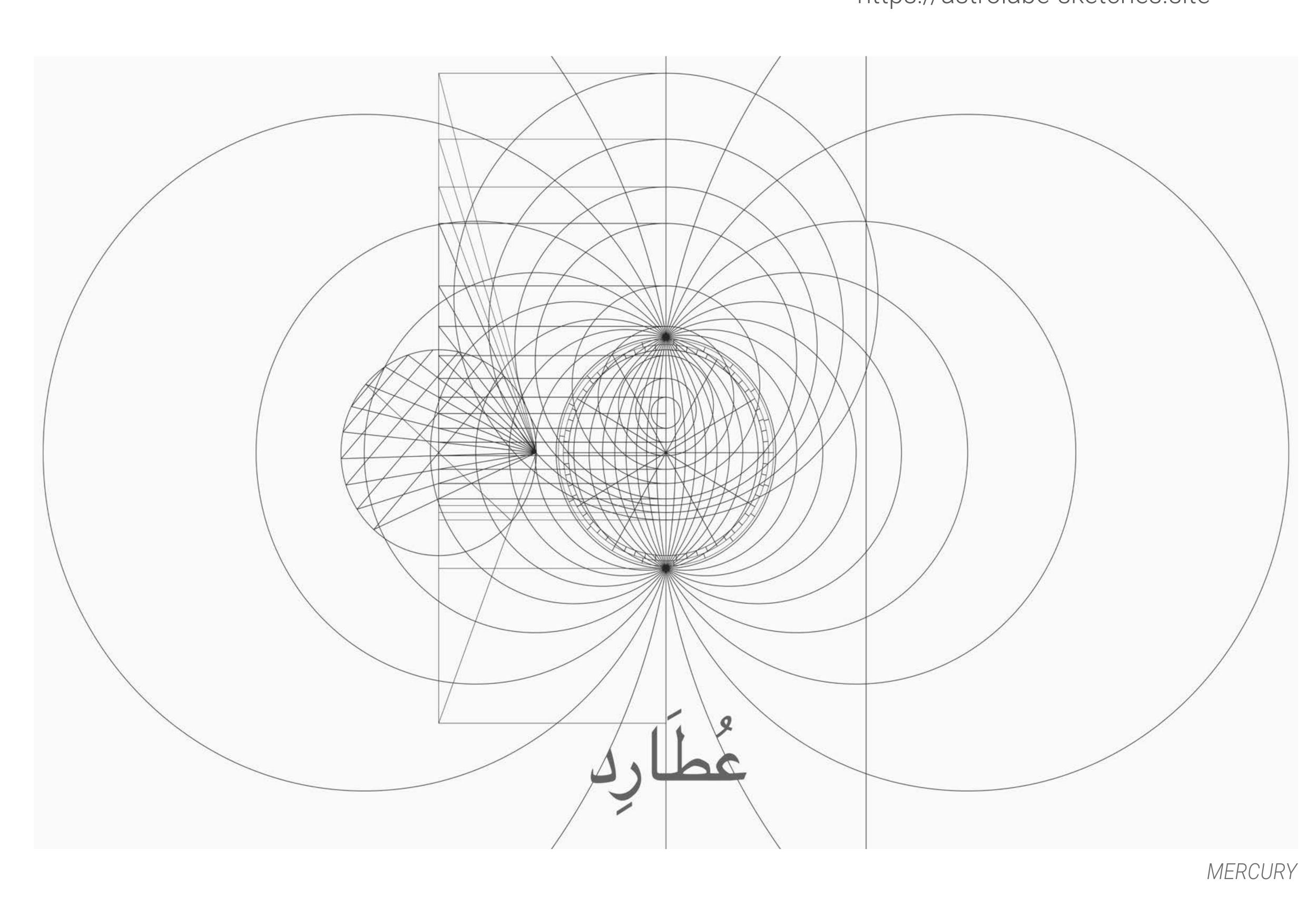
