

# Information

1865 | Harvard Lectures on the Logic of Science. Lecture X: Grounds of Induction | W 1:276

comprehension X extension = information

1865 | Harvard Lectures on the Logic of Science. Lecture XI | W 1:288

Connotation X Denotation = Information

1866 | Lowell Lectures on The Logic of Science; or Induction and Hypothesis: Lecture IX | W 1:479

The reason why

Extension X Comprehension = Information

is that Extension and Comprehension can only be reckoned by the interpretants, each interpretant measuring either the one or the other.

1867 | Upon Logical Comprehension and Extension | W 2:82-83

A symbol, in its reference to its object, has a triple reference:-

1st, Its direct reference to its object, or the real things which it represents;

2nd, Its reference to its ground through its object, or the common characters of those objects;

3rd, Its reference to its interpretant through its object, or all the facts known about its object.

What are thus referred to, so far as they are known, are:

1st, The informed *breadth* of the symbol;

2nd, The informed *depth* of the symbol;

3rd, The sum of synthetical propositions in which the symbol is subject or predicate, or the *information* concerning the symbol.

By breadth and depth, without an adjective, I shall hereafter mean the informed breadth and depth.

It is plain that the breadth and depth of a symbol, so far as they are *not* essential, measure the *information* concerning it, that is, the synthetical propositions of which it is subject or predicate. This

follows directly from the definitions of breadth, depth, and information. Hence it follows:-

1st, That, as long as the information remains constant, the greater the breadth, the less the depth;

2nd, That every increase of information is accompanied by an increase in depth or breadth, independent of the other quantity;

3rd, That, when there is no information, there is either no depth or no breadth, and conversely.

These are the true and obvious relations of breadth and depth. They will be naturally suggested if we term the information the *area*, and write-

Breadth X Depth = Area.

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1867 | On a New List of Categories | W 2:59; CP 1.559

...there is, first, the direct reference of a symbol to its objects, or its denotation; second, the reference of the symbol to its ground, through its object, that is, its reference to the common characters of its objects, or its connotation; and third, its reference to its interpretants through its object, that is, its reference to all the synthetical propositions in which its objects in common are subject or predicate, and this I term the information it embodies. And as every addition to what it denotes, or to what it connotes, is effected by means of a distinct proposition of this kind, it follows that the extension and comprehension of a term are in an inverse relation, as long as the information remains the same, and that every increase of information is accompanied by an increase of one or other of these two quantities.

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1893-1895 [c.] | Division III. Substantial Study of Logic. Chapter VI. The Essence of Reasoning | MS [R] 409:104; CP 4.65

...I use the word *information* to mean a state of knowledge, which may range from total ignorance of everything except the meanings of words up to omniscience; and by *informational* I mean relative to such a state of knowledge.

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1901-1902 [c.] | Definitions for Baldwin's Dictionary [R] | MS [R] 1147

Information [L. *informatio*, a sketch, imperfect knowledge.]

The total of all the propositions, accepted in a given state of knowledge, which involve a given term, are independent of one another, and are not implied in the meaning of the term, considered as a quantity belonging to the term in that state of knowledge, this quantity being at once proportional, in a vague sense, to the informed breadth, and to the informed depth of the term.

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1903 | Lowell Lectures of 1903. Lecture III. 2nd Draught | MS [R] 463:13

Now if you inform me of any truth, and I know it already, there is no information. If it is something that I shall never have any further reason to believe, you are speaking of a universe with which I have no concern and what you say signifies nothing to me. If it is genuine information, it must amount to this, that whenever and wherever in the future such and such circumstances may occur, then I *shall* experience something. I beg you to notice that any information which ostensibly relates to the present condition of things really signifies what the person addressed *will* experience provided an opportunity occurs.

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1903 | Nomenclature and Divisions of Dyadic Relations | CP 3.608

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...the dyadic relations of logical *breadth* and *depth*, often called denotation and connotation, have played a great part in logical discussions, but these take their origin in the triadic relation between a sign, its object, and its interpretant sign; and furthermore, the distinction appears as a dichotomy owing to the limitation of the field of thought, which forgets that concepts grow, and that there is thus a third respect in which they may differ, depending on the state of knowledge, or amount of information.

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1904 [c.] | New Elements (Kaina stoiceia) | EP 2:305

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Besides the logical depth and breadth, I have proposed (in 1867) the terms *information* and *area* to denote the total of fact (true or false) that in a given state of knowledge a sign embodies.

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1910.11.30 | The Rationale of Reasoning | MS [R] 664:19

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...I call any acquisition of knowledge "information," which has logically required any other experience than experience of the *meanings of words*.