



Diagrammatics 101

Description

Drawings, sketches and illustrations belong to the interpretative arts. Then there are *diagrams*. As [iconic signs](#), diagrams make fewer claims in the realms of creativity and imagination, but they do have to be interpreted. Diagrams are in the company of charts, graphs and tables the authors of which extract the salient features of a phenomenon, show relationships and predict outcomes.

C.S. Peirce (1839-1914) was amongst the first to theorise the diagram. It is clear to me from the sparse collection of diagrams in his published papers that he was thinking mainly of diagrams in mathematical and geometrical proof. He wrote “mathematical reasoning is diagrammatic” (206).

As a minimal illustration of the nature of the diagram he demonstrates the well-known geometrical *proof* that a line with an endpoint abutting another line forms two angles, the sum of which is equivalent to two right angles. Here is the proof.



The abutting line (sloping) creates two angles and defines a point on the second line (drawn horizontally here). By drawing a line perpendicular to the horizontal line you see that there are two right angles. Therefore, the sum of the two angles formed by the abutting line equals two right angles.

This is arguably a trivial and unnecessary demonstration of a self evident fact, though it has consequences in the derivation of proofs for more complicated and consequential geometries.

The particular, the general and the ludic

Back when geometrical proofs were taught in schools I used to reach for my plastic protractor and measure the angles, and wonder why that wasn’t sufficient to prove that the angles did what the theorems said.

Peirce points out that for the diagrammatic proof to work the geometry student has to recognise that the diagram is not just about the lines as drawn, but applies to any two lines configured at any angle and of any length, colour, thickness, etc.

That we might take a diagram such as the ones above to represent a general condition and not a particular case demonstrates for Peirce the mediated, relational, linguistic, and learned characteristic of the diagram — that he calls *Thirdness*:

— If you object that there can be no immediate consciousness of generality, I grant that. If you add that one can have no direct experience of the general, I grant you that as well. Generality, Thirdness, pours in upon us in our very perceptual judgements, and all reasoning, so far as it depends on necessary reasoning, that is to say, mathematical reasoning, turns upon the perception of generality and continuity at every step — (207).

Peirce also had something to say about the diagrams of the mathematician John Venn (1834-1923), and others have had much to say about Peirce on diagrams. See Bibliography below.

For the explosion of diagrammatic generality in mathematics and satire see [Google Images](#) entries for — diagram — juxtaposed with — nineteenth century, — — brexit, — — trump, — or just about any topic.



Bibliography

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