

Science in the Renaissance

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Fra Carnevale, *The Ideal City* (ca. 1480-1484)

Alberti, *De re
aedificatoria*,
Paris 1512

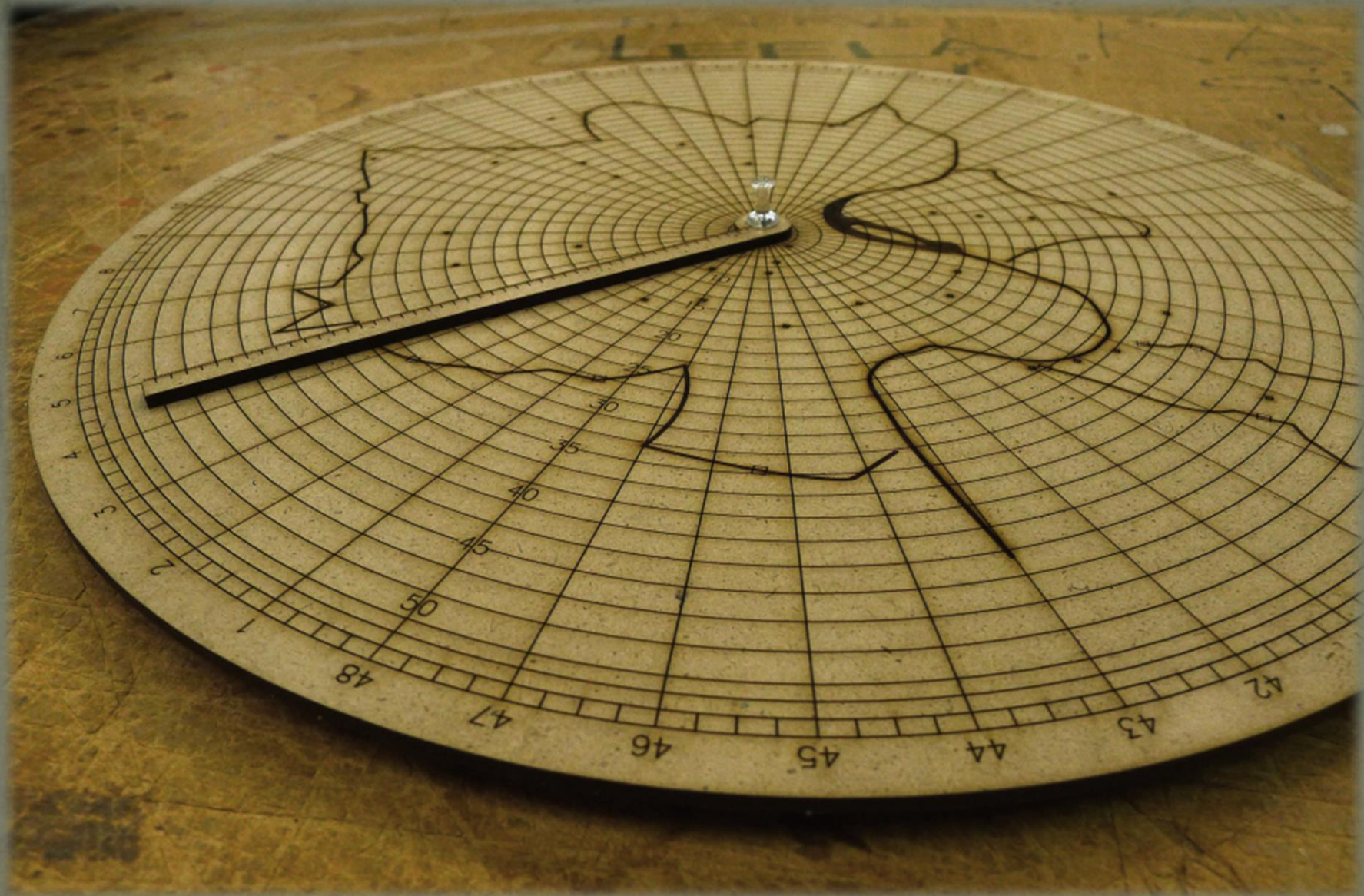
Erhofferata *Volus* *capit* *domi* *pe*
Leonis Baptistae Alberti Florentini viri
clarissimi Libri De re aedificatoria decem. Opus
integrū et absolutū : diligenterq; recognitum.
Distinctum est autē nuper opus ipsum totum / quod antea
peruia legebatur oratione per capita / nōnullis e textu reb⁹
insignibus depromptis / et in margine annotatis.
Facta est etiā capitū ipsorū nō inelegans tabula cū dictionū
et ipsarū rerum scitu dignarum quę in margine sunt / indice
admodum luculento. *Ex Vsid. P. B. Scingarsium. An. 1512.*



Venūdantur Parrhusijs In Sole aureo vici sancti Iacobi.
Et in interfignio triū coronarū e regione diui Benedicti.



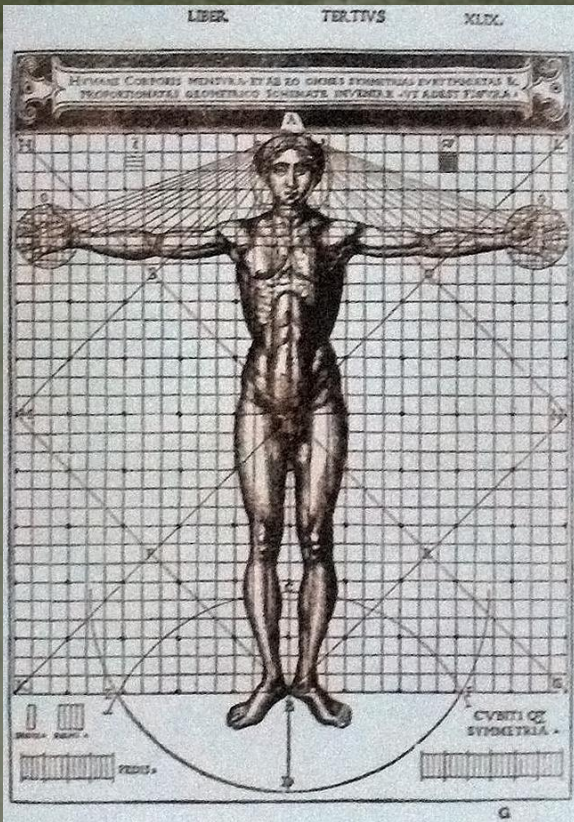
“Using mathematical instruments, I have recorded as carefully as I could the passage and *lineamenta* of the walls, the river and the streets of the city of Rome” (Leo Battista Alberti, *Descriptio vrbis Romae*)

