Conditionals: a Debate with Jackson

Graham Priest

1 Introduction: a Brief History of the Issue

The nature and logic of conditionals is a thorny issue. Stoic logicians, who were the first to discuss the matter in any detail, produced at least three different accounts; and debates about the nature of the conditional continued throughout the middle ages.[1] A new phase of the debate commenced with the rise of modern logic, around the turn of the twentieth century. The logic of Frege and Russell enshrined an account of the conditional as material. This was not a new view; indeed it is one of the Stoic views. But the new logic was powerful, and soon gained wide acceptance; the account of the conditional came along for the ride, and soon became orthodox.

Its shortcomings were always plain, though. Within a few years of the publication of *Principia Mathematica*, C. I. Lewis was hammering many of its counter-intuitive features, and alternative accounts of the conditional were provided by both modal logic and intuitionistic logic. It was really only with the rise of world semantics (for both modal and relevant logics) in the 1960s and 1970s that the orthodoxy concerning the material conditional was blown away, though. "Conditional logics", of the kind constructed by Stalnaker and David Lewis, were soon generally accepted as providing better accounts of at least the so called subjunctive/counterfactual conditional. And relevant logic provided an even more fundamental challenge to any account of the conditional that countenanced only possible worlds. The result of these developments is that we now have a plethora of theories concerning the conditional, with no generally accepted view as to which is correct. Still, it is at least to be hoped, now that much of the new logical technology is under control, that some new consensus concerning the nature of the conditional will condense around a more adequate account.

This paper is written in the hope of contributing to this project. It has two parts. The first is a discussion of the view defended by Frank Jackson in

[1] For a brief history of debates over the conditional, see the first few chapters of Sanford (1989).

his book *Conditionals* (1987); I will describe his account and note some of its shortcomings. There are good reasons for doing this.[2] Views of the kind defended there are, if not orthodox, still very common. And Jackson defends the view in, arguably, its most cogent form.[3]

The second part of the paper sketches a rather different account which, it seems to me, avoids these shortcomings. As anyone who has but a little knowledge of the history of the debate over conditionals will appreciate, the subject is a vexed one, where different intuitions pull in seemingly incompatible directions. Definitive solutions are therefore hard to envisage; and I certainly do not claim to provide one here. What I will attempt is a general framework for an account of conditionals, one that leaves plenty of parameters to be adjusted for fine tuning.

2 Jackson's Account

Jackson's distinguishes between indicative and subjunctive/counterfactuals conditionals. He endorses a Lewis/Stalnaker account of the latter, and a material account of the former. The material conditional has well-known problems, and is frequently defended by appeal to facts about conversational implicature; Jackson realises that the standard Gricean way of attempting this is inadequate, but advances, instead, a more sophisticated account of assertibility which he takes to do the job.

In a nutshell, Jackson's account of the conditional can be summarised in four main points:

Jackson's Theses

1. Conditionals are to be divided into two kinds: indicative and subjunctive/counterfactual.

2. Sentences (and, in particular, conditionals) have distinct truth conditions and assertibility conditions.

[2] Apart, of course, from the fact that this paper is appearing in a volume dedicated to Frank's work. Let me take this opportunity to express my admiration of Frank as a philosopher. His views always have an elegant simplicity, and are defended by great ingenuity. Few other contemporary philosophers can match him in this regard.

[3] When I drafted Priest (1989) I described Frank's book as 'Custer's last stand of the material conditional'. When I produced the final draft, I thought it better to take out this colourful description. Frank tells me that he was sorry that I did so. I hereby reinstante it.

3. For subjunctive/counterfactual conditionals: truth conditions are of the possible-world variety, as given by a Lewis/Stalnaker conditional logic; and such a conditional is assertible iff its probability is high.

4. For the indicative conditional: truth conditions are those of the material conditional; and such a conditional is assertible iff it is probable with respect to its antecedent, provided that this has non-zero probability.

In Thesis 4, having an antecedent with non-zero probability is the only qualification mentioned when the condition is introduced (effectively, on p. 11). But it turns out later that further qualifications are needed. Thus, as we will see, the antecedent and consequent must not, themselves, contain (indicative) conditionals. In fact, the precise class of antecedents and consequents in question here is never tied down firmly as far as I can see.

Let us, at any rate, look at each of these Theses in turn.[4]

2.1 Indicative and Subjunctive/Counterfactual

The distinction between indicative and subjunctive/counterfactual conditionals is now well entrenched, and Jackson takes it over without much comment. The more one thinks about this distinction, however, the more problematic it becomes. For a start, the extent to which English has a subjunctive, and what, exactly, constitutes it, is something that linguists disagree about. It is clear, moreover, that some languages have a more sophisticated system of subjunctives than does English, and that many things that are expressed in the subjunctive in those languages are expressed in the indicative in English. This is obviously another source of problems. One would not expect validity to be hostage to the vicissitudes of grammatical idiosyncracy.

Setting these problems aside, there are plenty of others. The antecedents of the following conditionals are clearly subjunctive:

- If I were to go tomorrow, it would be good fun.

- If he go tomorrow, he will enjoy himself.

But neither of these is necessarily a counterfactual. In both cases the antecedent can be true. (E.g.: 'If I were to go tomorrow, it would certainly be good fun... so I think I will go'.)

Conditionals of the following form are also usually classified as subjunctive/counterfactual:

[4] The following discussion draws on and expands that given in Priest (1989).

- If he had come in the window, there would have been footprints in the garden.

Now, on most accounts, the antecedent of this conditional is indicative, not subjunctive.[5] But whatever it is, it, also, is not necessarily counterfactual. (E.g.: 'If he had come in the window, there would have been footprints in the garden. Let us go and see... Ah! There are'.)

To make matters worse, conditionals that clearly have indicative antecedents can be counterfactual. Thus:

- If he goes tomorrow, he will have a miserable time.

- If it rained last night, the grass will be wet this morning.

(Thus, e.g.: 'If it rained last night the grass will be wet this morning... Okay, the grass is dry; so it didn't rain'.)[6]

Perhaps the most striking thing about conditionals, once you notice it, is that there are some conditionals where the antecedents can stand alone with the same sense as they have in the conditional, and some where they cannot.[7] Thus, for example, in:

- If it is raining we are going to get wet.

The antecedent, 'it is raining', means exactly what it says. Thus, if we apply *modus ponens*, we get:

If it is raining we are going to get wet.
It is raining.
———————————
We are going to get wet.

Contrast this with:

[5] The most usual line concerning the subjunctive in English is that verbs have only present and past subjunctives. The present subjunctive is identical to the root of the verb. The past subjunctive is identical to the past indicative, except in the case of *be*, in which case it is *were*.

