

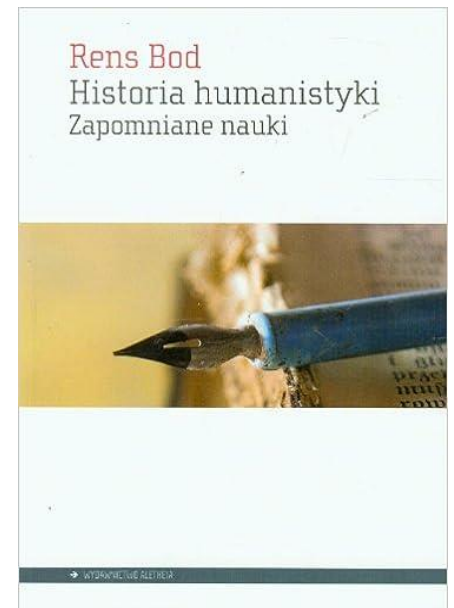
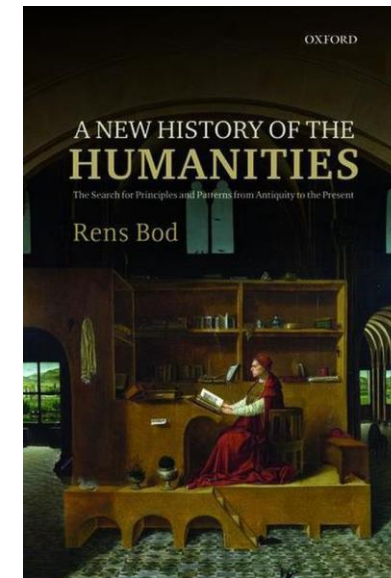
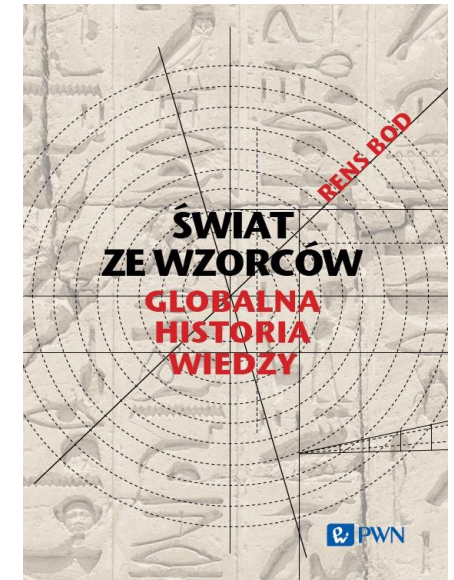
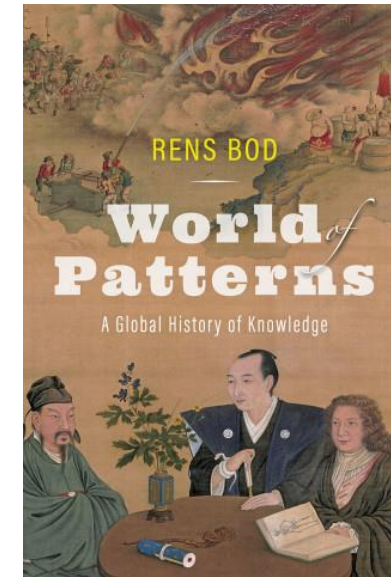
During his life, Copernicus published only one book, a translation of an historical work



Letters by the 7th c. Byzantine scholar Theophylactus translated by Copernicus, (Cracow 1509)

Main message of this talk: Beware of disciplinary myopia

- We get a more nuanced understanding of Copernicus's work if we view him both from a “humanistic” and a “scientific” perspective
- We need an integration of the history of the humanities and the history of science.
- Rewriting history of science/knowledge by including all (and thus also the humanistic) disciplines
 - *A New History of the Humanities* (OUP 2014)
 - *World of Patterns: Global History of Knowledge* (JHUP 2022)
 - Also available in Polish (last one published this week)



What is this book which Copernicus published himself?

- *Letters* by 7th c. Theophylactus Simocatta: “last historian of the ancient world”
- Translation is a farewell to uncle Lucas Watzenrode, but it’s also a showcase.
- Polish humanism: Copernicus is one of the first Poles to translate an ancient Greek work.
- Copernicus was working at the same time on the *Commentariolus*, which was never printed.



