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Verisimilitude

The rather fanciful idea of a limit of theories: you think that successive versions of the truth converge upon exactness as a limit.

This is usually presented as terms of the refinement of predictions, though it's quite different in practice. A kind of evolution takes place, but often with wild variations in form.

I want to say that the process results in an increase in verisimilitude, but haven't any immediate idea how to define it.

It doesn't seem very linguistic, however. It seems more a property of the semantic models of the linguistic object; something more geometric in nature.

The quality you are trying to put your finger on is exemplified by old maps of the world: what are they *lacking*? is the question. How are later maps better than early ones? — They are more exact, obviously, but the progression is not at all continuous, one cannot say that earlier maps begin by being topologically correct and proceed by metric refinement, it's something subtler than that.

Indeed it is endlessly fascinating to contemplate these things.

A medieval conception:



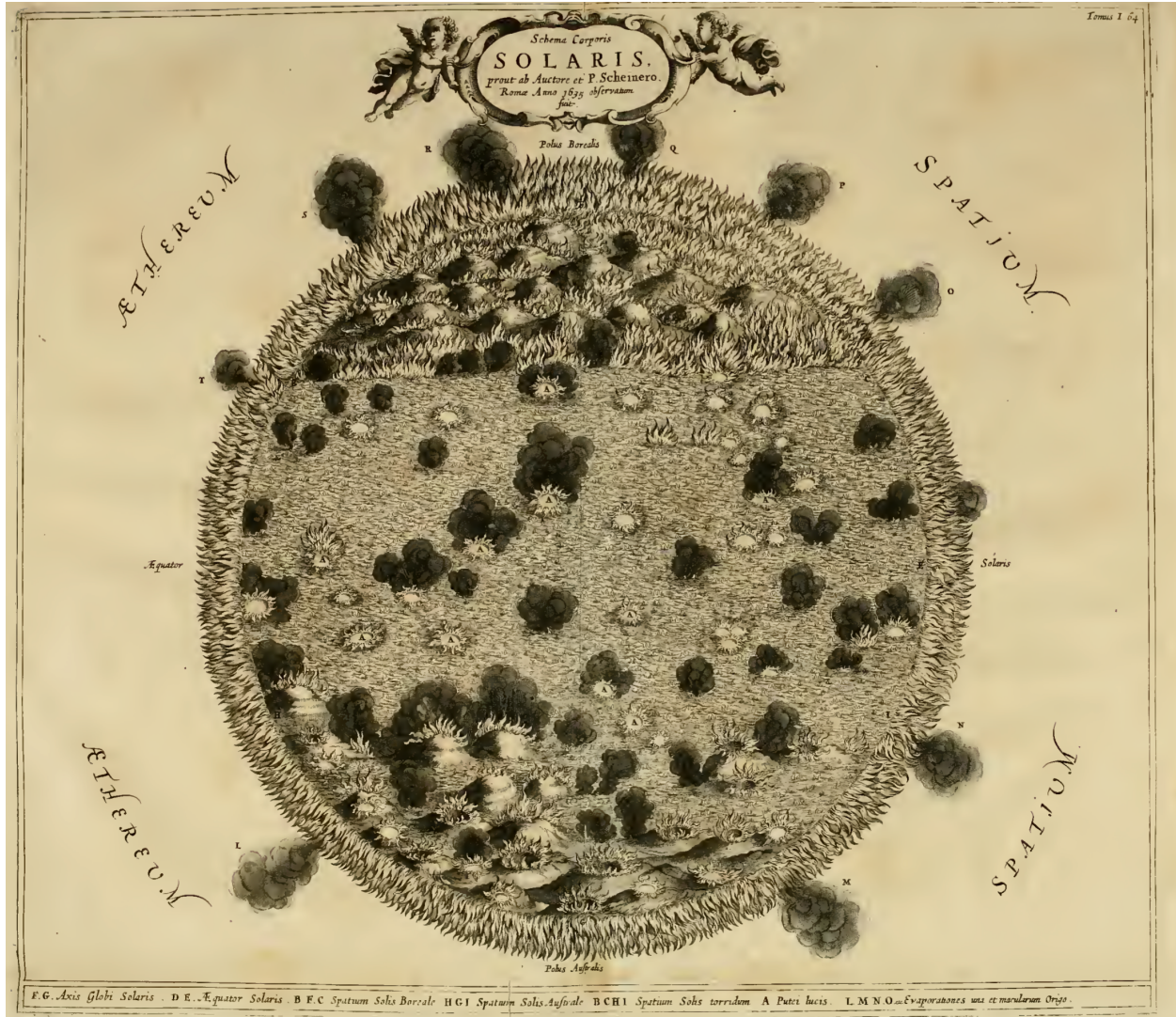
Early conceptions of the Americas:



