* that the object is a barn? Most of us would have little hesitation in saying this, so long as we were not in a certain philosophical frame of mind. Contrast our inclination here with the inclination we would have if we were given some additional information. Suppose we are told that, unknown to Henry, the district he has just entered is full of papier-mâché facsimiles of barns. These facsimiles look from the road exactly like barns, but are really just facades, without back walls or interiors, quite incapable of being used as barns. They are so cleverly constructed that travelers invariably mistake them for barns. Having just entered the district, Henry has not encountered any facsimiles; the object he sees is a genuine barn. But if the object on that site were a facsimile, Henry would mistake it for a barn. Given this new information, we would be strongly inclined to withdraw the claim that Henry *knows the object is a barn.*”

On Goldman’s scenario, there is a fact *f* that exemplifies the proposition *p* expressed by (11) in the context we are considering, where we take *p* to be true in any possible situation *s* in which the thing Henry is actually referring to (or its counterpart) is a barn:

(11) **That’s a barn.**

Henry correctly believes *p* of *f*. Yet Henry doesn't know that *p*. Why? The usual reaction in the face of examples of this kind is that Henry’s belief hasn’t been acquired through a reliable method. Usually, our visual perception apparatus is a reliable source of knowledge. But Henry had bad luck and found himself in a situation of trickery. As long as trickery is a possibility, visual perception is not a good enough method for gaining knowledge. The story of Henry shows that if definition ④ is on the right track at all, an additional condition requiring a reliable method of belief formation is needed. A common way of stating that condition in our case (essentially following Goldman 1976) would be to require that Henry be able to distinguish the real barn situation from relevant alternatives that have fake barns. Bringing in a notion of ‘relevant alternative’, the reliability condition

introduces context dependency and vagueness into the semantics of knowledge ascriptions. This is as it should be. A good account of knowledge ascriptions has to predict their vagueness and context dependence, too. If the fake barns are further away, or just a possibility mentioned by a nearby skeptic, our intuitions about what Henry does or doesn't know start fading away. The fake barns become less and less relevant. Our final analysis of knowledge ascriptions now looks as follows:

- ⑦ S knows p if and only if
- (i) There is a fact f that exemplifies p,
 - (ii) S believes p *de re* of f, and
 - (iii) S can rule out relevant possible alternatives of f that do not exemplify p.

⑦ has (almost) the familiar three conditions: (i) requires truth, (ii) belief, and (iii) reliability of method. The most important consequence of ⑦, I believe, is that it makes accurate predictions about the appearance of vagueness and context dependency in knowledge ascriptions. How come, the knowledge ascriptions in Russell's example and in Gettier's own examples are so clearly false? Given ⑦, the answer is that our judgements about those cases are so clear because the belief condition (ii) is so obviously violated. The believers are not acquainted with any facts that exemplify the proposition they believe. On the other hand, the knowledge ascriptions in barn examples and their kin are so vulnerable and context dependent because conditions (i) and (ii) are both satisfied, and what is at stake is only whether or not condition (iii) is satisfied as well, which can be a matter of degree. Definition ⑦, then, accounts well for the varying degrees of vagueness and context dependency that we find in different kinds of knowledge ascriptions. In this respect, ⑦ contrasts with the purely contextualist analysis of Lewis 1996, which

predicts more vagueness and context dependency for Russell's example and Gettier's own examples than we in fact observe¹⁴.

If ⑦ is right, the semantics of the verb *to know* (and presumably other factive verbs as well), requires a highly specific notion of 'fact'. Facts must be specific enough to be the *res* of beliefs. Depending on your assumptions about possible *res*, this might or might not mean that they have to be particulars.

5. Facts and counterfactuals

We have seen that knowledge ascriptions require a highly specific notion of 'fact'. Interestingly, the truth-conditions for counterfactuals seem to rely on facts that are almost equally specific. But this time round, those facts should be propositions. They cannot be particulars - at least if we are assuming a premise semantics for counterfactuals. Let me explain.