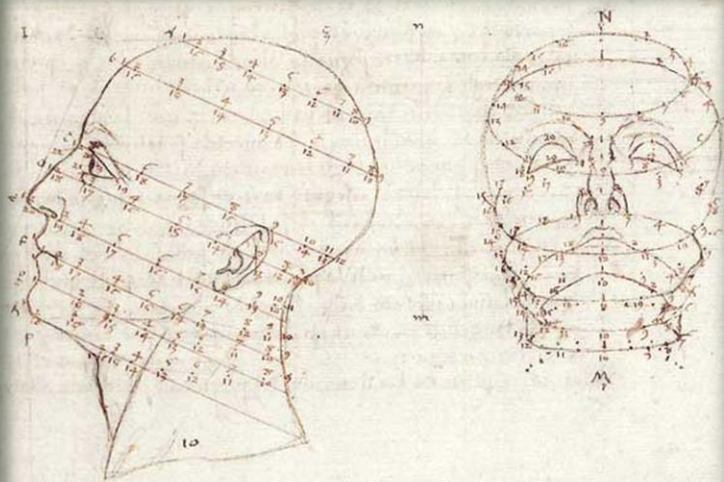


Measuring and representing the world

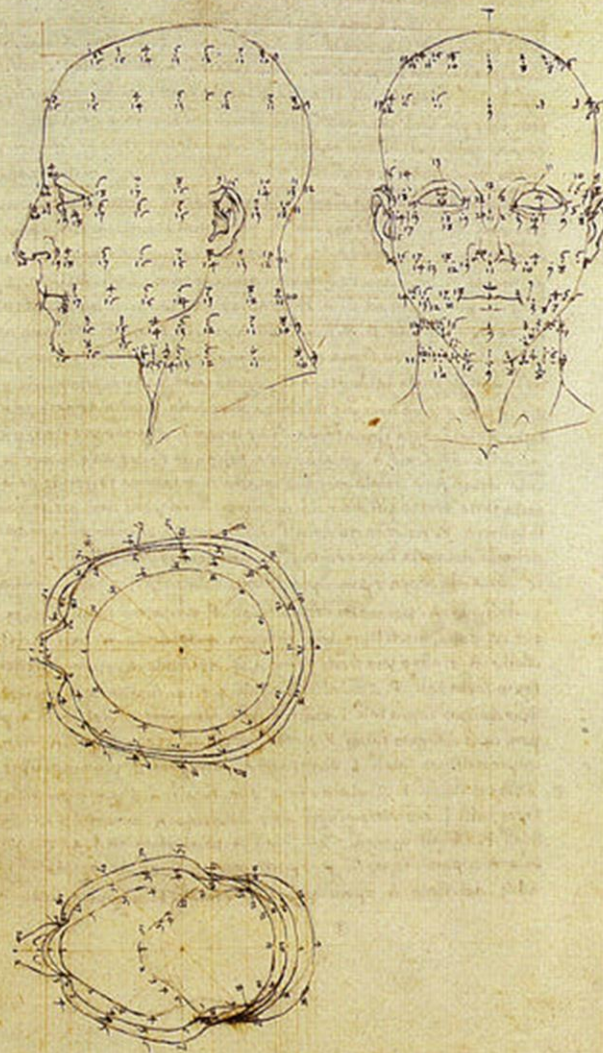
Left: Cesare Cesariano, Vitruvian man (1521), inspired by Vitruvius' *De architectura*

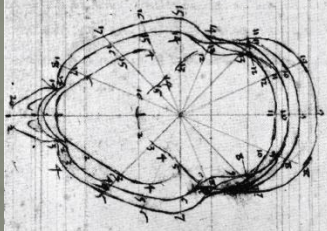
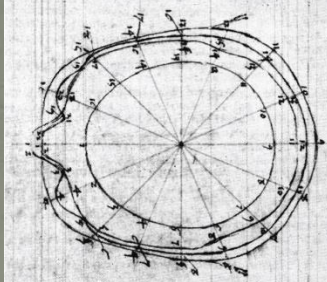
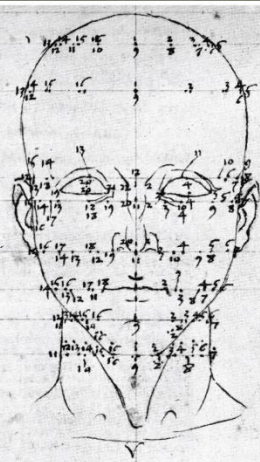
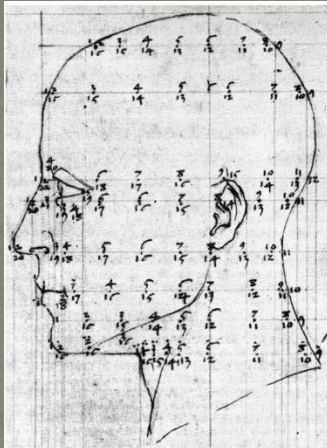
Below: Dürer, "Draughtsman Drawing a Recumbent Woman" (1525)





Piero della Francesca
De prospectiva pingendi
 (late 15th century)



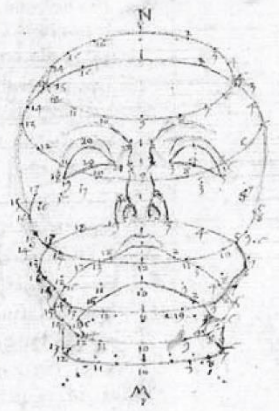
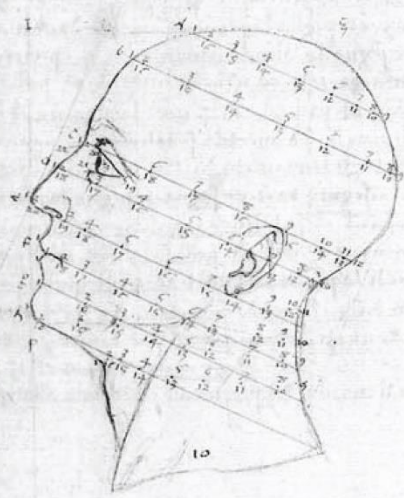


Handwritten notes in Chinese characters, likely describing the measurements or proportions of the face. The text is arranged in vertical columns.



Handwritten notes in Chinese characters, continuing the descriptions or instructions related to the facial measurements.