[6] Lewis (1973), pp. 3f. shrewdly confesses that, despite the title of his book, the conditionals he is dealing with are to be identified with neither counterfactual conditionals not subjunctive conditionals. For him, 'counterfactual' is simply a term of art. What makes him suppose that "counterfactual" conditionals are not just conditionals *simpliciter*? The fact, he says, that there are conditionals that do not seem to fit into the truth conditions he gives. These are conditionals such as the indicative conditional in the notorious Oswald/Kennedy example. We will see in due course why examples of this kind do not establish the point.

[7] See, e.g., Smiley (1983-4).

- If this were Friday, it would be the end of the week.
- If he had had a middle-class family life, he would have gone to university at age 18.
- If it rains you will get wet.

In the first of these, the antecedent, ‘This were Friday’ makes no sense standing alone. The stand-alone sense it must have is exposed by applying *modus ponens*:[8]

> If this were Friday it would be the end of the week.
> It is Friday.
> ---
> It is the end of the week.

In the second, the antecedent ‘He had had a middle-class family life’ can stand alone in the right context. (E.g.: ‘He had had a middle-class family life until his parents decided to give all their money to the Battersea Dogs’ Home’.) But in the context of the conditional this is not what it means, as can again be seen by applying the *modus ponens* test:

> If he had had a middle-class family life,
>   he would have gone to university at age 18.
> He had [did have] a middle-class family life.
> ---
> He went to university at age 18.

Similarly with the last example. The antecedent, ‘it rains’, can certainly stand on its own; but in the context of the conditional this is not what it means. Here is the *modus ponens* test:

> If it rains you will get wet.
> It will rain.
> ---
> You will get wet.

Let us call conditionals where the antecedent can stand alone with the same sense, *prime* conditionals. If there is a natural logical break in the genus of conditionals it is between prime and non-prime conditionals. Prime conditionals are always indicative. Non-prime conditionals can be indicative or subjunctive/counterfactual, as the preceding examples show.

I will return to this matter later. For the present, let us move on to Jackson’s second thesis.

[8] And as the example shows, the stand-alone sense of the consequent can be different as well.

2.2 Truth and Assertibility

The case for distinguishing between truth conditions and assertibility conditions is a standard one.[9] Thus:

- Molly is poor and she is happy
- Molly is poor but she is happy

are both true under the same conditions, namely when Molly is both poor and happy. But an utterance of the second would normally convey the information that Molly is happy despite being poor. If all poor people were happy, it would be a most odd thing to assert. I wish to contest none of this here.[10]

The simplest account of assertibility conditions for conditionals uniformly identifies assertibility with probability. But where indicative conditionals are concerned, Jackson diverges from this policy. As Thesis 4 shows, he takes indicative conditionals to have different assertibility conditions. We will come to these in due course. For now, just note the following. For Jackson's account to work, he has to specify defensible assertibility conditions for all sentences that contain indicative conditionals, not just some of the simplest.

For a start, we need to specify the assertibility conditions of conditionals whose antecedents have zero probability. Whether this can be done, I do not know; but if it can be done, it will not be by deploying probability theory. Suppose that classical logic is correct (and if it is not, just vary the example). Then consider the following two conditionals:

- If intuitionistic logic is correct, the law of double negation fails.
- If intuitionistic logic is correct, the disjunctive syllogism fails.

The first conditional seems eminently assertible; the second does not. Yet both have the same zero-probability antecedent.

It might be thought that this sort of case could be handled by using a probability theory which takes conditional probability as primitive, and so allows for $\Pr(A/B)$ to defined even when $\Pr(B) = 0$. It cannot; even in such theories it is standardly the case that if A and B are logically false then $\Pr(C/A) = \Pr(C/B)$.[11] But now merely consider the following pair of conditionals:

[9] Assertibility here is to be interpreted semantically. It has nothing to do with questions of etiquette, politeness, etc.

[10] But see Humberstone (1991).

[11] And more generally (classically), if A and B are logically equivalent then $\Pr(C/A) = \Pr(C/B)$. See, e.g., Popper (1972), p. 322 (A2), Roeper and Leblanc (1999), p. 11 (RC6).

- If intuitionistic logic is correct, the disjunctive syllogism fails.
- If paraconsistent logic is correct, the disjunctive syllogism fails.

Both antecedents are logically false; but the first conditional is not assertible; the second is.

Turning to another aspect of the situation, what are we to say about the assertibility conditions of sentences such as the following?

- If you go you will get wet, or if you go you will not get wet.
- If you want to go then, if you can afford it, you can go.
- John believes that if you go you will get wet.

Jackson makes a partial attempt to answer this question in an appendix to *Conditionals*, but it is seriously incomplete, since it concerns only some truth functional contexts. There is no suggestion as to what to say about conditionals embedded in quantifiers, modal and other intentional contexts. Nor is it clear that Jackson's strategy succeeds even for the limited cases he considers. Jackson concedes that conditionals whose antecedents or consequents are themselves conditionals cannot be treated in the same way as conditionals whose antecedents are non-compound. Generally speaking, he says, conditionals of the form $A \rightarrow (B \rightarrow C)$ are to be treated as $(A \wedge B) \rightarrow C$, and conditionals of the form $(A \rightarrow B) \rightarrow C$ have no clear sense at all. If sense can be attributed in such cases, this is because we interpret the embedded conditional in some other way. This latter claim would seem to be false. Merely consider: 'If he will go only if I will, then he won't be going—because I'm not'. The conditional is perfectly intelligible, and the antecedent, 'he will go only if I will' means exactly what it says.

The least one can say is that Jackson's account at this point is seriously incomplete. The clear worry, however, is that Jackson has diverged from the simple and uniform account of the connection between assertibility and probability for conditionals to defend an account of the indicative conditional as material, only to find that the move has effect only in a somewhat restricted class of cases.

2.3 Subjunctive/Counterfactual Conditionals

The behaviour of the subjunctive/counterfactual conditional that Jackson endorses is that provided by the Lewis/Stalnaker "similarity sphere" semantics. There are different versions of these, and he does not commit himself to any particular one. But there are certainly features common to the systems preferred by Lewis and Stalnaker themselves which are problematic. Thus, both endorse the inference:

$$A, B \vdash A > B$$

where $>$ is the subjunctive/counterfactual conditional. But let us suppose that you think that sticking pins in voodoo dolls causes the person of whom the doll is a model to die; let us also assume that this belief is false. You ruminate about an enemy: 'If I were to stick this pin into this doll of x, x would die'. So you stick the pin in. For completely unconnected reasons, x is knocked down by a bus that evening and is killed. Did you speak truly? Arguably not.

Actually, the validity of this inference is not an essential feature of "similarity sphere" semantics. Its validity is given by the condition that if A is true at a world, w, then there is only one world maximally similar to w where A is true—w itself.[12] This is not mandatory, however. If we interpret similarity as *similarity in the relevant respects* then, given that A is true, there may be many worlds where A is also true that are similar in all the relevant respects; and even if B is true at w, it may not be true at some of the others. Thus, there may be worlds in which all your actions concerning the voodoo doll are exactly the same as in this one, but where x does not die (since your actions are causally irrelevant to x's fate).

