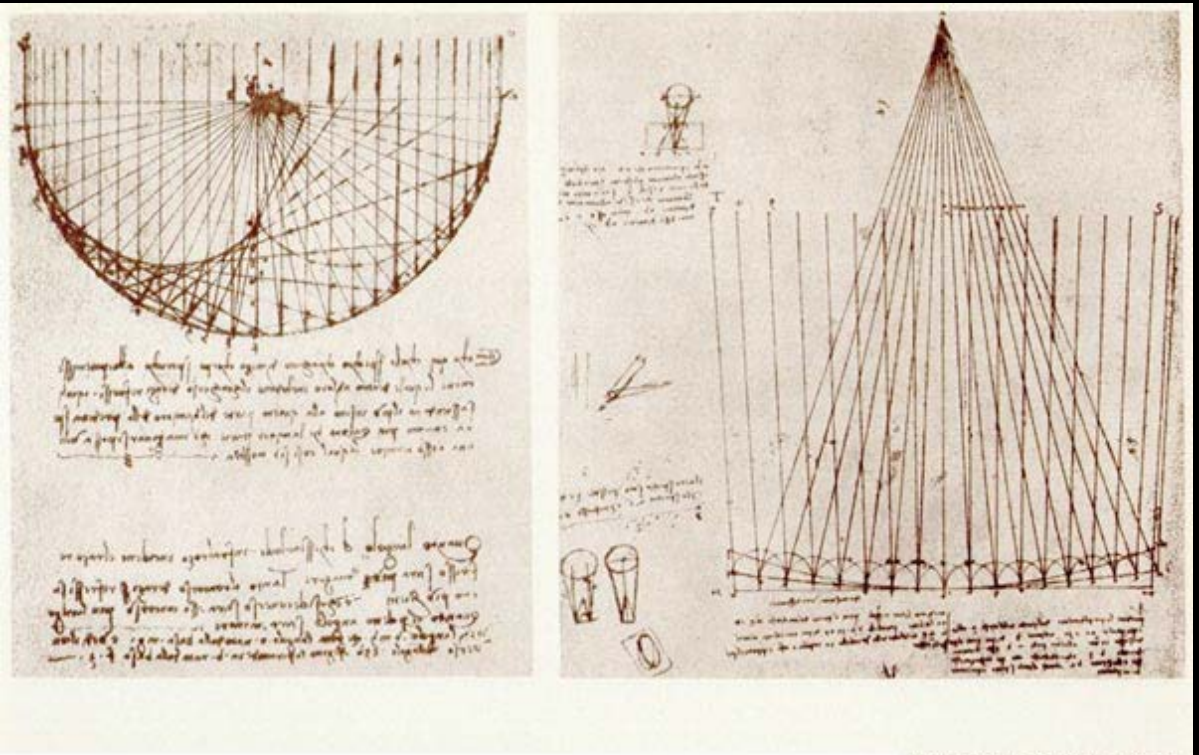
AHST 2331-001 (20045)
Understanding Art
Dr. Charissa N. Terranova
Tuesdays and Thursdays 11:30-12:45
ATC 1.102

Tuesday February 21

Optics, Lenses, and Prosthetic Vision: Iraq, Egypt, China, The Netherlands, Italy and England

Extensions of the Senses and/or Prosthetic Extensions: The great Canadian media theorist Marshall McLuhan used the word “extension” to describe various technological media, ranging from writing and moveable print-type to film and the automobile to photography and the computer. This class explores how such technological extensions function as prosthetics which enhance the capabilities of the basic human body.

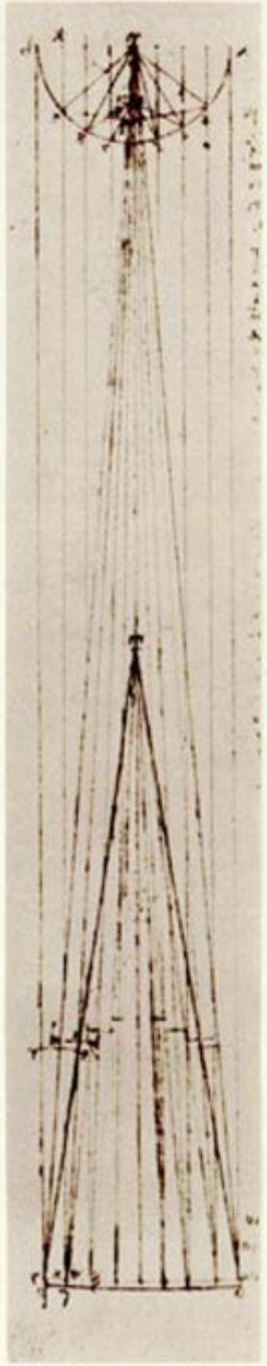
Optics: the scientific study of sight and the behavior of light, or the properties of transmission and deflection of other forms of radiation. Here we see figures from Leonardo da Vinci's surviving notebooks showing his interest in the optical properties of concave mirrors as well as in ways to use machines to replace skilled manual labor for their manufacture.



Leonardo da Vinci, ca. 1510–15

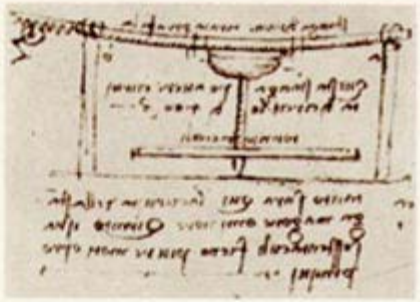
Left: Reflection of light in spherical concave mirror – Cod. Arund., fol. 87 r

Right: Paths of light rays in parabolic mirror – Cod. Atl., fol. 248 v-a

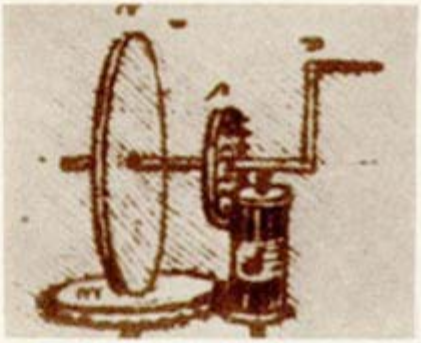


Leonardo's study made on spherical aberrations of mirrors – Cod. Arund., fol. 86 v

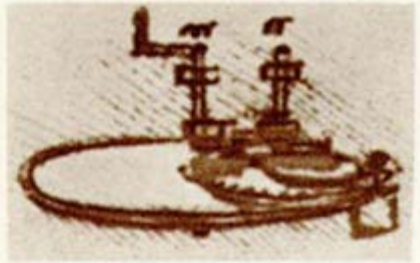
Leonardo da Vinci
ca. 1510–15



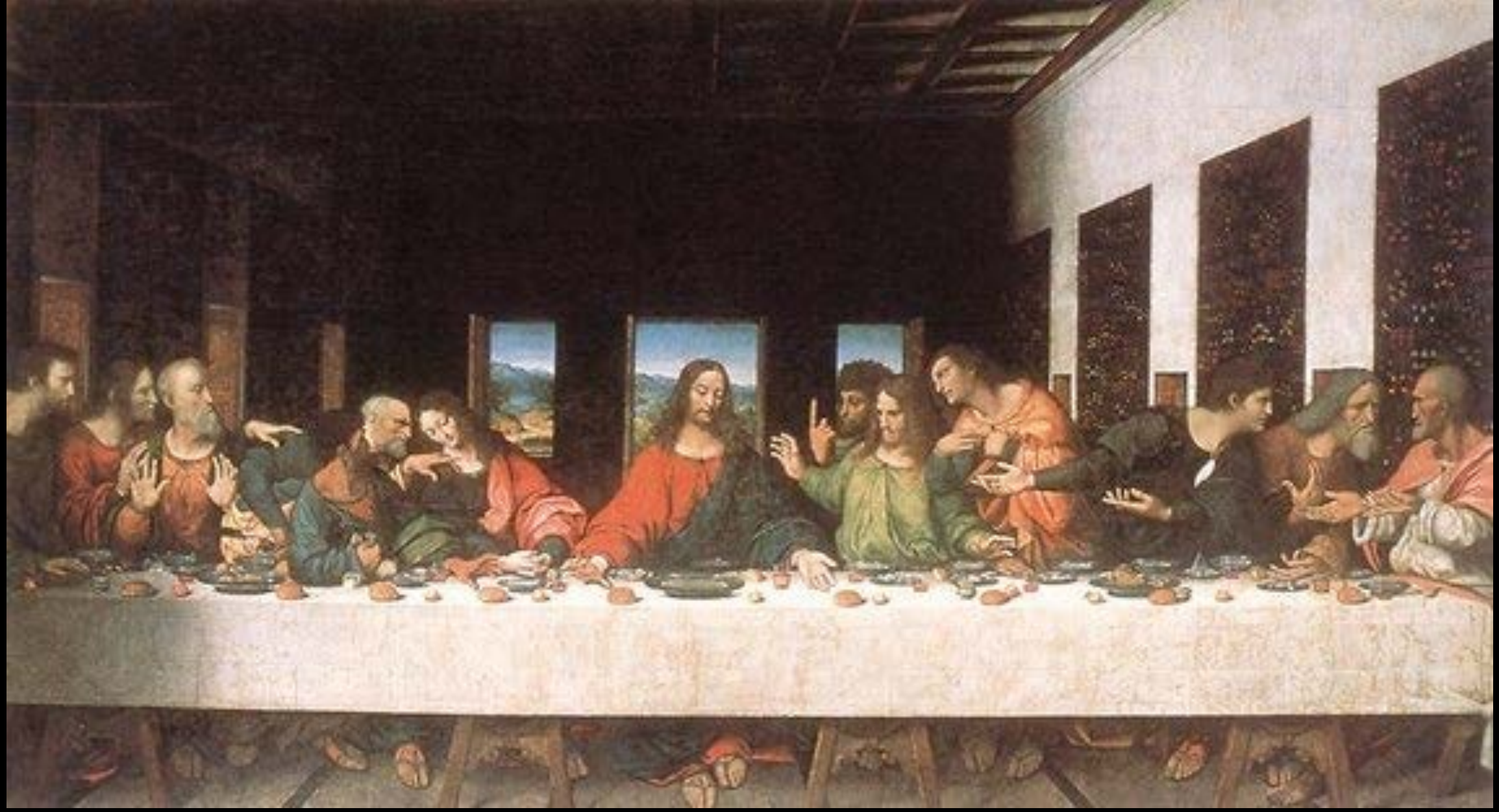
Potter's wheel for making mirrors with large focal length – Cod. Arund., fol. 84 v



Machine for grinding concave mirrors with large radius of curvature – Cod. Atl., fol. 396 v-f



Machine for grinding mirrors – Cod. Atl., fol. 396 v-f



Leonardo da Vinci, The Last Supper, 1520

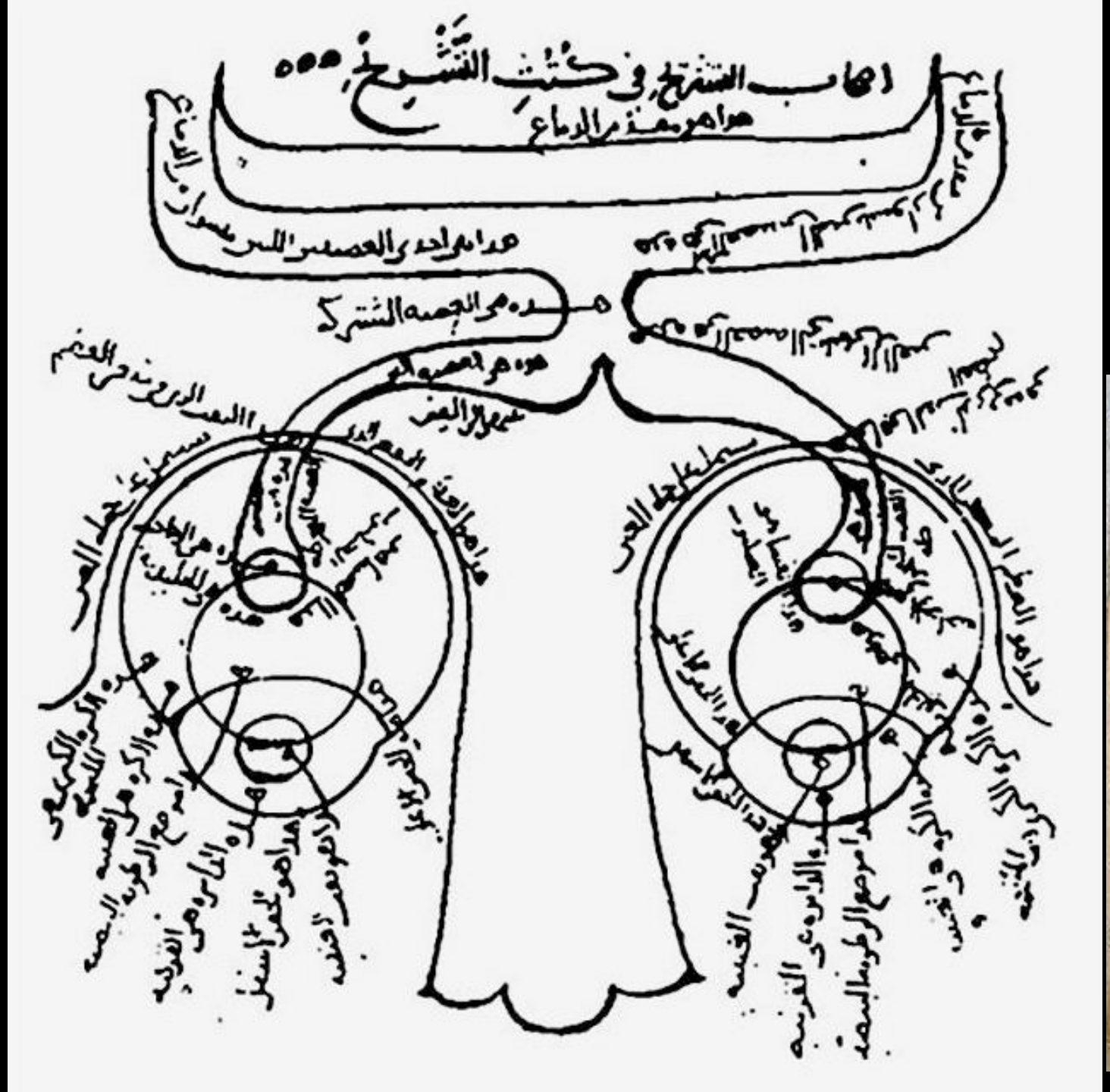
Nimrud/Layard Lens, 750-710 BCE, Assyrian palace of Nimrud, modern Iraq

Oval rock-crystal inlay: ground and polished, with one plane and one slightly convex face. It has been regarded as an optical lens but would have been of little or no practical use. When it was found by Layard this oval piece of ground quartz or rock crystal was immediately identified as a lens, and it has come to be known as the 'Nimrud lens'. It could certainly have been used as a crude magnifying glass, with a focal length of 12 centimetres from the plane surface. Over the years it has been examined by a number of opticians (e.g. Gasson 1972), many of whom believe that it was deliberately manufactured as a lens. However, although this piece of rock crystal has been carefully ground and polished, and undoubtedly has optical properties, these are probably accidental. There is no evidence that the Assyrians used lenses, either for magnification or for making fire, and it is much more likely that this is a piece of inlay, perhaps for furniture. This is supported by Layard's statement that this object 'was buried beneath a heap of fragments of beautiful blue opaque glass, apparently the enamel of some object in ivory or wood, which had perished' (Layard 1853: 198)*

*http://www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=369215&partId=1

Reading Stones

A **reading stone** was an approximately hemispherical lens that was placed on top of text to magnify the letters so that people with presbyopia could read it more easily. Reading stones were among the earliest common uses of lenses.

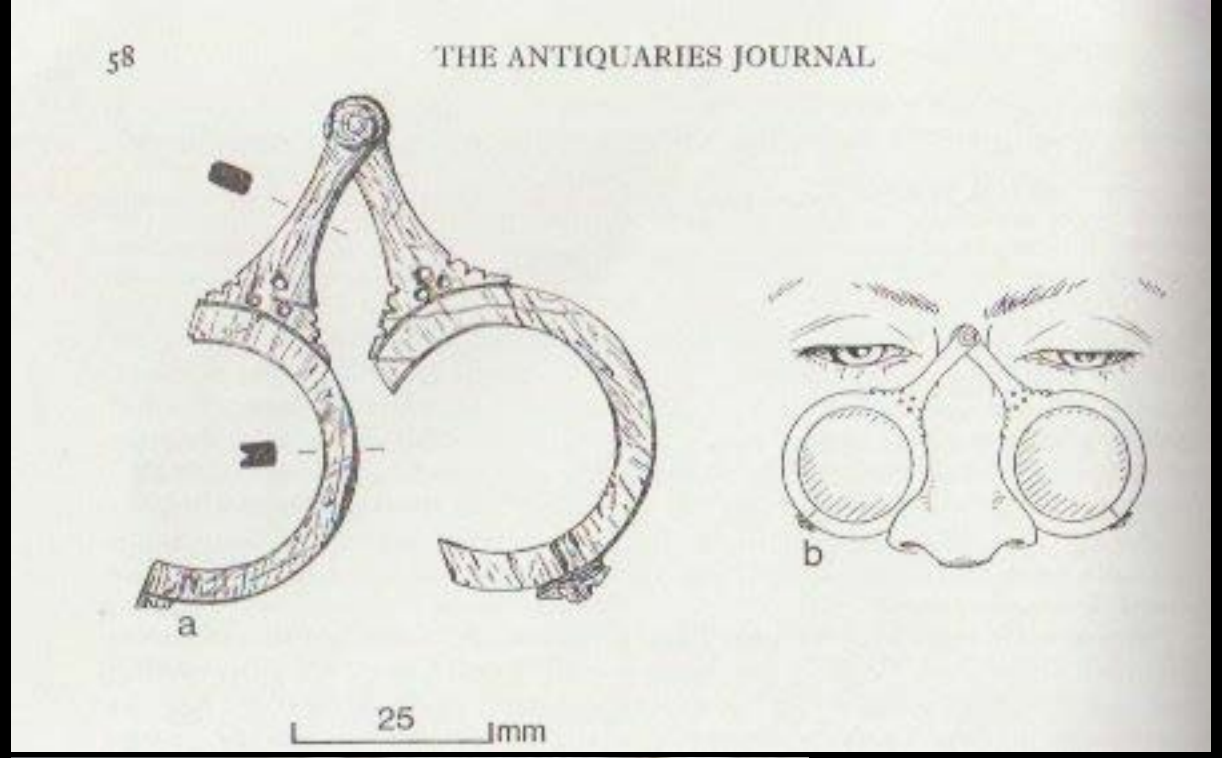


The use of a convex lens to create a magnified image is discussed in the Muslim scholar Alhazen's [Ibn al-Hatham in Egypt] 11th century *Book of Optics* (below), a seven-volume treatise translated from Arabic into Latin in the 12th century. On the left we see the visual system according to Ibn al-Hatham. The diagram shows two human eyes seen from above, the principal humors and the optic nerves connecting the eyeballs to the brain.

The use of a convex lens to form an enlarged or magnified image is discussed in Alhazen's *Book of Optics* (1021). Its translation into Latin from Arabic in the 12th century was instrumental to the invention of eyeglasses in 13th century Italy. By 1301, there were guild regulations in Venice governing the sale of eyeglasses.

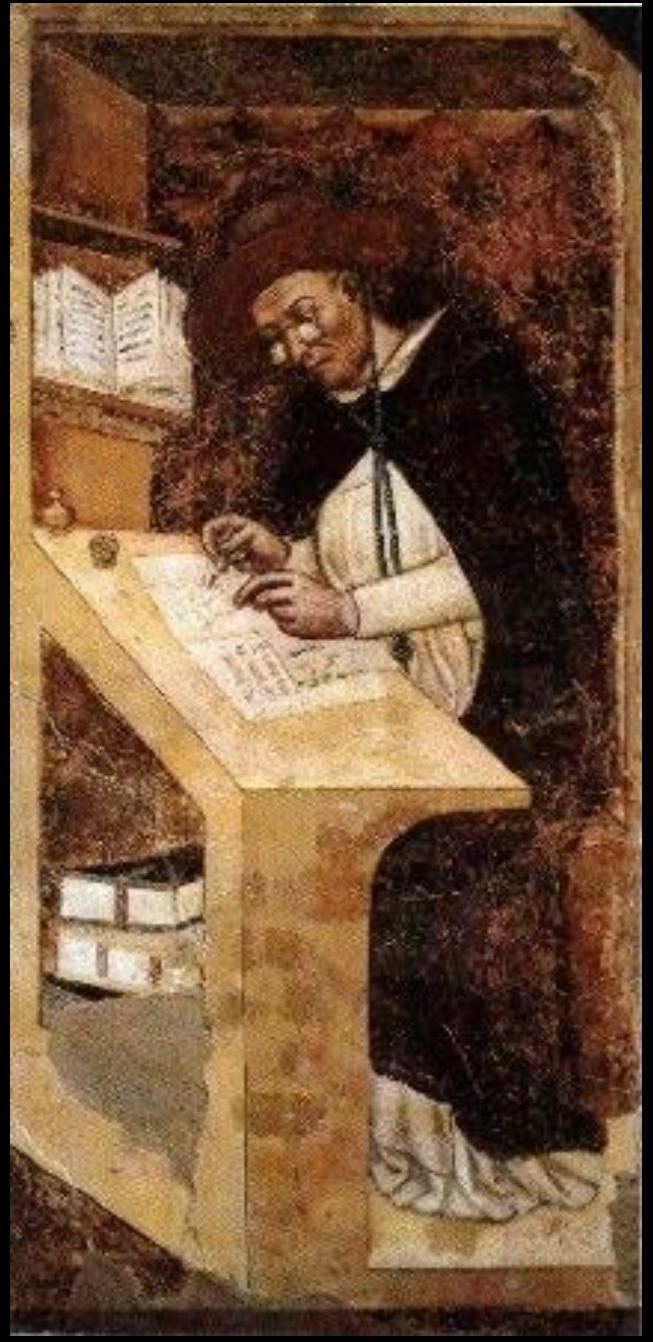
Portrait of Cardinal Fernando Niño de Guevara by El Greco circa 1600 shows glasses with temples passing over and beyond the ears.

Early frames for glasses consisted of two magnifying glasses riveted together by the handles so that they could grip the nose. These are referred to as "rivet spectacles."