Theophylactus's *Letters* translated by Copernicus (Cracow 1509)

Humanism and philology in Copernicus's time

- Early 16th century: heyday of humanism
- Generally believed that all knowledge must lie with the ancients – but also a strong wish to renew Ptolemaic geocentric astronomy
 - No contradiction: one could look for models by other ancient astronomers
 - **Pythagoreans, Philolaus**: celestial bodies move in perfect circles around a *central fire*
 - **Aristarchus**: all planets move around the *Sun*
 - **Heraclides**: Mercury and Venus revolve around Sun, which in turn revolves around Earth
- However, none of these models were computational like Ptolemy's

No doubt that Copernicus was (also) a mathematical astronomer...

- Copernicus realized that one needs a *mathematical and computational model* – not just a conceptual one – for precise predictions
 - Copernicus's model was as precise as Ptolemy's, contra Fracastoro's model
 - Yet Copernicus still needed epicycles and eccentrics. But no equant!
- So indeed Copernicus was a mathematical astronomer, but...

Copernicus was also a humanist and a philologist

- He edited aforementioned historical work by Theophylactus, and he also worked in jurisprudence, cartography, medicine, coinage, economics...

→ *Can Copernicus's humanistic background help us to better understand his astronomical work?*

- Firstly, Copernicus seems to work like a philologist: he did not base his astronomy on series of new observations but mostly used existing “older” data.
- *De Revolutionibus* is Ptolemy's *Almagest* rewritten according to the heliocentric hypothesis -- chapter by chapter, section by section
 - Johannes Kepler: “Copernicus interpreted Ptolemy, not nature.”

Copernicus followed humanist precepts

- Copernicus wished to replace Aristotelian authority, which was considered outmoded by humanists.
- The anti-Aristotelians were quickly growing in the 16th c., e.g. Benedetti, Galileo in study of nature, but also in the study of the human:
 - **Poetics:** Tesauro, Gracian: rejected Aristotle's unity of time, space and action
 - **History:** J.J. Scaliger: showed that earliest Egyptian kings were older than the earth's age
 - **Philology:** Sasseti, De Laet: American languages were unrelated to European languages
 - **Art theory:** L.B. Alberti, 15th c.: linear perspective overrules classical perspective

Copernicus' way of working stands in humanist tradition: no empirical cycle

- For instance, Galileo, Kepler, Harvey a.o. explicitly used the *empirical cycle*:
 - from theory to testing patterns in “new” observations, and back to adapting theory if the observed patterns don't correspond to the assumptions
- Copernicus mostly used previous observations and employed heliocentric & circular assumptions to “save the phenomena”
 - Note that Galileo used the empirical cycle **only** for his experimental work (mechanics), not in astronomy (while Kepler did).

A conceptual distinction: *Manipulable vs Non-manipulable*

- *Fields with manipulable patterns:* musical science, mechanics...
- *Fields with non-manipulable patterns:* philology, chronology, astronomy...
 - See Galileo, *Two New Sciences*, 1638
- Kepler's background was in philology, where manuscripts could *not* be experimentally *manipulated* but only observed, just like in his astronomical and chronological work.
- Galileo was familiar with empirical cycle in an *experimental* discipline (musicology, via his father) where strings could be manipulated, but he did not apply it in his astronomy.

Can Copernicus's humanistic background help us to understand his astronomical work?

- Copernicus belonged to a tradition where data were not experimentally manipulated
- The two different fields – manipulable vs non-manipulable – lead roughly to two different approaches:
 - Either following the *empirical cycle* with manipulation of patterns (e.g. musicology, mechanics), then going back to underlying theory
 - Or working out an hypothesis by *saving the phenomena* without manipulating the patterns (e.g. philology, mathematical astronomy)

Copernicus is in the *non-manipulable* tradition

- Astronomical data cannot be experimentally manipulated
 - And this is also the case in philology, jurisprudence, cartography
 - In fact, Copernicus assumed heliocentrism and worked out his astronomy from there
- Yet his purported medical experiment in Olsztyn (c. 1620), creating two groups of residents using separate menus to figure out origin of a disease, seems to contradict Copernicus's non-manipulable way of working. Or is it apocryphal?
- In any case, his *astronomical* work was non-manipulable

Conclusions

- We get a better understanding and a more nuanced picture of Copernicus's way of working in astronomy by taking into account his (non-manipulable) background in philology and other humanistic fields.
- Copernicus followed humanist precepts.
- But can his humanistic background also “explain” his astronomical work?
 - No, historical actors cannot be explained in a simple monocausal way. We can only point to an “influence” -- or ‘discours’ if you prefer this word.

Thank you!