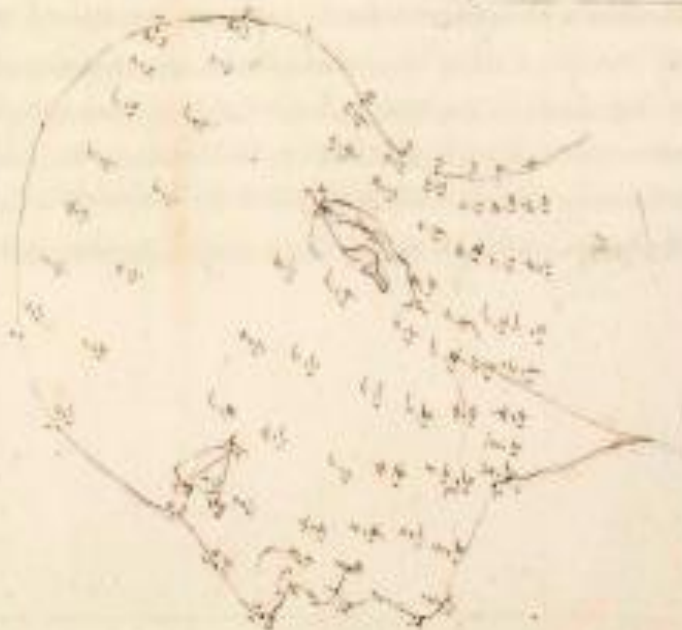
Handwritten notes in Chinese characters, possibly providing a summary or additional details about the measurements.





A	141
B	142
C	143
D	144
E	145
F	146
G	147
H	148

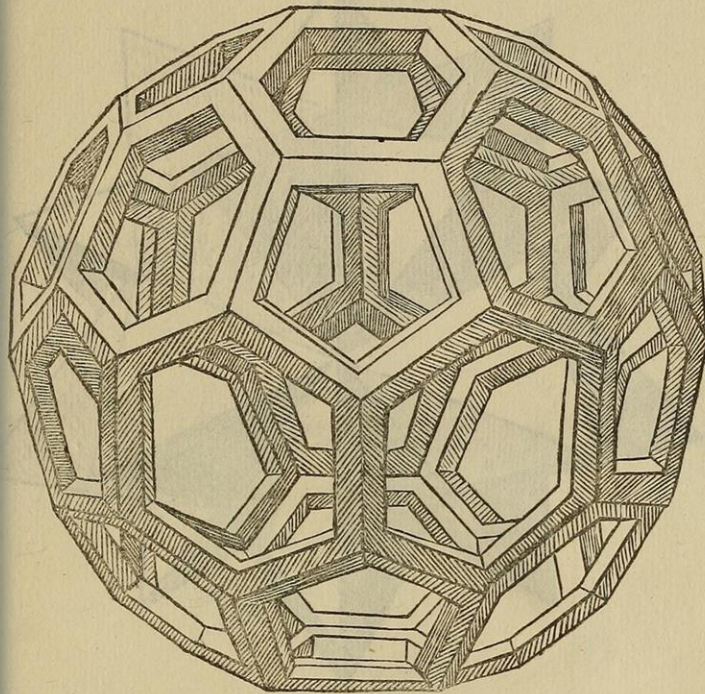
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Luca Pacioli, *De divina proportione* (1509): mathematics, geometry, painting, architecture

εικοσάεδρον ἀποτετμημένον κενόν

XXIIII

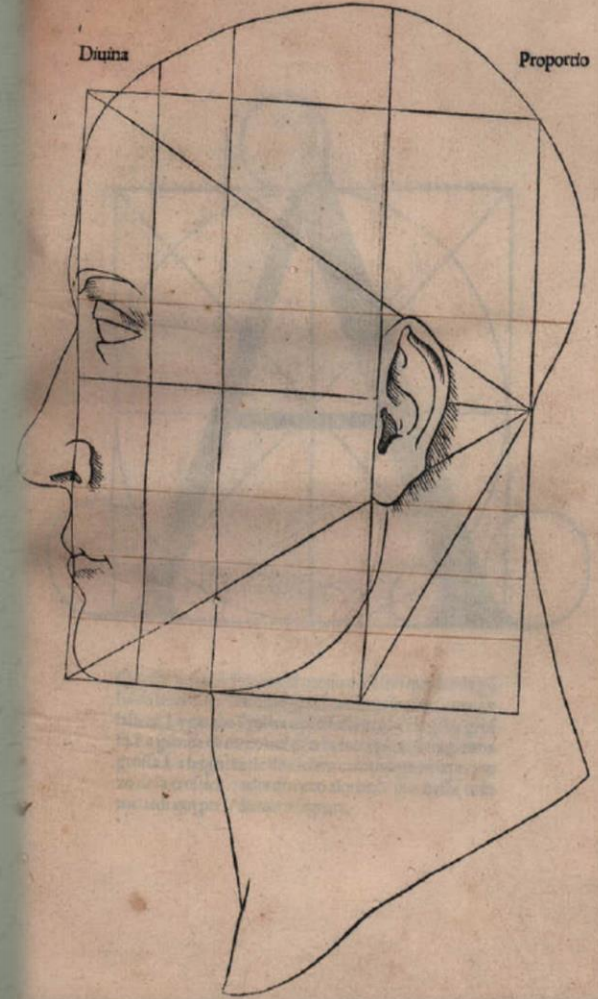


Icosaedron abscisum Vacuum

Icosaedron Aporetminon Cenon

Divina

Proportio



Luca Pacioli's Platonic solids



Luca Pacioli
*Summa de arithmetica,
geometria, proportioni et
proportionalita* (1494)

Arithmetic, algebra, geometry &
accounting (double-entry
bookkeeping, balance sheets, the
establishment of an investment's
future value)



Come si debbe dettare le ptite de debitori.

adcccc. Lxxxiiij.

Lodouico di piero forestani

de dare adi. xiiij. nouembre

1493. §. 44. f. 1. d. 8. porto

ptati in pñanza. posto cas-

sa hauere acar. 2. §

ea di. 18. detto. §. 18. f. 1. d.

6. pmettamo p lui a marti-

no di piero fora boschi a suo

piacer posto hère i qsto a. c. 1. §

18 f. 11 d. 6.

Lassa i mano di simone da

lesso bōbeni de dar adi. 14.

nouēbre. 1493. §. 62. f. 13.

d. 2. da francesco dantonio

cavalcanti in questo a. c. 2. §

62 f. 13 d. 6.

admartino di piero fora bo-

schì de dare a di. 14. nouem-

bre. 1493. §. 18. f. 11. d. 6.

porto lui medesimo contati

posto cassa a car. 2. §

18 f. 11 d. 6.