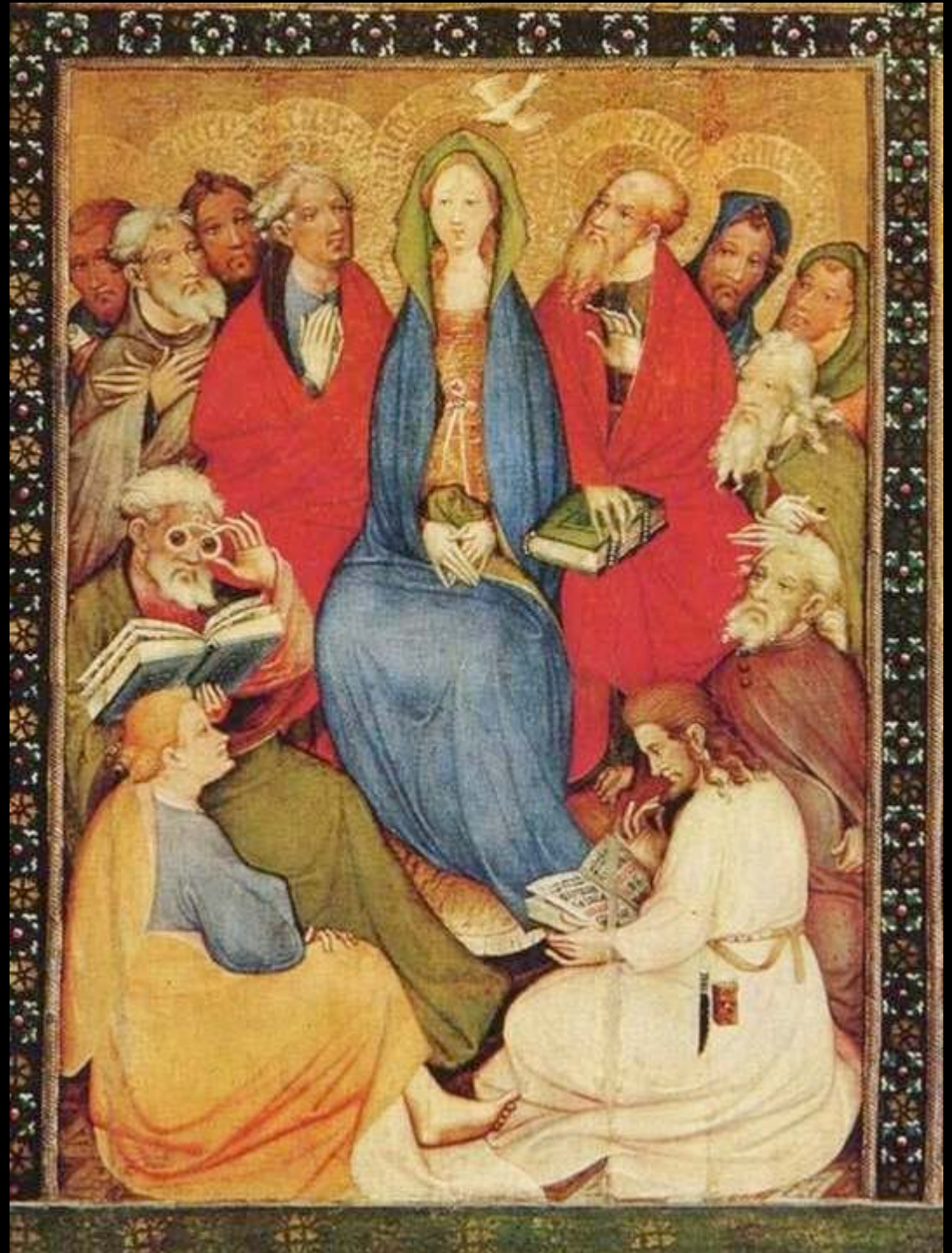


Above: rivet spectacles

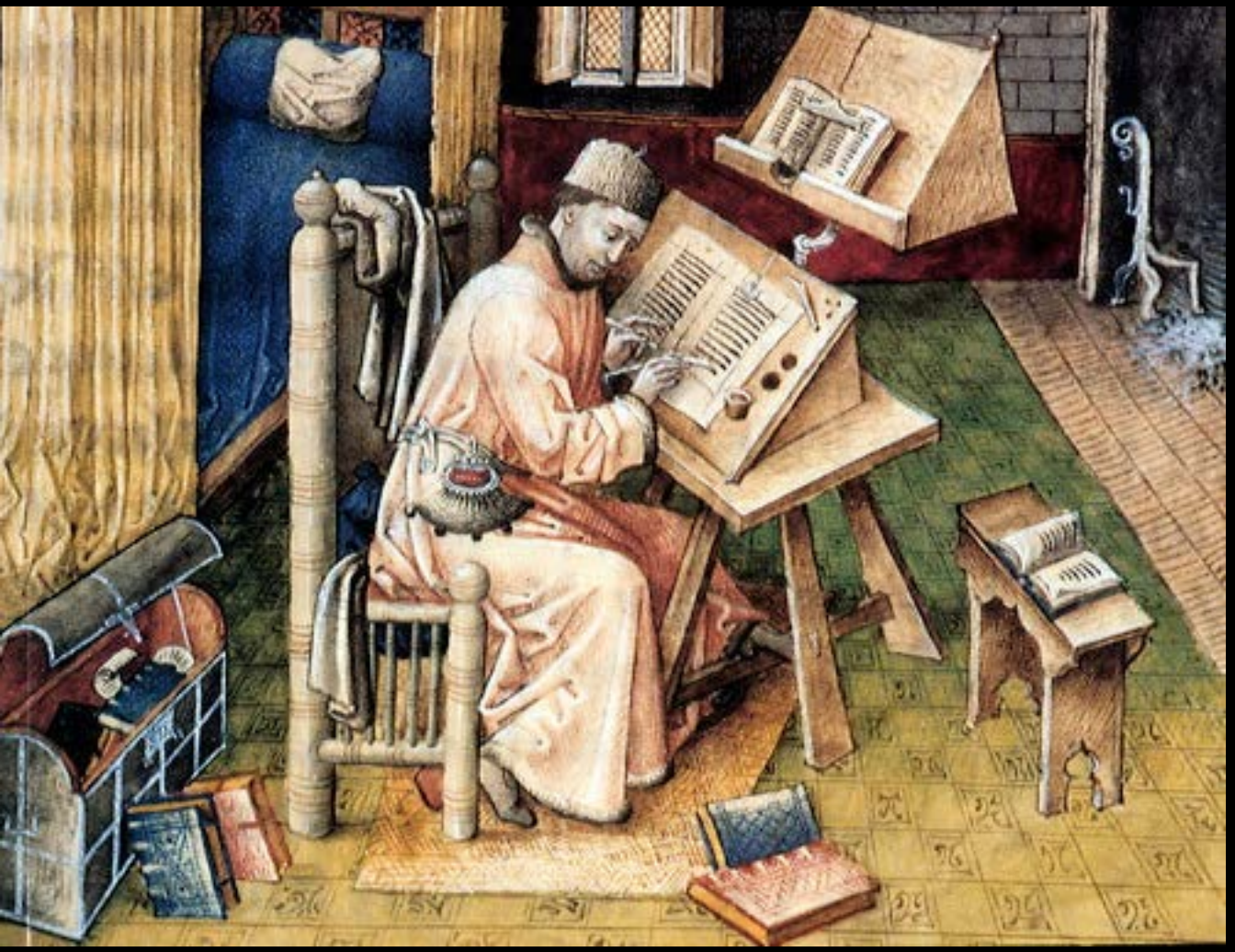
Bottom Left: corbel displayed high up in the church of St Martin, Salisbury in Wiltshire, England, 1430-1440



Tommaso da Modena, Portrait of Cardinal Hugh de Provence Reading in a Scriptorium, 1352

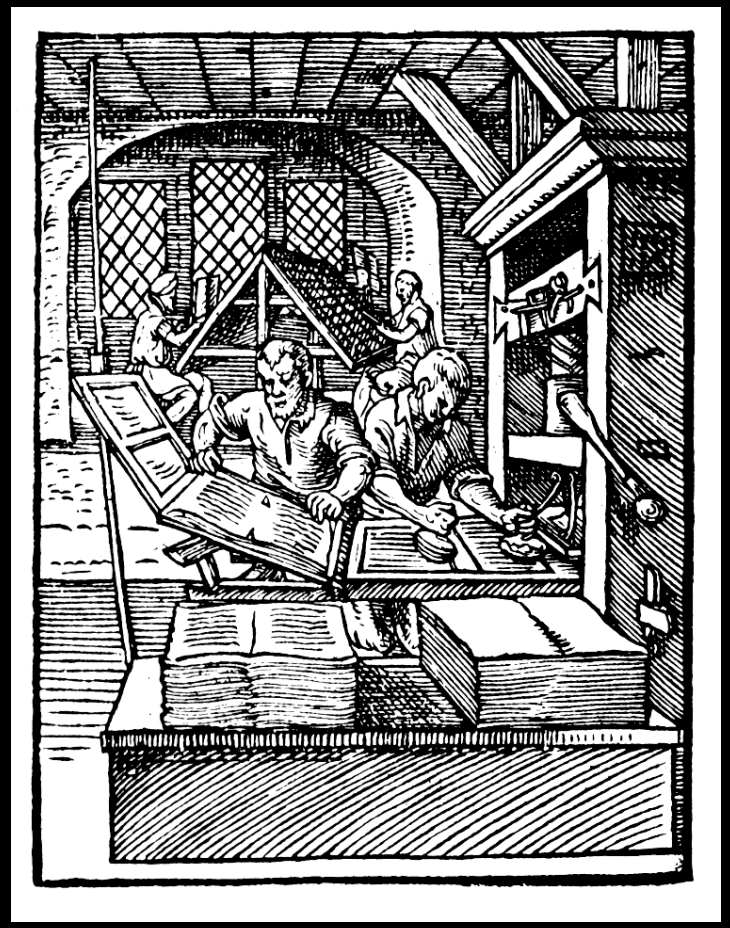


Left and Above: Conrad von Soest, Virgin Enthroned with bespectacled Apostle, 1403, in the Altarpiece of the church of Bad Wildungen, Germany



From hand-written texts to…

Movable print and the mechanized Gutenberg printing press 1450



Early wooden printing press, depicted in 1568. Such presses could produce up to 240 impressions per hour.

Johannes Gutenberg [1398-1468] An artist's visualization of Johannes Gutenberg in his workshop, showing his first proof sheet. Gutenberg conceptualized and then built the first print with movable type in 1450.

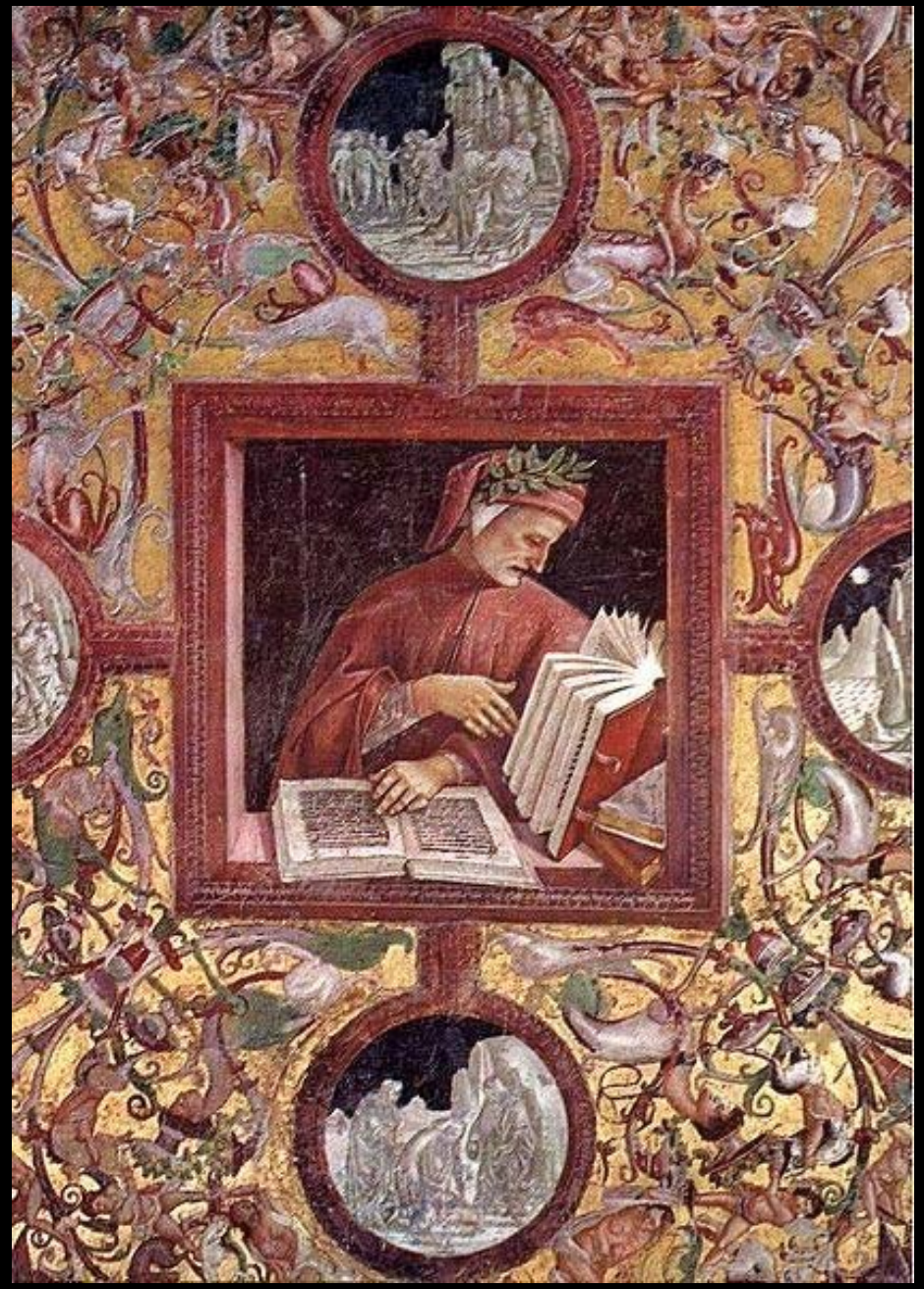
Movable type was a massive improvement of the handwritten manuscript and allowed for much faster production of printed materials. Movable type was also invented in China at approximately the same time that Gutenberg developed his invention. However, Gutenberg was instrumental in spreading its use across Europe and the World.

Gutenberg's major publication was a Bible, which is referred to as the *42-line Bible*, the *Mazarin Bible* or the *Gutenberg Bible*. The book first appeared in 1455, although it is thought to have undergone production starting in 1454, and there were approximately 180 copies produced, of which 21 complete copies still exist. The book set many of the printing standards for future publications and is still referenced for its quality in production and typography.

The rise of the vernacular in print

The *vernacular* is different from literary or official language: it's the way people really talk with each other, like how families talk at home.

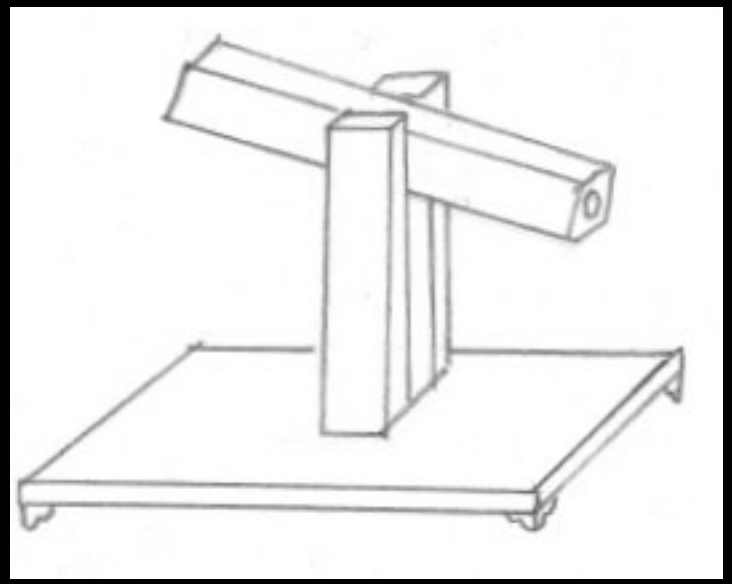
You know how some language is fancy and formal? Vernacular is different: think of it as how friends talk when no one is listening. Vernacular language includes slang and obscenities. One of the hardest things about writing for school is getting away from the vernacular and learning to write in more formal ways that don't come as naturally. You can also say specific groups have a vernacular, meaning the unique way people in a certain region or profession speak.



Dante Alighieri, detail from Luca Signorelli's fresco, Chapel of San Brizio, Orvieto Cathedral, 1500-1503; he was influential in establishing their Tuscan dialect as the most prominent literary language in all of Italy

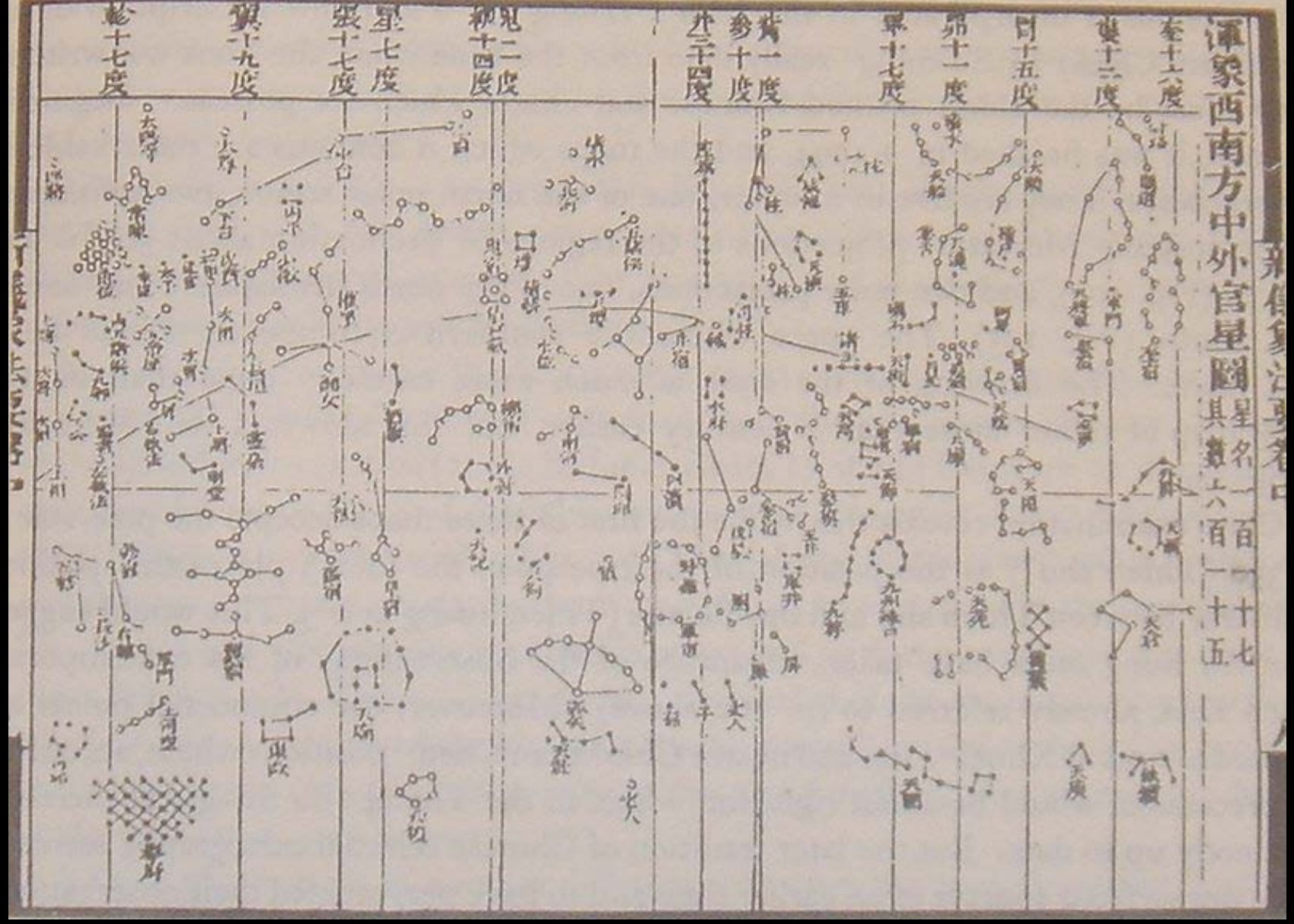
The well defined traditional groups of readers knew Latin, and many read it with ease and better than their own mother tongue. Books in the vernacular languages were for 'every man, as well rude as learned,' and the student of literacy and literary taste must be as much concerned with the 'rude' as with the learned. Latin, the language of the educated, was the international language throughout the Middle Ages; this fact is reflected by the book production. Slightly more than three-fourths of surviving incunables* are in Latin, the rest in different vernacular languages. Throughout the XVIth century the percentage of books in the vernacular increased, caused in part by the mounting concern of authors, printers and publishers with the 'rude' (men, women and children who were able or willing to read books in their own tongue, but not in Latin). It is also true that the importance of Latin as the language of communication among the learned declined, in spite of the revival of learning and increased concern with the classics and their style. Already during the first half of the XVIth century books in Latin and those in the vernacular languages were much more evenly distributed, and by the end of the XVIth century the latter accounted probably for more than half of the total production.

*An **incunable**, or sometimes incunabulum (plural **incunables** or incunabula, respectively), is a book, pamphlet, or broadside (such as the Almanach cracoviense ad annum 1474) that was printed—not handwritten—before the year 1501 in Europe.

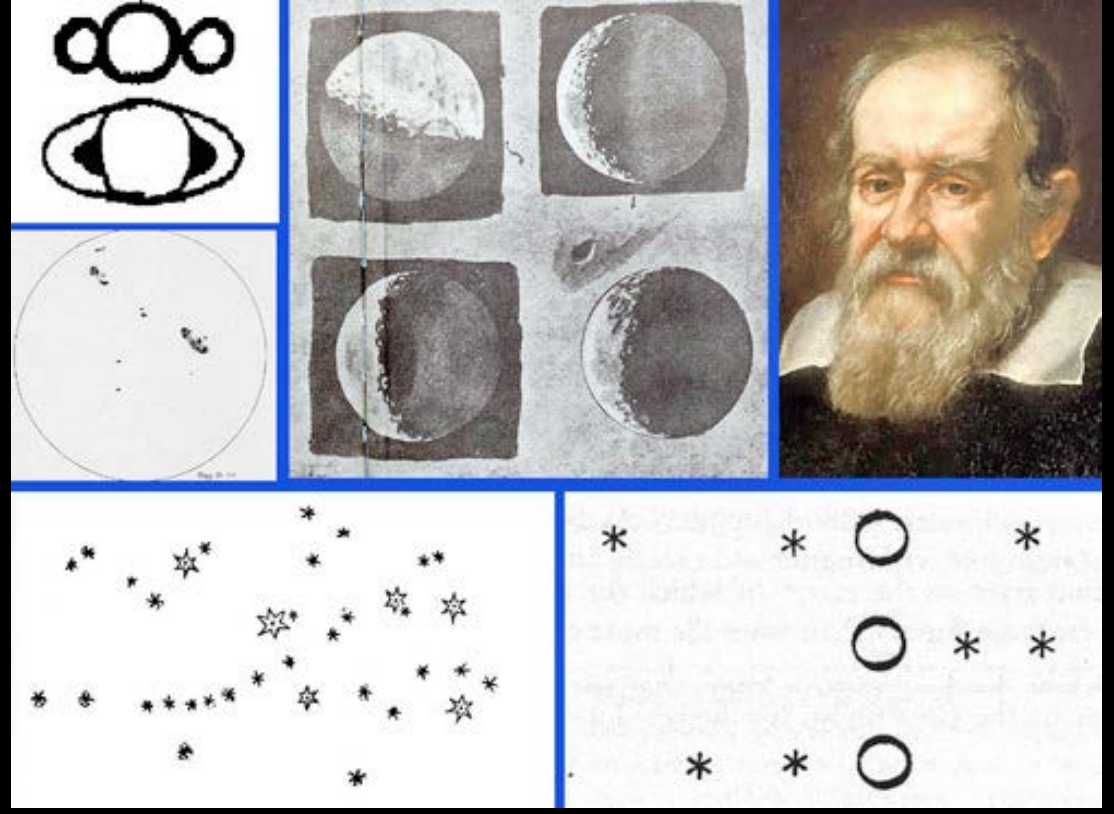


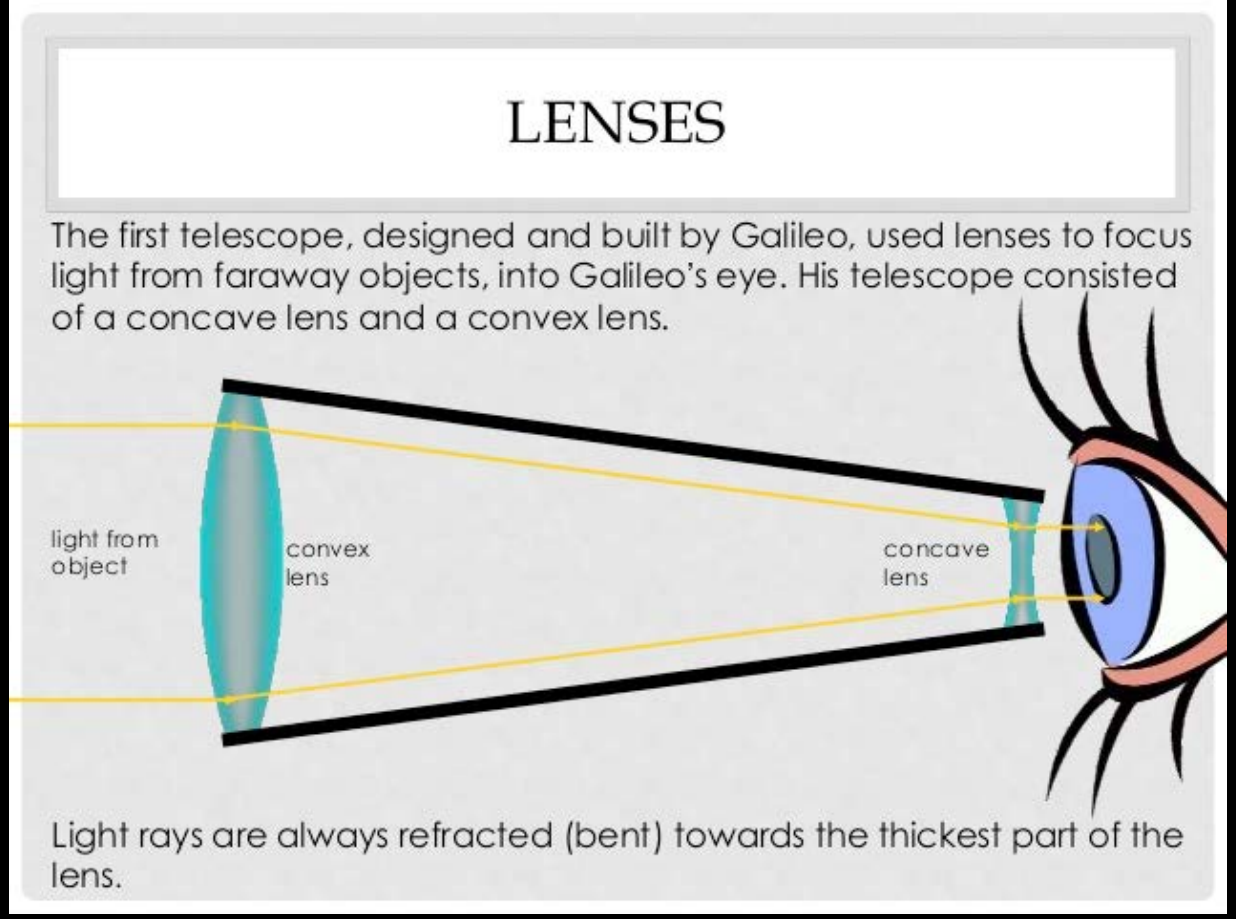
The ancient Chinese used instruments that look a lot like telescopes. These were sighting tubes and simply tubes that you could look through. They were somewhat effective in that they blocked out light around a viewer allowing them to see fainter objects and to better concentrate on a single object.

