Reasoning Machine

1887 | Logical Machines | W 6:70-71

Every reasoning machine, that is to say, every machine, has two inherent impotencies. In the first place, it is destitute of all originality, of all initiative. It cannot find its own problems; it cannot feed itself. It cannot direct itself between different possible procedures. [—] This, however, is no defect in a machine; we do not want it to do its own business, but ours. [—] We no more want an original machine, than a house-builder would want an original journeyman, or an American board of trustees would hire an original professor. If, however, we will not surrender to the machine, the whole business of initiative is still thrown upon the mind; and this is the principal labor.

In the second place, the capacity of a machine has absolute limitations; it has been contrived to do a certain thing, and it can do nothing else. For instance, the logical machines that have thus far been devised can deal with but a limited number of different letters. The unaided mind is also limited in this as in other respects; but the mind working with a pencil and plenty of paper has no such limitation. It presses on and on, and whatever limits can be assigned to its capacity today, may be over-stepped tomorrow. This is what makes algebra the best of all instruments of thought; nothing is too complicated for it. And this great power it owes, above all, to one kind of symbol, the importance of which is frequently entirely overlooked – I mean the parenthesis.

1887 | Logical Machines | W 6:69-70

The secret of all reasoning machines is after all very simple. It is that whatever relations among the objects reasoned about is destined to be the hinge of a ratiocination, that same general relation must be capable of being introduced between certain parts of the machine. For example, if we want to make a machine which shall be capable of reasoning in the syllogism

If A then B,
If B then C,
Therefore, if A then C,

we have only to have a connection which can be introduced at will, such that when one event A occurs in the machine, another event B must also occur. This connection being introduced between A and B, and also between B and C, it is necessarily virtually introduced between B and C. This is the same principle which lies at the foundation of every logical algebra; only in the algebra, instead of depending directly on the laws of nature, we establish conventional rules for the relations used. When we perform a reasoning in our unaided minds we do substantially the same thing, that is to say, we construct an image in our fancy under certain general conditions, and observe the result. In this point of view, too, every machine is a reasoning machine, in so much as there are certain relations between its parts, which relations involve other relations that were not expressly intended. A piece of apparatus for performing a physical or chemical experiment is also a reasoning machine, with this difference, that it does not depend on the laws of the human mind, but on the objective reason embodied in the laws of nature. Accordingly, it is no figure of speech to say that the alembics and cucurbits of the chemist are

instruments of thought, or logical machines.

nd | Our Senses as Reasoning Machines | NEM 3:1115

...no machine has been constructed that will deduce more than one conclusion; yet it has been shown that all possible general conclusions can be arranged in serial order and as soon as anybody wishes to defray the not extravagant cost, the specifications will be ready for a machine that will actually turn out new theorems from a given set of premises, one after another, as long as they continue to have any interest. But though a machine could do all that, and thus accomplish all that many an eminent mathematician accomplishes, it still cannot properly be called a reasoning machine, any more than the sort of man I have in view can be called a reasoner. It does not reason; it only proceeds by a rule of thumb.