Francesco dantonio : ca-

ualcanti de dare a di. 12. di

nouēbre. 1493. §. 20. f. 4.

d. 2. ci promise nostro pia-

cere per lodouico di piero

forestani a carti. 2. §

20 f. 4 d. 2.

Come si debbe vittare le ptite di creditori.

adcccc. Lxxxiiij.

Lodouico di piero forestai

de hauere a di. 22. nouēbre.

1493. §. 20. f. 4. d. 2. sono p

parte di pagamento. E per

lui ce lia promissi: a nostro

piacere francesco dantonio.

cavalcanti posto dare a c. 2. §

20 f. 4 d. 2.

Lassa in mano di simone

dalesso bōbeni de hauere a

di. 14. nouēbre. 1493. §. 44

f. 1. d. 8. a lodouico di piero

forestani in questo a car. 2. §

44 f. 1 d. 8.

E a di. 22. nouembre. 1493

§. 18. f. 11. d. 6. a martino di

piero fora boschi a car. 2. §

18 f. 11 d. 6.

admartino di piero fora bo-

schì di hauere a di. 18. nouē

br. 1493. §. 18. f. 11. d. 6. li

pmettamo a suo piacere p

lodouico di piero forestani

posto obbi hère i qsto a. c. 2. §

18 f. 11 d. 6.

Francesco dantonio ca-

ualcanti de hauere a di. 14.

nouēbre. 1493. §. 62. f. 13.

d. 6. reco lui medesimo con-

tanti. posto Lassa dare a

carti. 2. §

62 f. 13 d. 6.

Quello

Abraham Zacuto, *Almanach perpetuum*, 1496

| Tabla tabularum ad ingressum earum post radicem inferiorem | | | | | | | | | | | | | | | |
|--|-----|------|------|------|-----|-----|-----|------|-----|------|------|------|-----|-----|-----|
| anni | sol | luna | latu | supl | mis | pen | mex | anni | sol | luna | latu | supl | mis | pen | mex |
| 1473 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1507 | 3 | 4 | 35 | 35 | 35 | 3 | 35 |
| 1474 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1508 | 4 | 5 | 36 | 36 | 36 | 4 | 36 |
| 1475 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1509 | 1 | 6 | 37 | 37 | 37 | 5 | 37 |
| 1476 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1510 | 2 | 7 | 38 | 38 | 38 | 6 | 38 |
| 1477 | 1 | 5 | 5 | 5 | 5 | 5 | 5 | 1511 | 3 | 8 | 39 | 39 | 39 | 7 | 39 |
| 1478 | 2 | 6 | 6 | 6 | 6 | 6 | 6 | 1512 | 4 | 9 | 40 | 40 | 40 | 8 | 40 |
| 1479 | 3 | 7 | 7 | 7 | 7 | 7 | 7 | 1513 | 1 | 10 | 41 | 41 | 41 | 1 | 41 |
| 1480 | 4 | 8 | 8 | 8 | 8 | 8 | 8 | 1514 | 2 | 11 | 42 | 42 | 42 | 2 | 42 |
| 1481 | 1 | 9 | 9 | 9 | 9 | 1 | 9 | 1515 | 3 | 12 | 43 | 43 | 43 | 3 | 43 |
| 1482 | 2 | 10 | 10 | 10 | 10 | 2 | 10 | 1516 | 4 | 13 | 44 | 44 | 44 | 4 | 44 |
| 1483 | 3 | 11 | 11 | 11 | 11 | 3 | 11 | 1517 | 1 | 14 | 45 | 45 | 45 | 5 | 45 |
| 1484 | 4 | 12 | 12 | 12 | 12 | 4 | 12 | 1518 | 2 | 15 | 46 | 46 | 46 | 6 | 46 |
| 1485 | 1 | 13 | 13 | 13 | 13 | 5 | 13 | 1519 | 3 | 16 | 47 | 47 | 47 | 7 | 47 |
| 1486 | 2 | 14 | 14 | 14 | 14 | 6 | 14 | 1520 | 4 | 17 | 48 | 48 | 48 | 8 | 48 |
| 1487 | 3 | 15 | 15 | 15 | 15 | 7 | 15 | 1521 | 1 | 18 | 49 | 49 | 49 | 1 | 49 |
| 1488 | 4 | 16 | 16 | 16 | 16 | 8 | 16 | 1522 | 2 | 19 | 50 | 50 | 50 | 2 | 50 |
| 1489 | 1 | 17 | 17 | 17 | 17 | 1 | 17 | 1523 | 3 | 20 | 51 | 51 | 51 | 3 | 51 |
| 1490 | 2 | 18 | 18 | 18 | 18 | 2 | 18 | 1524 | 4 | 21 | 52 | 52 | 52 | 4 | 52 |
| 1491 | 3 | 19 | 19 | 19 | 19 | 3 | 19 | 1525 | 1 | 22 | 53 | 53 | 53 | 5 | 53 |
| 1492 | 4 | 20 | 20 | 20 | 20 | 4 | 20 | 1526 | 2 | 23 | 54 | 54 | 54 | 6 | 54 |
| 1493 | 1 | 21 | 21 | 21 | 21 | 5 | 21 | 1527 | 3 | 24 | 55 | 55 | 55 | 7 | 55 |
| 1494 | 2 | 22 | 22 | 22 | 22 | 6 | 22 | 1528 | 4 | 25 | 56 | 56 | 56 | 8 | 56 |
| 1495 | 3 | 23 | 23 | 23 | 23 | 7 | 23 | 1529 | 1 | 26 | 57 | 57 | 57 | 1 | 57 |
| 1496 | 4 | 24 | 24 | 24 | 24 | 8 | 24 | 1530 | 2 | 27 | 58 | 58 | 58 | 2 | 58 |
| 1497 | 1 | 25 | 25 | 25 | 25 | 1 | 25 | 1531 | 3 | 28 | 59 | 59 | 59 | 3 | 59 |
| 1498 | 2 | 26 | 26 | 26 | 26 | 2 | 26 | 1532 | 4 | 29 | 1 | 60 | 60 | 4 | 60 |
| 1499 | 3 | 27 | 27 | 27 | 27 | 3 | 27 | 1533 | 1 | 30 | 2 | 61 | 61 | 5 | 61 |
| 1500 | 4 | 28 | 28 | 28 | 28 | 4 | 28 | 1534 | 2 | 31 | 3 | 62 | 62 | 6 | 62 |
| 1501 | 1 | 29 | 29 | 29 | 29 | 5 | 29 | 1535 | 3 | 1 | 4 | 63 | 63 | 7 | 63 |
| 1502 | 2 | 30 | 30 | 30 | 30 | 6 | 30 | 1536 | 4 | 2 | 5 | 64 | 64 | 8 | 64 |
| 1503 | 3 | 31 | 31 | 31 | 31 | 7 | 31 | 1537 | 1 | 3 | 6 | 65 | 65 | 1 | 65 |
| 1504 | 4 | 1 | 32 | 32 | 32 | 8 | 32 | 1538 | 2 | 4 | 7 | 66 | 66 | 2 | 66 |
| 1505 | 1 | 2 | 33 | 33 | 33 | 1 | 33 | 1539 | 3 | 5 | 8 | 67 | 67 | 3 | 67 |
| 1506 | 2 | 3 | 34 | 34 | 34 | 2 | 34 | 1540 | 4 | 6 | 9 | 68 | 68 | 4 | 68 |