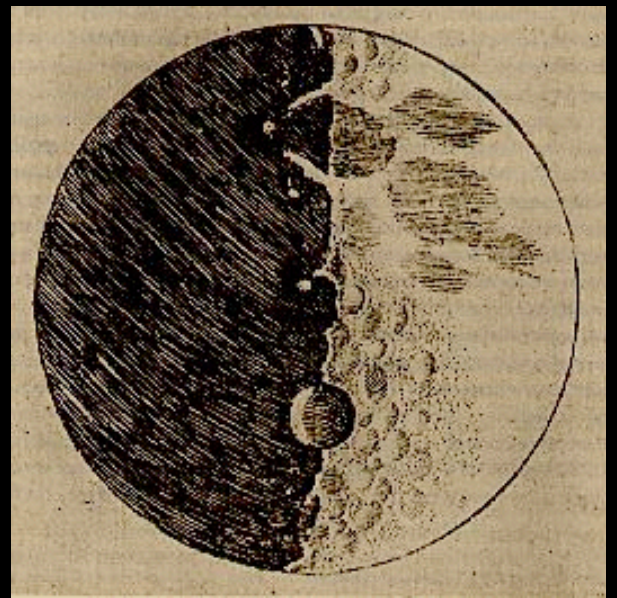
http://www.telescopenerd.com/telescope-astronomy-articles/ancient-chinese-astronomy.htm



Going back over 2,500 years, the Chinese were building observatories, and cataloging stars into maps and arrangements of constellations. The star map shown above dates back to the Song Dynasty [960-1279]. It was created by Su Song who was a Chinese scientist. This map was first published in 1092.

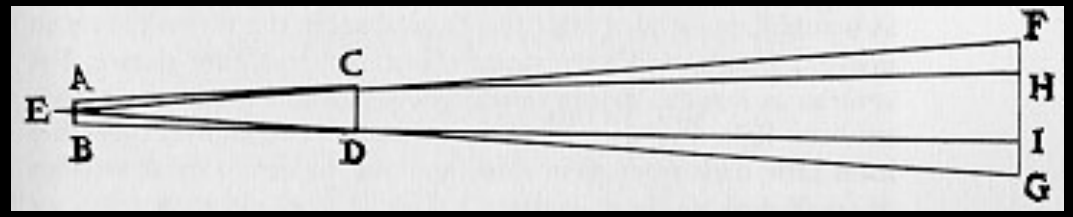






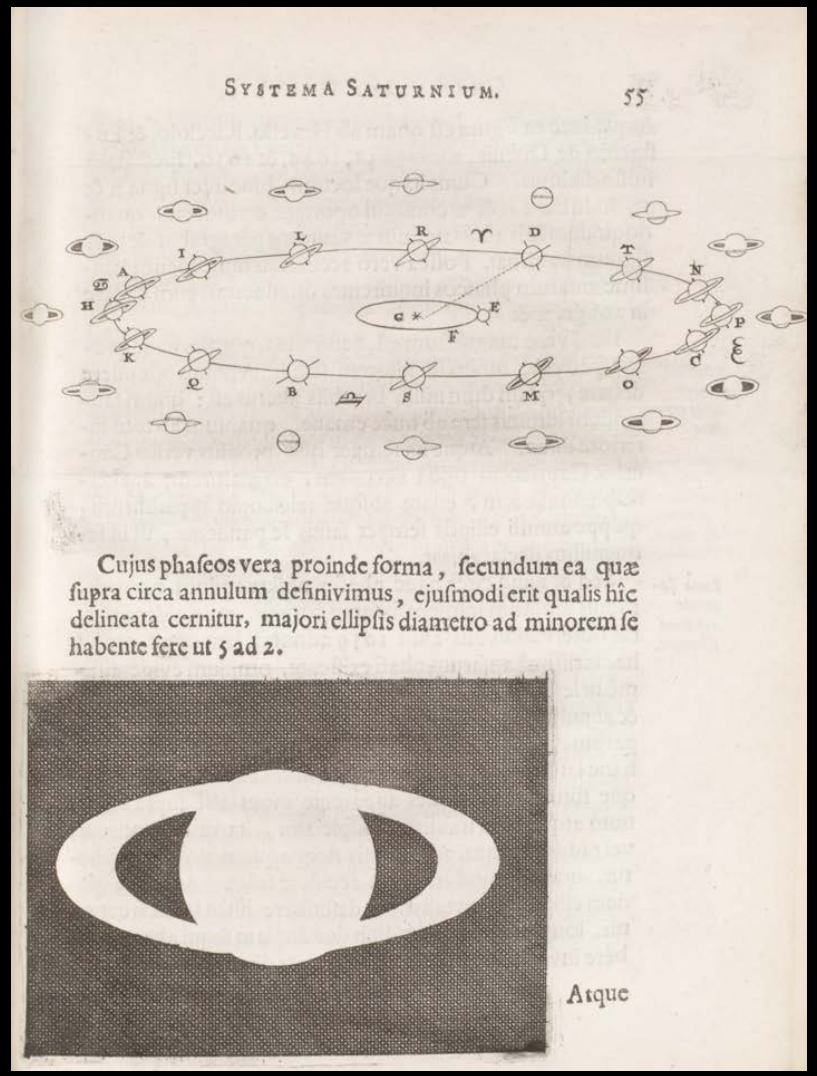
Galileo Galilei [1564-1642] did not invent the telescope. The Dutch, notably Christiaan Huygens, were the first to invent and experiment with lenses (to improve eye sight). But Galileo was the first to use the telescope to study the heavens systematically. His little telescope was poorer than even a cheap modern amateur telescope, but what he observed in the heavens rocked the very foundations of Aristotle's universe and the theological-philosophical worldview that it supported. It is said that what Galileo saw was so disturbing for some officials of the Church that they refused to even look through his telescope; they reasoned that the Devil was capable of making anything appear in the telescope, so it was best not to look through it. That is, the telescope was an instrument of the Devil. That such was so could be no clearer than the image of the moon as it appeared through Galileo's telescope.

http://homework.uoregon.edu/pub/class/301/galileo.html



Galileo's drawing of the optical path of his telescope

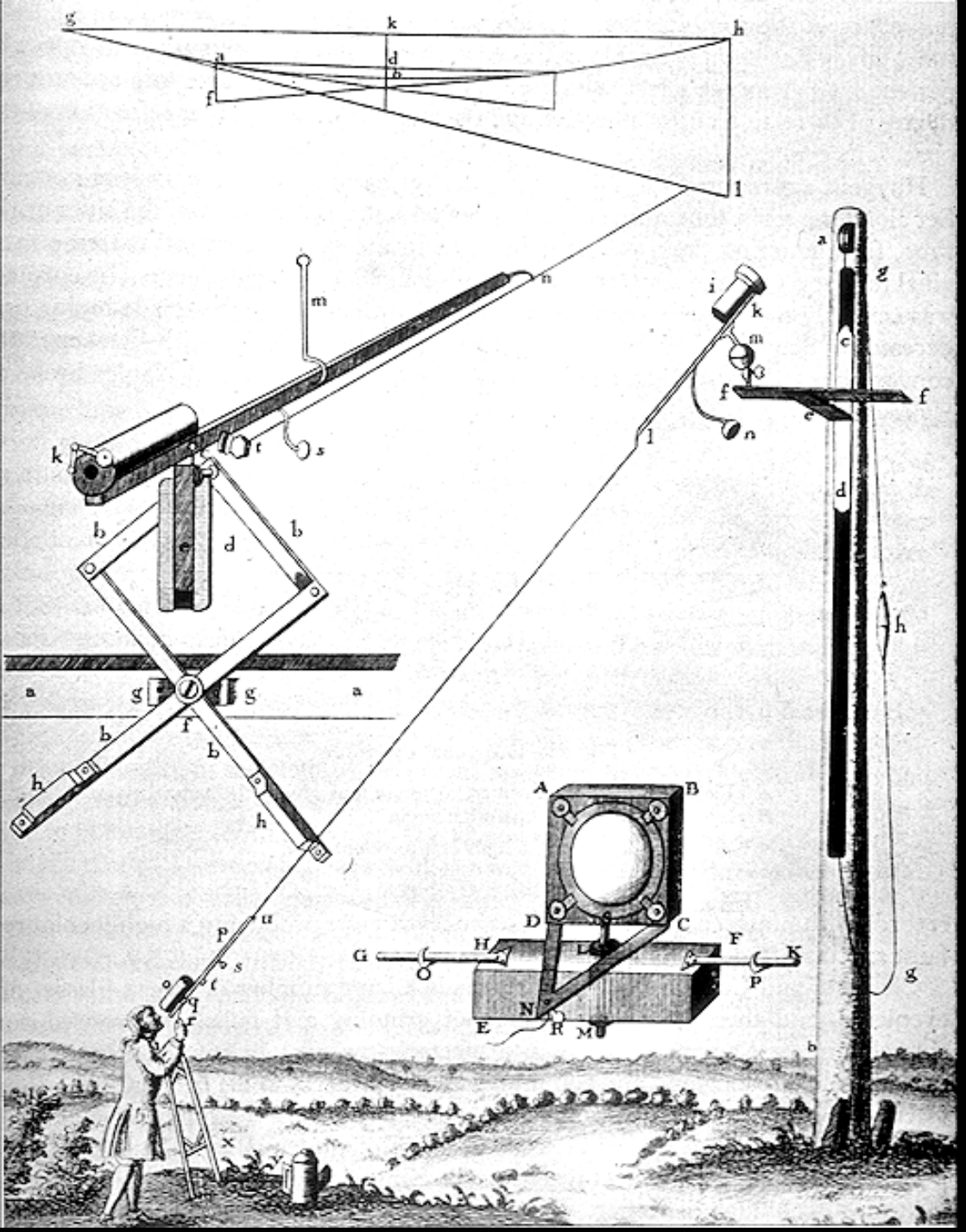
Galileo made his first telescope in 1609, modeled after telescopes produced in other parts of Europe that could magnify objects three times. He created a telescope later that same year that could magnify objects twenty times. With this telescope, he was able to look at the moon, discover the four satellites of Jupiter, observe a supernova, verify the phases of Venus, and discover sunspots. His discoveries proved the Copernican system which states that the earth and other planets revolve around the sun. Prior to the Copernican system, it was held that the universe was geocentric, meaning the sun revolved around the earth.

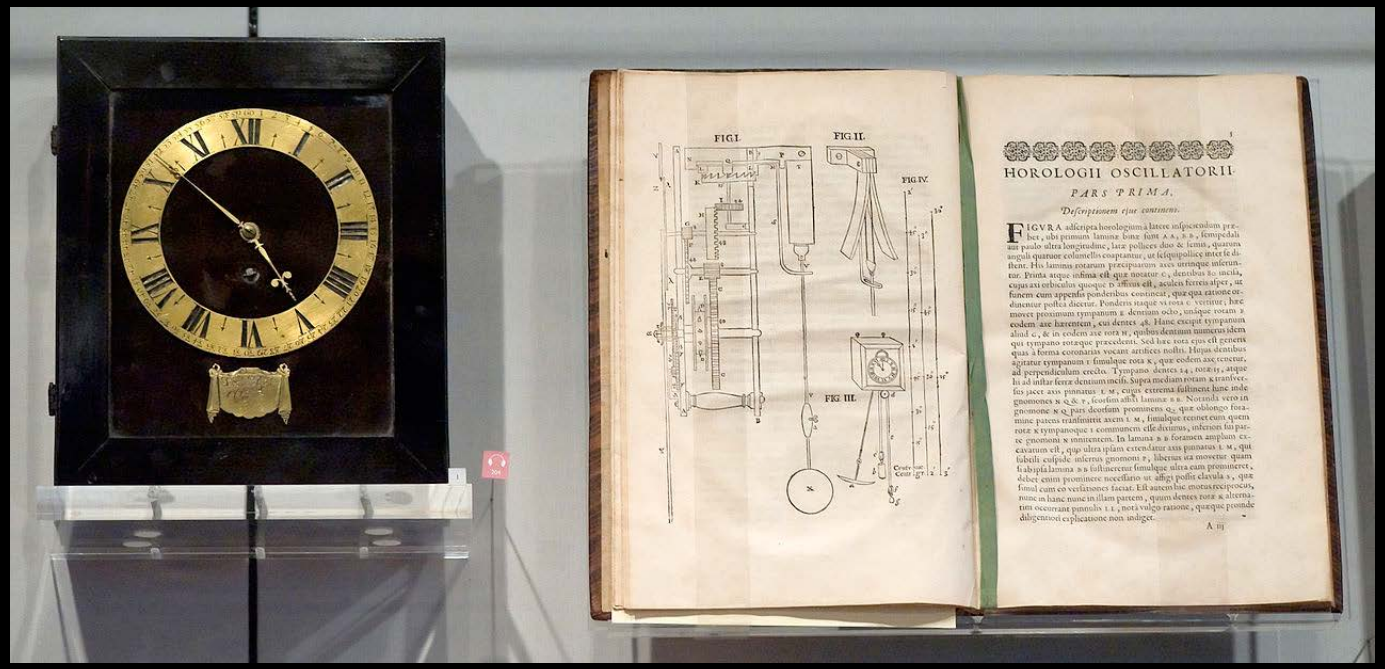


Huygens' explanation for the aspects of Saturn, Systema Saturnium, 1659

In 1655, the Dutchman Christiaan Huygens proposed that Saturn was surrounded by a solid ring, "a thin, flat ring, nowhere touching, and inclined to the ecliptic." Using a 50 power refracting telescope that he designed himself, Huygens also discovered the first of Saturn's moons, Titan. In the same year he observed and sketched the Orion Nebula. His drawing, the first such known of the Orion nebula, was published in *Systema Saturnium* in 1659. Using his modern telescope he succeeded in subdividing the nebula into different stars. The brighter interior now bears the name of the Huygenian region in his honor. He also discovered several interstellar nebulae and some double stars. Shortly before his death in 1695, Huygens completed *Cosmotheoros*, published posthumously in 1698. In it he speculated on the existence of extraterrestrial life, on other planets, which he imagined was similar to that on Earth.

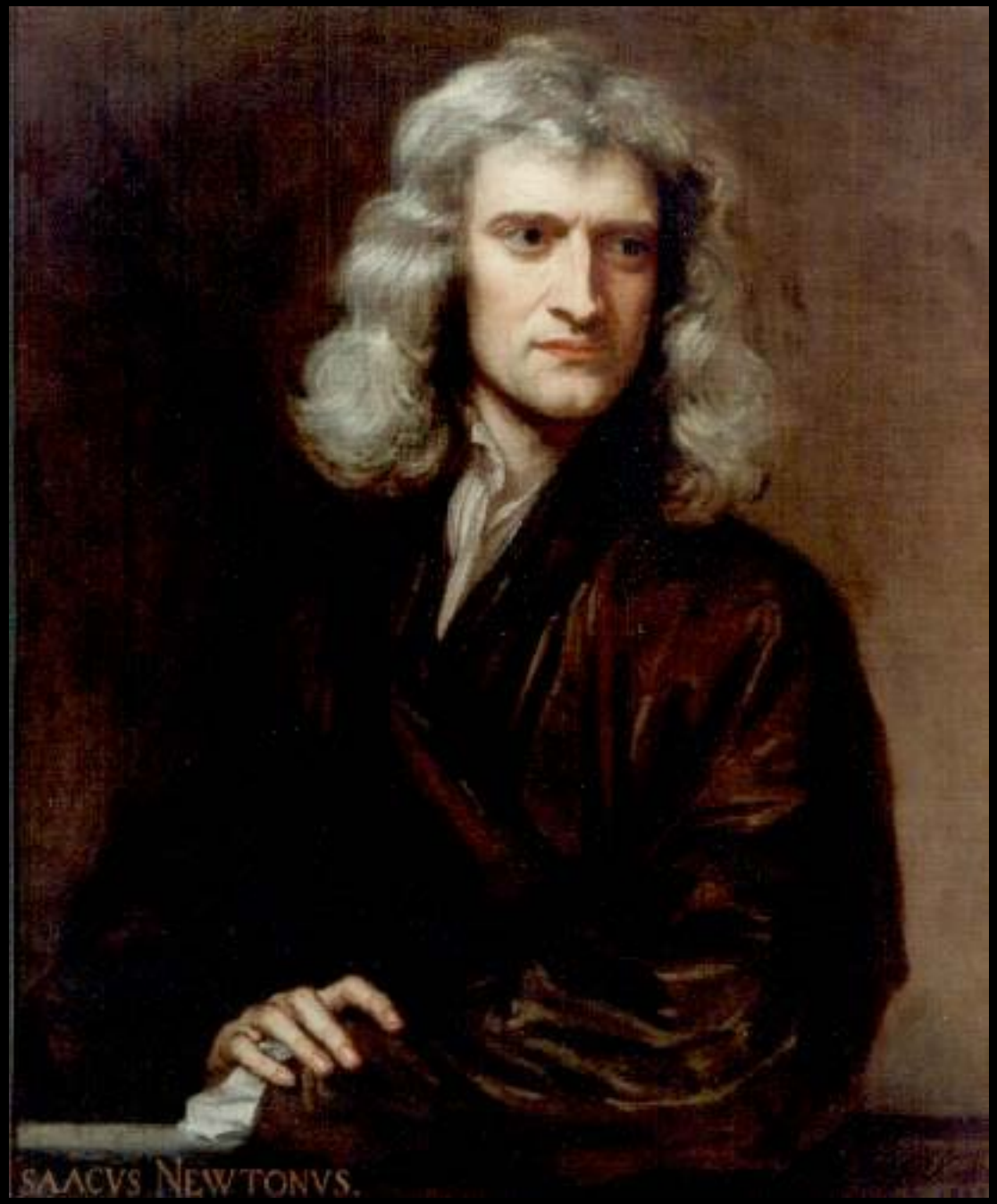
Christiaan Huygens [1629-1695]. Cut from the engraving following the painting of Caspart Netscher by G. Edelinck, between 1684 and 1687.





Above: Spring driven pendulum clock, designed by Huygens, built by instrument maker Salomon Coster (1657), and copy of the *Horologium Oscillatorium*

Left: An engraving of Christiaan Huygens's 210-foot aerial telescope showing the eyepiece and objective mounts and connecting string. The aerial telescope is a type of very long focal length refracting telescope, built in the second half of the 17th century, that did not use a tube. Instead, the objective* was mounted on a pole, tree, tower, building or other structure on a swivel ball-joint. The observer stood on the ground and held the eyepiece, which was connected to the objective by a string or connecting rod. By holding the string tight and maneuvering the eyepiece, the observer could aim the telescope at objects in the sky. the **objective** is the optical element that gathers light from the object being observed and focuses the light rays to produce a real image. Objectives can be a single lens or mirror, or combinations of several optical elements.

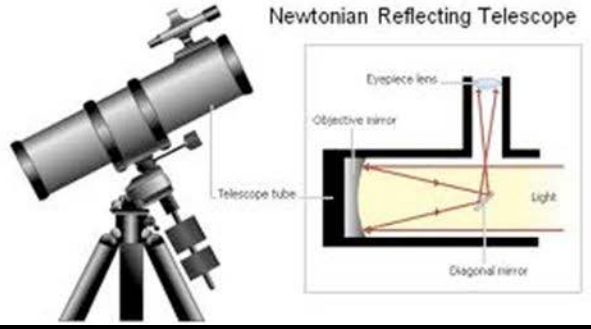


This is the earliest portrait of Sir Isaac Newton [1642-1727] to survive. It was painted in 1689 when Newton was in London as a member of the Convention Parliament, following the "Glorious Revolution" of 1688. The artist was Godfrey Kneller, perhaps the greatest portrait painter of his day.

