PROFESSOR BOOLE'S MATHEMATICAL THEORY

the sign of identity, =. The sign + is used to express the mental operation by which parts (of extensive quantity) are collected into a whole. For instance, if x represent animals, and y vegetables, x + ywill represent the class made up of animals and vegetables together. On the other hand, the sign - is used to express the mental operation of separating a whole (of extensive quantity) into its parts. Thus, x representing human beings, and y representing negroes, x - y will represent all human beings except negroes. With regard to the sign $x, x \times y$ or x y (as it may be written) is used to denote those objects which belong at once to the class x and to the class y; just as, in common language, the expression dark-waters denotes those objects which are at once dark and waters. Hence we obtain a method of representing a concept taken particularly. For, if x denote men, then, since some men may be viewed as those who besides belonging to the class'x belong also to some other class v, some men will be denoted by v x. In general,

v x = some x. (1)

It can easily be shown, that, as in Algebra, so in the logical system which we are describing, the literal symbols, x, y, &c., are commutative; that is,

and that they are also distributive; that is,

$z (x + y) = z x + z y \dots (3)$

Another relation between Algebra and the Logical System under consideration is, that, in the latter as well as in the former, a literal symbol may be transposed from one side of an equation to the other by changing the sign of operation, + or --. But there is an important relation which subsists in the science of Thought, and not generally in Algebra, namely,

That this is true in the Logical system, is plain; for x^* , which is another form of x x, denotes (by definition) those things which belong at once to the class x and to the class x; that is, it denotes simply those things which belong to the class x; and it is therefore identical with x. But though the equation (4) does not generally subsist in Algebra, it subsists when x is unity or zero. If, therefore, we take the science of Algebra with the limitation that its unknown quantit

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