A much more damaging objection to semantics of the kind in question turns on the fact that they countenance only possible worlds. Thus, take some logically impossible or necessarily false sentence, A. Since this is realised at no possible world, any conditional of the form $A > B$ will come out as vacuously true. But this seems wrong. Counterfactuals discriminate between conditionals with such antecedents. Consider, to tweak the example of 2.2, the following conditionals:

- If intuitionistic logic were correct, the law of double negation would fail.

- If intuitionistic logic were correct, *modus ponens* would fail.

The first is clearly true; the second false. Or consider:

- If you had shown Fermat's last theorem to be false in 1990, you would have become famous.

[12] For formal details, see Priest (2001), ch. 5, esp. 5.7.

- If you had shown Fermat's last theorem to be false in 1990, I would have given you my life's savings.

Since the mid-1990s we have known that Fermat's last theorem is true, and so necessarily so; thus, showing it to be false is impossible. But the first conditional is surely true; I assure you that the second is not.

It would seem clear that we can navigate sensibly around conditionals with logically impossible antecedents, just as much as we can navigate around conditionals with physically impossible antecedents. But then, if we wish to give a world-semantics for that kind of conditional, we need to deploy not just possible worlds but impossible worlds.

2.4 The Material Conditional: Assertibility Conditions

Let us now move to indicative conditionals and Thesis 4, starting with assertibility conditions. It is here that we find the most distinctive part of Jackson's account. Jackson calls the following statement (Adams):

> The assertibility of 'If A (indicative) then B' is $\Pr(B/A)$, provided that $\Pr(A) \neq 0$.

—plus whatever other restrictions are necessary, such as that A and B do not contain indicative conditionals. He notes that (Adams) is very plausible, that it is entailed by the assertibility conditions enunciated in Thesis 4, but by no extant rival theory of the conditional. This, in fact, provides his main argument for the assertibility conditions in question.

Unfortunately, (Adams) though possibly true in normal circumstances, may be false.[13] Suppose that we know that all people under the age of 10 live with their parents, and that all the inhabitants of Autumn's Retreat are aged pensioners. Suppose, also, that we know of a certain Fred that his parents live in Autumn's Retreat. We then wish to know whether Fred is under 10, and reason as follows:

> If Fred is under 10, he lives with his parents. But, in that case, he lives in Autumn's Retreat, in which case he is an aged pensioner. Thus, *if Fred is under 10 he is an aged pensioner*. It follows that Fred is not under 10.

In the context of the deliberations, the italicised conditional is highly assertible. Yet the probability that Fred is an aged pensioner, given that he is

[13] I owe the following example to the late Ian Hinckfuss.

under 10, is zero. Since (Adams) is not universally true, and since Jackson's assertibility conditions entail it, neither are the assertibility conditions.

It might be pointed out that, given the background information, the probability of the antecedent is zero, since the information entails its negation. This is not, therefore, a case covered by (Adams). Perhaps, but since Jackson does not say how to proceed with zero-probability antecedents, the point is moot.[14] More importantly, it is the logical probability of the antecedent that is zero (given the background information); but the sense of probability relevant to assertibility is not logical, but subjective. (Fermat's Last Theorem, being necessarily true, has always had logical probability 1; but before the mid-1990s, it did not have unit subjective probability for any knowledgable mathematician.) And at the point in the reasoning where the italicised conditional is asserted, we have not yet established that the antecedent is false. So it does not have zero subjective probability.[15]

Why does Jackson need his distinctive assertibility conditions? A principle functions of these is to protect the material account of the indicative conditional from some obvious objections. Consider the inference:

$$\frac{\text{The sun will rise tomorrow.}}{\text{If the sun does not rise tomorrow we will play cricket.}}$$

The inference, according to the material conditional, is valid. Yet the premise is true (we all hope), whilst the conclusion appears for all the world to be false. Jackson's reply is that the inference is, despite appearances, valid; we are just misled. The premise is highly assertible (probable), whilst the conclusion is not (since the probability that we will play cricket tomorrow, given that the sun does not rise, is minimal). We mistake failure to preserve

[14] The most natural way of handling zero-probability antecedents is simply to use a probability theory that takes conditional probability as primitive. We may then simply drop the non-zero condition in its formulation. If we do this, then this way of avoiding the objection lapses.

[15] A different reply, suggested by Jackson in correspondence, is that the italicised conditional is *not* assertible; what is assertible is the conditional: 'If (Fred is under 10 $\wedge$ All those under 10 live with their parents $\wedge$ Fred's parents live in Autumn's Retreat $\wedge$ All who live in Autumns's Retreat are aged pensioners) then Fred is an aged pensioner'. Note, first, that the antecedent has zero probability (since it entails that Fred is under 10 and an aged pensioner), so it is not clear that it is assertible, even on Jackson's own account. More importantly, the truth of the italicised conditional does depend on the extra conditions enumerated; but that does not mean that they have to be made explicit for the conditional to be assertible. Thus, an ordinary conditional such as 'If you jump off the roof, you will hurt yourself' depends on all sorts of conditions, such as that you will not be caught by angels, etc. These conditions do not have to be made explicit for the conditional to be assertible (and true, as we shall see). And the italicised conditional is perfectly assertible in the context, as any native reasoner can agree.

assertibility for failure to preserve truth; thus the inference appears to us to be invalid.

Jackson's explanation will not work, however. Moving from assertible premises to unassertible conclusions is neither necessary nor sufficient for an inference to appear to us to be invalid. Consider the inference:

$$\frac{\text{Jones has lost an arm.}}{\text{Jones has lost an arm or Jones has lost a leg.}}$$

The argument strikes us as valid. But suppose that you know the premise to be true. It then has a high degree of assertibility. But the conclusion is not assertible, since it suggests that you don't know which.

Or consider the inference:

$$\frac{\text{It is not the case that if I wear blue socks the sun will fail to rise tomorrow.}}{\text{The sun will rise tomorrow.}}$$

The argument (though valid according to the material conditional) certainly strikes us as invalid. Yet the inference takes us from something highly assertible (since the probability that the sun will fail to rise tomorrow given that I wear blue socks is low—the probability that the sun will or will not rise tomorrow is independent of my choice of socks) to something that is also highly assertible (probable).

2.5 The Material Conditional: Truth Conditions

Let us now move from assertibility conditions to truth conditions. Jackson motivates the idea that the indicative conditional is material by observing that we often move freely between indicative conditionals and material conditionals. Thus, suppose someone informs you that if you miss the bus you will be late, $M \rightarrow L$. You can infer from this that it is false that you will miss the bus and not be late, $\neg(M \wedge \neg L)$. Conversely, suppose that someone tells you that you won't go to the movies without spending money, $\neg(G \wedge \neg S)$. Then you would seem to be able to infer that if you go to the movies, you will spend money $G \rightarrow S$.

