

COUNTERFACTUALS WITH DISJUNCTIVE ANTECEDENTS

(Received 19 July, 1976)

Let  $A$  and  $B$  be indicative sentences, either of ordinary English (or some other natural language), or truth-functional compounds of natural-language sentences built up by means of the usual truth-functional connectives. Then we call  $\Box$  'if it were the case that  $A$ , it would be the case that  $B$ '<sup>1</sup> a *regimented counterfactual sentence* (RCS). (Hereinafter, we shall use ' $\dots > \dots$ ' to abbreviate 'if it were the case that  $\dots$ , it would be the case that  $\dots$ '.) Several writers, including David Lewis,<sup>2</sup> have proposed ways of assigning truth-conditions to RCS's. The proposal made by Lewis in his *Counterfactuals* and elsewhere – viz.,  $A > B$  is true<sup>3</sup> just in the case that (i)  $A$  is necessarily false, or (ii) there is a possible world at which  $A \& B$  is true that is more like the actual world than is any world at which  $A \& \sim B$  is true – seems to us to be correct. In this paper, we will defend Lewis's proposal against a criticism recently made by Donald Nute, by Kit Fine, and by Lewis G. Creary and Christopher S. Hill.<sup>4</sup>

The premises of the argument for the inadequacy of the Lewis proposal may be represented as follows:

- (1) The English sentence (call it ' $S$ ') 'If we were to have good weather this summer or if the sun were to grow cold before the end of the summer, we would have a bumper crop' is false<sup>5</sup>
- (2)  $S$  is equivalent to the RCS (call it ' $S^*$ ') '(The weather next summer will be good  $\vee$  The sun will grow cold next summer)  $>$  We shall have a bumper crop next summer'
- (3) If the Lewis proposal is correct, then  $S^*$  is true.

If these three premises are true, then, clearly, the Lewis proposal is wrong. Premise (1) seems true, since, if the sun were to grow cold, then we should *not* have a bumper crop. Premise (3) is demonstrable, given that good weather next summer would produce a bumper crop (which we shall assume), and that there is a world in which we have good weather next summer that is

more like the actual world than is any world in which the sun grows cold next summer, which is surely true.<sup>6</sup>

But premise (2) is false. Sentence  $S^*$  is not equivalent to  $S$ , because  $S^*$  is equivalent to

$S^{**}$  Consider the following disjunction:

The weather will be good next summer  $\vee$  The sun will grow cold next summer;

if this disjunction should turn out to be true, then we should have a bumper crop next summer

and  $S$  is not. (To see that  $S^*$  is equivalent to  $S^{**}$ , remember that ‘...  $>$  \_\_\_’ abbreviates ‘if it were the case that ..., it would be the case that \_\_\_’.) Sentence  $S$  is not equivalent to  $S^{**}$  because  $S$  is, as we have conceded, false, and  $S^{**}$  is true. For suppose

$D$  The weather will be good next summer  $\vee$  The sun will grow cold next summer

were to turn out to be true. What would happen? For one thing, the weather would be good next summer. Moreover, if  $D$  were true, the relationship between the weather and the crops would be what it in fact is: if  $D$  were true, ‘If the weather were good, we should have a bumper crop’ would be true.<sup>7</sup> Therefore, if  $D$  were true, we should have a bumper crop next summer.<sup>8</sup> And therefore, premise (2) of the argument against the Lewis proposal is false.

Since Lewis’s critics accept premise (2), and since it appears to be a logical consequence of  $S$  that if the sun were to grow cold before the end of the summer, we should have a bumper crop, they propose that we adopt a system of counterfactual logic according to which

$$[(A \vee B) > C] \supset (B > C)^9$$

is a valid schema. (To be precise, Nute and Creary and Hill propose this; Fine considers the possibility seriously and does not reject it.) But this proposal is unacceptable. Suppose someone asks which side Spain fought on in World War II, and we reply, “Neither. Spain did not enter the war. But if she had fought on one side or the other, it would have been the Axis.” That is, we

reply by asserting the counterfactual conditional

(Spain fought on the Axis side  $\vee$  Spain fought on the Allied side)  
 $>$  Spain fought on the Axis side.

But if the above schema were valid, then from the truth of what we say, the truth of

Spain fought on the Allied side  $>$  Spain fought on the Axis side

would follow!

