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QUANTITY

intensive quantity (cf. INTENSITY AND INTENSIVE MAGNITUDE). For here we seem to have a difference of more and less without any relation of whole and part. For instance, a sound of a given degree of loudness does appear to be composed of partial loudnesses, and it seems meaningless to speak of a lower degree of loudness as conceivably included within or substituted for part of a higher degree of loudness. We may, indeed, consider intensive quantity as immediate experience, falling under definition (1).

The notion of intensive magnitude may, however, be regarded as implicating parts, though none of them are separately distinguishable within the whole. In this it differs from a continuous extensive quantum. For in a continuous extensive quantum we can distinguish and count an indefinite number of parts. The continuity consists in the fact that however many parts we distinguish, there are still other parts undistinguished. For each assignable part is itself indefinite, divisible into other parts. In the intensive magnitude, on the contrary, there are no assignable parts at all. None the less, it may be maintained that though not separately distinguishable, they may be supposed to exist, and that the supposition is implied in speaking of an intensive quantum at all. The only admissible alternative seems to be the denial that what is called an intensity is a quantum at all—at least, if we consider it by itself, apart from comparison with other similar presentations.

From this point of view it may be held that what is called intensive quantity presupposes the serial arrangement of sensations according to their degrees of resemblance and difference. It is not the separate sensations but the interval between them in the series which is quantitative. Suppose that we are considering, instead of two sounds, two pairs of sounds. Symbolize the one pair by A and B , the other by a and b . We find that we are able to judge whether the difference in loudness between A and B is or is not the same with the difference in loudness between a and b . Thus we can form a series or scale of loudnesses passing from one to another by intervals which we judge to be equal. By counting these equal intervals we can assign a numerical value for the place of any sensation in the series, and this is what is meant by its intensive quantity. This view seems unable to avoid the fallacy of explaining in a circle. For the intrinsic intensity of each

sensation it substitutes degrees of resemblance. But what is a degree of resemblance if it is not an intensive quantity?

The psychological development of the cognition of quantity consists in the gradual abstraction from other characters of the object and the fixing of attention merely on the relation of whole and part as such. Every object of consciousness is or implies the unity of a manifold, and has therefore a quantitative aspect. Hence quantity is presented in every objective experience. But it is only by a long process that it comes to be separately contemplated. The abstraction is a mental experiment which justifies itself by its fruitfulness. In fixing attention exclusively on the quantitative aspects of objects the mind finds opened out before it a vast system of numerical and other relations having the character of necessary truths.

The justification of definition (1) is found in the fact of quantitative experience, which is not, however, brought into relation of whole and part with other experiences.

For Kant's doctrine of quantity as belonging to the ANTICIPATIONS OF EXPERIENCE, see that topic. (G.F.S.—J.M.B.)

Quantity (aesthetic): see QUALITY (aesthetic).

Quantity (in logic and mathematics). (1) Any ACCIDENT (q.v.) whereby a substance has part outside of part. Cf. QUANTITY (2).

This is the old definition; and it is true to the old meaning of the word in representing quantity as much more concrete than the modern conception. Quantity (see Aristotle's *Praedicamenta*, vi) is either discrete or continuous. Continuous quantity is either magnitude or time. The old definition of mathematics as the science of quantity is misunderstood, if quantity is here taken in the modern sense; it was only meant that mathematics treated of accidents having number, magnitude, or duration. There was therefore a mathematics of music.

(2) In the general modern sense, quantity is a system of serial relationships.

Serial relationship differs from transitive relationship merely in the point of view, and (so closely connected are the two points of view) in hardly more than the mode of expression. Now, all transitive relation is traceable to inclusion. Hence, quantity might be defined as a system of inclusions looked upon as serial. It is very important to understand that quantity is a mere system of relative ordinal relations in a linear series.

QUANTITY

Each complete determination of quantity in a given system is a 'value.'

Quantity is either counted or measured. Counted quantity may have a finite multitude of values. Of systems of quantity of denumeral multitude, the simplest is that of the integer numbers. The system of rational fractions is the only other familiarly used. These fractions can, in several ways, be arranged in their order of quantity by mere counting.