However, the second inference, at least, is not valid. To see this, suppose that you are not going to go to the movies, come what may, even if it is a free night. (There is a programme on the television that is much more interesting.) Then you know that it is not true that you will go, $\neg G$, and so that it is not true that you will go *and* not spend money, $\neg(G \wedge \neg S)$. You are not entitled to infer that if you go you will spend money: it may be a free night.

In the kind of situation in which we do move from the negated conjunction to the conditional, other factors are usually operating. Thus, in the cinema situation, if someone tells you $\neg(G \wedge \neg M)$, they do not normally do this on the basis that they know $\neg G$. (If they knew this, there wouldn't normally be much point in telling you anything.) If they tell you this, it is normally on the basis that there is some connection between G and M: presumably that you have to pay to get in tonight. It is exactly in situations like this that the conditional is true. Thus, though we may infer the conditional in situations of this sort, this is not because it follows from what you were told. It is a conversational implicature from the fact that it was said.

Not only is the above argument for the material truth conditions of indicative conditional fallacious, there are clear counter-examples to the thesis. There are many inferences which are valid for the material conditional, but which clearly take us from truths to falsehoods for indicative conditionals, and so are invalid.[16]

Here is one. Suppose that you have an electrical circuit with two switches, a and b, and a light c. If both switches are closed, a current will flow, and the light will go on. If only one switch is closed, the circuit will be open, and so the light will not go on. Thus we have: If switch a is closed and switch b is closed, light c will go on, $(A \wedge B) \rightarrow C$. If the conditional were material, it would follow that $((A \wedge \neg B) \rightarrow C) \vee ((\neg A \wedge B) \rightarrow C)$, i.e. that if switch a is closed, but not switch b the light will go on, or vice versa. Both disjuncts are clearly false.

Here is another. You don't know where John is, but you do know that if he is in Paris, he is in France, $P \rightarrow F$, and if he is in Beijing, he is in China, $B \rightarrow C$. Again, if we are dealing with material conditionals here, it follows that $(B \rightarrow F) \vee (P \rightarrow C)$: if he is in Beijing he's in France, or if he is in Paris he's in China. Both disjuncts are clearly false.

3 A Different Account

We have seen that Jackson's account faces a number of problems. Let us see if we can do better. In the second part of this paper I will sketch an account which, it seems to me, does. Let us start by going back to the beginning.

3.1 Prime and Non-Prime Conditionals

At the beginning, there is a problem even about how to characterise the topic of conditionals. Typically, conditionals employ the word 'if'. Thus,

[16] A list of such inferences is compiled in Routley *et al.* (1982), pp. 6f.

they may be of the form 'If A (then) B' or 'B only if A'. But the use of the word 'if' is not necessary. Just consider 'Were you here, I would not feel lonely', or even 'One false move and I shoot'. Conversely, not every sentence containing 'if' is a conditional in the logician's sense. Consider: 'If I may say so, you are very pretty', 'The dog, if it was a dog, ran off'. As these sentences indicate, an if-clause can be used to make some kind of concession. It can also have other functions, as we will see in due course. At any rate, in a conditional it expresses some kind of dependence of the consequent upon the antecedent. And that is what conditionals are: a construction for indicating such a dependence.[17] This is hardly a definition: it is far too vague. In particular, the question of the nature of the dependence in question cries out to be asked. But perhaps the answer to such a question is to be expected only the end of an investigation, not at the beginning. At any rate, the characterisation will do us for the present.

Let us now return to the distinction between prime and non-prime conditionals.[18] Prime conditionals are easy. The dependence, whatever it is, obtains between the antecedent and consequent, pure and simple. The case with non-prime conditionals is obviously otherwise. So what is going on with such conditionals?[19]

Start by noting that English has a problem modifying compound sentences, and particularly conditionals. Because so many modifiers in English (such as modal auxiliaries, tenses, and even negation) operate on verb phrases, not whole sentences, there is no logically apt place to deploy the modifier in a conditional. Thus, to take a standard and well known example, the sentence:

- If the earth is known to be round, it must be round.

[17] This is quite compatible with the dependence being of a vacuous kind in some cases (in the same way that the value of a function can sometimes depend vacuously on its argument—as with a constant function).

[18] Non-primeness can, in fact, arise for various reasons. One concerns quantifier pharases. Thus, consider the conditional: 'If anyone goes to the opera tonight, they are in for a treat'. This is a non-prime conditional: 'Anyone goes to the opera tonight' makes little sense on its own. It is clear, however, that the conditional is logically equivlent to: $\forall x$(if x goes to the opera tonight, x is in for a treat). Setting the free variable aside, the conditional in the scope of the quantifier is obviously non-prime in its own right. In what follows I will be concerned only with non-primeness of this kind, which is due to tense and mood.

[19] As will be clear to those who are familiar with the work of Dudman on conditionals (e.g., his (1986), (1988)), the material that follows in this section is heavily indebted to him. As a linguist, what he provides is much more subtle than anything I can attempt. However, as a logician, I find it appropriate to abstract away from some of the grammatical details.

is ambiguous. It could be of the form (with obvious notation): $KRe \rightarrow \Box Re$; but the most natural reading is: $\Box(KRe \rightarrow Re)$. Interpreted in this way, the English sentence expresses the modality of the whole conditional by modifying the verb-phrase of the consequent. Semantically, what the modifier is doing is getting us to evaluate the unmodified conditional, $KRe \rightarrow Re$, at worlds other than the actual.

Now, in many non-prime conditionals the tenses of the antecedent and consequent appear to work in just this way. Tenses and tense-dependence in English are complex, however; and the modifications of conditionals performed by various tense (and mood) combinations, particularly so. Let us consider some of the non-prime conditionals that we met in 2.1, starting with the relatively simple:

- If it rains, you will get wet.

The corresponding prime conditional is:

- If it is raining, you get wet.

The tense combination (antecedent, consequent) is $\langle$*present*, *future*$\rangle$; and what this gets us to do is to evaluate the prime conditional at a future (indefinitely specified) time, t. This is why, if we have 'It will rain' (i.e., 'It is raining at time t') we can apply *modus ponens*—at t, so to speak—to infer 'You get wet at time t' (i.e., 'You will get wet'.)

Now consider the more complex:

- If he had had a middle-class family life, he would have gone to university at age 18.

The corresponding prime conditional in this case is:

- If he has a middle-class family life, he will go to university at age 18.

The tense combination is $\langle$*pluperfect*, *past conditional*$\rangle$. And what this indicates is that we should evaluate the prime conditional at a past time, that of his upbringing, t. Thus, given that he had a middle-class family life, i.e., that 'he has a middle-class upbringing' is true at t, we can infer that, 'he will go to university at age 18' is true at t. That is—given that he is now older than 18—he went to university at age 18.