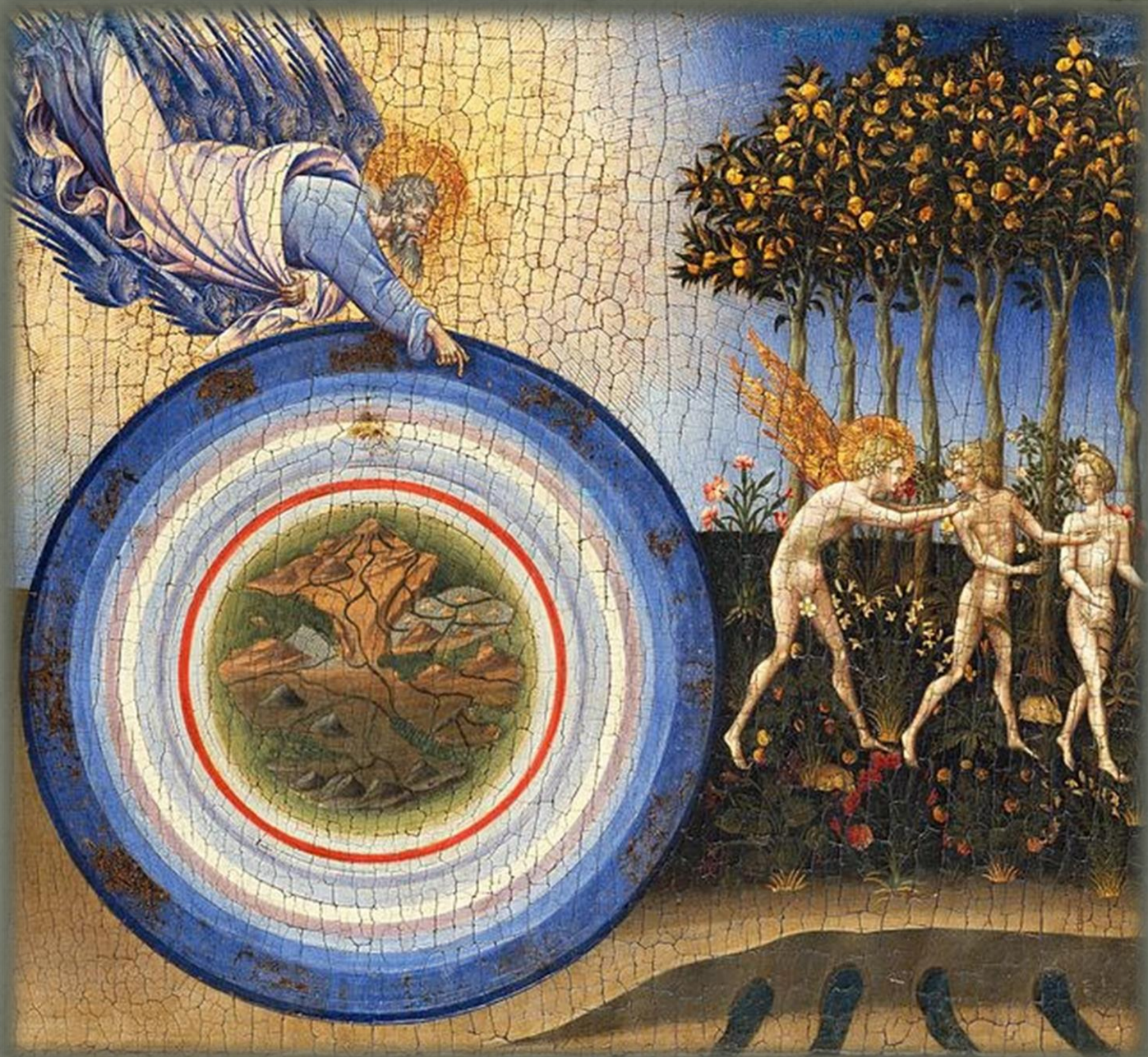
Ptolemy





Carta universal en que se contiene todo lo que del mundo se ha descubierto fasta agora; hizola Diego Ribero, año de 1529.