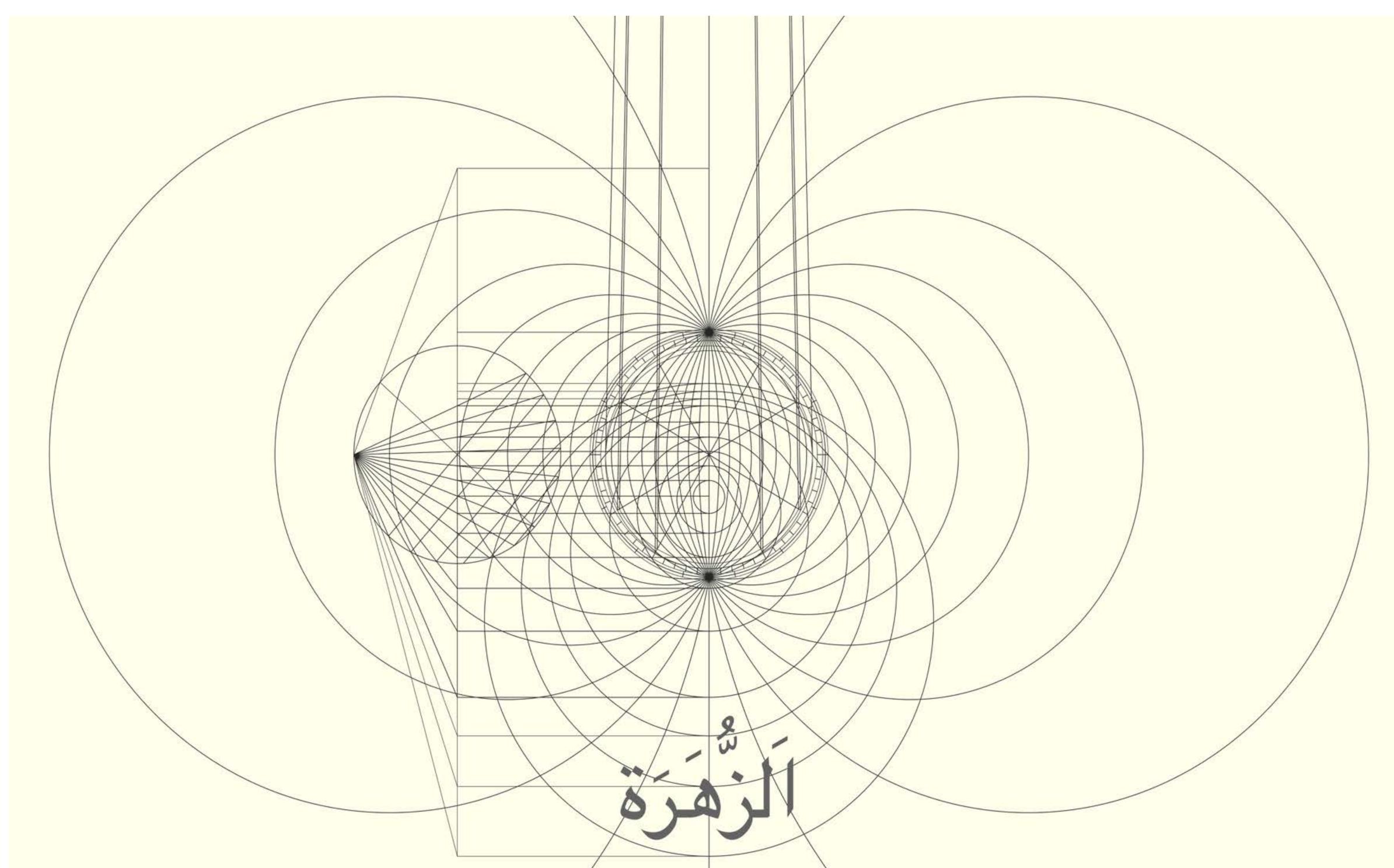
## Where is Here?