(3) Concepts, or terms, are, in logic, conceived to have *subjective parts*, being the narrower terms into which they are divisible, and *definitive parts*, which are the higher terms of which their definitions or descriptions are composed: these relationships constitute 'quantity.'

This double way of regarding a class-term as a whole of parts is remarked by Aristotle in several places (e.g. *Met.*, Δ. xxv. 1023 b 22). It was familiar to logicians of every age. Thus Scotus Erigena calls logic 'ars illa quae diuidit genera in species et species in genera resoluit.' John of Salisbury refers to the distinction as 'quod fere in omnium ore celebre est, aliud scilicet esse quod appellativa [i.e. adjectives and the like] significant, et aliud esse quod nominant. Nominantur singularia, sed universalia significantur.' For William of Auvergne, see Prantl, iii. 77. The writer has a long list of similar passages before him. But the Aristotelians had their minds upon the discrimination of different kinds of predication, and insisted that the differences of different genera are different, thus forbidding cross-divisions. Arnauld, however, in *l'Art de penser*, conceives all predicates, or all essential predicates, as alike, without distinguishing *genus* and *differentia*; and was so led to devote a short chapter (vi) to *l'étendue* and *la compréhension* before taking up the predicables. But his services in the matter have been grossly exaggerated, and it really seems to have been Kant who made these ideas pervade logic and who first expressly called them quantities. But the idea was old. Archbishop Thomson, W. D. Wilson, and C. S. Peirce endeavour to make out a third quantity of terms. The last calls his third quantity 'information,' and defines it as the 'sum of synthetical propositions in which the symbol is subject or predicate,' antecedent or consequent. The word 'symbol' is here employed because this logician regards the quantities as belonging to propositions and to arguments, as well as to terms. A distinction of *extensive* and *comprehensive dis-*

tinctness is due to Scotus (*Opus Oxon.*, I. ii. 3): namely, the usual effect upon a term of an increase of information will be either to increase its breadth without diminishing its depth, or to increase its depth without diminishing its breadth. But the effect may be to show that the subjects to which the term was already known to be applicable include the entire breadth of another term which had not been known to be so included. In that case, the first term has gained in *extensive distinctness*. Or the effect may be to teach that the marks already known to be predicable of the term include the entire depth of another term not previously known to be so included, thus increasing the *comprehensive distinctness* of the former term. The passage of thought from a broader to a narrower concept without change of information, and consequently with increase of depth, is called *descent*; the reverse passage, *ascent*. For various purposes, we often imagine our information to be less than it is. When this has the effect of diminishing the breadth of a term without increasing its depth, the change is called *restriction*; just as when, by an increase of real information, a term gains breadth without losing depth, it is said to gain *EXTENSION* (q.v., in logic). This is, for example, a common effect of *induction*. In such case, the effect is called *GENERALIZATION* (q.v.). A decrease of supposed information may have the effect of diminishing the depth of a term without increasing its information. This is often called *abstraction*; but it is far better to call it *pre-scission*; for the word *abstraction* is wanted as the designation of an even far more important procedure, whereby a transitive element of thought is made substantive, as in the grammatical change of an adjective into an abstract noun. This may be called the principal engine of mathematical thought. When an increase of real information has the effect of increasing the depth of a term without diminishing the breadth, the proper word for the process is *amplification*. In ordinary language, we are inaccurately said to *specify*, instead of to *amplify*, when we add to information in this way. The logical operation of forming a hypothesis often has this effect, which may, in such case, be called *supposition*. Almost any increase of depth may be called *determination*.

(4) Syllogistic is sometimes regarded as the mathematics of a system of quantities consisting of but two values, *truth* and *falsity*.

QUANTITY — QUINQUE VOCES

(5) The quantity of a proposition is that respect in which a universal proposition is regarded as asserting more than the corresponding particular proposition: the recognized quantities are UNIVERSAL, PARTICULAR, SINGULAR (see those terms, in logic), and—opposed to these as 'definite'—Indefinite. *Quantitas* is used in this sense by Apuleius.