In this context, consider the notorious pair:

- If Oswald did not shoot Kennedy, someone else did.

- If Oswald had not shot Kennedy some one else would have.

The first is a straight prime conditional, and means what it says. The second is non-prime, coded as ⟨*pluperfect*, *past conditional*⟩. The corresponding prime conditional is:

- If Oswald does not shoot Kennedy, some one else will.

This expresses exactly the same thought, as expressed at the time of (the potential) murder. And the tense-coding of the non-prime conditional gives it the sense of the prime conditional, as evaluated at that time.

It is clear that the non-prime examples that I have been discussing show at least one common feature: there is a temporal back-shift in the antecedent. Thus, in the first example, the point of evaluation is in the future, but the tense is present; in the second, the point of evaluation is in the past, but the tense is pluperfect (past past). I am sure that this is no accident, and that there must be a general theory about how tense-coding functions. I have not attempted to give it here; it is doubtlessly much more complex that anything we have seen so far indicates. There are, for example, many other tense-pair codings that need to be considered.[20] However, I have at least said enough to indicate how a non-prime conditional with a certain tense structure has the same sense as the corresponding prime conditional, but evaluated at a different temporal location.

Before I finish the discussion of non-prime conditionals, and because subjunctive conditionals are so central to the way that logicians currently think about conditionals, let me make a final comment on mood proper, as distinct from tense. Consider the third non-prime conditional that we met in 2.1:

- If this were Friday, it would be the end of the week.

The corresponding prime conditional (as exposed by the *modus ponens* test) is: 'If this is Friday, it is the end of the week'. The mood of the antecedent here is not playing the role of indicating a shift in the locus of semantic evaluation. All it appears to be doing is indicating that the speaker does not accept the antecedent of the prime conditional. Compare: 'This is Friday;

[20] Thus, try ⟨*pluperfect*, *present conditional*⟩; for example: 'If he had left last week, he would not be here now'. One of the things that makes a general theory messy (though this is not a factor in this example) is the fact that the connection between tense and time in English is itself complex. For example, the present tense can be used to describe particular present events, but can also be used to express temporally extended dispositions. Compare: 'The bus stops; she is so excited; *she runs to meet him*' with 'She loves him so much that whenever they meet *she runs to meet him*'.

and if it is Friday it is the end of the week' with the odd 'This is Friday; and if this were Friday it would be the end of the week'. In other words, the use of the subjunctive indicates a non-committal attitude on the part of the speaker—as traditional accounts of the subjunctive have it—but in no way contributes to the semantic content of the conditional, as is witnessed by the fact that, in most contexts of use, whether we use a subjunctive conditional of this kind or the corresponding indicative conditional is a matter of complete indifference.

3.2 World Semantics

This is all I intend to say about non-prime conditionals here. It is clear that a proper semantic theory of such conditionals would require not only a semantics for a significantly tensed language, but also a general theory of the relationship between temporal codes and the shift of the locus of evaluation. I will leave that as another project. The understanding of how non-prime conditionals work is really an understanding of the interconnection between tense and the conditional. As such, it is not an understanding of the conditional itself, though it is clear that it will depend on this. To understand conditionality as such, we need to understand the behaviour of prime conditionals (or just conditionals from now on). This has enough problems of its own, and is quite enough for the present. I turn to the issue now.

Counter-examples of the kind that I discussed in 2.5 make it clear that the conditional is not material. Indeed, the idea that the conditional is truth functional has always been a most implausible one. 'If Newton's theory of gravity is true, masses attract each other in inverse proportion to the square of the distance between them' is true; 'If Newton's theory of gravity is true, masses attract each other in inverse proportion to the cube of the distance between them' is false; even though both of these have the same false antecedent. Conditionals are inherently intentional. And this means, at least according to our current understanding of logical technology, that they should be given a world-semantics. But as we saw in 2.3, the worlds in question must include not only physically impossible worlds, such as ones in which Newtons' theory of gravity is true, but logically impossible worlds, such as ones where Boethius' connexive theory of the conditional is true (to use, I hope, a relatively uncontentious example). How does this work?[21]

[21] For further discussion of, and all technical details concerning, the material in this and the next two sections, see Priest (2001), chs. 9, 10. Note that possible and impossible worlds are called normal and non-normal worlds there.

Suppose that we have a simple propositional language with conjunction, disjunction, negation, and an operator $\rightarrow$. The arrow is to be thought of as representing a genuine sufficiency operator. $A \rightarrow B$ means something like: in every situation where A holds B holds. $\rightarrow$ therefore represents a notion of complete logical sufficiency: entailment in the fullest sense of that word.

In a semantic interpretation of this language, worlds are of two kinds, possible and (logically) impossible. The actual world is one of the possible worlds. A physically impossible world is a possible world in which the laws of physics are different (from those in the actual world). A (logically) impossible world is, similarly, a world at which the laws of logic are different (from those in the actual world).[22] Logical truth is, therefore, truth at *all possible* worlds, not *all* worlds.

What does this mean for truth conditions? Conjunction and disjunction behave normally; negation we will come back to in the next section. The really important connective in the present context is $\rightarrow$. Since this is a genuine sufficiency relation, $A \rightarrow B$ is true at the actual world, and in fact all possible worlds, just if at every world where A holds B holds.[23] What of impossible worlds? Sentences of the form $A \rightarrow B$ express entailment relations, that is, laws of logic; and impossible worlds are worlds where the laws of logic are different. $\rightarrow$ cannot, therefore behave in the same way at such worlds. For example, given the truth conditions for $\rightarrow$ at possible worlds, $p \rightarrow p$ is a logical truth; there must therefore be worlds where $p \rightarrow p$ fails to be true.

How this is to be achieved technically is a question that can be answered in various different ways. For example, standard relevant logics employ a three place relation, R, such that $A \rightarrow B$ holds at an impossible world x, just if for all y and z such that $Rxyz$, if A holds at y, B holds at z. What such a relation means, and why it should get tangled up in the truth conditions for $\rightarrow$ are issues on which the jury is still out.

A simpler, and unproblematic, strategy is to assign $\rightarrow$-formulas *arbitrary* truth values at impossible worlds. This reflects the fact that if logic can change, *anything* that expresses a logical law may hold or fail. Thus, at

[22] One might mean by a logically impossible world simply one where something logically impossible happens. This is weaker. The fact that the laws of logic are different does not mean that something logically impossible actually happens, only that it can. The stronger notion is the appropriate one. Compare physical impossibility. A world where something can accelerate from sub-luminal to super-luminal speeds is physically impossible, even though nothing, as a matter of fact, may ever get to accelerate through the speed of light.

