Mathematical Reasoning

1896 [c.] | Lessons of the History of Science | CP 1.54

We find some peoples drawn more toward arithmetic; others more toward geometry. But in either case, a correct method of reasoning was sure to be reached before many centuries of real inquiry had elapsed. The reasoning would be at first awkward, and one case would be needlessly split up into several. But still all influences were pressing the reasoner to make use of a diagram, and as soon as he did that he was pursuing the correct method. For mathematical reasoning consists in constructing a diagram according to a general precept, in observing certain relations between parts of that diagram not explicitly required by the precept, showing that these relations will hold for all such diagrams, and in formulating this conclusion in general terms. All valid necessary reasoning is in fact thus diagrammatic.

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…a necessary reasoning is one which *would* follow under all circumstances, whether you are talking about the real world or the world of the Arabian Nights' or what. And that precisely defines mathematical reasoning. It is true that a *distinctly* mathematical reasoning is one that is so intricate that we need some kind of diagram to follow it out. But something of the nature of a diagram, be it only an imaginary skeleton proposition, or even a mere noun with the ideas of its application and signification[,] is needed in all necessary reasoning.