

ON A SYNTACTICAL CHARACTERIZATION  
 OF LOGICAL EXPRESSIONS

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In *The Logical Syntax of Language*, Rudolf Carnap proposed the following characterization of logical and descriptive expressions:

Let  $E_1$  be the product of all expressional classes  $E_i$  of [a language]  $S$ , which fulfil the following four conditions. . . . 1. If  $U_1$  [is an expression of any form which] belongs to  $E_i$ , then  $U_1$  is not empty and there exists a sentence which can be sub-divided into partial expressions in such a way that all belong to  $E_i$  and one of them is  $U_1$ . 2. Every sentence which can be thus sub-divided into expressions of  $E_i$  is determinate. 3. The expressions of  $E_i$  are as small as possible, that is to say, no expression belongs to  $E_i$  that can be sub-divided into several expressions of  $E_i$ . 4.  $E_i$  is as comprehensive as possible, that is to say, it is not a proper sub-class of a class which fulfils both (1) and (2). An *expression* is called logical ( $U_L$ ) if it is capable of being sub-divided into expressions of  $E_i$ ; otherwise it is called descriptive ( $U_D$ ). A *language* is called *logical* if it contains only [logical symbols]  $a_L$ ; otherwise *descriptive*.<sup>1</sup>

Although this characterization has often been found unacceptable,<sup>2</sup> I do not believe that anyone has ever pointed out how badly and simply it fails. W. V. Quine had a "would-be" argument in "Carnap and Logical Truth"<sup>3</sup> which is along the lines that I have in mind. Quine considered adding the extra-logical general term 'heavier than' to a language in which Carnap's dichotomy supposedly held. Quine then asked whether adding general rules

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1. Rudolf Carnap, *The Logical Syntax of Language*, Routledge and Kegan Paul, London (1967), pp. 177-178. (I have made obvious inconsequential changes in notation to avoid Carnap's German symbolism.)

2. See, e.g., W. V. Quine, "Carnap and Logical Truth" in *The Ways of Paradox and Other Essays*, Random House, New York (1966), especially section 7.

3. *Ibid.*, pp. 116-117.

governing 'heavier than' would not absurdly lead to its classification as a logical expression according to Carnap's criterion. Quine, however, observed correctly that one thing prevents this—Carnap's use of Cartesian co-ordinates. This allows for expressing particular statements such as 'b is heavier than c' in Carnap's system, and as Quine pointed out "There is no reason to suppose that all the truths of *this* domain can be exactly segregated in purely syntactical terms."<sup>4</sup>

However, there clearly are descriptive predicates for which, unlike 'heavier than', one can lay down rules as to which entities they do and do not apply to. The simplest examples being descriptive predicates that either apply to everything or to nothing. 'Unicorn' is clearly a descriptive expression. However, it can be determined which entities 'unicorn' applies to by the rule

$$(x) - (x \text{ is a unicorn}).$$

Thus, Carnap's use of Cartesian co-ordinates, which blocked Quine's "would-be" argument, does not affect us. Carnap's criterion absurdly characterizes the descriptive expression 'unicorn' as a logical expression. Thus, Carnap's characterization fails by about as simple a *reductio ad absurdum* as one can ask for.\*

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4. *Ibid.*, p. 117.

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