One matter remains to be considered. What about *S*? It is clearly a counterfactual conditional, and one whose meaning is reasonably clear. How should the proposition it expresses be expressed in a language whose apparatus for representing counterfactuals is restricted to RCS's and truth-functional combinations thereof? If it can't be expressed in such a language, then Lewis's proposal, even if it is correct, is of restricted utility. But there is really no problem about this. The proposition *S* expresses should be expressed in regimented language this way:

(The weather next summer will be good  $>$  We shall have a bumper crop next summer ) & (The sun will grow cold next summer  $>$  We shall have a bumper crop next summer).

And this sentence is false on the Lewis proposal. But, someone may object, this RCS is a conjunction, and *S* contains 'or'. This objection has little force, however. There are certainly sentences that are *not* counterfactual conditionals in which 'or' has, loosely speaking, the force of 'and'. For example, 'Either the Well-Ordering Theorem or Zorn's Lemma leads to the Axiom of Choice'<sup>10</sup> and 'I can fly or take the train'.<sup>11</sup> Moreover, it is no secret that the superficial structural features of a natural-language sentence can be a treacherous guide for one who is translating that sentence into some regimented idiom. (Consider the problem of teaching the beginning logic student to translate English sentences containing 'any' into the regimented quantifier-variable idiom.) For every regimented idiom, there is a body of 'lore' concerning the translation of natural-language sentences into it. The discovery of sentences like *S* is a contribution not to the problem of assigning truth-conditions to sentences expressed in the regimented counterfactual idiom, but rather to the translation-lore of that idiom.<sup>12</sup>

## NOTES

<sup>1</sup> The corners or quasi-quotation marks are used after the manner of Quine. In the sequel they will be dropped for the sake of typographical simplicity.

<sup>2</sup> David Lewis, *Counterfactuals*, Harvard, 1973, *passim*.

<sup>3</sup> Or, as one of the authors prefers to say, 'expresses a true proposition'.

<sup>4</sup> Nute, 'Counterfactuals and the Similarity of Words' [*sic*], *The Journal of Philosophy* LXXII 21, (1975), 773–778. Fine, critical notice of *Counterfactuals*, *Mind* LXXXIV (n.s.), (1975), 451–458. Creary and Hill, review of *Counterfactuals*, *Philosophy of Science* XLIII 3, (1975), 341–344. We wish to thank David Lewis for calling our attention to the fact that the 'disjunctive antecedents' problem was raised in the cited reviews.

<sup>5</sup> *S* is taken from Nute's presentation of the argument we are considering. Fine uses 'If Thorpe or Wilson were to win the next General Election, Britain would prosper'; Creary and Hill use 'If either Mary or the Jones twins had tutored Johnny, he would have passed his algebra course'.

<sup>6</sup> For a demonstration that  $S^*$  is true on the Lewis proposal, see Nute, *op. cit.*, p. 778, APPENDIX. In general, if  $A > C$  is true, and if there is a world at which  $A$  is true that is more like the actual world than is any world at which  $B$  is true, then  $(A \vee B) > C$  will be true on the Lewis proposal, whether or not  $B > \sim C$  is true and whether or not  $B > C$  is true.

<sup>7</sup> Anyone who doubts either of these claims may find it instructive to imagine asking an omniscient being whether  $D$  is true and being told by the being that  $D$  is true. (That is, to imagine a case in which we learn that this disjunction is true otherwise than by learning of one of its disjuncts that *it* is true.) What should we expect next summer if we came so to learn that  $D$  was true? We should expect that the weather would be good next summer. But to admit that this is what we should expect in the imagined case is, in effect, to assent to the counterfactual 'If  $D$  were true, we should have good weather next summer'. A similar argument can be used to support the second claim.

<sup>8</sup> The inference-form employed in this argument is  $A > B$ ,  $A > (B > C) / \therefore A > C$ , which, so far as we know, has never been questioned.

<sup>9</sup> Nute intends this formula to be valid in the system of counterfactual logic  $C'$  he presents *op. cit.* But it is *not* a valid formula of  $C'$ .

<sup>10</sup> Of course, 'The Well-Ordering Theorem leads to the Axiom of Choice and Zorn's Lemma leads to the Axiom of Choice' and 'The disjunction of the Well-Ordering Theorem and Zorn's Lemma leads to the Axiom of Choice' are logically equivalent. But the former is surely the natural way to read this sentence.

<sup>11</sup> This example is David Lewis's. Lewis has communicated to us this and several other examples of cases in which 'seeming narrow-scope disjunction is really wide-scope conjunction', including 'You may have your coffee with cream or without' and 'The law allows you to count this either as a deduction or an adjustment'.

<sup>12</sup> Fine has briefly suggested (*op. cit.*), as one possibility, that sentences like his sentence about Thorpe and Wilson do not have 'genuinely disjunctive' antecedents. This seems to us to be the only possibility.