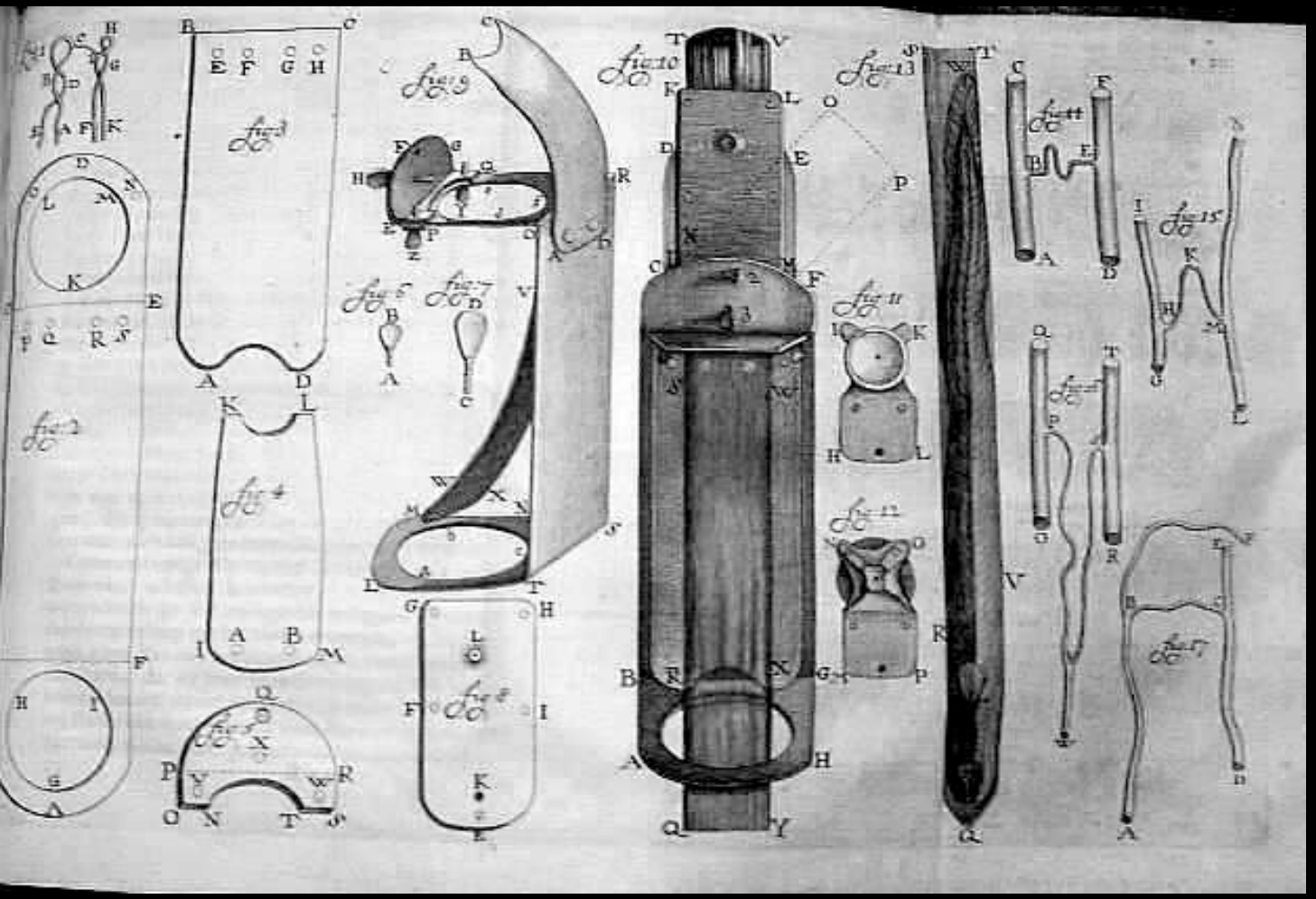
Newton was 46 years old and *Principia*, or *Mathematical Principles of Natural Philosophy*, had been published two years previously. It represents Newton "at the height of his powers."

Reflecting Telescope

- **Reflecting Telescopes** use a large concave mirror to gather light
  - The mirror collects light from distant objects and focuses the rays to form a *real* image
  - A *small* mirror inside the telescope reflects the image to the **eyepiece**
    - **The images you see are upside down**



Replica of Newton's second Reflecting Telescope that he presented to the Royal Society in 1672



Leeuwenhoek made more than 500 optical lenses. He also created at least 25 single-lens microscopes, of differing types, of which only nine have survived. These microscopes were made of silver or copper frames, holding hand-made lenses. Those that have survived are capable of magnification up to 275 times.

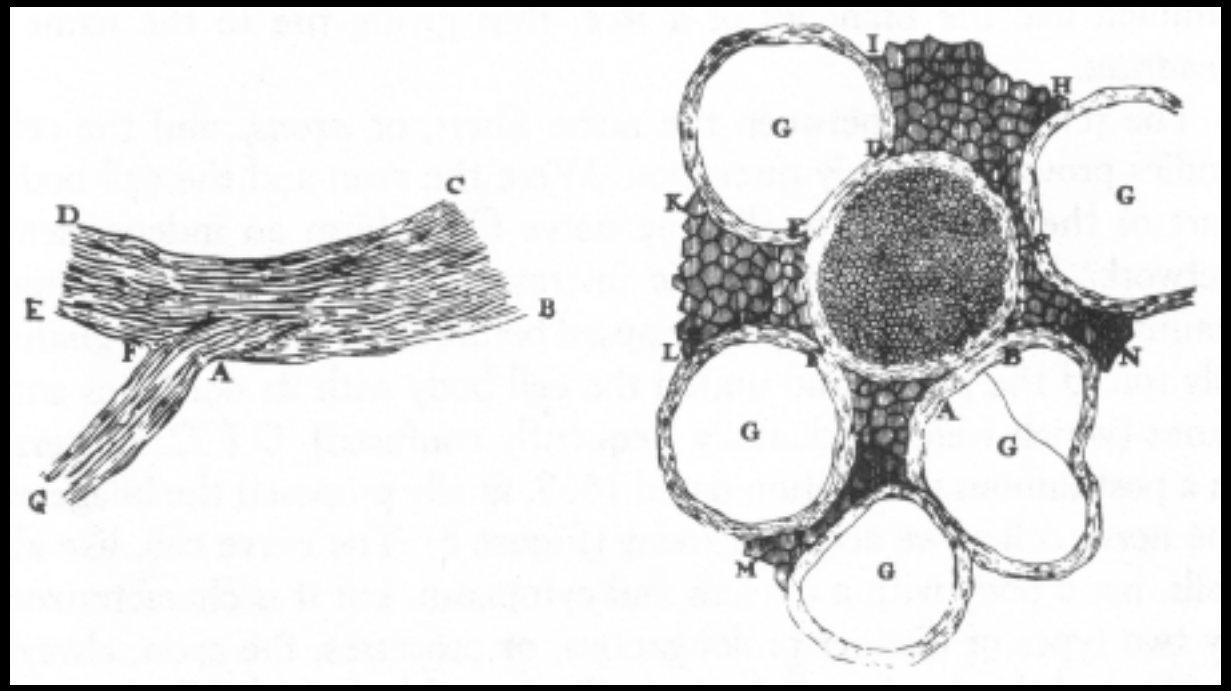
Anton van Leeuwenhoek [1632-1723]

Cell Theory

Anton van Leeuwenhoek (1632-1723)

Dutch microscopist

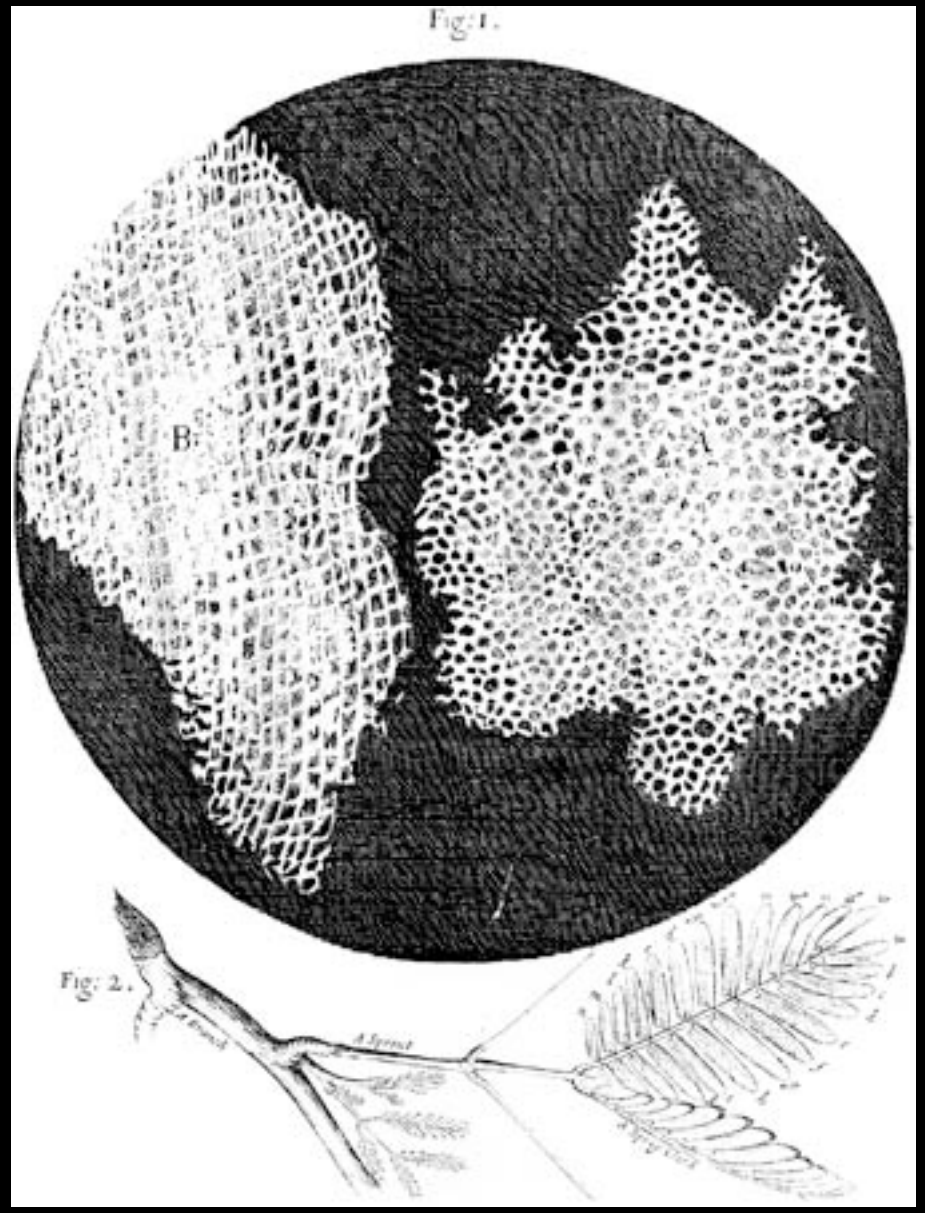
AKA: Antony van Leeuwenhoek was an unlikely scientist. Yet with skill, diligence, an endless curiosity, Leeuwenhoek succeeded in making some of the most important discoveries in the history of biology***. It was he who discovered bacteria in 1676***, his observations on the plaque between his own teeth, "a little white matter, which is as thick as if 'twere batter." He repeated these observations on two ladies (probably his own wife and daughter), and on two old men who had never cleaned their teeth in their lives. Leeuwenhoek found "an unbelievably great company of living ***animalcules***, These were among the first observations on living bacteria ever recorded. ***He observed and recorded living cells for the first time.***



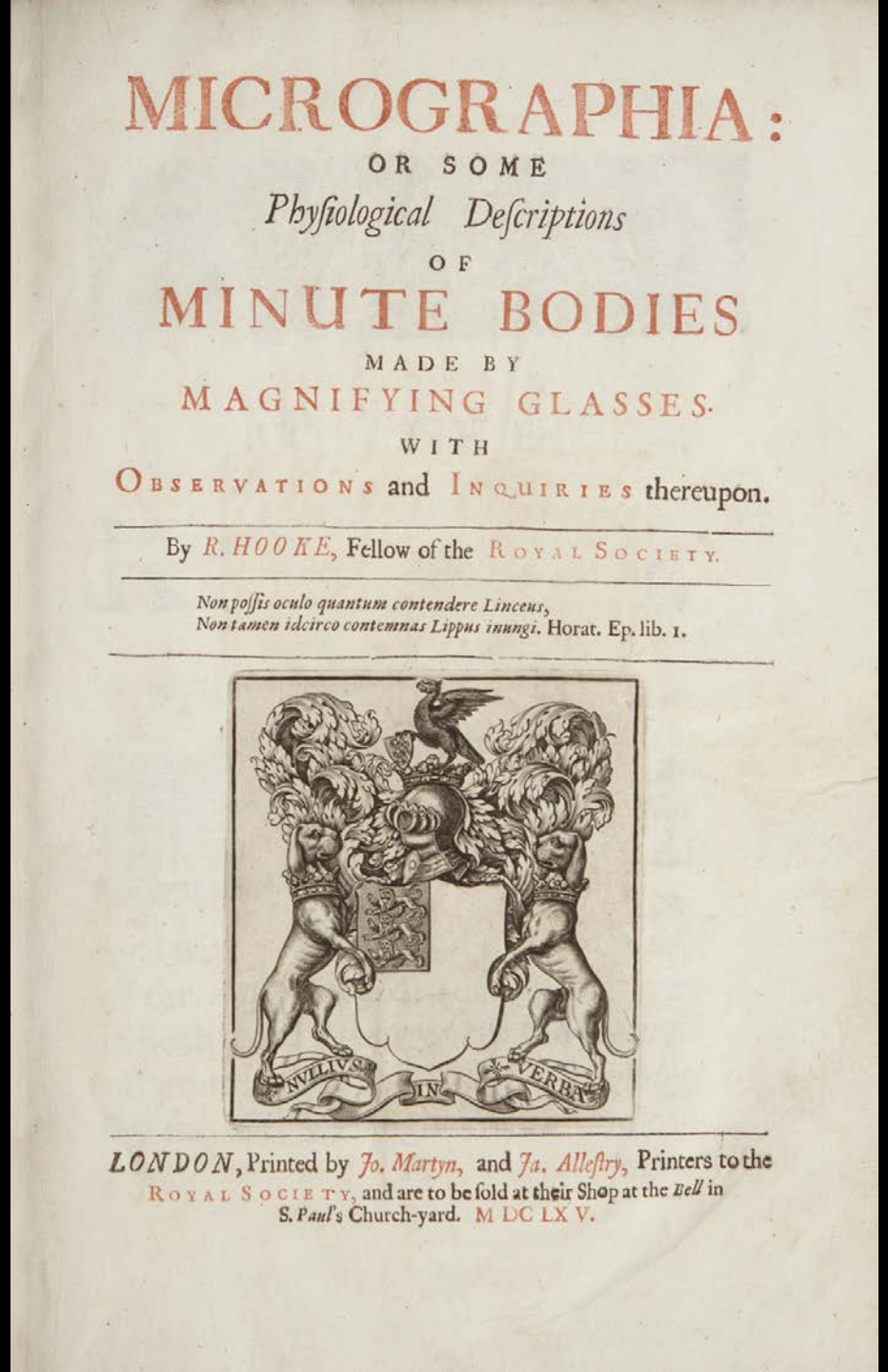
Drawings by van Leeuwenhoek in 1719, showing a longitudinal and a cross section of a nerve.

Red Blood Cells drawn by Leeuwenhoek in 1719

Robert Hooke (1635–1703)



Robert Hooke's drawings of the cellular structure of cork and a sprig of sensitive plant



MICROGRAPHIA:
OR SOME
Physiological Descriptions
OF
MINUTE BODIES
MADE BY
MAGNIFYING GLASSES.
WITH
OBSERVATIONS and INQUIRIES thereupon.

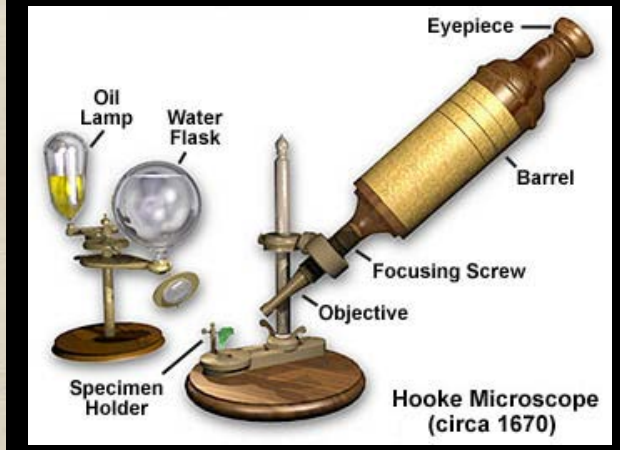
By *R. HOOKE*, Fellow of the ROYAL SOCIETY.

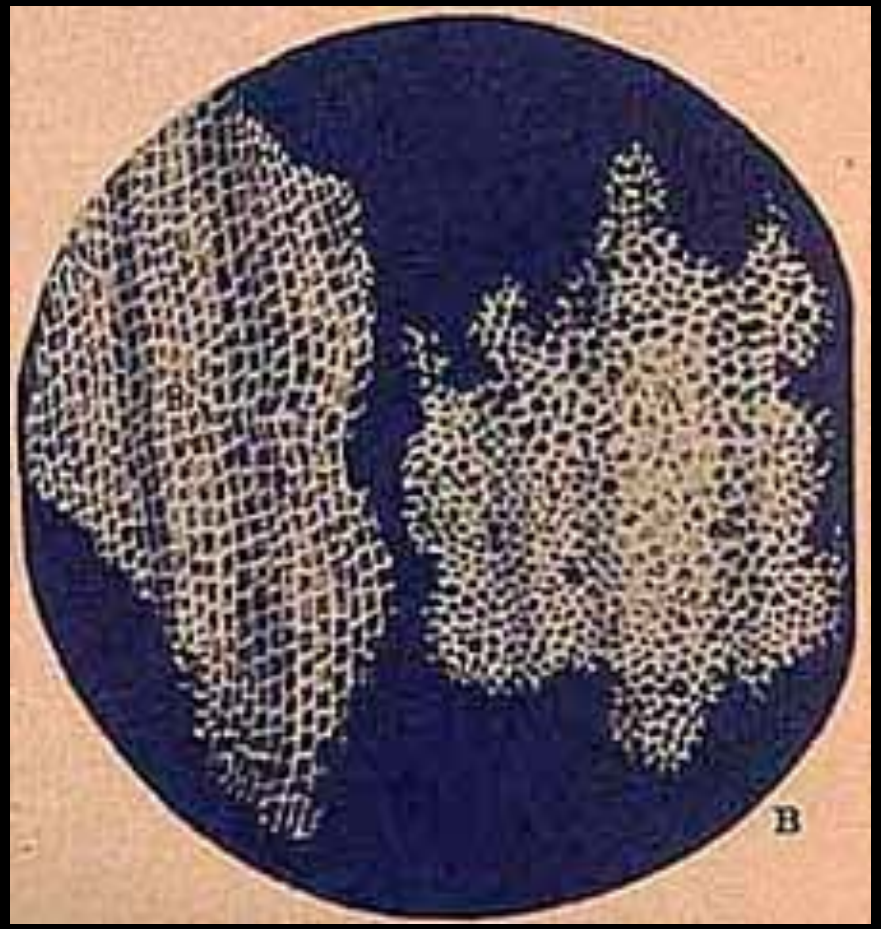
Non possis oculo quantum contendere Linceus,
Non tamen idcirco contemnas Lippus inungi. Horat. Ep. lib. 1.

NVLLIVS IN VERBA

LONDON, Printed by *Jo. Martyn*, and *Ja. Allestry*, Printers to the ROYAL SOCIETY, and are to be sold at their Shop at the *Bell* in S. *Paul's* Church-yard. M DC LX V.

Hooke coined the term *cell* for describing biological organisms, the term being suggested by the resemblance of plant cells to cells of a honeycomb.





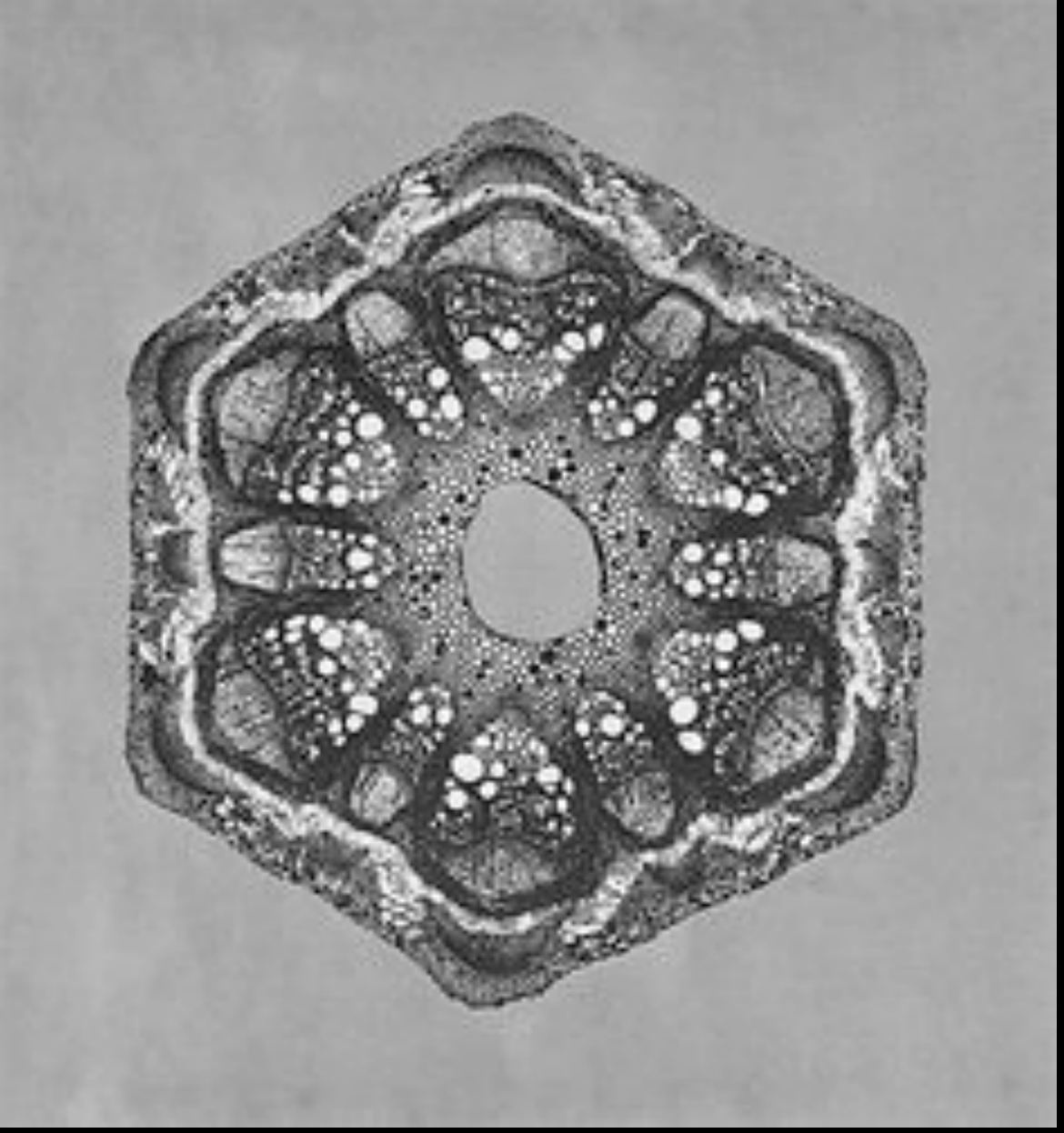
In "Observation XVIII" of the *Micrographia*, Hooke wrote:

. . . I could exceedingly plainly perceive it to be all perforated and porous, much like a Honey-comb, but that the pores of it were not regular. . . . these pores, or cells, . . . were indeed the first microscopical pores I ever saw, and perhaps, that were ever seen, for I had not met with any Writer or Person, that had made any mention of them before this. . .

Hooke had discovered plant cells -- more precisely, what Hooke saw were the cell walls in cork tissue. In fact, it was Hooke who coined the term "cells": the boxlike cells of cork reminded him of the cells of a monastery. Hooke also reported seeing similar structures in wood and in other plants. In 1678, after Leeuwenhoek had written to the Royal Society with a report of discovering "little animals" -- bacteria and protozoa -- Hooke was asked by the Society to confirm Leeuwenhoek's findings. He successfully did so, thus paving the way for the wide acceptance of Leeuwenhoek's discoveries. Hooke noted that Leeuwenhoek's simple microscopes gave clearer images than his compound microscope, but found simple microscopes difficult to use: he called them "offensive to my eye" and complained that they "much strained and weakened the sight."

