ABSTRACT. Karttunen's seminal 1973 article 'Presuppositions of compound sentences', lays the groundwork for the elegant and fruitful theory of this subject which he subsequently presented in (1974). In (1973, pp. 185--8), however, he fallaciously argued that the regularities he discovered concerning the behavior of and, or, and if . . . then in English cannot be embodied in any three-valued logic giving a truth-functional interpretation to these connectives. The present paper refutes Karttunen's argument by exhibiting an interpretation with the desired properties, and shows further how the full articulation of his 1974 system can be developed naturally within a truth-conditional semantics for English if bivalence is abandoned – contrary to what Karttunen expected.

The purpose of this paper is to sketch briefly how Karttunen's rules for the 'projection' of presuppositions to complex sentences can be formulated model theoretically, using 'truth gaps' rather than any special component of semantic representation to describe the presuppositions. I will refer herein to Karttunen's definitive (1974) statement of his rules rather than his earlier and somewhat different (1973) account. First, a few remarks on the nature and method of semantic interpretation to be employed.

Because natural language sentences are not strings of uninterpreted symbols but instead have meaning, declarative sentences are true with reference to certain states of affairs and false with reference to others.¹ Sentence (1), for instance, is true of the state of affairs that exists today and false of the state of affairs that existed at any point before 1974.

(1) A president of the U.S. has resigned his office.

In talking about what it is that a sentence is true or false in relation to, it is common to use expressions such as 'potential state of affairs,' 'possible set of circumstances,' the more colorful 'possible world,' and several others. I shall adopt Dana Scott's term 'point of reference' to serve neutrally in place of any of these expressions. Just as one reference point is the actual, present state of things, others reflect what once was the case or eventually will be the case, still others what might have been or become the case had things gone differently than they actually did at some point, and so on. For present
purposes it is not necessary to know exactly what constitutes a reference point or even to know the exact range of possible worlds. I shall just assume that we are given a set $I$ which indexes the class of all reference points, which thus are in a one-to-one correspondence with the members of $I$.

If it is in virtue of its meaning that a statement $S$ is true or false at any given point $i$ of reference, then the meaning of $S$ associates truth-values with $S$ relative to the members of $I$. This association is called the intension of $S$, and may be viewed simply as an ordered pair of disjoint subsets of $I$ the one consisting of the reference points at which $S$ is true and the other being the set of points with reference to which $S$ is false. Now an interpretation of a language assigns to each grammatical sentence $S$ of the language a semantic value, which I will denote by $[[S]]$; A natural thing to take as the semantic value of an expression, as a first approximation at least, is the intension of that expression. For declarative sentences this means an ordered pair of disjoint sets of reference points, and for convenience I adopt the notational convention that $[[S]] = ([[S]]_T, [[S]]_F)$, where $[[S]]_T$ is the set of points relative to which $S$ is true, and correspondingly for $[[S]]_F$.

Now how could a finite procedure of interpretation assign a semantic value to each string in an infinite set such as a natural language? Well, if the set of grammatical strings is generated by a finite system of recursive rules, one can give a tandem recursive specification of semantic values. There are standard methods in model theory for specifying the semantic value of expressions produced by a rule in terms of the semantic values of the expressions which the rule operates on. In showing how to give an interpretation of English which embodies Karttunen's principles for 'projecting' presuppositions, I will deal only with a highly oversimplified grammar and will, in the fashion of the 'standard theory', interpret only underlying structures. Since expressions of the base are either listed in the lexicon or generated by means of phrase structure rules, we can interpret such expressions by (a) listing the semantic value of each lexical expression and (b) stating a rule of semantic interpretation for each phrase structure rule of the base.

For concreteness, let us consider a context-free base grammar which has categories $S$, $N$, $V_1$, $V_1'$, $V_2$, $V_2'$, and $V_2''$ and morphemes *and*, *or*, *if*, *then*, *John*, *Mary*, *slouches*, *sings*, *turns out*, *seems*, *loves*, *sees*, *amazes*, *pleases*, *believes*, and *realizes*. Let its branching rules be

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