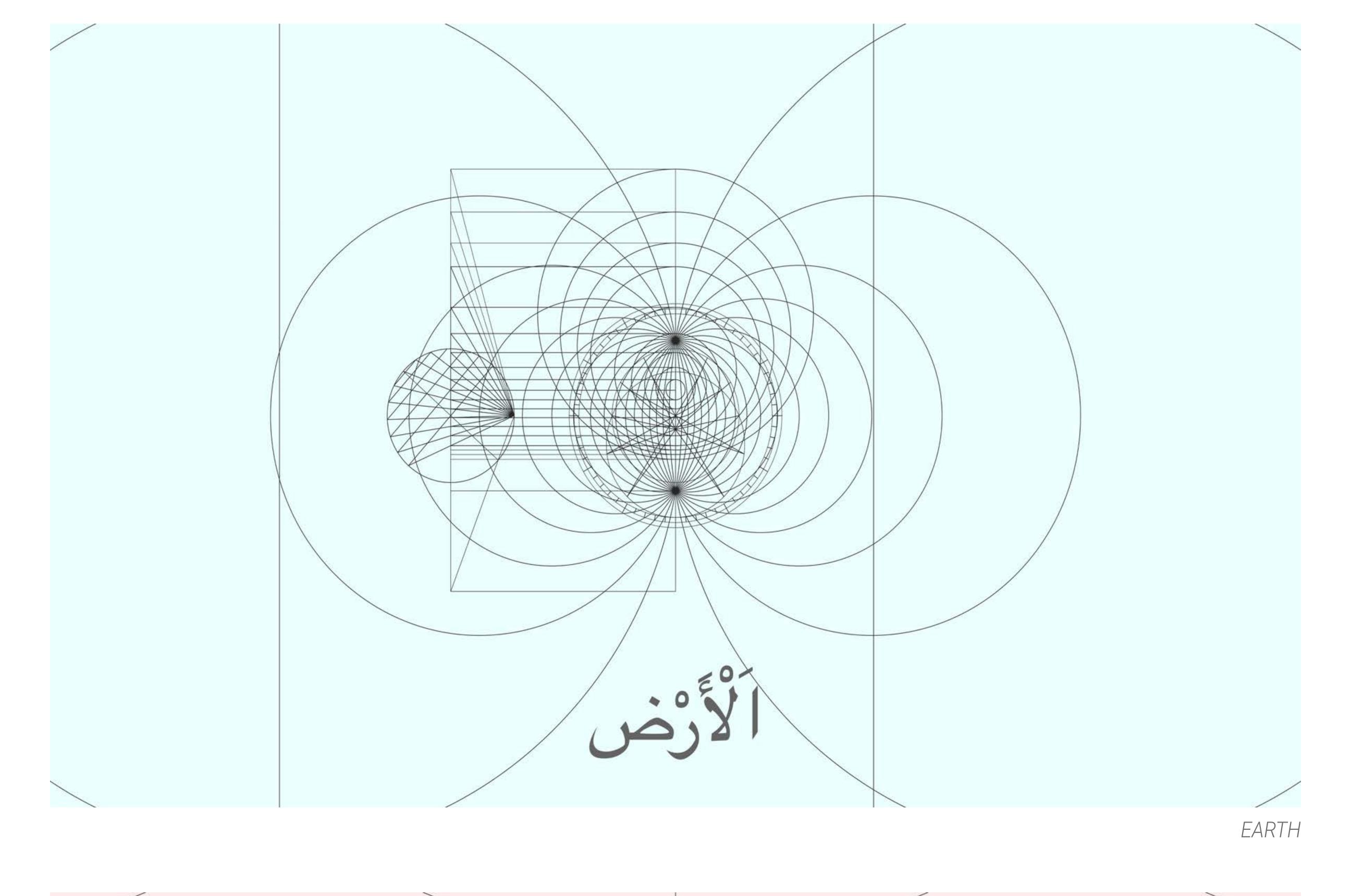
Astrolabes for use on Mercury, Venus, Mars ... and even Pluto