BIOLOGY IN ART and BIOART
MODERN AND CONTEMPORARY ART

Above: Wassily Kandinsky, Réciproque, 1942-44
Left: Wassily Kandinsky, Variegated Black, 1935



Photomicrograph of a cross section of a twig, from *Structures in Art and in Science* in the *Vision + Value Series,* ed. by György Kepes (1965)

Bacterial Sublime

Cellular Sublime

Scientific Sublime

Anna Dumitriu, “Engineered Antibody,” 21 amino acids, polymer clay, Coomassie Brilliant Blue dye, jewellery wire, cotton calico, vintage tatted linen lace, silk, and embroidery, Based on research by Liu Lab member Xiang Li. 2015-2016

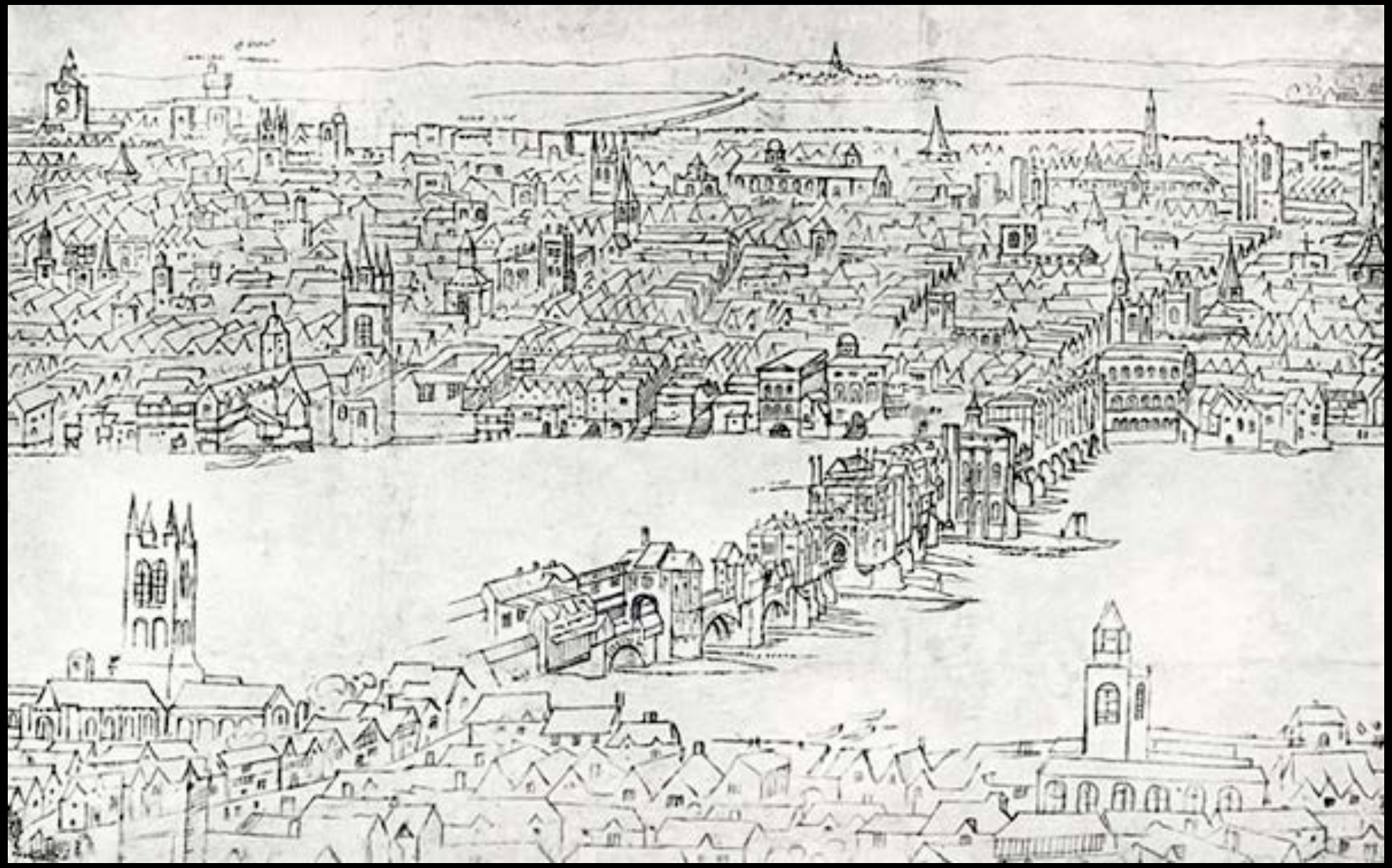
The shapes and forms of Dumitriu’s work elicit meaning within and beyond gender. The artist-scientist collaboration at work in all three pieces embodies an equally if not more powerful meaning-maker than sexual categories, even while the presence of Dumitriu – a woman *and* artist – in the lab is a resounding, even revolutionary, symbol of open frontiers and progressive thinking. A result of her residency working with researchers in the Liu Lab for Synthetic Evolution at the University of California Irvine, Dumitriu’s “Engineered Antibody” plays on the metaphor that amino acids are the “beads of life:” the idea that scientists enlist to describe structures of proteins constructed from chains of amino acids. The work is a necklace made up of 452 handmade beads containing the actual 21 amino acids of an antibody purified from the blood of an HIV positive patient.

Robert Hooke (1635-1703)
English natural philosopher, architect and polymath. English natural philosopher, architect and polymath, Surveyor for the City of London after the fire of 1666

Christopher Wren (1632-1723)
English polymath, architect, King's Surveyor for the City of London after the fire of 1666


0 10 20 30 40 50 Miles
0 20 40 60 80 Kms
Principal road
Other main road
Urban area
Major City
Large City
City
Large Town
Town
Small Town
SCOTLAND
England
Wales
North Sea
English Channel
Glasgow
Edinburgh
Liverpool
Manchester
Birmingham
London
Bristol
Leeds
Sheffield
Newcastle-upon-Tyne
Cardiff
Swansea
Plymouth
©itaveluk.co.uk

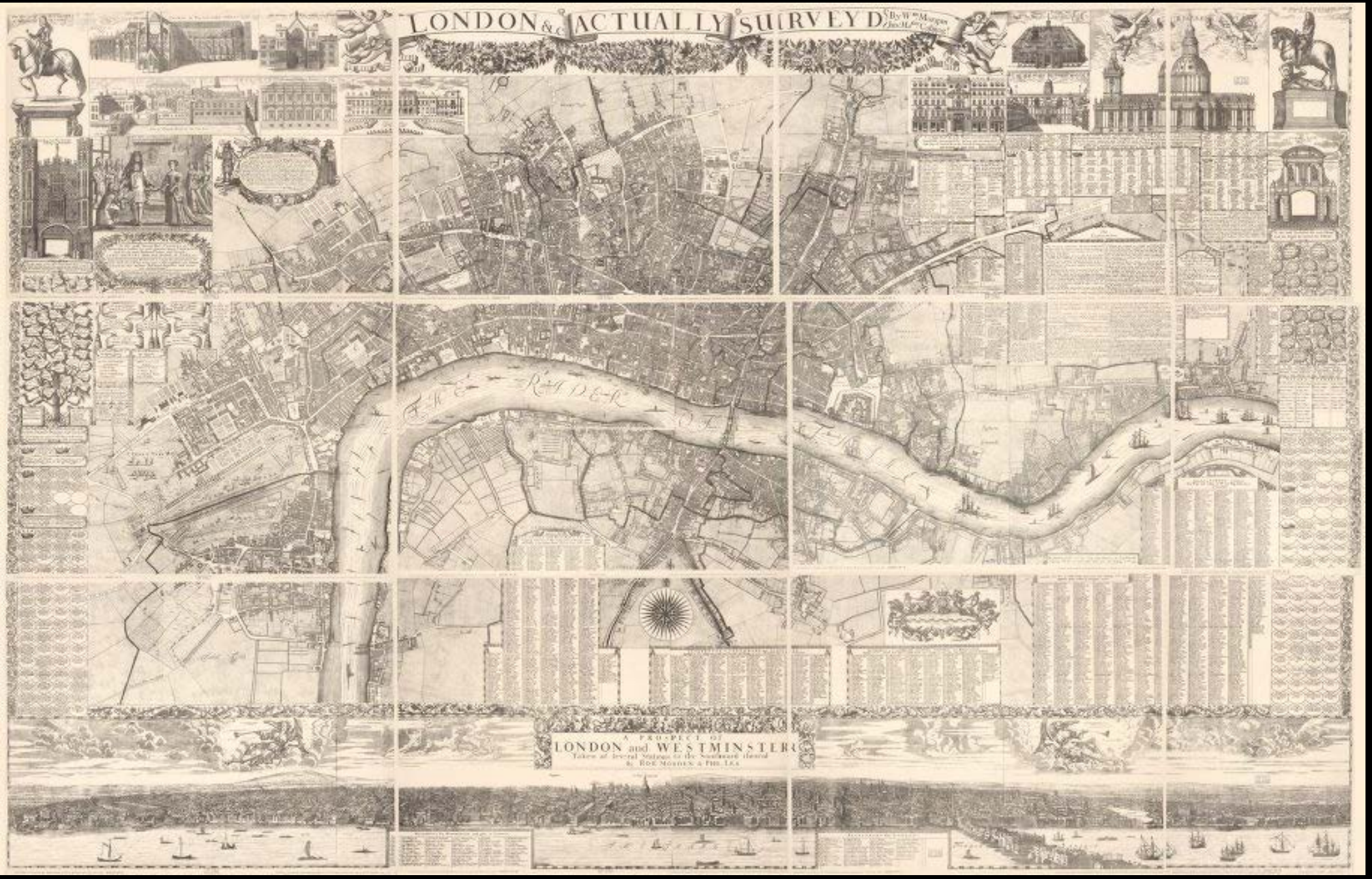

Reykjavik
ICELAND
Norwegian Sea
Denmark Strait
Barents Sea
Faroe Islands
Torshavn
Shetland Islands
North Sea
ATLANTIC OCEAN
Bay of Biscay
Mediterranean Sea
Black Sea
Baltic Sea
Oslo
Stockholm
Helsinki
Copenhagen
Riga
Vilnius
Minsk
Moscow
St. Petersburg
Kiev
Warsaw
Berlin
Amsterdam
Brussels
London
Paris
Madrid
Lisbon
Rome
Athens
Istanbul
Ankara
Tel Aviv
Damascus
Nicosia
Tunis
Algiers
Rabat
Gibraltar
Marseille
Vienna
Prague
Budapest
Bucharest
Sofia
Belgrade
Zagreb
Ljubljana
Bratislava
Chisinau
Kharkov
Donetsk
Odessa
Simferopol
Sochi
Tbilisi
Yerevan
Baku
Tashkent
Almaty
Astana
Ulan Bator
Beijing
Tokyo
Seoul
Pyongyang
Hanoi
Bangkok
Kuala Lumpur
Singapore
Jakarta
Manila
Taipei
Hong Kong
Mumbai
New Delhi
Karachi
Kabul
Tehran
Baghdad
Riyadh
Cairo
Khartoum
Addis Ababa
Nairobi
Kinshasa
Luanda
Lusaka
Harare
Pretoria
Cape Town
Windhoek
Gaborone
Maputo
Antananarivo
Port Louis
Dakar
Bamako
Abidjan
Accra
Lagos
Abuja
Yaoundé
Libreville
Brazzaville
Bangui
Ndjamena
Niamey
Ouagadougou
Lome
Conakry
Freetown
Monrovia
Bissau
Banjul
Nouakchott
Rabat
Algiers
Tunis
Tripoli
Cairo
Khartoum
Asmara
Djibouti
Mogadishu
Addis Ababa
Nairobi
Kampala
Dar es Salaam
Lusaka
Harare
Windhoek
Gaborone
Maputo
Antananarivo
Port Louis
Dakar
Bamako
Abidjan
Accra
Lagos
Abuja
Yaoundé
Libreville
Brazzaville
Bangui
Ndjamena
Niamey
Ouagadougou
Lome
Conakry
Freetown
Monrovia
Bissau
Banjul
Nouakchott
Rabat
Algiers
Tunis
Tripoli
Cairo
Khartoum
Asmara
Djibouti
Mogadishu
Addis Ababa
Nairobi
Kampala
Dar es Salaam
Lusaka
Harare
Windhoek
Gaborone
Maputo
Antananarivo
Port Louis
Dakar
Bamako
Abidjan
Accra
Lagos
Abuja
Yaoundé
Libreville
Brazzaville
Bangui
Ndjamena
Niamey
Ouagadougou
Lome
Conakry
Freetown
Monrovia
Bissau
Banjul
Nouakchott
© MAPS.COM / CABES / Alamy Stock Photo



London Bridge 1554-57


LONDON
Scala passuum & pedum
THAMYS
fluuius
Greyes
Drapers
Fishmongers
Goldsmiths
Skinners
Haberdashers
Salters
Ironmongers
Vintners
Clothworkers
Lambeth marsh
Of one of the foure 12 Companies is the Lo. Mayor of the Cyty yearely chosen
A guide for Countrey men In the famous Cittey of LONDON by the helpe of wich plot they shall be able to know how farr it is to any street As allso to go onto the same without forder trouble Anno 1653.


LONDINVM FERACISSIMI ANGLIAE REGNI METROPOLIS
THE TOWRE



William Morgan
Map of London
1682

VISSCHER'S VIEW OF LONDON, 1616

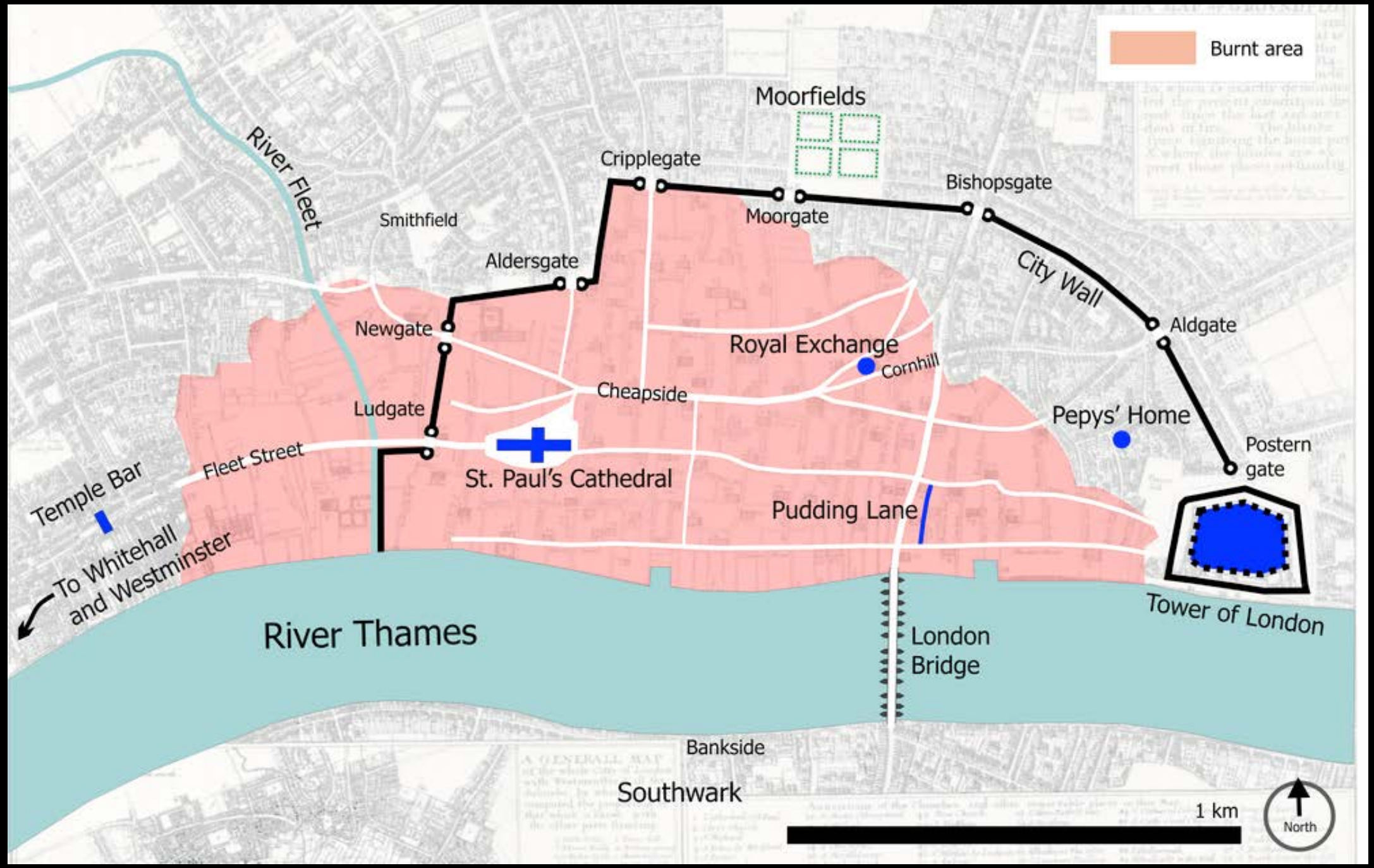
A panorama of London by Claes Visscher, 1616; The tenement housing on London Bridge (detail at right) was a notorious death-trap in case of fire, although much would be destroyed in an earlier fire in 1632.


THE BRIDGE
ke

The Great Fire of London which happened in 1666, here painted later by an unknown painter. The painter depicts the fire as it would have appeared on the evening of Tuesday, 4 September 1666 from a boat in the vicinity of Tower Wharf. The Tower of London is on the right and London Bridge on the left, with St. Paul's Cathedral in the distance, surrounded by the tallest flames.

Matteus Merian, London on the left in 1650 and on the right during the fire of 1666

Wenceslaus Hollar, Before and After the Great Fire



London in 1666, with the burnt area shown in pink

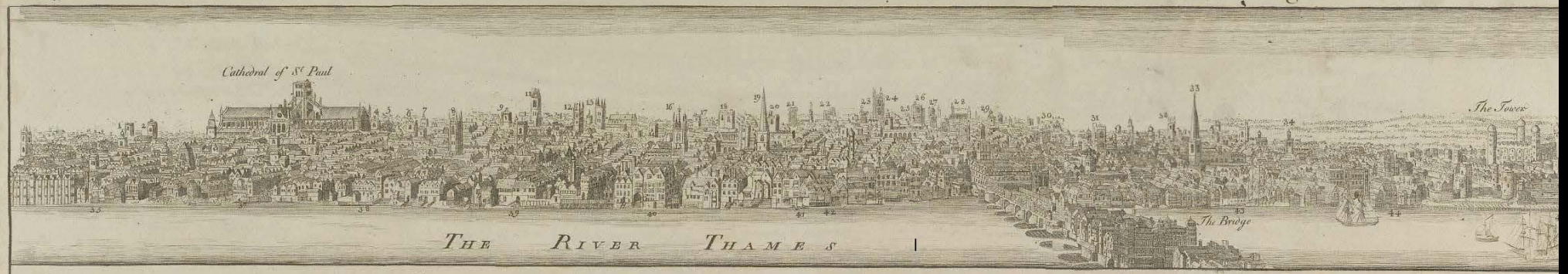

THE BRIDGE
ke

TENEMENT HOUSING

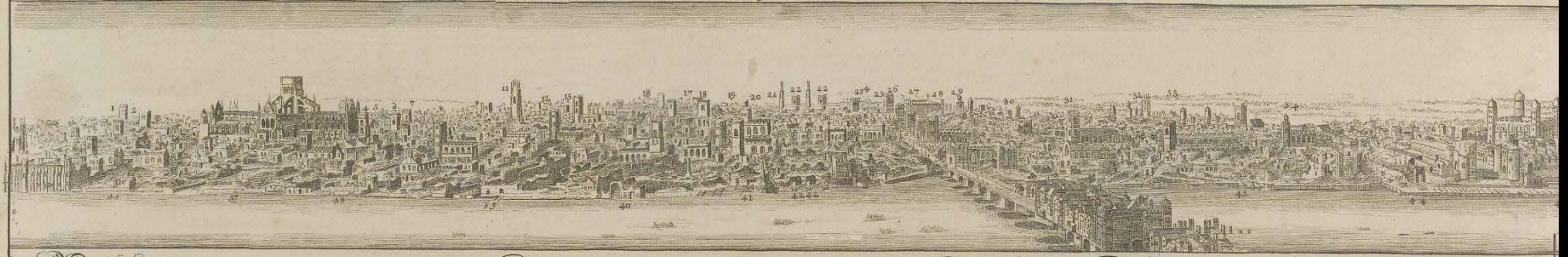
In 17th-century London, the human habitations were crowded to bursting point, intermingled with sources of heat, sparks, and pollution, and their construction increased the fire risk. The typical six- or seven-story timbered London tenement houses had ”jetties" (projecting upper floors). They had a narrow footprint at ground level, but maximized their use of land by "encroaching" on the street, as a contemporary observer put it, with the gradually increasing size of their upper stories. The fire hazard was well perceived when the top jetties all but met across the narrow alleys; "as it does facilitate a conflagration, so does it also hinder the remedy", wrote one observer —but "the covetousness of the citizens and connivancy [corruption] of Magistrates" worked in favor of jetties.


OLY'S
UDGE
ANTRY
YORK
BARGHEST
SHAMBLES
SWEET
SHOP
VIA
VECCHIA
Artisan Bread
Tel
01904
627701
Handmade
Artisan
Chocolates
YE OLD
SHAMBLES TAVERN
Great Food

A Prospect of the City of London from St Marie overs Steeple in Southwark in its flourishing Condition before the Fire



Another Prospect of the above City taken from the Same Place as it Appeared after that Dreadfull Fire in 1666



A Plan for Rebuilding the City after the Fire Designd by that Great Architect Sr Christoph.r Wren and approvd of by Kings and Parliament but unhappily Defeated by Faction

REFERENCE to the VIEWS

1 S. Benet
2 S. Andrew in Wardrop
3 S. Peters in Thames street
4 S. Martins by Ludgate
5 S. Andrew in Holborne
6 S. Pulchers
7 S. Nicholas
8 S. Christ Church
9 S. Augustines
10 S. Foster
11 S. John Zachary
12 S. Martins in Thames str.
13 S. Marys Aldermanbury
14 S. Thomas
15 Bow Church
16 S. Laurence
17 S. Mary Botolph La.
18 Allhallowes the Gr.
19 S. Stephens Colman Str.
20 S. Margaret
21 S. Mary Wilnoth
22 S. Laurence Poultney
23 S. Stephens in Walbroke
24 S. Christopher
25 S. Bartholemew
26 S. Edmunds
27 S. Michael in Cornhill
28 Allhallowes
29 S. Peters in Coralhill
30 S. Denis
31 S. Magnus
32 S. Andrew Hubart
33 S. Mary Hill
34 S. Botolph Aldgate
35 S. Dunstans East
36 Allhallowes Barking
37 Paul's Wharfe
38 Waterhouse
39 S. Crane
40 Queen hithe
41 Stiliard
42 Col-Harbour
43 Old Swan
44 Fish mongers hall
45 Bilins gate

EXPLANATION to the PLAN

The shadowed part is that which escapd the Conflagration

C. Churches M. Markets

A Scale of 1800 Feet

VUES DE LA VILLE de LONDRES

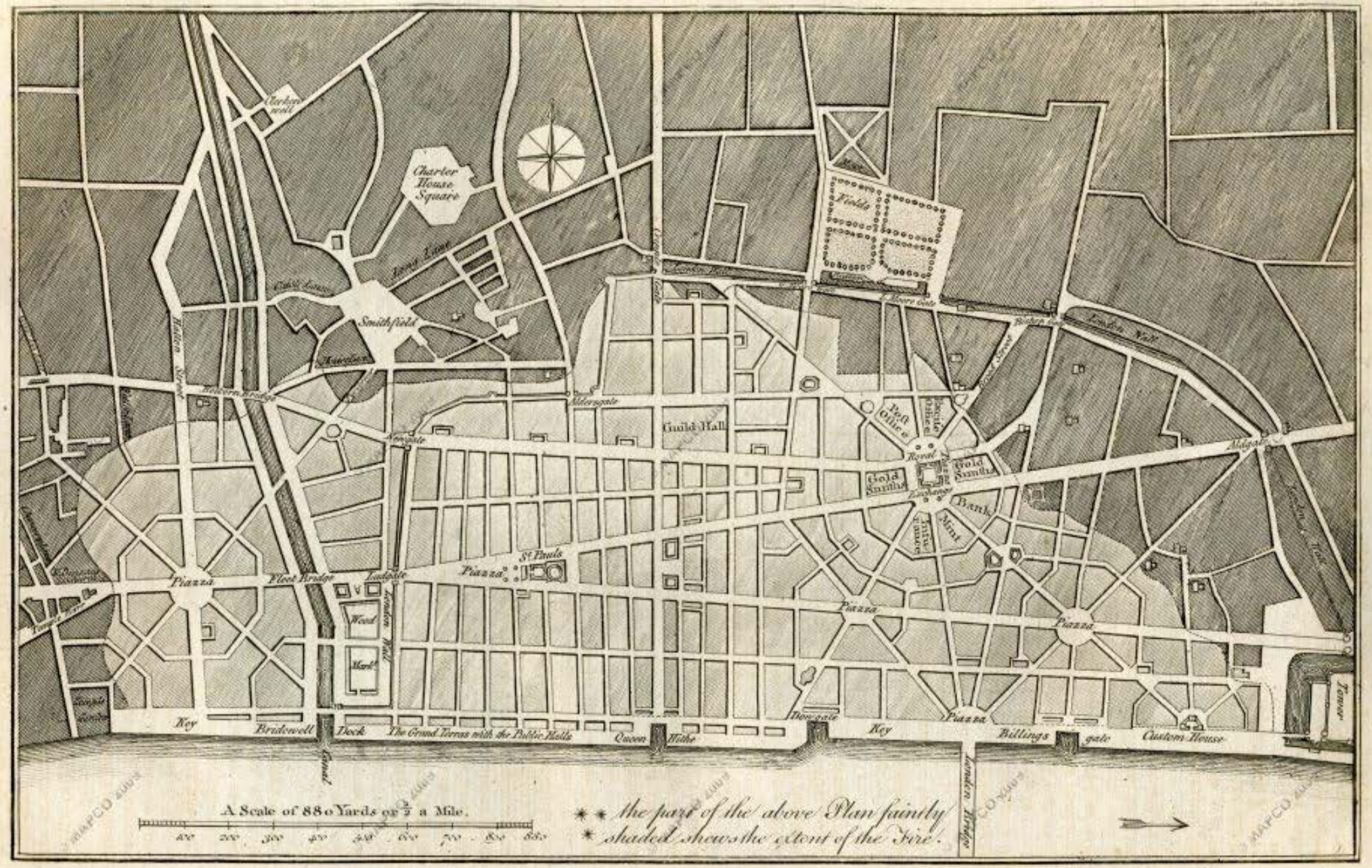
Comme il etoit devant & apres L'INCENDIE de 1666. AVEC Le PLAN pour la rebâtir. Projette par ce grand ARCHITECTE le Chevalier CHRISTOPHLE WREN, & aprouvé par le Roi & PARLEMENT: mais malheureusement rejetté par Faction.

