

The Dynamical Interpretation of the ‘Sky Disc of Nebra’

BURKARD STEINRÜCKEN¹

¹Public Observatory and Planetarium of Recklinghausen, Stadtgarten 6, D-45657 Recklinghausen, Germany
(steinruecken@sternwarte-recklinghausen.de)

The ‘Sky Disc of Nebra’ is the earliest representation of the night sky with concrete astronomical content (1600 BC). The two segments on the edge can be interpreted as the eastern and western horizon sectors. The angle of $82,7^\circ$ they cover is the annual solar swing between the two solstitial points for the latitude of Saxony-Anhalt. The meaning of the other symbols is not clear. The disc shows the night sky but without concrete constellations except the cluster of seven stars, probably the Pleiades. The ‘central gold disc’ could be the sun or the full moon, the ‘crescent symbol’ could symbolize the lunar crescent, but also the partially eclipsed moon or sun. Most enigmatic is the bowlike symbol on the edge, which has so far been interpreted as a ‘ship’ crossing the sky from the eastern to the western horizon. Here a new interpretation of this ornament and the whole disc is given. Fitting circles and ellipses with the method of least squares to the circular or curved ornaments unseals a highly sophisticated mathematical design of the disc: The holes on the edge follow an ellipse with the ratio of the major axis to the minor axis of 256/244. An ellipse with nearly the same ratio (within the tolerances of app. 1–2 mm) fits to the inner edges of the golden segments. This inner ellipse is rotated 90° against the symmetry axes of the outer ellipse. The ‘ship’ is fitted by an outer and an inner circle. They touch each other at a point on the symmetry line of the ship. The outer circle surrounding the ship reaches to the center of the disc. This leads to the idea to roll the ‘outer ship circle’ on the edge of the disc (like a Tusi couple). The ‘ship rotator’ rolls into the symmetry position on the elliptical axes and the cardinal directions (Fig. 1). Cyclical motion is guaranteed because of the rational proportion of the circumference of the ‘outer ellipse’ and the ‘outer ship circle’ of 2:1. The rolling motion of the ship, which is possibly a metaphor for the eternal celestial motion, is animated in digital videofiles on <http://www.sternwarte-recklinghausen.de>. The circle fitting the inner edge of the crescent (‘inner crescent circle’) has the same diameter as the ship rotator. A further circle (‘star circle’), optimized to enclose the Pleiades, is tangent to the ‘inner crescent circle’ and has the third part of its diameter. These are possible hints for a more complex motion with an epicyclic motion of the star circle within the ‘inner crescent circle’. If the ‘inner crescent circle’ is fixed to the ship rotator (Fig. 1), it slides during the rotator cycle through the disc and the ‘star circle’ touches the ‘outer ellipse’ in the western and eastern part of the horizon but does not leave the disc in any phase of the cycle. Slight changes of the adjustment of the ‘star circle’ to the left or the right prevents the contact or causes a crossing of the ‘star circle’ beyond the elliptical border of the disc. The complex mechanism seems to symbolize two successive solar years, the visibility of the Pleiades in the seasons and the division of the year in equinoxes, solstices and quarterdays. These festival days are indicated by contact phenomena of moving and fixed circles on the disc. The mechanism also has some similarities to the moving ‘world-soul’ described in the Timaeus of Plato. Plato’s world soul and the mechanism shown on the Sky Disc follow not exactly the behaviour of the real objects of nature but the idea of a world-construction based on some perfect mathematical idols.

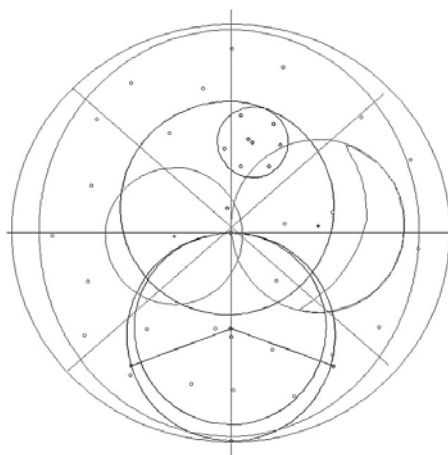


Fig. 1.

The mechanism with the ship-rotator in the lower symmetry position.
The ‘inner crescent circle’ is fixed to the rotator with the Pleiades rolling inside.