Gary James Stilwell MD

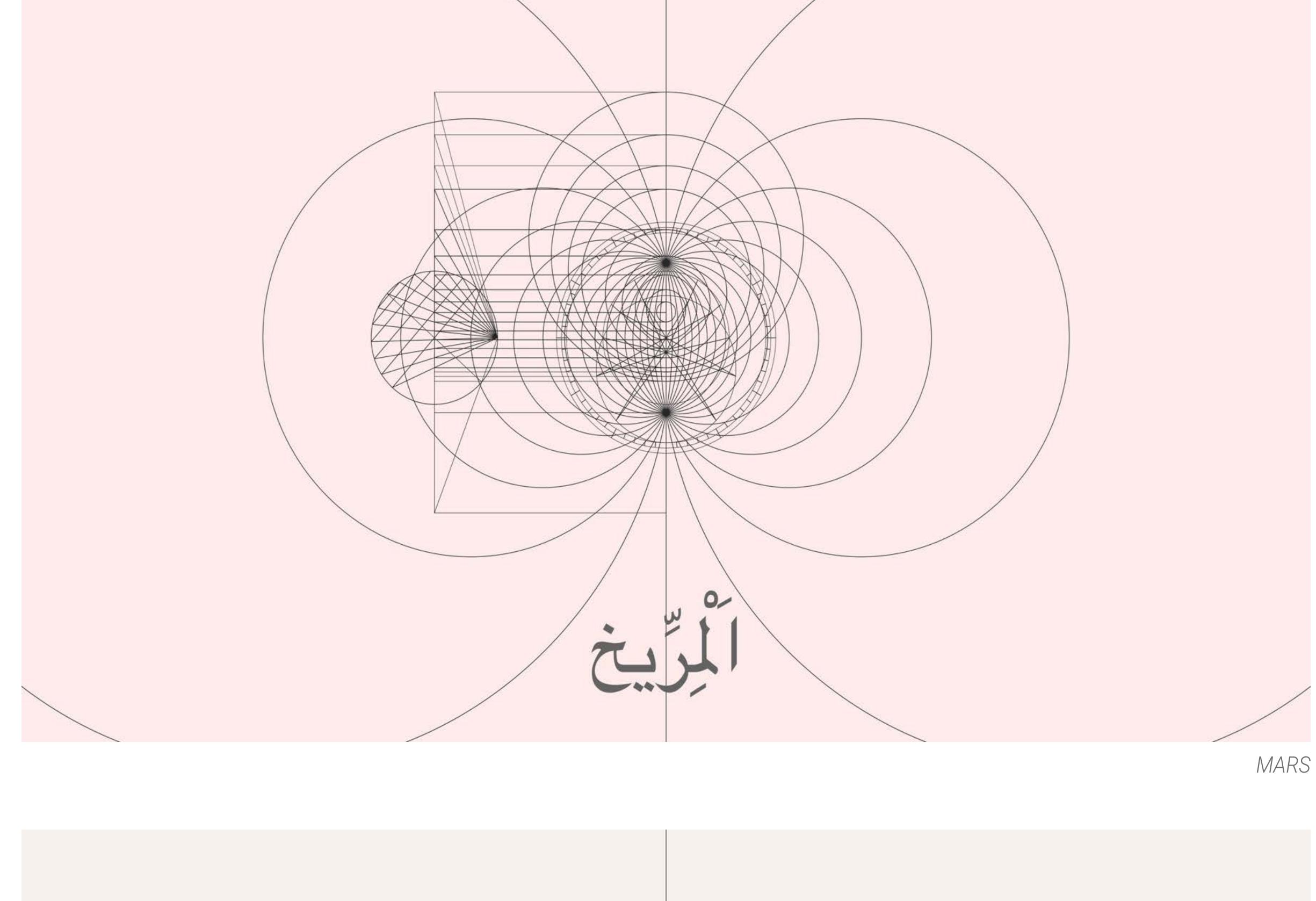
astrolabe.sketches@gmail.com https://astrolabe-sketches.site