Quantification of the Predicate. The attachment of signs of propositional quantity to the predicates of simple propositions is called by this name. The *dictum de omni* defines the relation of subject and predicate, so that 'Any *A* is *B*' is to be understood as meaning 'To whatever *A* is applicable, *B* is applicable.' But this definition must be modified, in order to give any room for a quantification of the predicate. If then we are to take *all* and *some* in their proper distributive senses and not in collective senses, to say that 'Every man is every animal' would, as Aristotle remarks, be absurd, unless it were meant that there was but one man and one animal, and that that one man was identical with that one animal. This system has never been proposed. But Hamilton, with his followers, T. S. Baynes and Calderwood, take the marks of quantity in a collective sense. They thus have, as one of the propositional forms, 'Some man is not some animal,' which precisely denies 'Every man is every animal,' in the distributive sense, and is entitled to an equal standing in logic. It does not deny 'All man is all animal,' in the collective sense of these logicians. This system had some vogue in its day.

De Morgan's system of Propositions. This permits the retention of the *dictum de omni*, merely applying propositional quality to the subject. We thus get the following eight forms of proposition:

-) To whatever *A* is applicable, *B* is applicable.
- (-) To whatever *A* is inapplicable, *B* is applicable.
-)-(To whatever *A* is applicable, *B* is inapplicable.
- ((To whatever *A* is inapplicable, *B* is inapplicable; i.e. To whatever *B* is applicable, *A* is applicable.
- () To something to which *A* is applicable, *B* is applicable.
- (-(- To something to which *A* is inapplicable, *B* is inapplicable.
-)-) To something to which *A* is inapplicable, *B* is applicable; i.e. To something to which *B* is applicable, *A* is inapplicable.
-)((To something to which *A* is applicable, *B* is inapplicable.

cable, *B* is applicable; i.e. To something to which *B* is applicable, *A* is inapplicable.

) (To something to which *A* is inapplicable, *B* is inapplicable.

The above is substantially one of De Morgan's own forms of statement, called by him onymatic. There is no objection to this system; but it is an idle complication of forms which does not enable us to take account of any mode of inference that the old system does not cover. Still it does away with the figures of syllogism. But whatever the merits or demerits of the system, De Morgan developed it with logical elegance. (C.S.P.)

Quantity (in physics). A magnitude which admits of precise comparison or measurement. Usually limited to concepts expressed by algebraic symbols. Cf. the other topics QUANTITY, also VALUE (in mathematics). (S.N.)

Quantum [Lat.]. Determinate QUANTITY (q. v.).

Quicunque. A designation of the ATHANASIAN CREED (q. v.) from its introductory words *Quicunque vult*, Whosoever will. (A.T.O.)

Quiddity (*Quid*, *Quod*, *Quo*, *Quem*, in phrases) [Lat. *quidditas*, *quid*, what]: Ger. *Quiddität*; Fr. *quiddité*; Ital. *quiddità*. See LATIN AND SCHOLASTIC TERMINOLOGY (4, 5).

Quietism [Lat. *quies*, rest]: Ger. *Quietismus*; Fr. *quétisme*; Ital. *quietismo*. A form of MYSTICISM (q. v.) which lays emphasis upon the passive and receptive attitude of the human spirit in relation to the influx of the divine Spirit, and making little or nothing of activity in religious matters, whether ceremonial or moral activity, and everything of contemplation.

It made the Sabbath a symbol of rest in God. Its aim was the absorption of the practical personality in God. Its chief representatives are Angelus Silesius and Molinos. The influence of the latter, a Spanish priest, was considerable in the Roman Catholic Church. Cf. PATRISTIC PHILOSOPHY, ad fin., also ST. THOMAS (philosophy of). Fénelon represented it until it was condemned by the pope under the influence of Bossuet. Madame Guyon is its chief literary representative. It is somewhat akin to PIETISM (q. v.) and to the religious philosophy of the Friends. (J.D.)

Quinque voces: see PREDICABLE.

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