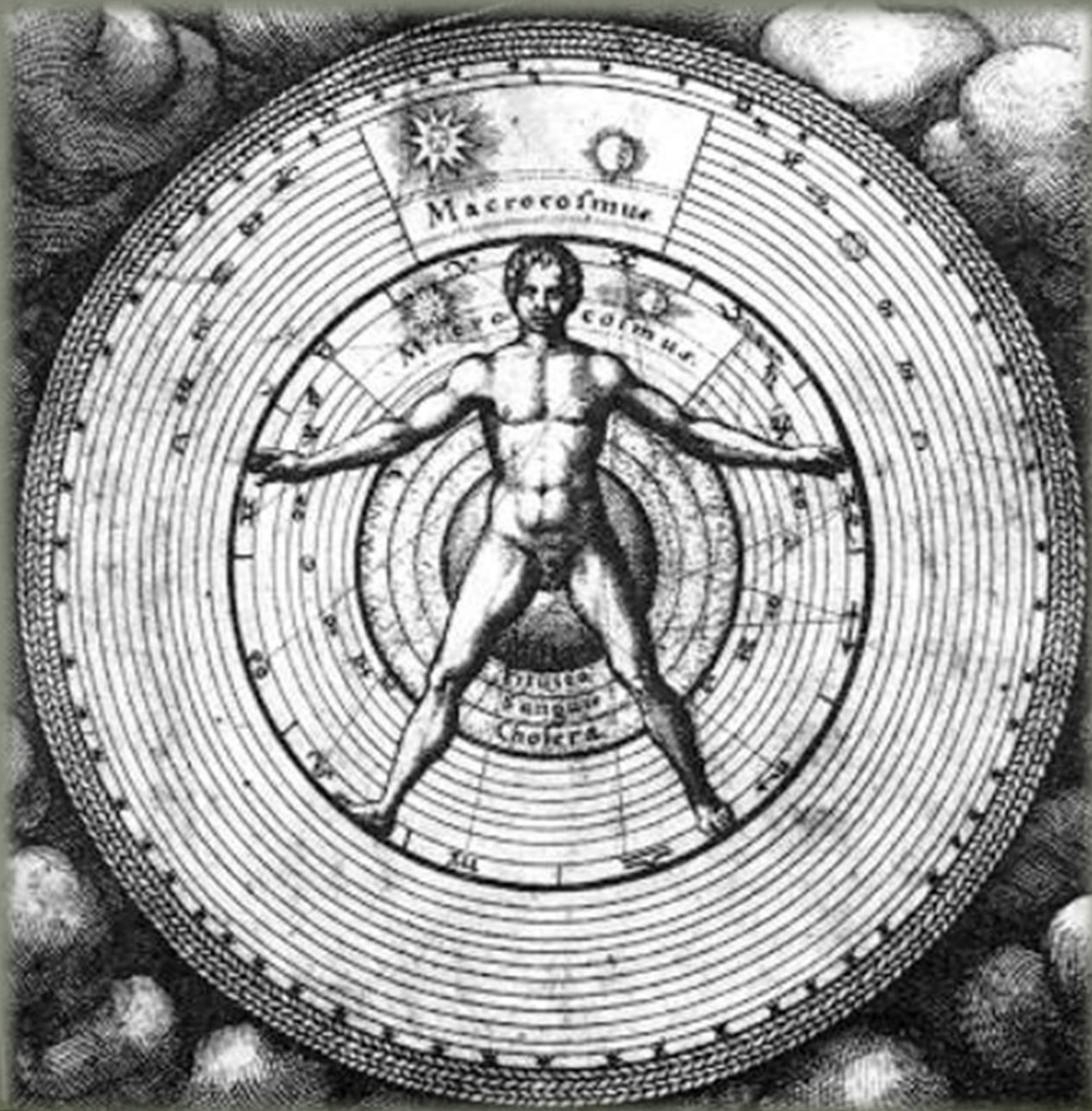
An allegorical representation of the earth-centered Ptolemaic Universe.

The center of this universe of concentric spheres, contains the four elements: fire, air, water and earth.

The four humors of the body—choler, blood, phlegm, and melancholy—that determine temperament and in great imbalance make for disease, mental and physical...

A representation of man as a microcosm

(Robert Fludd, *Utrisque cosmi maiores... Historia*, 1617-19)



Paracelsus (1493-1541)

(Philippus Aureolus Theophrastus Bombastus von Hohenheim)

Alchemist, scientist,
occultist

In his work, uniting the
diverse disciplines of
medicine, biology and
alchemy, he assisted –
almost in spite of
himself – the birth of
science and the
emergence of the age
of rationalism.



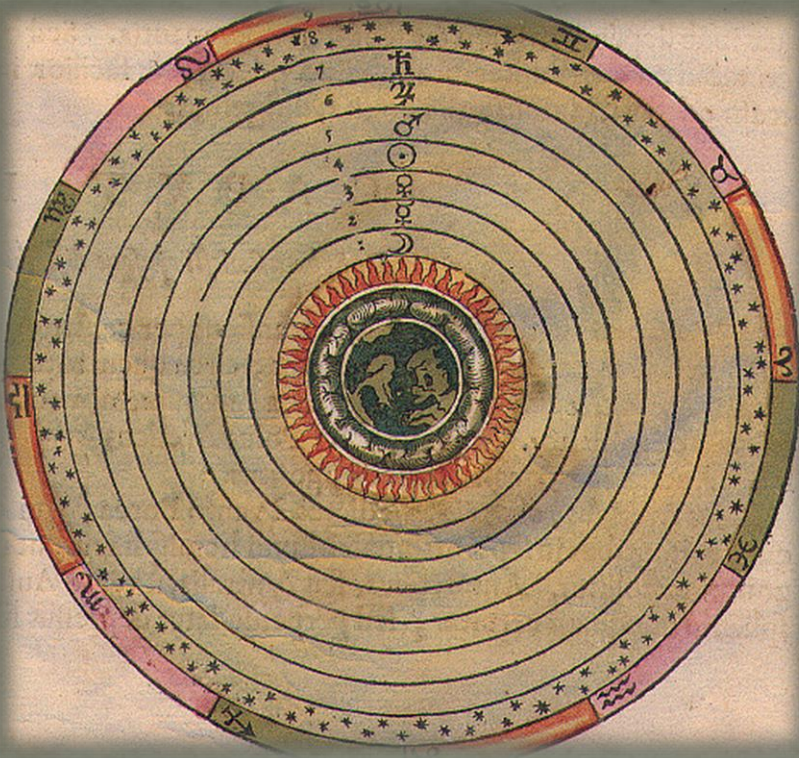


John Dee (1527-
1608)

John Dee's
Monas Hieroglyphica
(1564)

The *monas*, or unity,
underlying the universe as
expressed in a hieroglyph,
or symbol.





Giordano Bruno (1548-1600)

The earth is not in the center of the universe; it is central only to our own surrounding space.