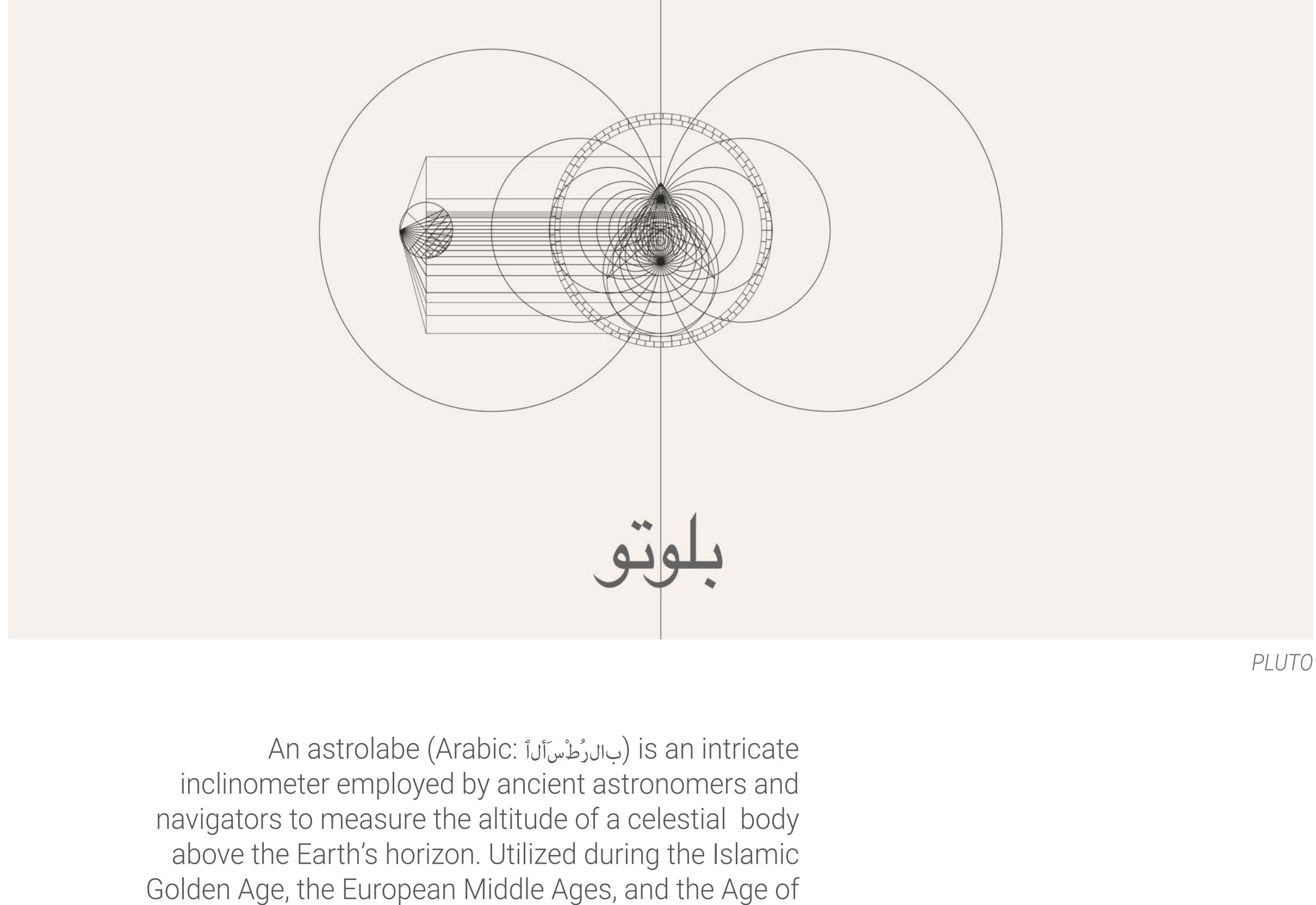






MARS





identifying the stars and planet as well as measuring the latitude, determining the time, and estimating the height of distant objects. The first universal astrolabe was invented by the Islamic scholar Abu Ishaq Ibrahim al-Zarqali (b. 1029). Unlike its predecessors, his 'Tablet of al-Zarqali' projected both the equatorial and ecliptic coordinate systems on a vertical plane that cut the celestial sphere at the solstices, permitting its use at any latitude on Earth.

Discovery, it served as a handheld model of the universe,

Inspired by al-Zarqali, I drew construction lines to create astrolabes for use on each of the eight planets and Pluto, appending his trigonometry calculations with contemporary NASA data and JavaScript. Latitude was set at 39.8628° N, matching that of Al-Zarqali's birthplace in Toledo, Spain. Variation between the digital drawings results from each planet's unique obliquity to orbit in addition to their distinct rotational and orbital periods.

VEN MER EAR MAR PLU Obliquity to Orbit 0.034 177.4 23.4 25.2 119.5 (degrees) 23.9 1,408 -5,832 24.6 -153.3 Rotational Period (Earth hours)

Orbital Period 88.0 224.7 365.2 687.0 90,560 (Earth days) My curiosity was sparked by the projection effect, the observational illusion caused by viewing distant objects from a particular perspective. I wondered whether an astrolabe could also provide navigational and temporal

orientation on the other planets of our solar system? Yes, these sketches affirm the ability of al-Zarqali's ingenious instrument to cross space and time and guide future exploration of our neighbors. Even Pluto!

I made the multi-planet astrolabe series during my postgraduate studies at MIT in Dr. Elizabeth Cavicchi's course EC.090 'Re-create Experiments from History: Inform the Future from the Past.'

I'm grateful for your interest in viewing my work and invite you to share the sketches with others who also possess a passion for historical scientific instruments, astronomical art, and/or exploring Pluto.