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The Model of the Heavens

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in voce **a.Kepler**

Abstract

Kepler's passage from nested solids to empirical orbits as a parable of revising world models when the map and the heavens diverge.

I. The beloved map

In 1596 Kepler published *Mysterium Cosmographicum*, arguing that the six planets known in his day correspond to the five Platonic solids nested between nested spheres. The model was geometrically gorgeous: it turned the solar system into a **closed intelligible diagram**—a world model in which distances and numbers *felt* ordained. Historians rightly treat the construction as

metaphysical speculation married to mathematical taste; what matters here is its **cognitive function**. Kepler was not merely guessing; he was building the kind of representation human beings build whenever they need the universe to be *surveyable* at a glance.

II. Where the territory bites

The model failed under Tycho Brahe's precision. The "map" did not merely need tuning; it required abandonment of the very state variables in which Kepler had invested his hope. His subsequent work on Mars—leading to the area law and eventually to elliptical orbits—exemplifies a rarer intellectual virtue: **revising the state space** rather than endlessly fitting noise inside an inadequate geometry. The episode is a canonical instance of *map and territory* reasoning: the heavens were never obligated to respect nested solids.

III. World models today

Modern physics internalizes a different geometry of possibility spaces; machine learning internalizes still others. The rover projects of our own institute literalize the lesson Kepler learned at great cost: sensors give streams; maps must be **updated under stress**. Uncertainty is not an embarrassment to be hidden behind a clever figure; it is data about the limits of one's representation.

IV. Pedagogy

Teaching Kepler as only "the laws" misses the moral. Students should see the **attachment** a scientist can feel toward a wrong yet beautiful model, and the discipline required to let it go when the world refuses it. That is world-model education in the ethical sense—not training in certainty, but training in **corrigibility**.

V. Conclusion

Kepler's heavens teach that the deepest maps are those we are willing to sacrifice when the territory demands it. Volume 3's theme—how disciplines construct and revise representations—finds one of its purest parables in the passage from solids to ellipses: not an ascent from error to truth only, but from one kind of intelligibility to another, truer kind.

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