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# NOTES ON COPERNICUS'S EARLY HELIOCENTRISM

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My first case deals with a positive consequence of a marginal event. This happened thanks to Laurentius Corvinus (1465–1527), who started his studies at the Cracow University in 1484, receiving the master in liberal arts degree in 1489. As a student and magister at Cracow University he was acquainted with astronomy; as magister he lectured at the faculty for several years, including the first years of Copernicus's studies in Cracow. In those years Corvinus lectured on "De ente et essentia" (1492) and "Aristotle's Libri Posteriorum" (1493); he also wrote *Cosmographia dans manuductionem in tabulas Claudii Ptolomei* (published in Basel, 1496). During his long and friendly acquaintance with Copernicus, when they met in 1508, Corvinus helped to publish Copernicus's Latin translation of the Byzantine Greek poetry by Theophylactus Simocatta, the "Letters". Corvinus transmitted Copernicus's translation to the printer's shop in Cracow to be published in 1509.

Laurentius Corvinus prefaced the "Letters" with a eulogy, with its first words describing the astronomer who treats the "swift motion of the Moon and changing ways of its Brother" ("qui celerem lune cursum alternosque meatus Fratris: cum profugis tractat"). This has frequently been interpreted as a sure proof that in 1508 (when Corvinus's eulogy was written) Copernicus had as yet no idea of a heliocentric astronomy because he appeared to put the Moon's brother, the Sun, into motion. This verdict — although passed against better founded, accessible evidence — can be met in many historical publications right up to the last years of the twentieth century. But Corvinus became a decisive witness with the further text of the eulogy, presenting Copernicus as an astronomer "who based his work on remarkable principles [*miris principijs*; *mirus* can also mean: astonishing, strange, amazing], who knows how to study the splendid works of the Almighty and how to find the secret causes of events". Obviously neither Corvinus nor Copernicus would understand "remarkable principles" as leading to the previous geocentric astronomy. Evidently in 1508 Corvinus must have already been informed of Copernicus's active work on the heliocentric astronomy. (Note that my presentation does not attempt to declare the year of Copernicus's writing the *Commentariolus*.)

Another case: twenty-eight years ago a serious misinterpretation occurred in the presentation of a new translation of Copernicus's *Commentariolus*. The author criticized what he called wrong, unmotivated, and illogical elements of heliocentric astronomy, present in the first part of the *Commentariolus*. However, the "illogical elements" did not wait long for a rebuttal: Edward Rosen checked the critical notes in question and denied their incorrectness (in *Nicholas Copernicus' minor works*, 1985): "Actually, in its admirable compactness, without a superfluous word,

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*Commentariolus* gives every sign of being the end product of much reflection, careful planning, and superb organization."

In the *Commentariolus*'s "Introduction" Copernicus announced the solution of an important problem he encountered in trying to secure circular motions for the celestial bodies; Copernicus reported: "After I had attacked this difficult and almost insoluble problem, at last it occurred to me how it could be solved with fewer and far more suitable constructions than were formerly put forth, if some postulates (which are called axioms) were granted to us" ("Rem sane difficilem aggressus ac paene inexplicabilem obtulit id se tandem, quo modo id paucioribus ac multo convenientionibus orbibus, quam olim sit proditum, fieri possit, si nobis alique petitiones, quas axiomata vocant, concedantur").

A copy — or rather copies — of the *Commentariolus* reached Cracow before 1514. In those times all astronomers used in their work the *Epitome of the Almagest* produced by Peurbach and Regiomontanus: a source useful also to Copernicus when he came to introduce the assumptions ("axiomata", "petitiones") at the end of his brief "Introduction". Let us place the Copernican "petitiones" alongside the corresponding "conclusiones" of the *Epitome*.

The seven axioms (petitions) in the *Commentariolus* [in brackets: the corresponding geocentric statements from the *Epitome*]:

1. There is no one centre of all celestial orbs ("omnium orbium caelestium sive sphaerarum unum centrum non esse") [*Epitome*, 1: "Celi figuram esse sphericam: et motus eius circularem"].

2. The centre of the Earth is not the centre of the world, but only of gravity and of lunar orbits ("Centrum terrae non esse centrum mundi sed tantum gravitatis et orbis lunaris") [*Epitome*, 3: "Terram in centro mundi esse"].

3. All orbs surround the Sun, which is located as if at the centre of the universe, so that that centre is close to the Sun ("Omnes orbes circulant Solem tamquam in medio omnium existentem. Ideoque circa Solem esse centrum mundi").

4. The proportion of the distance between the Sun and the Earth to the height of the firmament is smaller than that of the proportion of the semidiameter of the Earth to the distance of the Sun; in proportion to the height of the firmament the distance from the Earth to the Sun is imperceptive ("Minorem esse comparationem distantiarum Solis et terrae at altitudinem firmamenti quam semidimetiensis terrae ad distantiam Solis, adeo ut sit ad summitatem firmamenti insensibilis" (*Epitome*, 4: "Terram respectu firmament puncti vicem habere").

5. Whatever motion appears in the firmament is due to the Earth. The Earth together with close elements rotates on its fixed poles in the daily motion with firmament and highest heaven abiding unchanged ("Quicquid ex motu apparet in firmamento non esse ex parte ipsius, sed terrae. Terra igitur cum proximis elementis motu diurno tota convertitur in polis suis invariabilibus firmamento

immobili permanente ac ultimo caelo") [*Epitome*, 5: "Quod terra localem motium non habeat declarare"].

6. What appears to us as motions of the Sun is due to the motion of the Earth and our sphere, with which we revolve around the Sun like any other orb; thus the Earth is carried by more than one motion ("Quicquid nobis ex motibus circa Solem apparet, non esse occasione ipsius sed telluris et nostri orbis cum quo voluimur ceu aliquo alio sidere; sic terram pluribus motibus ferrit") [*Epitome*, 6: "Motus celestes in duplica differentia reperiri"].

7. What appears in the orbs as retrograde and direct motion is due to the motion of the Earth. Therefore, the motion of the Earth alone suffices to explain so many irregularities in the motion of celestial bodies ("Quod apparet in erraticis retrocessio ac progressus, non esse occasione ipsius sed telluris. Huius igitur solus motus tot apparentibus in caelo diversitatibus sufficit").

By confronting the conclusions of the *Epitome* with his corresponding postulates, Copernicus rejected geocentric astronomy and introduced his new heliocentric astronomy. The resulting composition of seven postulates, set in deliberate contrast with earlier assumptions, axioms and petitions, provided Copernicus with the foundation for a new scientific theory. Thus the order of postulates initiated by Nicholas Copernicus in the *Commentariolus* has an historical logic of its own.