Publié par JEAN ROCQUE, Chorographe de Son Altesse Royalle le Prince de GALLES. 1758.

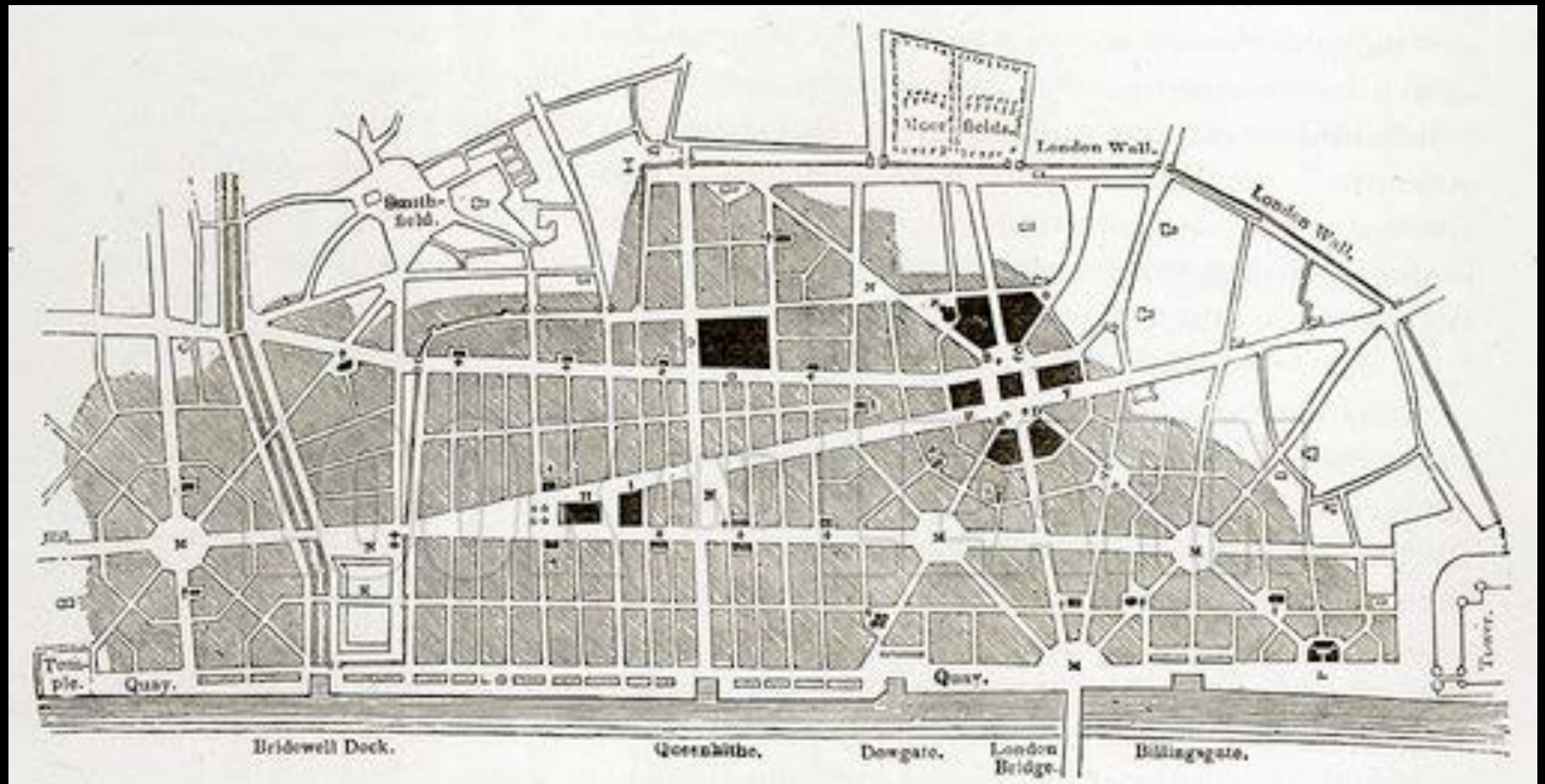
A Scale of 300 Toises

360 Yards or 4 of a Mile Irish

440 Yards or 4 of a Mile English



Christopher Wren, Plan for Rebuilding of London, 1666

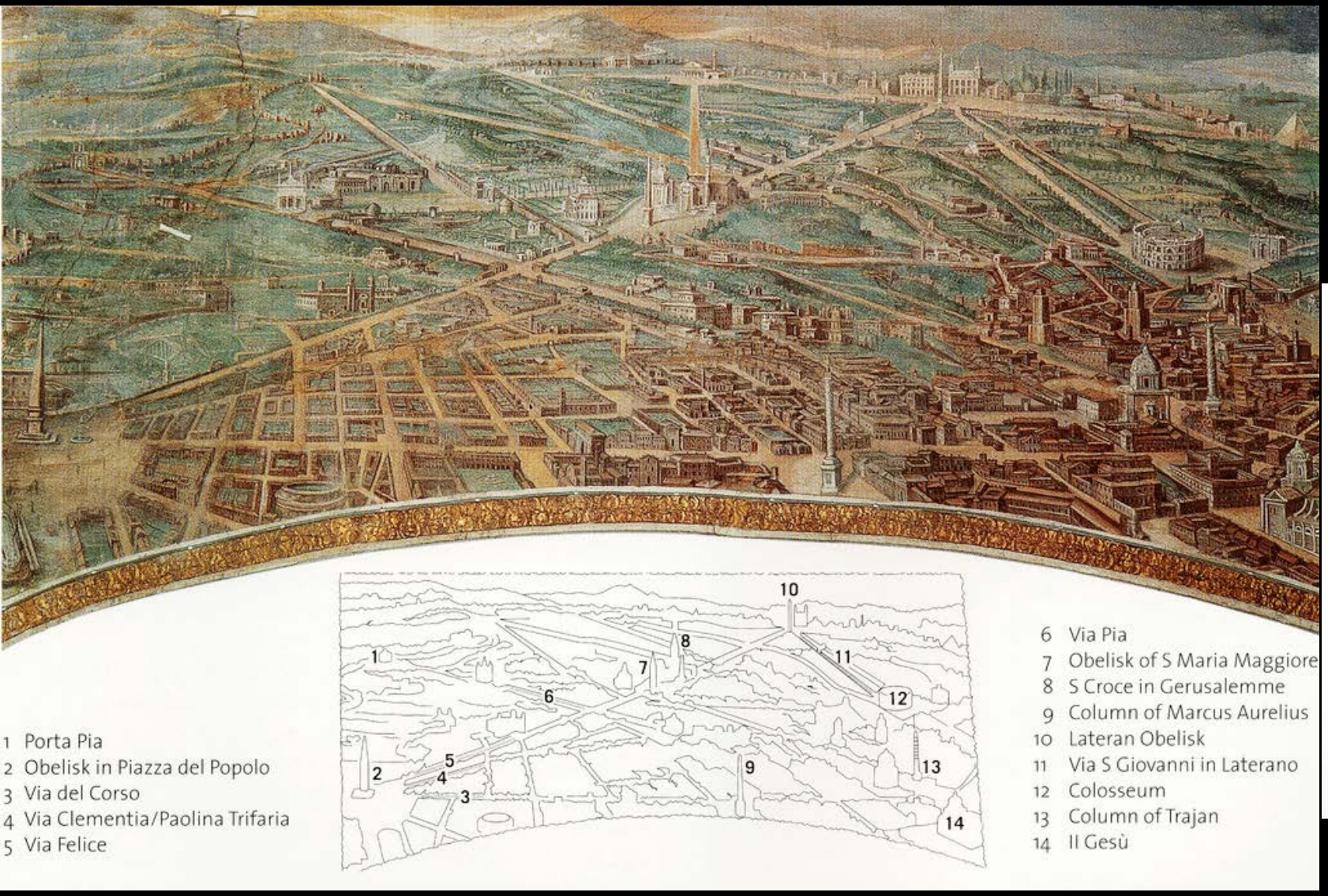


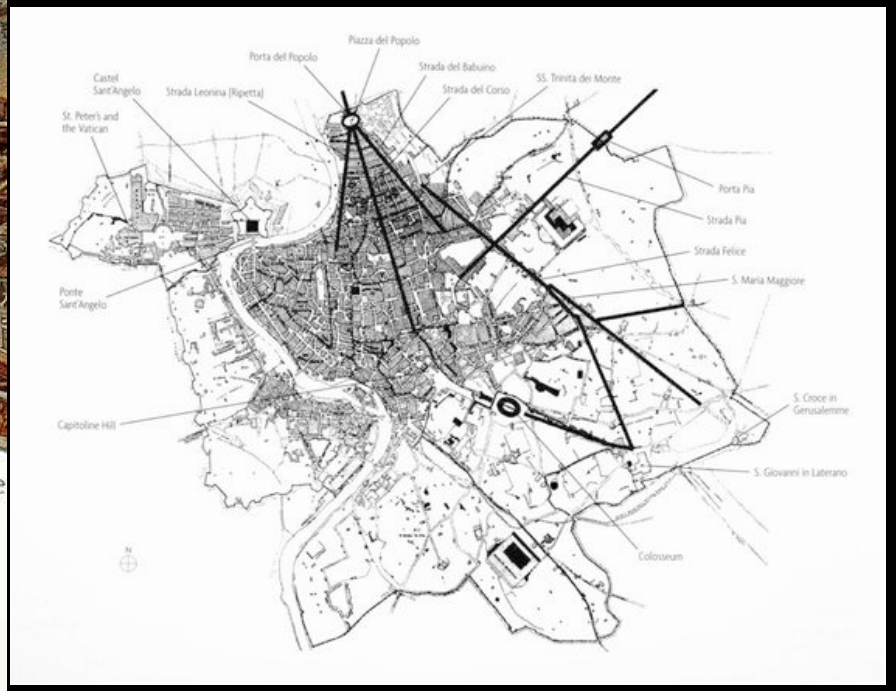
[Wren's Plan for rebuilding the City.]

[The shaded part shows the extent of the Fire.]

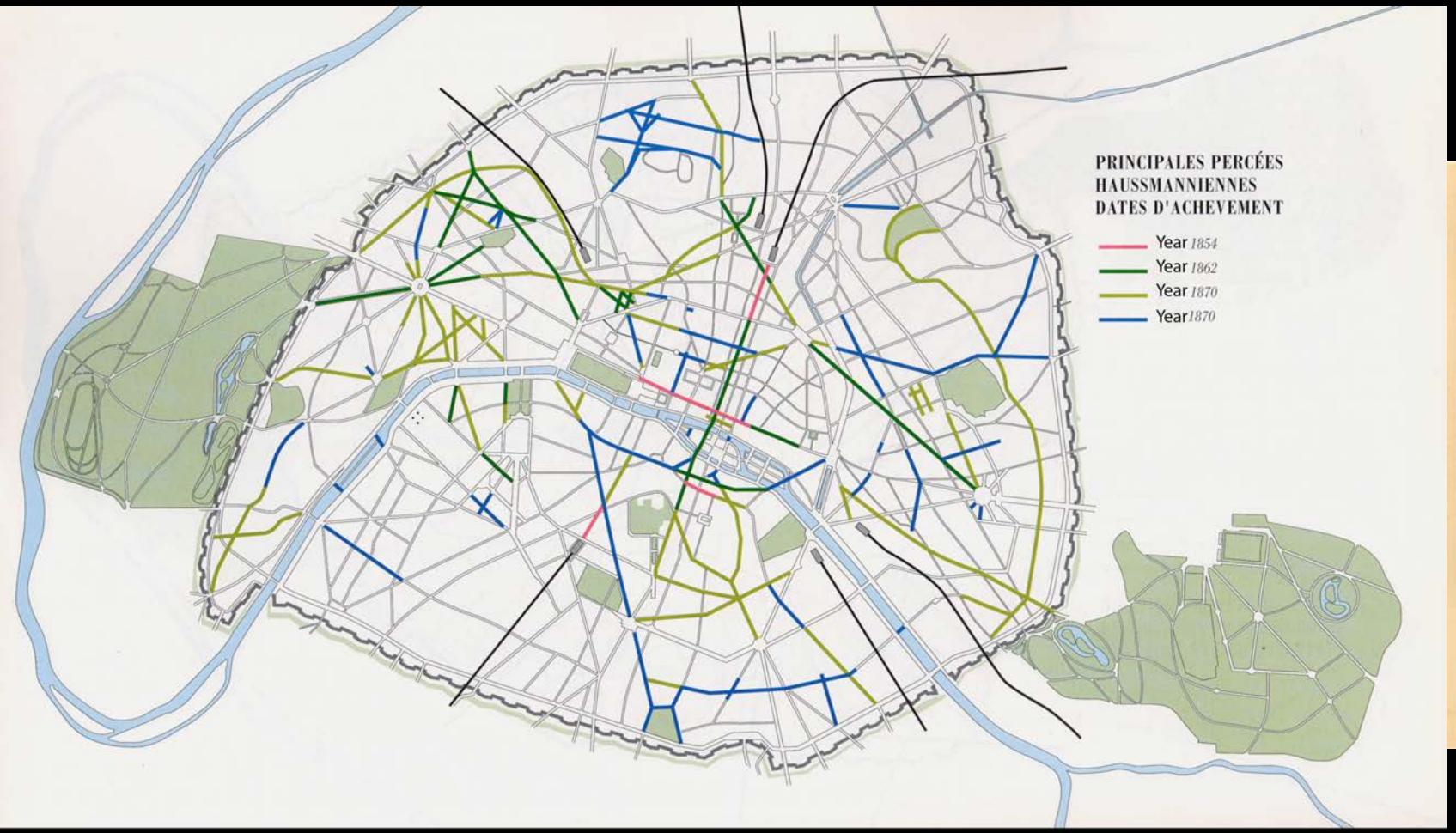
A. The Royal Exchange.
B. Post Office.
C. Excise Office.
D. Mint.
E. Insurance Office.
F. Goldsmiths'.
G. Guildhall.
H. St. Paul's.
I. Doctors' Commons.
K. Wood Market.
L. Custom House.
M. Piazzas.
N. Market.
† Churches.
‡ Continuation of London Wall.

Baroque
and
Neo-Baroque City Plans

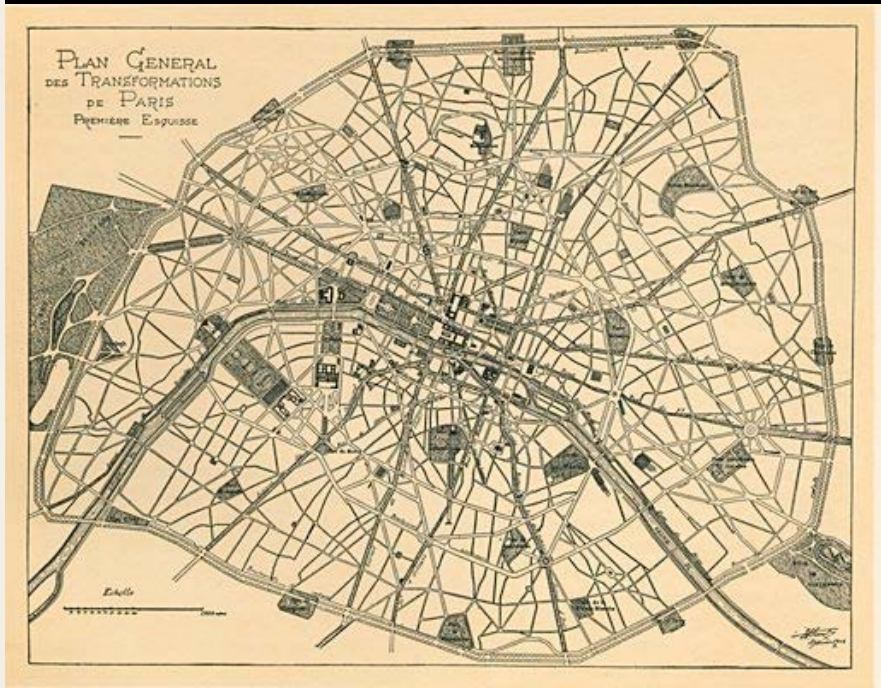




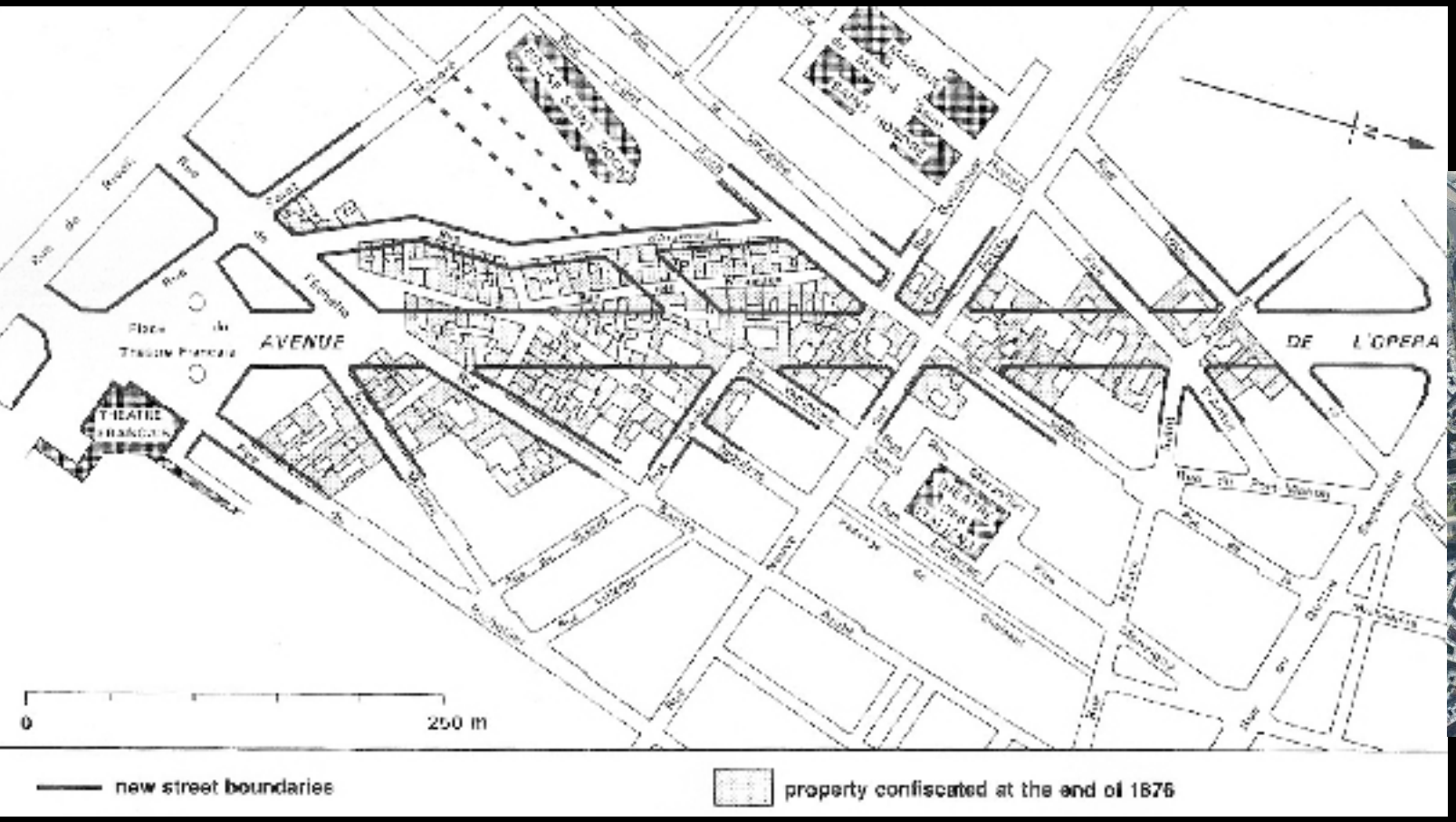
Pope Sixtus V, Plan for Rome, Italy, c. 1590