[23] Those who do not accept $S5$, but, say, $S4$ as an account of entailment can throw in an appropriate binary relation and give the truth conditions of $\rightarrow$ employing this. But for a relation of universal sufficiency, this would obviously seem to be wrong.

some impossible world, the sentence $(p \wedge q) \to p$ may not hold. This does not, of course, mean that $(p \wedge q) \to p$ is not actually true. Indeed, it is: given that conjunction behaves normally, at every world where $p \wedge q$ holds, so does p.

3.3 Negation

What of negation? Consider, say, the principles of excluded middle and non-contradiction, $A \vee \neg A$, $\neg(A \wedge \neg A)$. Either these are laws of logic or not. If they are not, then they must fail in some logically possible world. If they are, they may still fail, but the worlds at which they fail will be logically impossible. Either way, we need a semantics for negation which allows formulas of these forms to fail at worlds. There are, again, different ways that this may be achieved. One is to employ the Routley $*$-operator. Each world, w, has a mate, w^*; and $\neg A$ holds at w just if A fails, not at w, but at w^*. Again, what, exactly, the $*$ means, and why it should be involved in the semantics of negation is an issue on which the jury is still out. A less contentious proposal is to take negation to have its familiar truth conditions:

$\neg A$ is true at a world just if A is false at that world

and vice versa; but to make no assumption about truth and falsity being exclusive and exhaustive. Thus, A may be neither true nor false at a world, in which case, $A \vee \neg A$ and $\neg(A \wedge \neg A)$ will fail there. Or A may be both true and false at a world, in which case $A \wedge \neg A$ (and its negation) will hold there.

The semantics I have described in this section and the last are the semantics for a simple relevant logic, in the sense that whenever $A \to B$ is a logical truth, A and B share a propositional parameter. They still leave open important philosophical questions, however. The fact that there are truth-value gaps/gluts at some worlds, does not settle the question of which worlds it is at which this may happen. There are three possibilities. We may suppose that there are truth value gluts at the actual world. This will give us a dialetheic logic, which countenances true contradictions. More conservatively, we may suppose that the actual world is consistent, but that gluts may arise at other possible worlds. If we do that, we do not have dialetheism; but we still have a paraconsistent logic, i.e., one where the inference $A, \neg A \vdash B$ fails. More conservatively still, we may assume that truth value gluts occur only at impossible worlds. In this case, we have a relevant logic, but an explosive one (that is, where $A, \neg A \vdash B$ holds). The same three options are available for gaps (and there is no *a priori* reason why we need to endorse the same option for gaps and for gluts). We may suppose that there are truth value gaps at the actual world. In this case, we have the possibility that formulas of the form $A \vee \neg A$ are not actually true. More conservatively, we may hold that there are no gaps at the actual world, but that there are gaps at other possible worlds. In this case, although all instances of the principle of excluded middle are actually true, it is not a logical law. Most conservatively, we may suppose that gaps occur only at impossible worlds. In that case, we have a relevant logic that validates the principle of excluded middle.

Whatever philosophical choices one makes about these matters, there is still more to be said. The relevant logics that the above semantics deliver are relatively weak ones—in comparison with most logics in the family of relevant logics. Thus, if we assign $\rightarrow$-formulas arbitrary truth (and falsity) conditions at impossible worlds, the logic has no logical truths that involve nested $\rightarrow$s essentially. Thus, though we have $(A \rightarrow B), (B \rightarrow C) \vdash A \rightarrow C$, we do not have $\vdash (A \rightarrow B) \rightarrow ((B \rightarrow C) \rightarrow (A \rightarrow C))$. If we use a ternary relation to give truth conditions for the conditional, we will have logical truths that involve nested conditionals, such as this one, but not everything that one might have expected, e.g., $\vdash (A \wedge (A \rightarrow B)) \rightarrow B$. Perhaps that is as it should be. But the addition of constraints on the semantics will produce stronger relevant logics;[24] and it is certainly open to someone to argue that such constraints are justified. For example, if someone employs the ternary relation, and can motivate the reflexivity condition, $Rxxx$, then $(A \wedge (A \rightarrow B)) \rightarrow B$ will become logically valid.

This is not the place to go into this, though. It is time to get back to conditionals.

3.4 Conditionals, at Last

Though $\rightarrow$ functions in a conditionalish sort of way, it is not the conditional. It requires a connection between antecedent and consequent that is much much tighter than anything one would require in most contexts.[25] One way to see this is to look at some familiar examples. The semantics for $\rightarrow$ validate the principles of strengthening the antecedent and of transitivity:

$$A \rightarrow C \vdash (A \wedge B) \rightarrow C$$

$$A \rightarrow B, B \rightarrow C \vdash A \rightarrow C$$

[24] And even irrelevant ones if the constraints are strong enough.

[25] If one wants to put $A \rightarrow B$ in the form of a conditional, it is something like: If A then, of absolute necessity, B. Thus, it is really of the form $\blacksquare(A > B)$, where $>$ is the genuine conditional, and $\blacksquare$ is an absolutely unrestricted necessity operator. That is, $\blacksquare A$ holds at a possible world iff A holds at every world.

But there are well known counter-examples to each of these, such as:

- If it didn't rain yesterday, then the road was not wet. If it didn't rain yesterday and the water main broke, the road was not wet.
- If the other candidates pulled out, Jones got the job. If Jones got the job, the other candidates were very disappointed. So if the other candidates pulled out they were very disappointed.

Note that these are all prime conditionals.[26]

When we evaluate a conditional, we look to worlds where the antecedent is true, to see whether the consequent is true. But, as these examples indicate, we don't look to all worlds where the antecedent is true. Thus, for:

- If it didn't rain yesterday, then the road was not wet.

we look to worlds where it didn't rain, but not to those in which aberrant events, such as the breaking of a water main occur. That is, we look at those worlds that are, *ceteris paribus*, the same as ours, except for the fact that the antecedent holds. What counts as *ceteris paribus* depends, of course, on the antecedent in question. If the antecedent is 'it didn't rain yesterday', breaking water mains are aberrant; if the antecedent is 'it didn't rain yesterday and the water main broke' it is not. What counts as *ceteris paribus* may also be context-dependent. Thus consider the conditionals:

- If this car was a photon, then it would move at the speed of light.
- If this car was a photon, then some photons would move at sub-luminal speeds.

In the first case, we might be discussing racing cars, and the constancy of the speed of light is part of the *ceteris paribus*. In the second case, we might be discussing the nature of fundamental particles, and the dynamic capabilities of the car are part of the *ceteris paribus*.

Let us use $>$ to express the conditional; and if x is any world, let xR_Ay mean that y is *ceteris paribus* the same as x, except that A holds. Then what we have seen is that the natural truth conditions for $A > B$ are as follows:

[26] The other principle to which counterexamples are normally given in this context is contraposition: $A \rightarrow B \vdash \neg B \rightarrow \neg A$. This is valid given the star semantics for negation, but not the many-valued semantics. It can be made valid on these semantics by requiring $\rightarrow$ to preserve falsity backwards as well as truth fowards. Standard counter-examples work just as well against the contraposibility of prime conditionals: "If he took the car yesterday, it didn't break down *en route*. So if the car broke down yesterday *en route*, he didn't take it'.