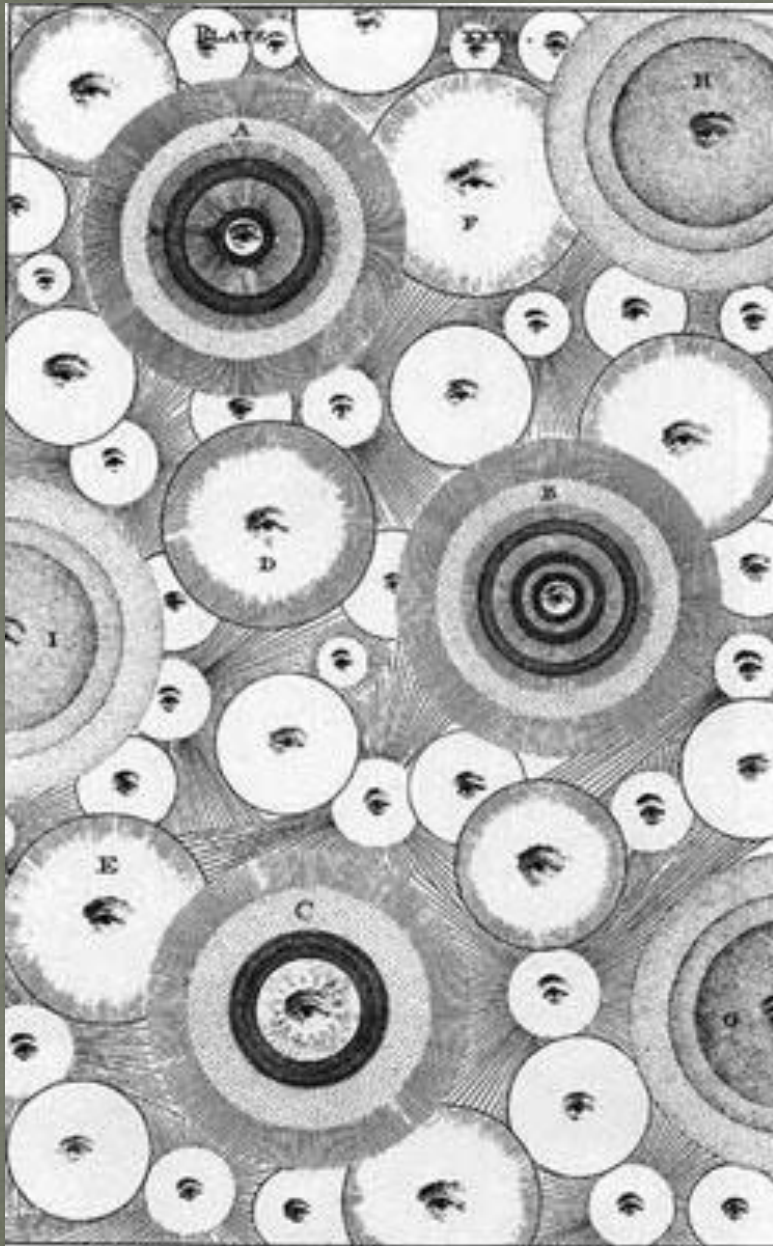


For Bruno there is no upper limit to the physical world and thus no end to the journey of **those who want to know**

What opens now in front of the “**heroic lover**”, the **philosopher**, is an **infinite space**

Giordano Bruno

- “Unless you **make yourself equal to God**, you cannot understand God ...”
- “Make yourself **grow to a greatness beyond measure**, by a bound **free yourself from the body...**”
- “... **raise yourself above all time, become Eternity**; then you will understand God.”
- “Believe that **nothing is impossible for you, think yourself immortal and capable of understanding all**, all arts, all sciences, the nature of every living being.”



Disks representing individual universes centered around "the most perfect of Beings."

From Thomas Wright of Durham's *An Original Theory or New Hypothesis of the Universe* (1750).

Witchcraft and the control of nature



Ulricus. Dico qd nō pōt nīl quādo ⁊ qbus ac inquantū a
deo ex causa maiestatis suā mouente eisdem ꝑcedit Sigismū
dua. Sup quo fundas hanc ꝑclusionem Ulricus. Sup pri
mo ꝑductio. In suo Ioannes damascenus libro secūdo ait. Hō

→ the malign and
occult force of
witchcraft.

→ **Satan** → was believed
to have agents at
work, with
mysterious, diabolical
power to do harm,
maleficium.

The paradoxes and contradictions of an age of transition



Francis Bacon – the experimental scientific method → 1592, '**I have taken all knowledge to be my province**' (1592)

1592 he also wrote that **God had recently sent plague**—‘but with a very gentle hand’—**to teach the curious who dared seek its natural cause** to ascribe it only to His mercy.

FRANC. BACONIS

DE VERULAMIO/

Summi Angliæ

CANCELLARII/

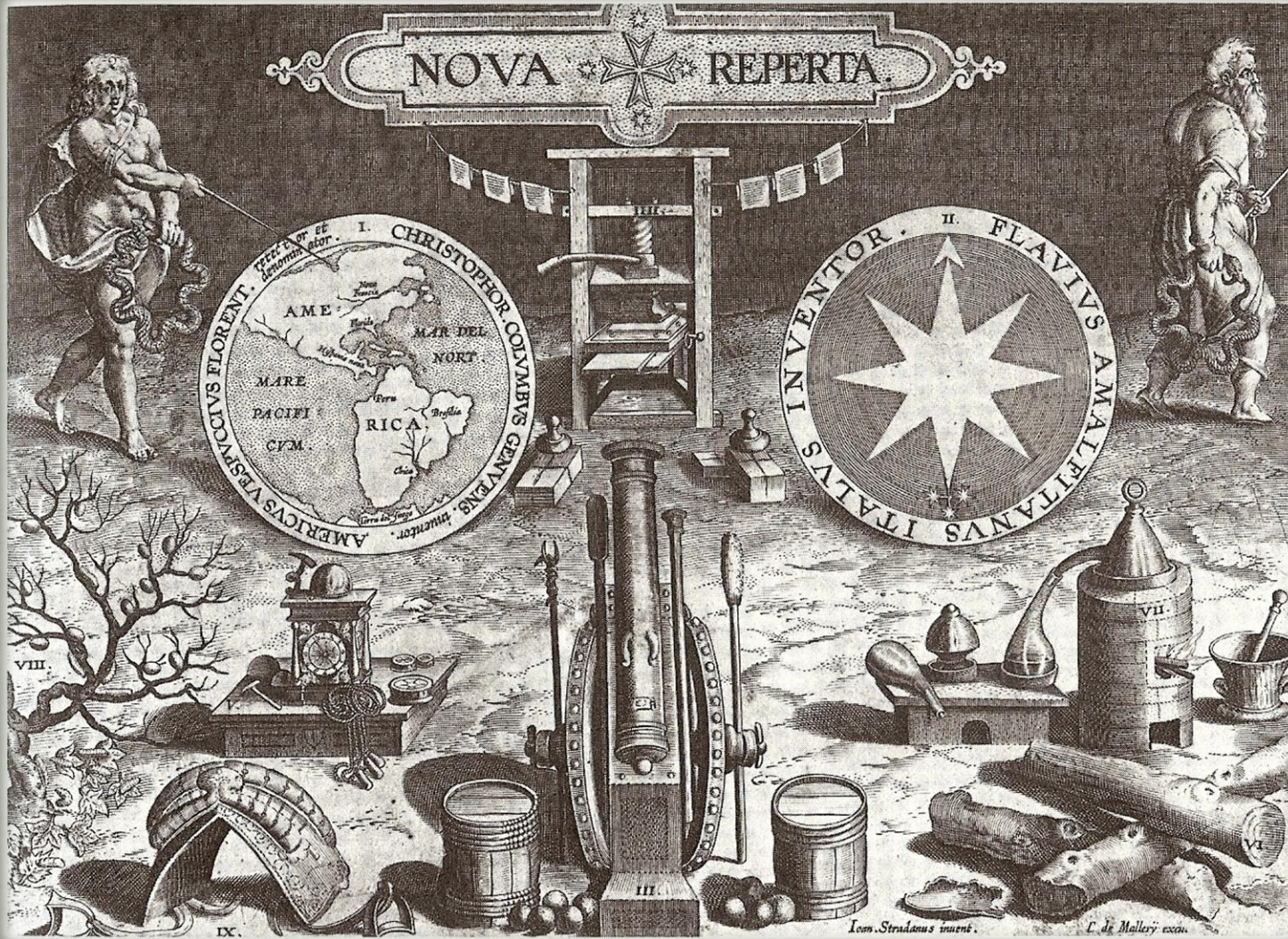
Novum Organum

Scientiarum.



