Sketches Of The History Of Man

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Sect. 5. On this Theory, considered as an Engine of Sciense.

and if there is any defect of evidence in the axioms, this defect will be communicated to the whole edifice raised upon them.

It may even be suspected, that an attempt, by any method, to demonstrate, that a syllogism is conclusive, is an impropriety somewhat like that of attempting to demonstrate an axiom. In a just syllogism, the connection between the premises and the conclusion is not only real, but immediate; so that no proposition can come between them to make their connection more apparent. The very intention of a syllogism is, to leave nothing to be supplied that is necessary to a complete demonstration. Therefore a man of common understanding, who has a perfect comprehension of the premises, finds himself under a necessity of admitting the conclusion, supposing the premises to be true; and the conclusion is connected with the premises with all the force of intuitive evidence. In a word, an immediate conclusion is seen in the premises, by the light of common sense; and where that is wanting, no kind of reasoning will supply its place.

SECT. 5. *On this Theory, considered as an Engine of Science.*

The slow progress of useful knowledge, during the many ages in which the syllogistic art was most highly cultivated as the only guide to science, and its quick progress since that art was disused, suggest a presumption against it; and this presumption is strengthened by the puerility of the examples which have always been brought to illustrate its rules.

The ancients seem to have had too high notions, both of the force of the reasoning power in man, and of the art of syllogism as its guide. Mere reasoning can carry us but a very little way in most subjects. By observation, and experiments properly conducted, the stock of human knowledge may be enlarged without end; but the power

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of reasoning alone, applied with vigour through a long life, would only carry a man round, like a horse in a mill, who labours hard, but makes no progress. There is indeed an exception to this observation in the mathematical sciences. The relations of quantity are so various, and so susceptible of exact mensuration, that long trains of accurate reasoning on that subject may be formed, and conclusions drawn very remote from the first principles. It is in this science, and those which depend upon it, that the power of reasoning triumphs: in other matters its trophies are inconsiderable. If any man doubt this, let him produce, in any subject unconnected with mathematics, a train of reasoning of some length, leading to a conclusion, which without this train of reasoning would never have been brought within human sight. Every man acquainted with mathematics can produce thousands of such trains of reasoning. I do not say, that none such can be produced in other sciences; but I believe they are few, and not easily found; and that if they are found, it will not be in subjects that can be expressed by categorical propositions, to which alone the theory of figure and mode extends.

In matters to which that theory extends, a man of good sense, who can distinguish things that differ, and avoid the snares of ambiguous words, and is moderately practised in such matters, sees at once all that can be inferred from his premises; or finds, that there is but a very short step to the conclusion.

When the power of reasoning is so feeble by nature, especially in subjects to which this theory can be applied, it would be unreasonable to expect great effects from it. And hence we see the reason why the examples brought to illustrate it by the most ingenious logicians, have rather tended to bring it into contempt.

If it should be thought, that the syllogistic art may be an useful engine in mathematics, in which pure reasoning has ample scope: First, It may be observed, That facts are unfavourable to

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this opinion: for it does not appear, that Euclid, or Apollonius, or Archimedes, or Hugens, or Newton, ever made the least use of this art; and I am even of opinion, that no use can be made of it in mathematics. I would not wish to advance this rashly, since Aristotle has said, that mathematicians reason for the most part in the first figure. What led him to think so was, that the first figure only yields conclusions that are universal and affirmative, and the conclusions of mathematics are commonly of that kind. But it is to be observed, that the propositions of mathematics are not categorical propositions, consisting of one subject and one predicate. They express some relation which one quantity bears to another, and on that account must have three terms. The quantities compared make two, and the relation between them is a third. Now to such propositions we can neither apply the rules concerning the conversion of propositions, nor can they enter into a syllogism of any of the figures or modes. We observed before, that this conversion, *A is greater than B*, therefore *B is less than A*, does not fall within the rules of conversion given by Aristotle or the logicians; and we now add, that this simple reasoning, *A is equal to B, and B to C*; therefore *A is equal to C*, cannot be brought into any syllogism in figure and mode. There are indeed syllogisms into which mathematical propositions may enter, and of such we shall afterwards speak: but they have nothing to do with the system of figure and mode.

When we go without the circle of the mathematical sciences, I know nothing in which there seems to be so much demonstration as in that part of logic which treats of the figures and modes of syllogism; but the few remarks we have made, shew, that it has some weak places: and besides, this system cannot be used as an engine to rear itself.

The compass of the syllogistic system as an engine of science, may be discerned by a compendious and general view of the con-

clusion

clufion drawn, and the argument ufed to prove it, in each of the three figures.

In the firft figure, the conclufion affirms or denies fomething, of a certain fpecies or individual; and the argument to prove this conclufion is, That the fame thing may be affirmed or denied of the whole genus to which that fpecies or individual belongs.

In the fecond figure, the conclufion is, That fome fpecies or individual does not belong to fuch a genus; and the argument is, That fome attribute common to the whole genus does not belong to that fpecies or individual.

In the third figure, the conclufion is, That fuch an attribute belongs to part of a genus; and the argument is, That the attribute in queftion belongs to a fpecies or individual which is part of that genus.

I apprehend, that, in this fhort view, every conclufion that falls within the compafs of the three figures, as well as the mean of proof, is comprehended. The rules of all the figures might be eafily deduced from it; and it appears, that there is only one principle of reafoning in all the three; fo that it is not ftrange, that a fyllogifm of one figure fhould be reduced to one of another figure.

The general principle in which the whole terminates, and of which every categorical fyllogifm is only a particular application, is this, That what is affirmed or denied of the whole genus, may be affirmed or denied of every fpecies and individual belonging to it. This is a principle of undoubted certainty indeed, but of no great depth. Ariftotle and all the logicians affume it as an axiom or firft principle, from which the fyllogiftic fyftem, as it were, takes its departure: and after a tedious voyage, and great expence of demonftration, it lands at laft in this principle as its ultimate conclufion. *O curas hominum! O quantum eft in rebus inane!*

Sect.