$A > B$ is true at world x iff for all y such that xR_Ay, B is true at y.

There may also be appropriate falsity conditions—and if you want to assign a conditional a degree of assertibility as well, this can simply be its probability.

Given these semantics, it is not difficult to check that we do not have:

$A > C \vdash (A \wedge B) > C$

$A > B, B > C \vdash A > C$

For example, the fact that C is true in all the worlds that are, *ceteris paribus*, the same, except that A holds, does not mean that it is true in all those worlds which are, *ceteris paribus*, the same, except that A and B hold. Thus, given only that it rains, the breaking of a water main is not *ceteris paribus*; but given that it rains and the water mains break, it very much is.

Allowing the R_As to be arbitrary relations gives a very weak conditional logic, just as, in standard modal semantics, an arbitrary binary accessibility relation gives a weak modal logic (K). And just as the natural understanding of the binary accessibility relation motivates constraints on its behaviour, such as reflexivity, so the natural understanding of the meaning of R_A motivates various constraints. Thus, since xR_Ay means that y is *ceteris paribus* the same as x, except that A holds, it clear that one should expect:

If xR_Ay then A holds at y.

And if A holds at x then clearly x is one of the worlds that are *ceteris paribus* the same as x, except that A is true. That is:

If A holds at x then xR_Ax.

The conditions in question are where x is a possible worlds; at impossible worlds, R_A can behave deviantly, as $\rightarrow$ does.[27] These constraints serve to validate the inferences $\vdash A > A$ and $A, A > B \vdash B$, which are otherwise invalid.

It is open to someone to argue that the *ceteris paribus* understanding motivates other constraints. Thus, though this is certainly not necessary—or

[27] An alternative strategy is to apply the constraints on R_A at all worlds, but to modify the truth conditions of conditionals at impossible worlds. Thus, for example, we might assign sentences of the form $A > B$ arbitrary truth values at impossible worlds. Conditionals may not express laws of logic; but which conditionals hold may certainly depend on logical laws. Thus, $(A \wedge B) > A$ is true since $A \wedge B$ entails A. We might therefore expect conditionals to exhibit the same sorts of capriciousness at impossible worlds as do sentences of the form $A \rightarrow B$.

maybe even desirable—one might argue that the notion should be cashed out in terms of similarity. In this case, the notion of similarity spheres naturally motivates other constraints on R_A. The conditional logic with which we end up depends, of course, on these constraints. It depends, equally, on the properties of the underlying relevant logic. Thus, given only the first of the above constraints, we have that $A \rightarrow B \vdash A > B$. So any logical truth of the form $A \rightarrow B$ gives rise to a true conditional.

However, we need not pursue these issues here. Things are no different in standard Lewis/Stalnaker semantics. The main point to note about the construction here is simply that it builds in impossible worlds at the appropriate places—in particular, worlds where logical falsehoods are true and logical truths fail. Thus, unlike the standard Lewis/Stalnaker semantics, the construction provides an adequate theoretical basis for the analysis of counter-logical conditionals.

3.5 Some Objections

As is clear, the account of conditionals that I have sketched leaves many details to be filled in. But it is also clear that it avoids the problems associated with Jackson's, and similar classically-motivated, accounts. It presupposes no dubious indicative/subjunctive division. Assertibility conditions play no essential role in it, so it is not subject to the problems that talk of assertibility brings. It is able to handle conditionals with logically impossible antecedents. And it does not make obviously invalid inferences valid.

Of course, it is open to objections of its own. Perhaps the most obvious objection to someone coming from a classical background is the fact that the account of the conditional I have given fails to validate many inferences that they have gotten used to accepting. Many of these, as we have seen, are no loss. I doubt that, for many of the others (e.g., Contraction: $A > (A > B) \vdash A > B$), their departure is much to be mourned either; but in any case, the validity of various additional inferences can be accommodated by fine-tuning the parameters of the account, e.g., by adding extra constraints at the appropriate places. Of course, fine-tuning the parameters is not going to give back, e.g., transitivity. (It had better not!) So what is one to say about arguments where this form of inference appears to be deployed? There are various possibilities: one is that the conditional in question really has the force of an $\rightarrow$, for which transitivity holds. Another is that the conditional can be thought of simply as material (as it often can in pure mathematical contexts), in which transitivity holds (at least in consistent contexts). Yet a third is that the inference in question is not simply transitivity, but a restricted and valid version thereof. Thus, for example, in conditional logics it is possible, by fine-tuning, to make the following inference valid. $A > B, (A \wedge B) > C \vdash A > C$. The argument may really be of this form.[28] At any rate, at this point the argument descends into case-by-case investigation.

Rather than do this, let me, instead, consider some objections that do not thus descend. One of these has been put to me in conversation by Jackson on a couple of occasions. Suppose that you think that John is going to fail his exam, come what may. You may express this fact by saying:

(Jackson) If John studies he will not pass his exam, and if John does not study he will not pass his exam.

This is exactly to say that there is no connection between studying and passing. Yet the conditionals are still true, simply on the strength of the consequent, as is required by material truth conditions.

A couple of things are relevant here. First, note that 'if' can function, not only as a conditional, but as 'whether', as in 'I do not know if/whether Jones is coming'. A natural way to express the fact in question about John is as:

- Whether Jones studies or not, he will not pass.

or as:

- If Jones studies or not, he will not pass.

It is quite natural that this would be expressed in the form (Jackson). The two sentences seem to be ways of saying the same thing, just as do the following:

- If you lose an arm or a leg you can claim the insurance.
- If you lose an arm you can claim the insurance and if you lose a leg you can claim the insurance.

But let us suppose that 'if' is functioning as a conditional in (Jackson). Is this compatible with (Jackson) expressing the simple claim that John will not pass? Yes. Note that (Jackson) entails that John will not pass—provided we have the law of excluded middle. Conversely, if John's studying is irrelevant to his passing, then in all the worlds that are, *ceteris paribus*, the same as ours, except that John studies, he does not pass; and in all the worlds that are, *ceteris paribus*, the same as ours except that John does not study, he

[28] For a discussion of this sort of situation, see Lewis (1981), pp. 71f.

does not pass. That is, (Jackson) is true on the account of conditionals which I have given.

Let us turn to some other objections of a general kind. Section 4.3 of *Conditionals* is entitled 'Why Indicative Conditionals cannot be Possible-Worlds Conditionals'; and, in it, Jackson gives three reasons as to why they cannot.