In a premise semantics, a "would"-counterfactual is true in a world *w* iff every way of adding as many facts of *w* to the antecedent as consistency allows reaches a point where the resulting set logically implies the consequent. On the other hand, a "might"-counterfactual is true in a world *w* iff not every way of adding as many facts of *w* to the antecedent as consistency allows reaches a point where adding the consequent would result in an inconsistent set. Facts figure prominently in those truth-conditions. What kind of facts? If facts are to be compatible or incompatible with propositions, they must themselves be propositions. However, while being propositions, those facts must still be highly specific. This is shown by examples that are directly modeled after Russell's and Gettier's examples. Look at (12)¹⁵:

14. See Cohen 1998 for discussion of this point.

15. In this section, I will use the numbers of example sentences to refer to the propositions expressed by those sentences, rather than the sentences themselves. This will make for less cumbersome prose. A caveat is needed, though. We have seen earlier that in a situation semantics,

(12) If Whitehead had been the Prime Minister, his name might have started with a 'B'.

(12) is false. Yet if facts were simply true propositions, our analysis would predict (12) to be true. Assuming Russell's scenario, we have:

(13) Whitehead is the Prime Minister. (Counterfactual Antecedent)

(14) The Prime Minister's name starts with a 'B'. (Fact)

(15) Whitehead's name starts with a 'B'. (Counterfactual Consequent)

(13) is the antecedent of our counterfactual. (14) is true, hence a fact by assumption. (13) and (14) together logically imply (15). Hence every superset of { (13) , (14) } logically implies (15). This means that there is a way of adding as many facts to the antecedent of our counterfactual as consistency allows such that there will never come a point where adding the consequent would result in an inconsistent set. A very similar example can be constructed using Gettier's scenario. Consider the following counterfactual.

(16) If Brown hadn't been in Barcelona, Jones might have owned a Ford.

(16) is false on Gettier's story. Yet if facts were just true propositions, it would be predicted to be true. We have:

it is not always so obvious what the propositions expressed by sentences are. There can be different logically equivalent propositions, for example, and the proposition expressed by a particular sentence in a context might not always be the one we first think it is. I believe that this subtlety does not affect my main point, though.

- (17) **Brown is not in Barcelona.** (Counterfactual Antecedent)
- (18) **Jones owns a Ford or Brown is in Barcelona.** (Fact)
- (19) **Jones owns a Ford.** (Counterfactual Consequent)

As before, the counterfactual antecedent and the fact mentioned jointly imply the counterfactual consequent. But this is sufficient to predict that (16) should come out true. The two examples we have just examined show that the facts involved in the evaluation of a counterfactual must be highly specific, too. While they have to be propositions, and have to be true, they can't be identified with true propositions. Let us investigate some alternative possibilities.

Suppose f is the (only) fact that exemplifies (18) in the actual world. Then $\{f\}$ is a proposition. It is a proposition all right, but not a very interesting one. For once, it is not persistent. Take the smallest persistent superset then. This gives us $p = \{s : f \text{ in } s\}$. Since f is a fact of the actual world, and p is persistent, the actual world is in p . Since f is only part of a single world, no other world is in p . The proposition p , then, is still highly specific. Too specific, that is. It is useless for the evaluation of counterfactuals. Since the actual world is the only world in p , p is only compatible with propositions that are actually true. But the antecedents of counterfactuals are typically false.

6. Propositional facts and natural propositions

We have seen that the facts involved in the evaluation of a counterfactual must be rather specific. But we have also seen that they cannot be too specific. They must be capable of being true in merely possible situations. Otherwise they could never be compatible with an assumption that is actually false. Which possible situations are we going to include? Here is a way of thinking about this question. Let a natural proposition be a persistent proposition that doesn't distinguish between maximally similar situations. Whenever it is true in a situation s , it is also true in any situation that is maximally similar to s . Applying strictest standards of

similarity, we may think of maximally similar situations as isomorphic situations very much like the isomorphic worlds of Kit Fine.¹⁶

"Intuitively speaking, two worlds are isomorphic if they are qualitatively the same, i.e., if they are the same but for the identity of the individuals in the world."

