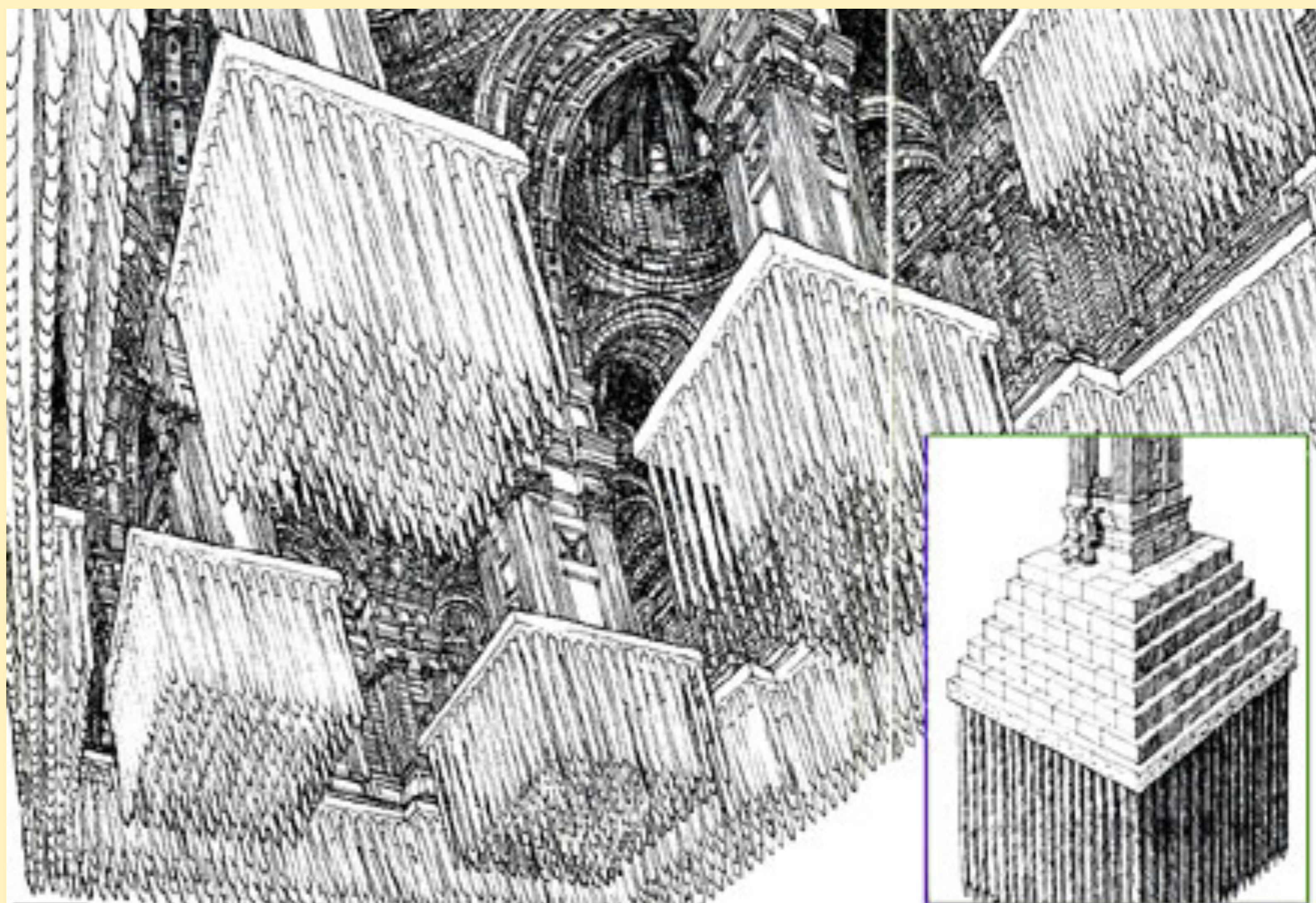


Aristotle on the Foundations of Science – a postmodern moment –

In his great work the *Posterior Analytics*, Aristotle deploys a view of science as axiomatized systems, much like the system that Euclid was to develop for geometry several decades later. In any given science, that is, there are a few first principles, or axioms; from those axioms there follow, by unshakably certain and rigid deduction, the theorems of the science.

There's a worm, however, in the bud of this grandiose idea: how can we be certain that the axioms themselves are true? How can we know for certain, for really certain, that any two points can be connected by one and only one straight line, or that the whole is greater than the part? The edifice of science is impressively rigid, but how good are its foundations?

Aristotle is aware of this problem, of course, and he offers the answer that we know these axioms by a kind of intellectual intuition, which he calls *nous*. This answer has long been thought unsatisfactory: for how can we know that our intuitions are accurate?



David Macaulay, representation of a cathedral seen from the bottom

But there is a stray remark in a very early work, the *Topics*, to the effect that *dialectic* is useful for grounding the axioms. Now dialectic – in the ancient understanding of it – is a kind of poor cousin in the logic family: its methods are wobbly and its results, though roughly reliable, are not certain. Science, then, is a grand and rigid edifice built on mushy foundations. It is like some of the great cathedrals of Europe: strong and massive stone buildings, erected on wooden piles driven into the soft earth.

Did Aristotle mean this stray and striking remark seriously, or was it just a fleeting thought tossed off in his younger days and then abandoned? He says nothing further about it.

Let's look however not at what he says but at what he *does*. The one science that Aristotle himself may be said to have axiomatized is logic: he derives all the theorems of valid reasoning from a few axioms. In the *Metaphysics* he spends some time justifying the most fundamental of these, the principle of non-contradiction: it is impossible for the same thing to belong and not to belong to the same thing at the same time and in the same respect. And his justification is nothing if not dialectical: a series of arguments about how difficult life would be if we didn't accept this principle! The foundations of logic are guaranteed *pragmatically*.

Who would have thought that Aristotle was a postmodern thinker?