Paris - Streets and Avenues cut by Haussmann, 1854 -1879

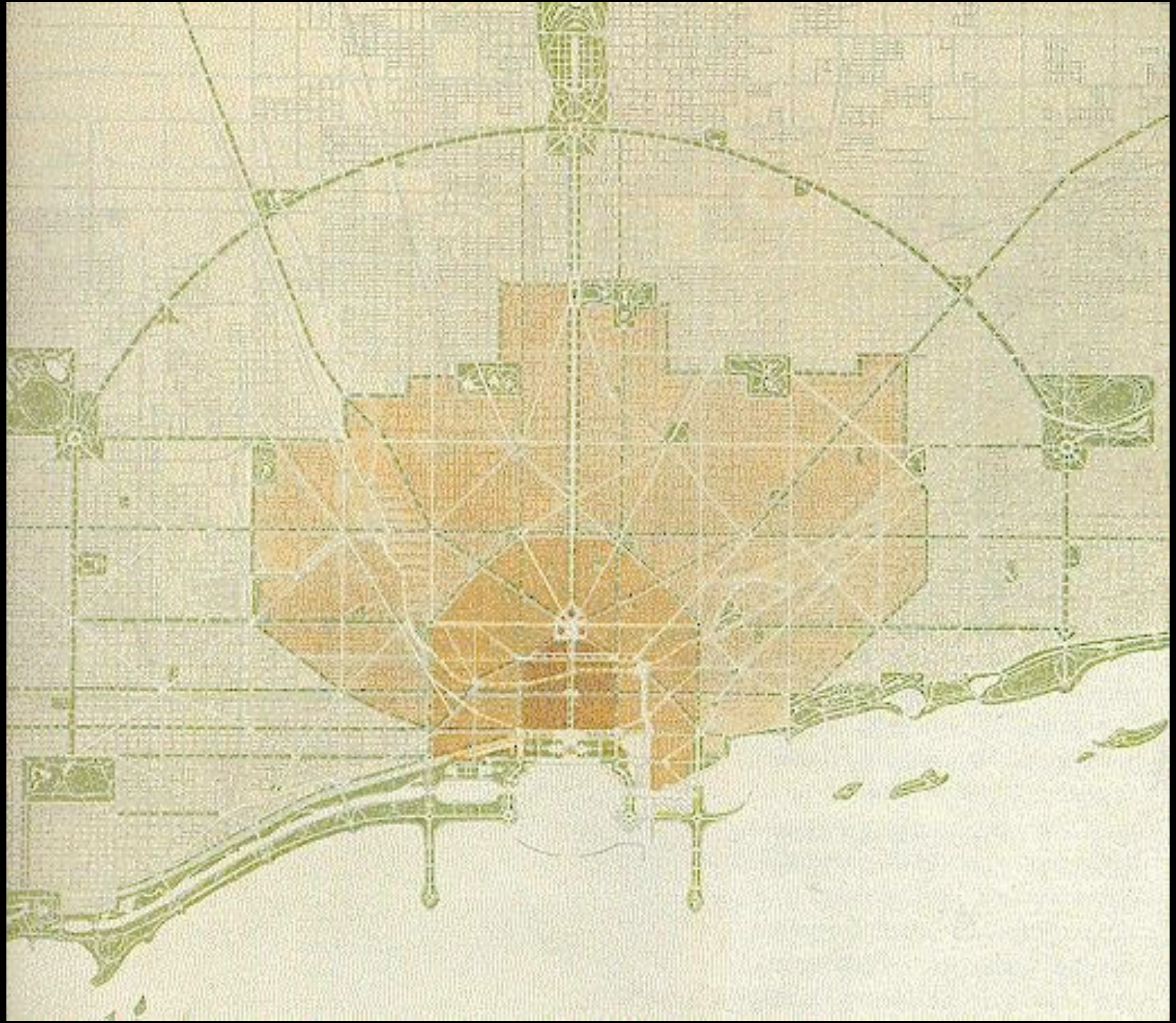


Baron Eugène Haussmann, Prefect of the Seine, under Napoleon III, 1853-1857

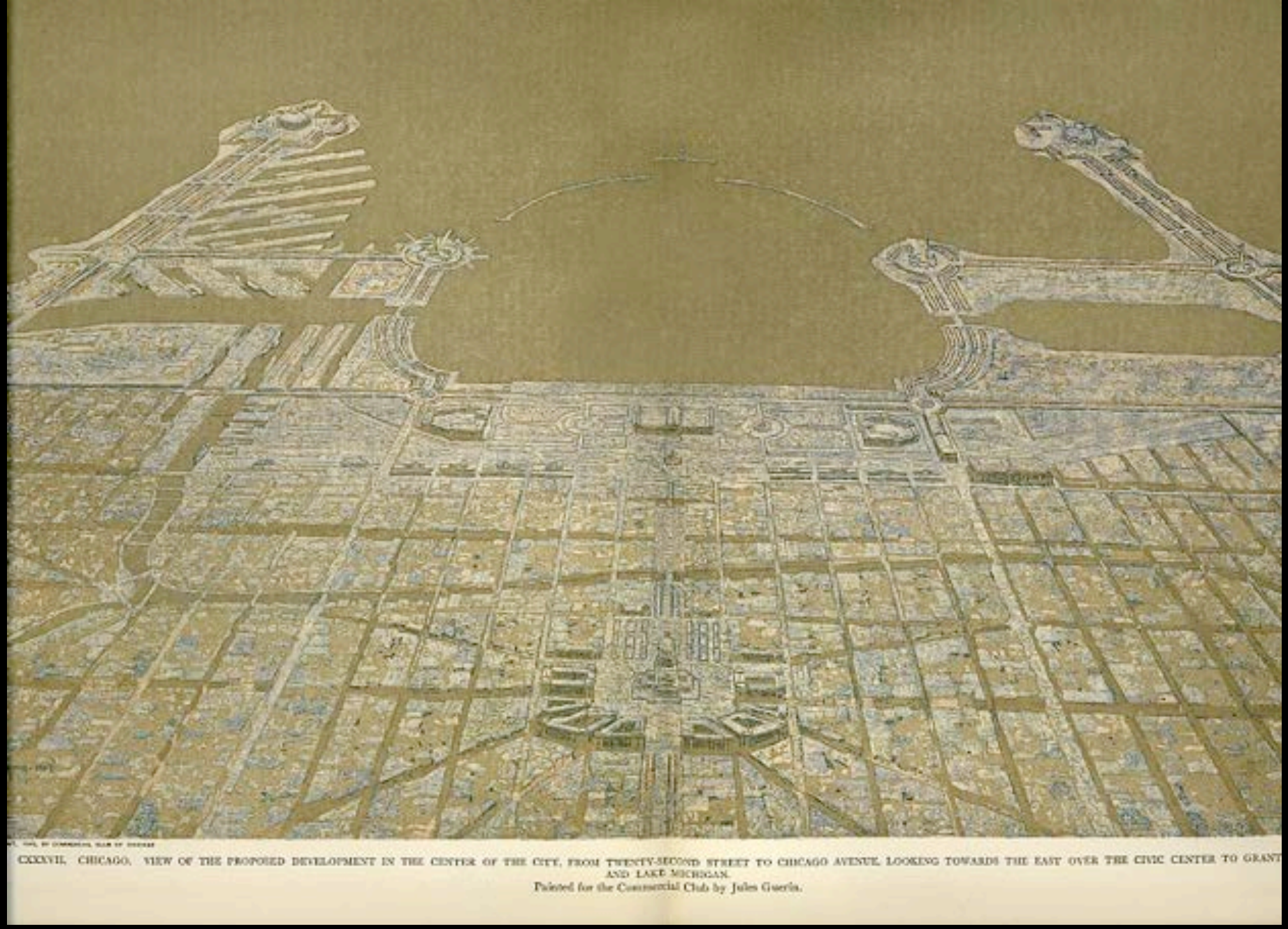


Property erased to make way for Avenue de l'Opera

An aerial view of Paris showing the boulevards radiating from the Arc De Triomphe

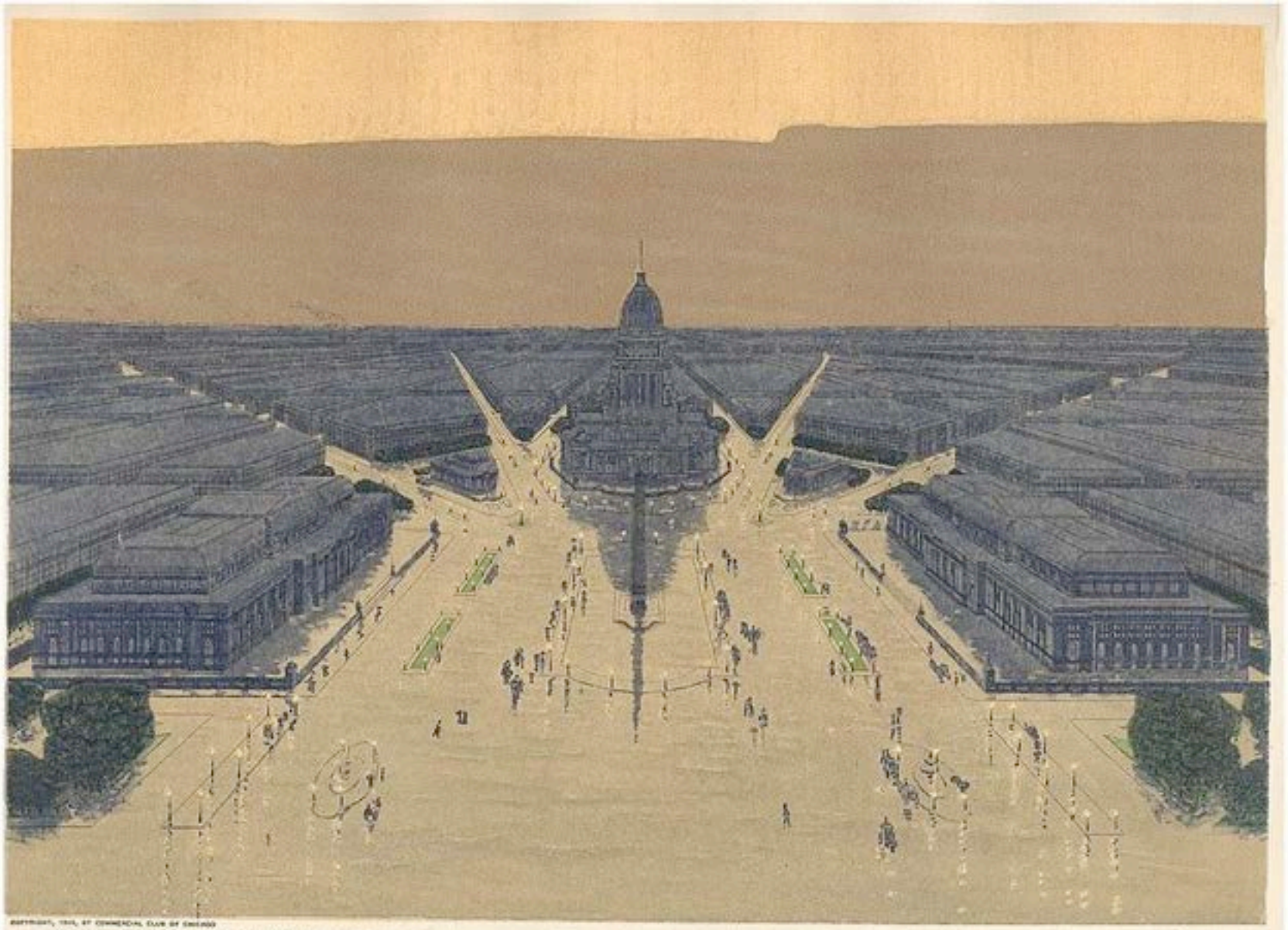


Daniel Burnham, Plan for Chicago, 1909



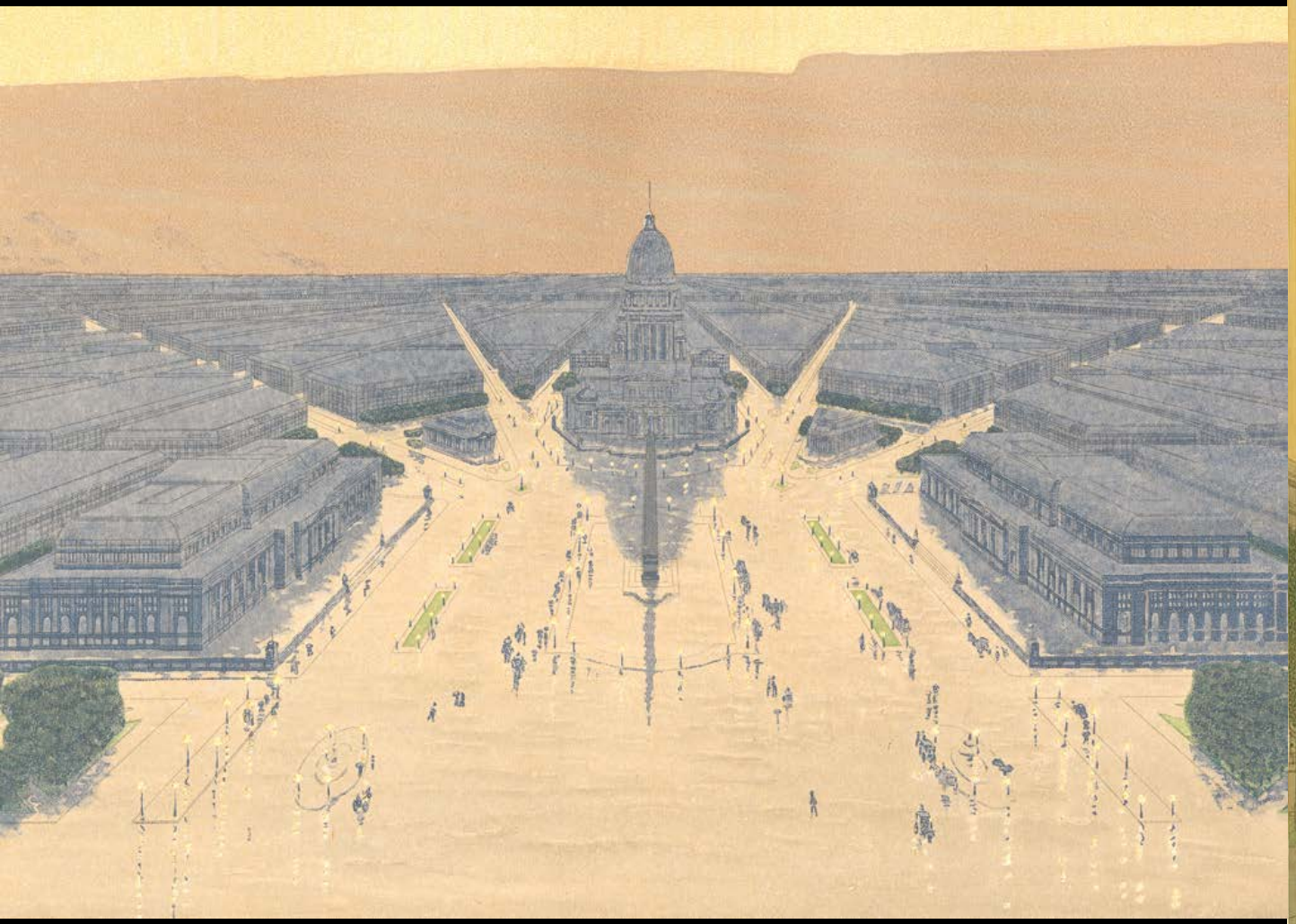
Centralized Chicago, painted by Jules Guerin, conceptualized by Daniel Burnham, 1909

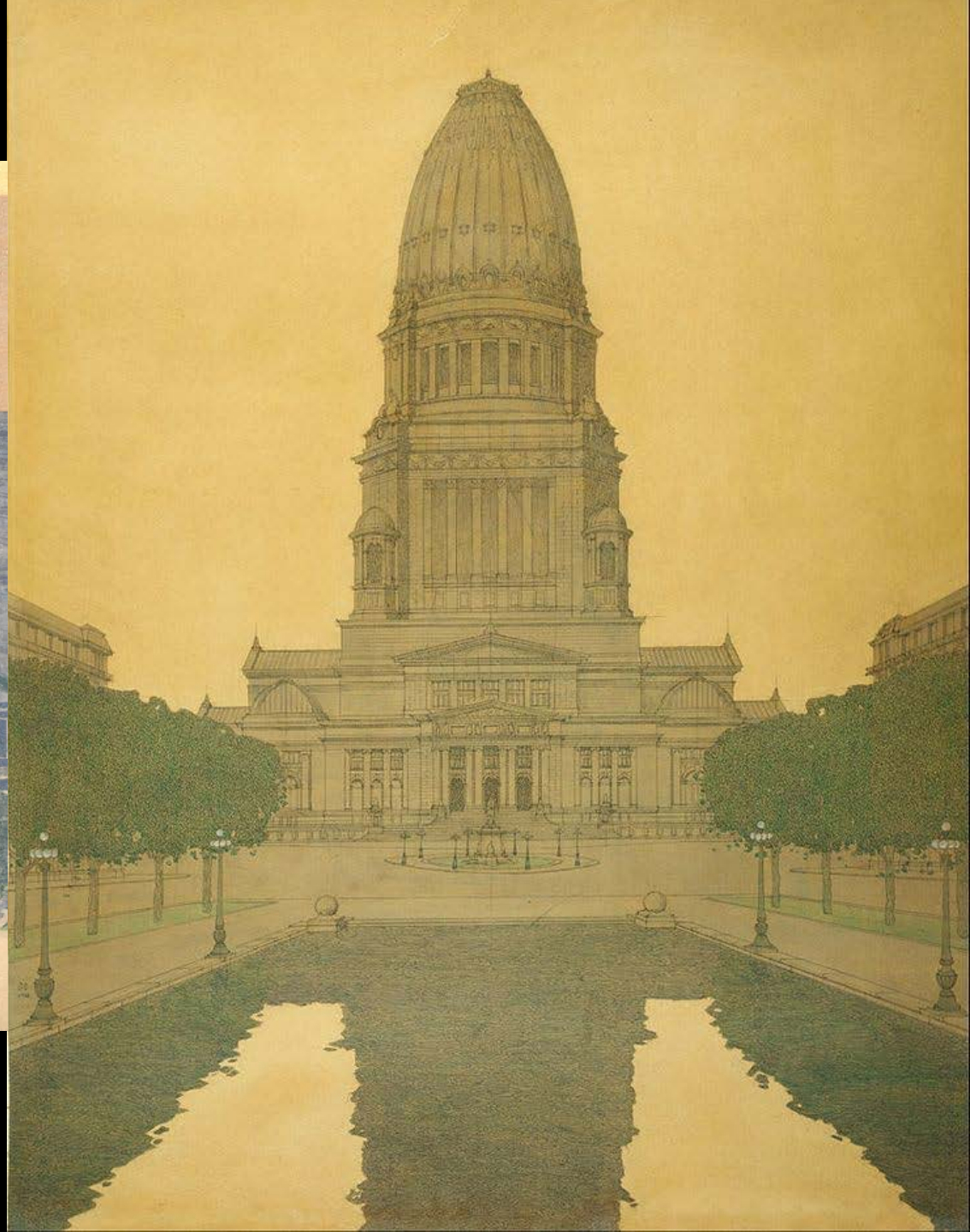
1909



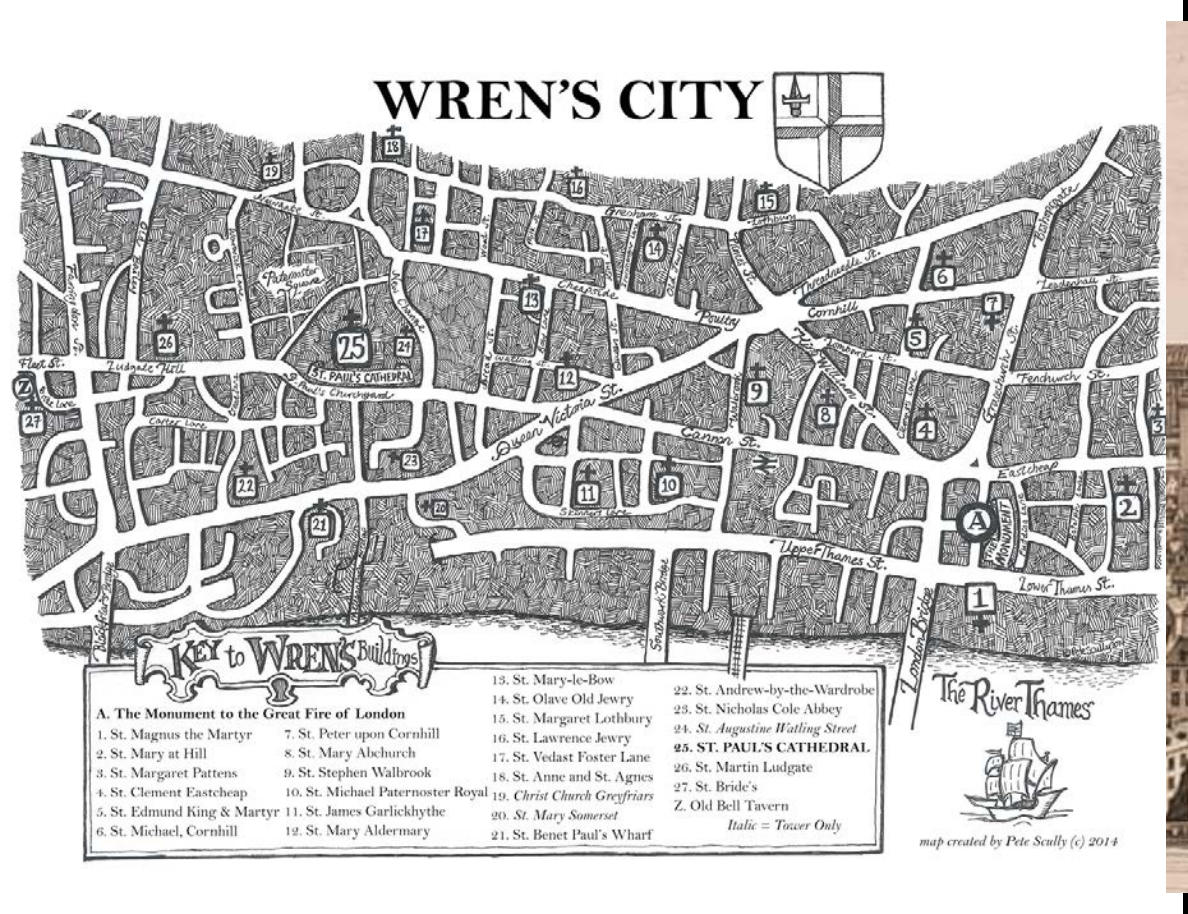
CXXXII. CHICAGO. VIEW, LOOKING WEST, OF THE PROPOSED CIVIC CENTER PLAZA AND BUILDINGS, SHOWING IT AS THE CENTER OF THE SYSTEM OF ARTERIES OF CIRCULATION AND OF THE SURROUNDING COUNTRY.
Painted for the Commercial Club by Jules Guerin.

Civic Center and Plaza, painted by Jules Guerin, conceptualized by Daniel Burnham, 1909





LONDON c. 1666



2029.—A Parallel of some of the principal Towers and Steeples built by Sir Christopher Wren.

1, St. Dunstan in the East. 2, St. Magnus. 3, St. Benet, Gracechurch-street. 4, St. Edmund the King, Lombard-street. 5, St. Margaret Pattens. 6, Allhallows the Great. 7, St. Mary Abchurch. 8, St. Michael, Cornhill. 9, St. Lawrence, Jewry. 10, St. Benet Fink. 11, St. Bartholomew. 12, St. Michael, Queenhithe. 13, St. Michael Royal. 14, St. Antholin, Watling-street. 15, St. Stephen, Walbrook. 16, St. Swithen, Cannon-street. 17, St. Mary-le-Bow. 18, Christ Church, Newgate-street. 19, St. Nicholas, Cole Abbey. 20, St. Mildred, Bread-street. 21, St. Augustin, Watling-street. 22, St. Mary Somerset. 23, St. Martin, Ludgate. 24, St. Andrew by the Wardrobe, 25, St. Bride, Fleet-street.

The scale is expressed by St. Paul's in the background.

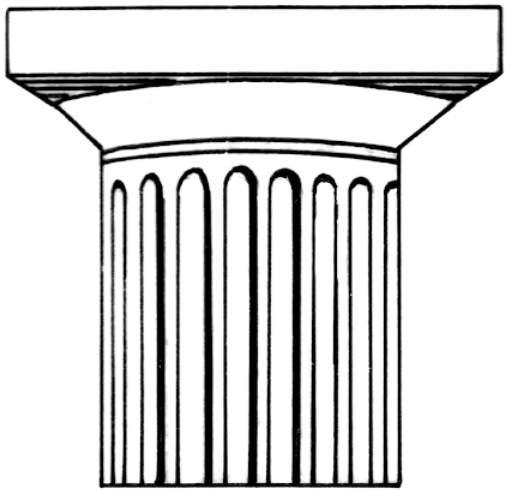
Eighty-eight parish churches were burned during the Great Fire of London in 1666. The office of Christopher Wren rebuilt 51 parish churches and St. Paul's Cathedral. Many of these churches were demolished as the population of the City of London declined in the 19th century and more were destroyed or damaged during the Blitz.