LVGD. BAT.
Apud Adrianum Wijngaerde.
et Franciscum Moiardum. 1645.

Science and technology: changing the world



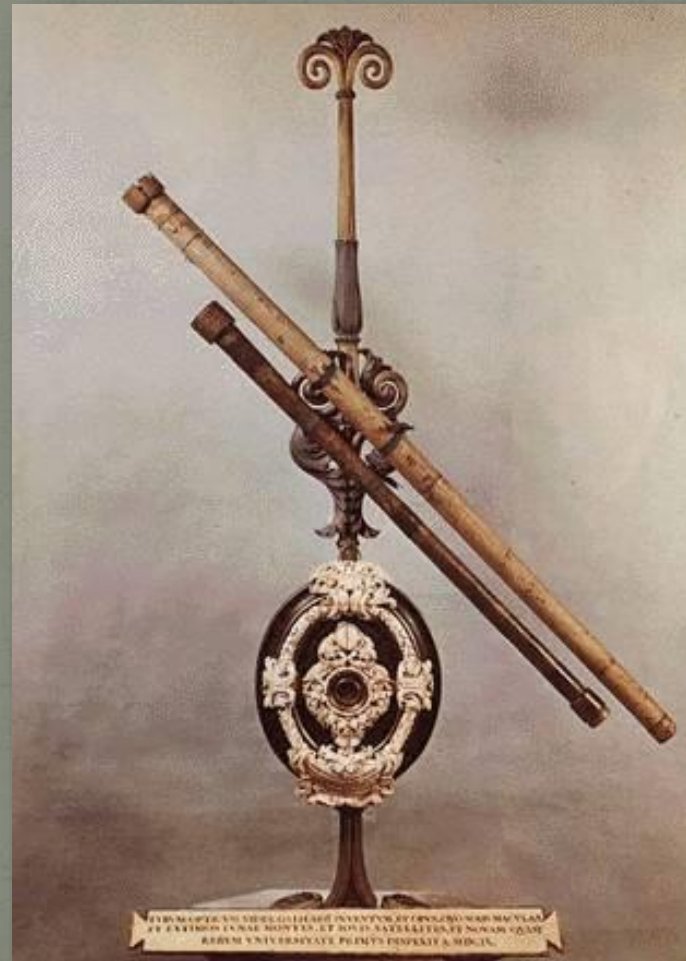
Theodor Galle, *Nova reperta* (New inventions, ca. 1591)

Exploration, Navigation, Cartography and Science: Translating / Representing the World



Theodor Galle, *Lapis polaris, magnes* (The invention of the compass, ca. 1591)

Galileo's telescope



New Worlds beyond this one:
John Wilkins's
*A Discourse Concerning A New World &
Another Planet*
(London, 1640)



Microscope

From Robert Hooke's *Micrographia* (1665).

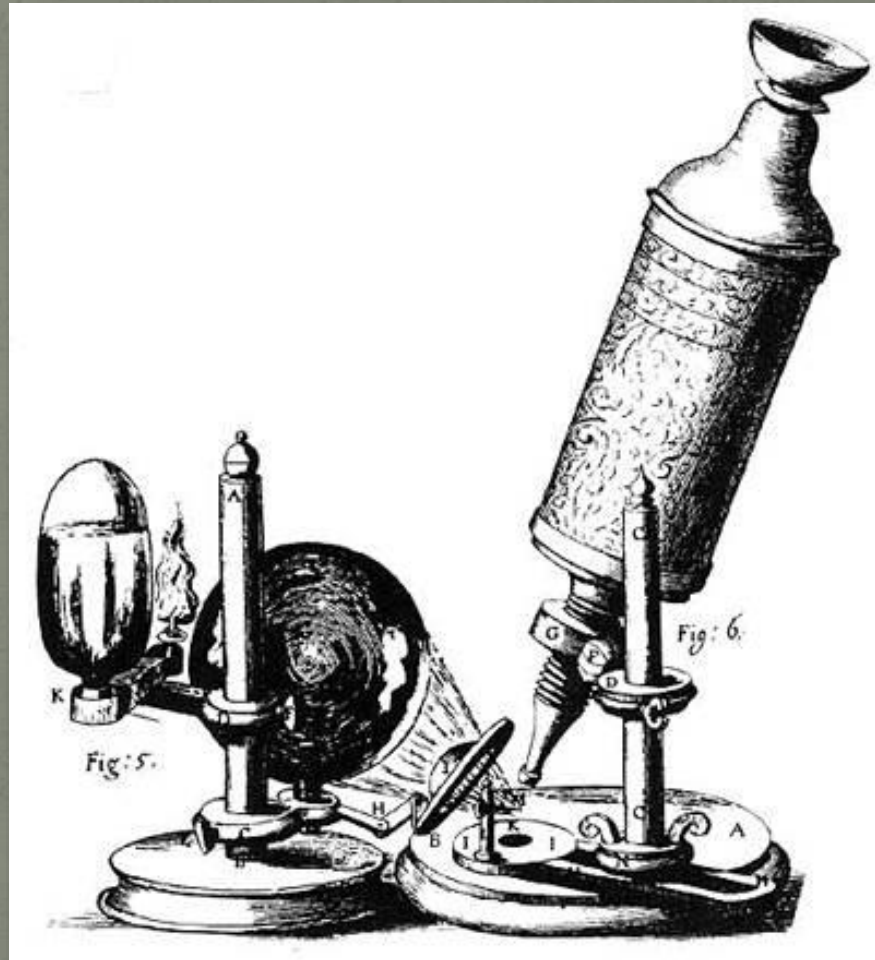


Illustration of a flea
Robert Hooke's *Micrographia* (1665).