Patagonia at first approximation:



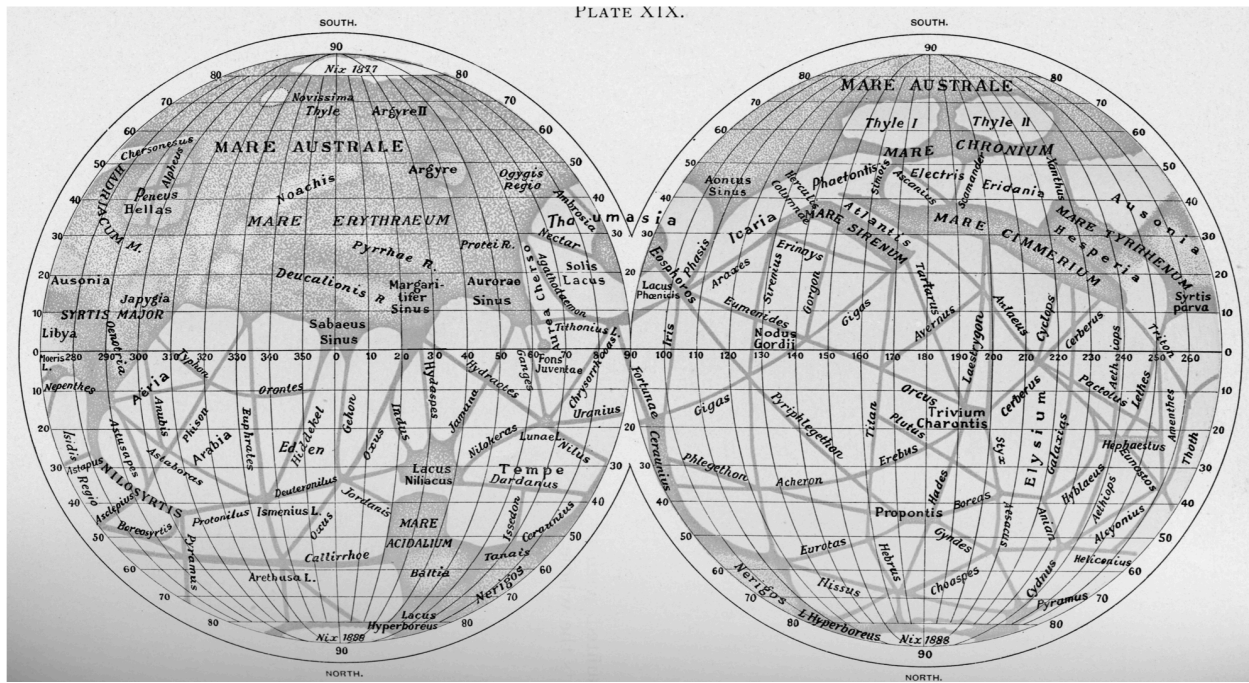
Strangest of all, astronomical objects — which after all one can *see* in their entirety. (At least you'd think so.) — Kirchner's map of the sun:



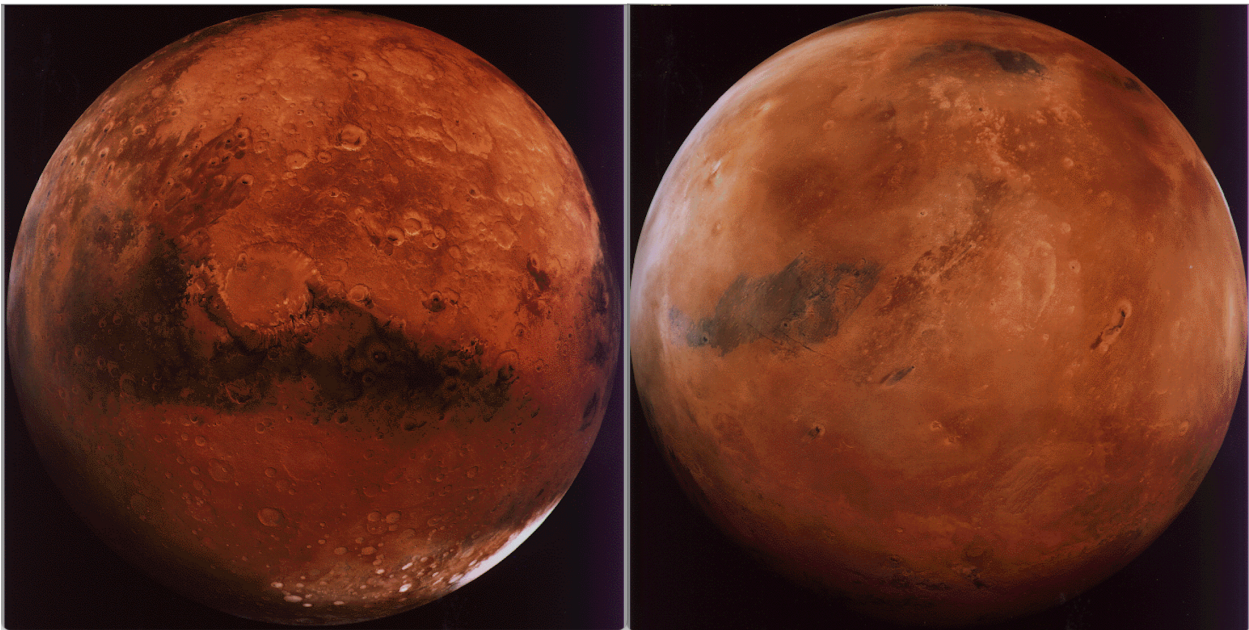
(??!!)

And of course the piece de resistance, Schiaparelli's map of Mars:¹

¹ As reproduced in Giovanni Schiaparelli, "The Planet Mars," transl. W.H. Pickering, *Astronomy and Astrophysics* 13 (1894): 635-39, 717-23.



To which compare a recent composite:



(No one believed Schiaparelli even then. See the chapter “The Controversy Over the Canals of Mars” in *The Extraterrestrial Life Debate: Antiquity to 1915; A Source Book*, edited with commentary by Michael J. Crowe. Notre Dame, University of Notre Dame Press, 2008.)

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Principles of correspondence

The curious case of quantum mechanics. One can identify three principles of correspondence that were meant to express the way classical physics would come out of the theory as a limit. — The first was Planck's, that classical results would have to be recovered in the limit as h (or h -bar) went to zero. — The second was Bohr's, that in his model of the atom classical results would have to appear as the large- n limit, when orbits with higher energies grew closer and closer together and radiative transitions became more and more continuous. — The third, far and away the most interesting, was Born's, that the fact that classical results had to appear as limits of a quantum *mechanics* — the idea of a new formalism was implicit — meant that there would have to be some structural similarity between the old and the new theories; that closeness in prediction should entail similarity of form. There is something bizarre and uncanny in this idea, even though it turns out to have been right.

If you think of it biologically — and really there doesn't seem to be any other way to think of it — Born's requirement simply looks like the principle of adaptation of existing structures: how the eye evolved, for instance, by the successive modification of a sort of moist sac. — Okay, so there is going to be some kind of energy in the new theory; then it must have some mathematical expression, and that expression is going to work something like a Hamiltonian. Heisenberg clung to that principle like a lifebuoy, and somehow kept his head above water long enough to carry a calculation through. It still looks like a miracle, but it was *possible*; and if it was possible, it *had to be* possible. — It isn't an accident that the eye evolved independently so many times, and always in the same fashion.

So the idea in this case is something like, the passage from the old theory to the new one involves using "the same" language but

changing the meanings of everything; keeping the syntax constant while changing the semantics underneath it. — It still looks like yanking the tablecloth away while leaving all the dishes and silverware untouched.

Or, again, like the cat fading out and the grin remaining.