ampheck

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Ampheck, from the Greek $\alpha\mu\phi\eta\kappa\eta\varsigma$, *double-edged*, is a term coined by Charles Sanders Peirce for either one of the pair of logically dual operators, variously referred to as *Peirce arrows*, *Sheffer strokes*, or logical NAND and logical NNOR. Either of these logical operators is a ***http://planetmath.org/SoleSufficientOpe*** *sufficient operator* for defining all of the other operators in the subject matter variously described as boolean functions, monadic predicate calculus, propositional calculus, sentential calculus, or zeroth order logic. See ***http://planetmath.org/LogicalConnective****logical connective* for further discussion.

> For example, $x \curlywedge y$ signifies that x is $\mathbf{f}$ and y is $\mathbf{f}$. Then $(x \curlywedge y) \curlywedge z$, or $\underline{x \curlywedge y} \curlywedge z$, will signify that z is $\mathbf{f}$, but that the statement that x and y are both $\mathbf{f}$ is itself $\mathbf{f}$, that is, is *false*. Hence, the value of $x \curlywedge x$ is the same as that of $\overline{x}$; and the value of $\underline{x \curlywedge x} \curlywedge x$ is $\mathbf{f}$, because it is necessarily false; while the value of $\underline{x \curlywedge y} \curlywedge \underline{x \curlywedge y}$ is only $\mathbf{f}$ in case $x \curlywedge y$ is $\mathbf{v}$; and $(\underline{x \curlywedge x} \curlywedge x) \curlywedge (x \curlywedge \underline{x \curlywedge x})$ is necessarily true, so that its value is $\mathbf{v}$.
> With these two signs, the vinculum (with its equivalents, parentheses, brackets, braces, etc.) and the sign $\curlywedge$, which I will call the *ampheck* (from $\alpha\mu\phi\eta\kappa\eta\varsigma$, cutting both ways), all assertions as to the values of quantities can be expressed. (C.S. Peirce, CP 4.264).

In the above passage, Peirce introduces the term *ampheck* for the 2-place logical connective or the binary logical operator that is currently called the *joint denial* in logic, the NNOR operator in computer science, or indicated by means of phrases like "neither-nor" or "both not" in ordinary language. In his handwritten manuscripts Peirce used a cursive symbol for the amphecks that he derived from his *dot-cross* notation for truth tables, one that the typographer most likely set by inverting the zodiac symbol for Aries, and that is set in the text above by using the so-called *curly wedge* symbol.

In the same paper, Peirce introduces a symbol for the logically dual operator. This was rendered by the editors of his *Collected Papers* as an inverted Aries symbol with a bar or a serif at the top, in this way denoting the connective or logical operator that is currently called the *alternative denial* in logic, the NAND operator in computer science, or invoked by means of phrases like "not-and" or "not both" in ordinary language. It is not clear whether it was Peirce himself or later writers who initiated the practice, but on account of their dual relationship it became common to refer to these two operators in the plural, as the *amphecks*.

1 Bibliography

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