Take the fact that you worked in the yard yesterday. Take it as a worldly fact. This is a situation. It is a situation in which you pruned my apple tree at five o'clock. Let us say that a merely possible situation is isomorphic to that situation if it is qualitatively the same and preserves counterpart relationships¹⁷. It can't contain you or my apple tree if individuals cannot exist in different possible worlds. But it must contain maximally similar counterparts of you and my apple tree. And my apple tree's counterpart must be pruned by your counterpart at five o'clock in a maximally similar way. Suppose there is exactly one worldly fact f that exemplifies (20) in the actual world:

(20) **Thomas is picking roses.**

Technically, $\{f\}$ is a proposition. The smallest persistent extension of $\{f\}$ is $p =$

16. Fine 1977. See also Rabinowicz 1979. Thanks to Ede Zimmermann for the references.

17. Counterpart relationships between individuals are based on overall similarity with respect to worlds, not situations. This guarantees persistence of propositions like the one expressed by 'Thomas is picking roses'. This proposition, then, is the proposition that is true in any situation s iff s contains a rose picking individual that is a counterpart of Thomas in the world of s . If the similarity relation involved in 'naturalness' preserves all counterpart relations, propositions like the one expressed by "Thomas is picking roses" are guaranteed to come out as natural as well. Requiring maximal qualitative similarity alone isn't sufficient, since two individuals that inhabit different worlds and are qualitatively indistinguishable in some situations don't have to be counterparts of each other. They may be quite different in other situations, hence lack overall similarity. But then it may happen that a proposition like the one expressed by "Thomas is picking roses" is true in a situation without being true in all situations that are qualitatively the same.

$\{s : f \text{ } s\}$, the set of all actual situations in which Thomas is picking roses. This proposition is persistent, but not yet natural. To extend p into a natural proposition, we have to add all situations that are maximally similar to some situation in p . Assuming persistence then forces us to add all situations that contain any one of the recently added situations as parts. Naturalness requires us to add all situations that are maximally similar to the situations we just added, ... you got the idea. We eventually end up with a set of situations that have one property in common: They are all situations in which an indistinguishable counterpart of Thomas is picking indistinguishable counterparts of actual roses in a way that is indistinguishable from the way Thomas is picking roses in our world.

For any possible situation s , let the natural extension of s , be the proposition generated by s in the manner I just described. We can now consider the following definition of the propositional facts of a world:

- ③ A proposition p is a propositional fact of a world w iff there is an $s \text{ } w$ such that p is the natural extension of s .

Let me briefly review what ③ does by looking at the counterfactual version of Russell's example. What went wrong there was the possibility of using (14) as a fact for the evaluation of the counterfactual (12). According to ③, (14) is not a propositional fact of our world. It is way too general. The propositional fact corresponding to (14) is the natural extension of the particular fact exemplifying (14). But that proposition is incompatible with the antecedent of (12). A parallel story can be told about the counterfactual analogue of the Gettier example. (18) itself is not a propositional fact. The propositional fact corresponding to (18) is the natural extension of the particular fact exemplifying (18), but that proposition is

incompatible with the antecedent of the counterfactual (16). If the facts relevant for counterfactual reasoning are propositional facts, then, 'dangerous' propositions like (14) or (18) are eliminated.

I conclude that the facts that are relevant for the truth of counterfactuals might very well be propositional facts. Propositional facts are sets of possible situations of a highly specific kind. Yet they still allow for possibilities. If the standards for 'maximal qualitative similarity' are lowered, they will become information units. This gets us closer and closer towards C. I. Lewis, whose views on facts his student Charles Baylis found so hard to swallow¹⁸:

"Charles Baylis is minded to pin a theory of fact on me, taking advantage of a momentary lapse of my verbal defense-mechanisms in an old article. I account this pure wickedness on his part; he knows that 'fact' is one of the trickiest words in any language; and he knows that I know it. But I shall foil him yet: I shall now pronounce the final and authoritative Lewis theory of fact. A fact is an actual state of affairs. But 'fact' is a crypto-relative term, like landscape'. A landscape is a terrain, but a terrain as seeable by an eye. And a fact is a state of affairs, but a state of affairs as knowable by a mind and stateable by a statement."

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