The first is the difficulty that one who takes there to be only one kind of conditional—as I do, essentially—finds in giving an account of the difference between the notorious Oswald/Kennedy conditionals of 3.1. The obvious way to handle them, Jackson suggests, is to try to explain the difference in terms of different notions of similarity, which faces various problems. This objection fails to get a grip on the account I have given here. The difference between the two conditionals was analysed in terms of the more general difference between prime and non-prime conditionals; similarity had nothing to do with it.

The second objection is to the effect that, though the evaluation of a counterfactual conditional takes us "out of this world", an indicative conditional does not. Jackson illustrates (p. 74):

> It is perfect sense to say that if Oswald had not shot Kennedy, things would be different from the way that they actually are... It is, on the other hand, nonsense to say indicatively that if Oswald did not shoot Kennedy, things are different from the way they actually are.

Let us see what to make of the matter on the account that I have given. The conditional:

- If Oswald had not shot Kennedy, things would be different from the way that they actually are.

is a non-prime ⟨*pluperfect*, *past conditional*⟩ conditional. Its corresponding prime conditional is:

- If Oswald does not shoot Kennedy, things will be different from the way that they actually are.

And if one evaluates this at the time of the killing, it is obviously true. In all those worlds which are, *ceteris paribus*, the same except that Oswald does not shoot Kennedy, things will different from the way that they transpired in actuality.

So far so good. The conditional:

- If Oswald did not shoot Kennedy, things are different from the way they actually are.

is a prime conditional. One can, in fact, hear the consequent in two ways. The first is as a straight contradiction: things are the way that they are not. If one hears it in this way, then the consequent is "a nonsense". In all the worlds that are, *ceteris paribus*, the same as ours except that Oswald did not shoot Kennedy, it is not the case that things are the way that they are not. The conditional is simply false.

But one can hear the consequent in another way, as true: if Oswald did not shoot Kennedy, then things *are* different from the way that they actually are—he did. In all those worlds that are, *ceteris paribus*, the same as ours, except that Oswald did not shoot Kennedy, things are different from the way that they actually are. To interpret the conditional in this way is unusual, but, it seems to me, perfectly intelligible. If you find it is hard to hear it so, just reflect on the following. Let us suppose that the Warren Commission got it right. Then Oswald was not framed. So in the way that things actually are, he was not framed. But *if he did not shoot Kennedy*, he was framed—that is, *things are different from the way that they actually are.* The italicised conditional is thus both intelligible and true.

So the situation is more complex than Jackson envisaged—as situations concerning conditionals often are. But, depending how you interpret the conditional, Jackson's intuitions are either accommodated or wrong. In either case, there is no problem.

The third objection is actually two. The first is to the effect that if A is consistent, the subjunctive conditionals 'If A were the case, B would be' and 'If A were the case, $\neg B$ would be' are contraries; but the indicatives 'If A is the case, B is' and 'If A is the case, $\neg B$ is' are mutually consistent. Thus, if I am told that 'if Fred voted for the motion, he did the right thing', by someone who knows of Fred's impeccable moral character, and 'if Fred voted for the motion he did the wrong thing', by someone who knows that the motion was evil, I can simply take these both as true, and infer that Fred did not vote for the motion. Now, in the semantics I have outlined, if A is consistent, then $A > B$ and $A > \neg B$ are contraries: they cannot both be true. But the voting example does not refute this, since the *ceteris paribus* clause in question is context-dependent. Thus, the first speaker knows that Fred is of good character. This is part of their *ceteris paribus*. And in worlds where Fred is of good character, and he voted for the motion, he did the right thing. By contrast, the second speaker knows that the motion was evil. This was part of their *ceteris paribus*, and in worlds where this is true and Fred voted for the motion, he did the wrong thing. Thus, both conditionals are true, but only because of the different *ceteris paribus* assumptions. I, on the other hand, know that, given the information possessed by the speakers (that Fred is of good moral character and that the motion was evil—though I may not myself know these things), the consistent assumption that Fred voted for the motion leads to a contradiction. I infer that the assumption is not true.

The second third objection is to the effect that if indicative conditionals of the form $A \rightarrow B$ and $A \rightarrow \neg B$ are contraries then there must be cases where the assertibility of an indicative conditionals exceeds its probability, which, Jackson argues earlier (p. 60), it cannot. The argument that there must be such cases depends, however, on (Adams): the identification of the assertibility of the indicative 'If A then B' with $\Pr(B/A)$. This is not something that the account of conditionals I have offered endorses. Indeed, in 2.4 I argued against the correctness of (Adams). So the argument, again, fails to take purchase.

So much for Jackson's objections. As I said in the Introduction, the question of the nature and behaviour of conditionals is a hard one. I would therefore be surprised if there were not many other objections to the account of conditionals that I have sketched. But the account does seem to me to be manifestly superior to most other accounts currently on offer. And if that's right, that's progress.[29]

References

[1] Dudman, V. (1986), 'Antecedents and Consequents', *Theoria* 52, 168-99.

[2] Dudman, V. (1988), 'Indicative and Subjunctive', *Analysis* 48, 113-22.

[3] Humberstone, L. (1991), Critical Notice of F. Jackson, *Conditionals*, *Philosophy and Phenomenological Research* 51, 227-34.

[4] Jackson, F. (1987), *Conditionals*, Oxford: Basil Blackwell.

[5] Lewis, D. (1973), *Counterfactuals*, Oxford: Basil Blackwell.

[6] Lewis, D. (1981), 'Counterfactuals and Comparative Possibility', pp. 57-85 of Harper, W. L., Stalnaker, R. and Pearce, G. (eds.), *Ifs*, Dordrecht: Reidel Publishing Co.

[29] Many thanks go to Frank Jackson for his helpful comments on an earlier draft of the essay. Parts of the paper were given to a Logic Group seminar at the University of Melbourne. Thanks for helpful comments go to a number of the people there, including Allen Hazen, Greg Restall and, especially, Lloyd Humberstone.

[7] Popper, K. (1972), *The Logic of Scientific Discovery*, London: Hutchinson.

[8] Priest, G. (1989), Review of F. Jackson, *Conditionals*, *Australasian Journal of Philosophy* 67, 236-9.

[9] Priest, G. (2001), *Introduction to Non-Classical Logic*, Cambridge: Cambridge University Press.

[10] Roeper, P. and Leblanc, H. (1999), *Probability Theory and Probability Logic*, Toronto: University of Toronto Press.

[11] Routley, R., Plumwood, V., Meyer, R. K. and Brady, R. (1982), *Relevant Logics and their Rivals*, Vol. I, Atascadero, CA: Ridgeview.

[12] Sandford, D. H. (1989), *If P then Q; Conditionals and the Foundations of Reasoning*, London: Routledge.

[13] Smiley, T. J. (1983-4), 'Hunter on Conditionals', *Proceedings of the Aristotelian Society* 84, 241-9.