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## LOGICAL MACHINE

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Logial Machine: Ger. *logische Machina*; Fr. *machine logique*; Ital. *macchine logistiche* (E.M.). An instrument devised to facilitate by mechanical means the handling of logical symbols or diagrams.

There are three such instruments which merit attention: —

(I) The first was constructed by W. Stanley Jevons in 1869 (announced in his *Substitution of Similars*, 1869, 60; described in *Philos. Trans. Roy. Soc.*, 1870, 497–518; brief description in *Proc. Roy. Soc.*, 1870, 166–9, and *Princ. of Sci.*, 1874, 123–31). This instrument was preceded by the logical slate and the logical ABACUS (q.v.) (*Proc. Manchester Lit. and Philos. Soc.*, Apr. 1866, 161; *Substitution of Similars*, 1869, 54–9). In the logical slate the combination of letters, representing all the possible combinations of a definite number of characters or qualities in a logical universe, were engraved in vertical columns upon a common writing-slate. The combinations inconsistent with given premises were then crossed off with a slate pencil, and the conclusions read off from the untouched combinations.

In the logical abacus the combinations were marked on flat slips of wood arranged in horizontal lines on an inclined blackboard having a series of ledges. The slips of wood were furnished with pins, so that those which represented combinations inconsistent with the premises could be lifted by means of a ruler to the ledge above.

In the logical slate, great care was necessary to cross off all the inconsistent combinations, and in the logical abacus similar care was required in picking out all the consistent combinations. The logical machine of Jevons is a logical abacus in which all that is required of the operator is to press the premises upon a series of keys; the operation of lifting the combinations consistent with the premises to the higher level being