Christopher Wren and Robert Hooke, The Monument to the Great Fire of London, 1671-77

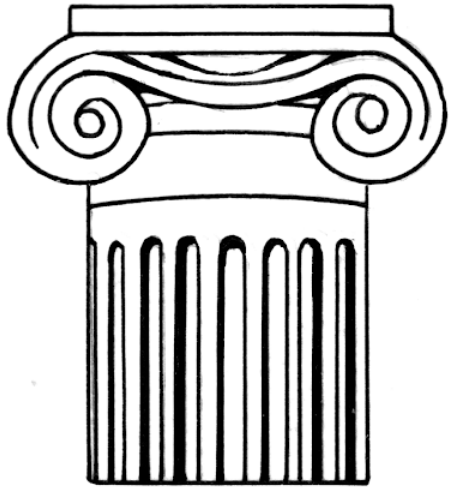
The Monument comprises a fluted Doric column built of Portland stone topped with a gilded urn of fire.

Its height marks its distance from the site of the shop of Thomas Farriner (or Farynor), the king's baker, where the Great Fire began.

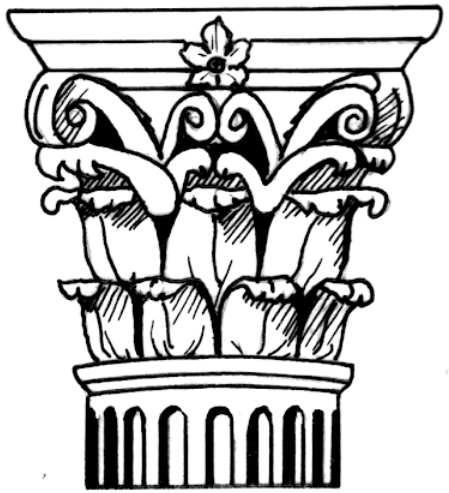
The top of the Monument is reached by a narrow winding staircase of 311 steps. A mesh cage was added in the mid-19th century at the top to prevent people jumping off, after six people had committed suicide from the structure between 1788 and 1842.



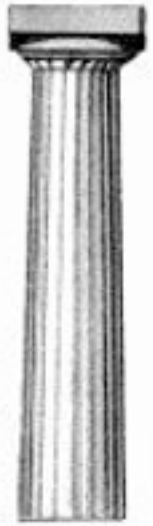
DORIC



IONIC



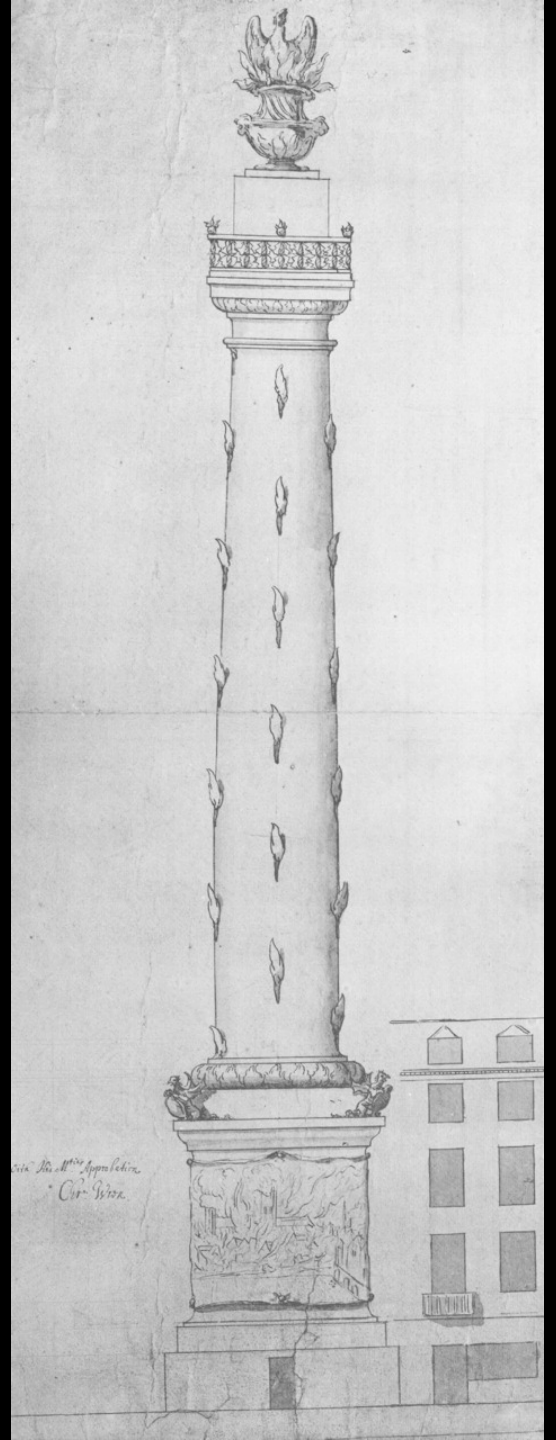
CORINTHIAN

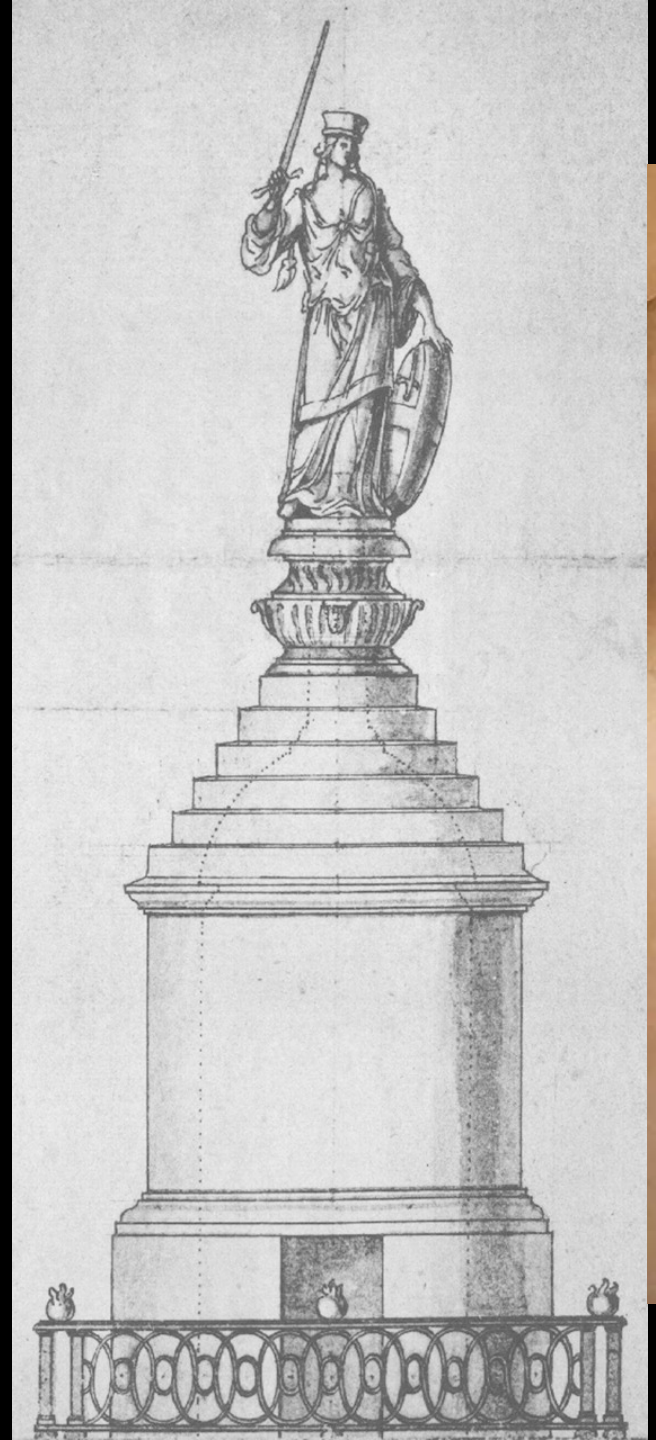


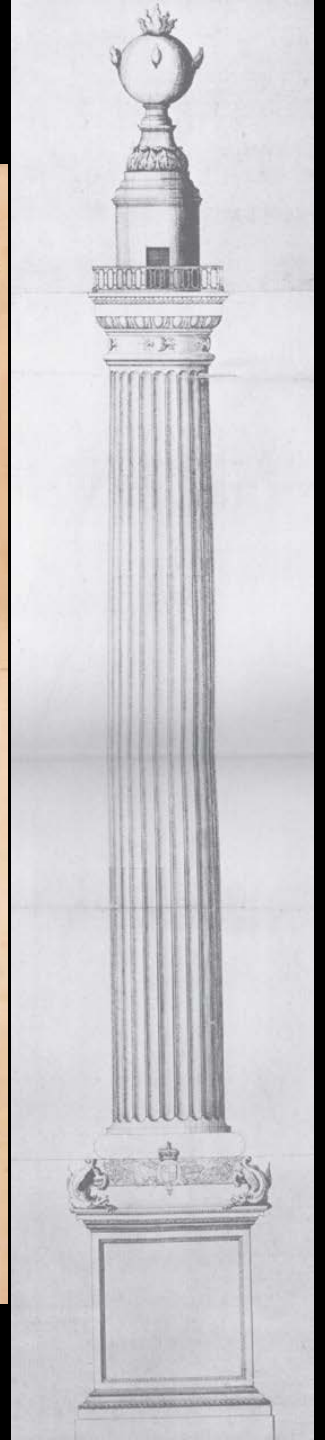
Doric

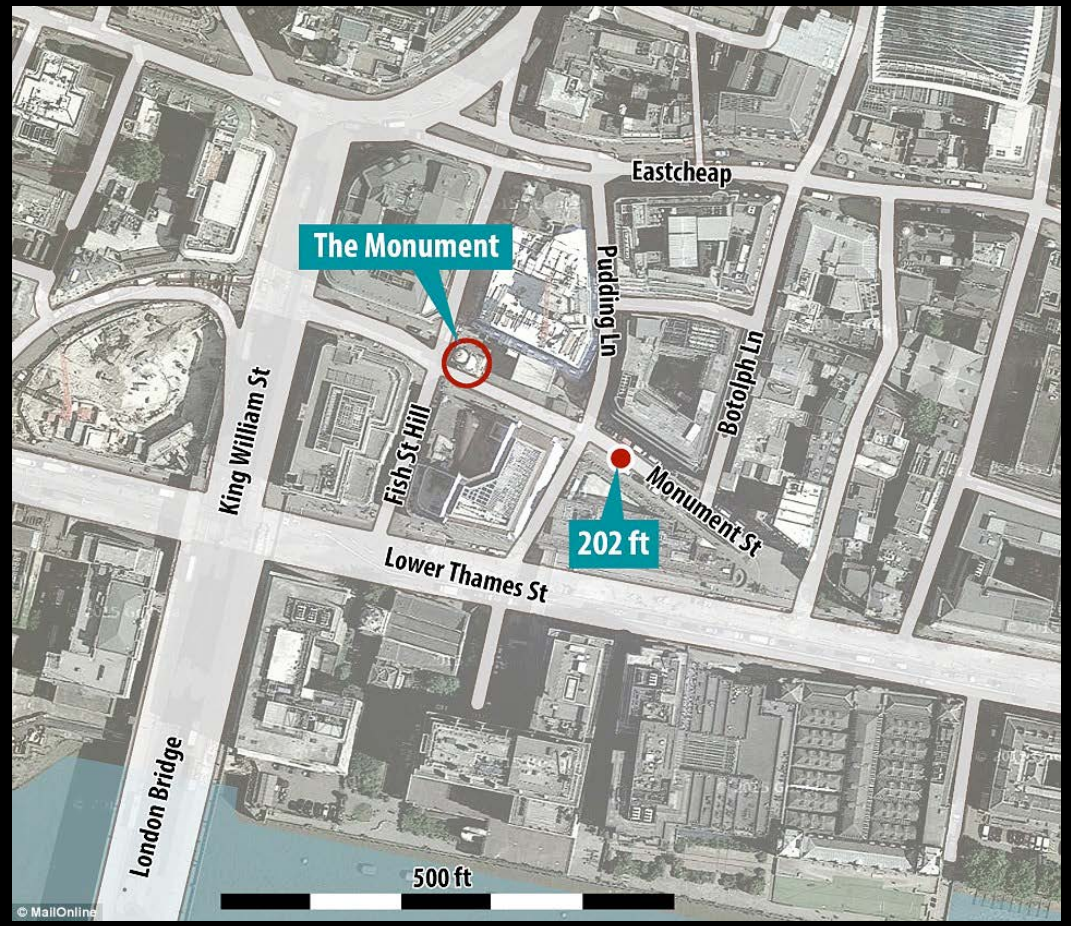
Ionic

Corinthian

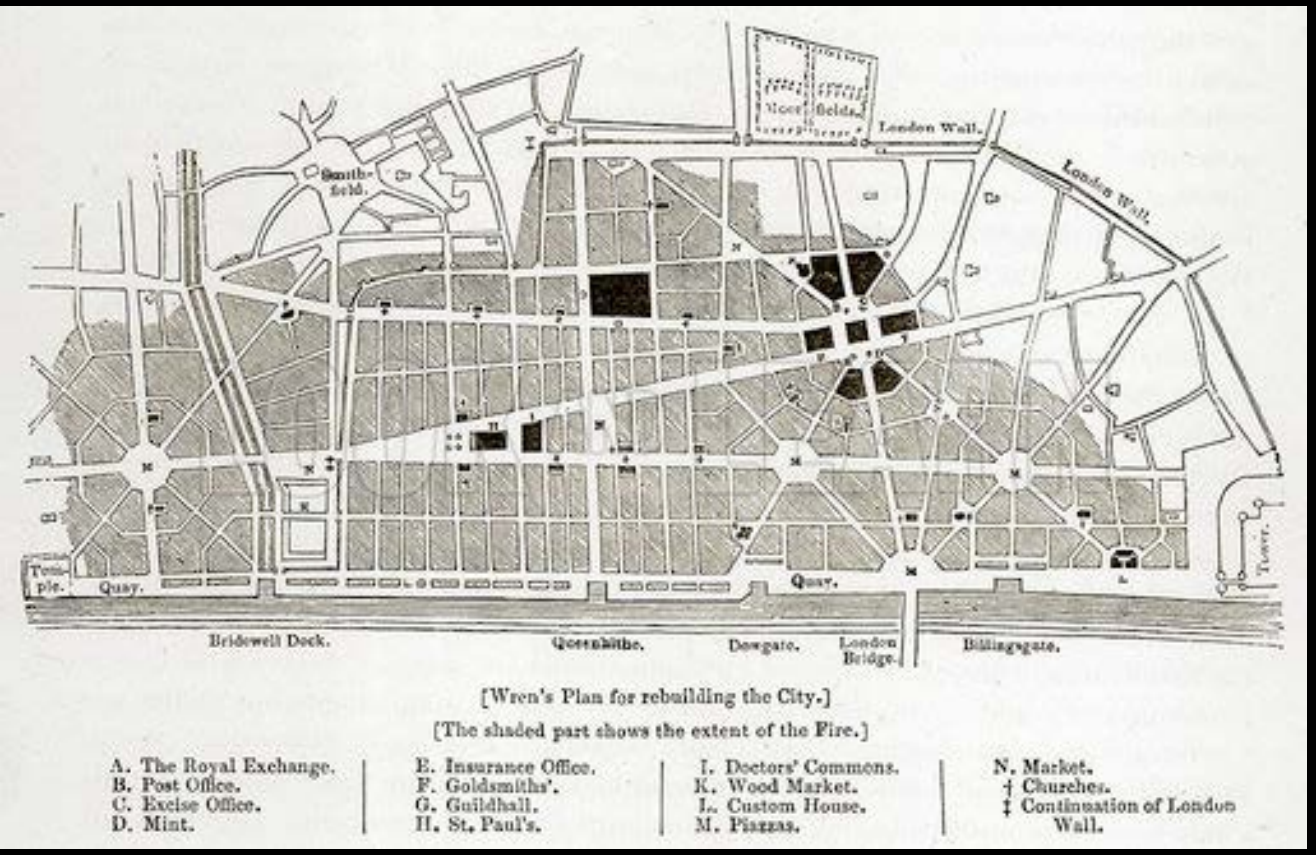


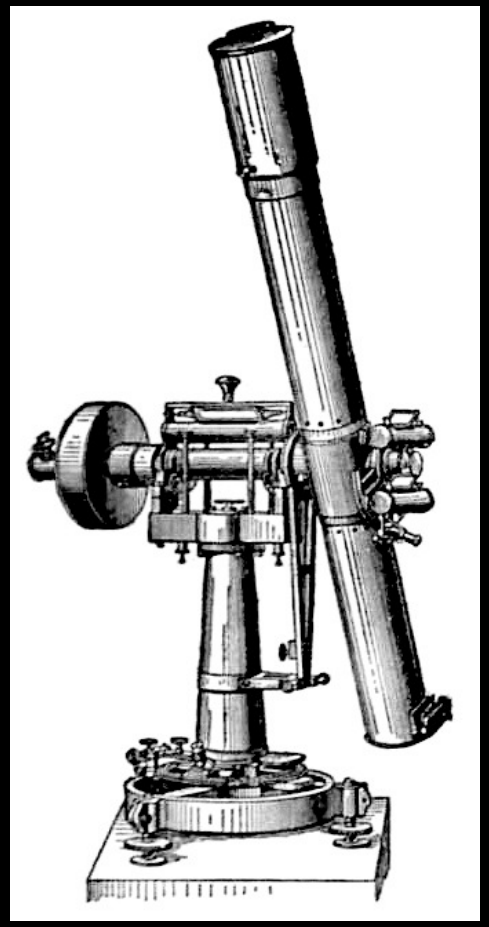





The Monument
Eastcheap
Pudding Ln
Botolph Ln
King William St
Fish St Hill
Monument St
202 ft
Lower Thames St
London Bridge
500 ft
© MailOnline

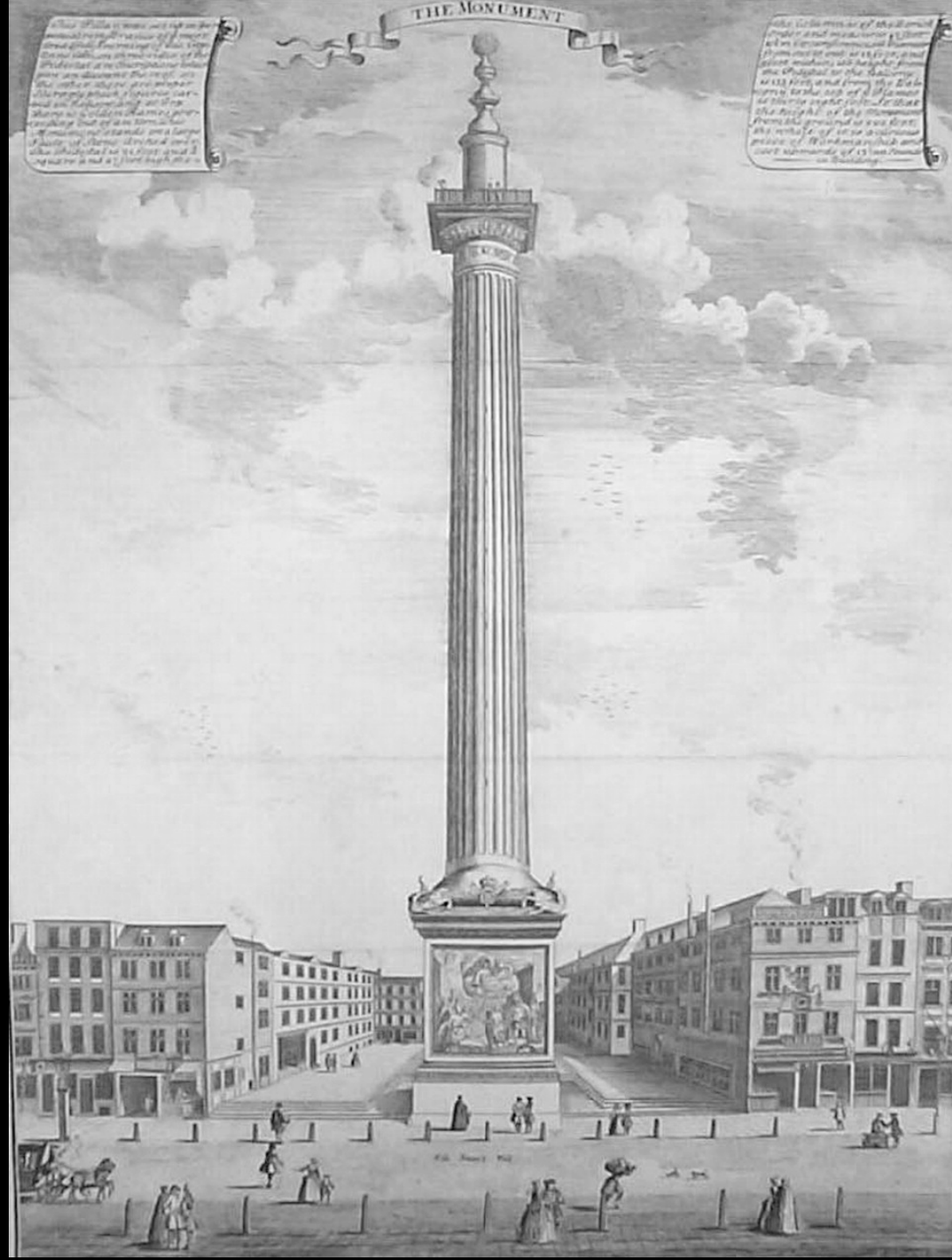
Its 202ft (61m) being the distance from its base to the bakery in Pudding Lane where the fire started…





A **zenith telescope** is designed to point straight up at or near the zenith. They are used for precision measurement of star positions, to simplify telescope construction, or both.

Wren and Hooke built the monument to double-up as a scientific instrument. It has a central shaft meant for use as a zenith telescope and for use in gravity and pendulum experiments that connects to an underground laboratory for observers to work (accessible from the present-day ticket booth). Vibrations from heavy traffic on Fish Street Hill rendered the experimental conditions unsuitable.
A hinged lid in the urn covers the opening to the shaft. The steps in the shaft of the tower are all six inches high, allowing them to be used for barometric pressure studies.



THE MONUMENT

THIS MONUMENT. DESIGNED BY SIR CHRISTOPHER WREN, WAS BUILT TO COMMEMORATE THE GREAT FIRE OF LONDON 1666. WHICH BURNED FOR THREE DAYS CONSUMING MORE THAN 13,000 HOUSES AND DEVASTATING 436 ACRES OF THE CITY. THE MONUMENT IS 202FT IN HEIGHT. BEING EQUAL TO THE DISTANCE WESTWARD FROM THE BAKEHOUSE IN PUDDING LANE WHERE THE FIRE BROKE OUT. IT TOOK SIX YEARS TO CONSTRUCT 1671-1677. THE BALCONY IS REACHED BY A SPIRAL STAIRWAY OF 311 STEPS AND AFFORDS PANORAMIC VIEWS OF THE .METROPOLIS A SUPERSTRUCTURE RISES FROM THE BALCONY AND SUPPORTS A COPPER VASE OF FLAMES.
THE ALLEGORICAL SCULPTURE ON THE PEDESTAL ABOVE WAS EXECUTED BY CAIUS GABRIEL CIBBER.

TIMES OF OPENING AND CLOSING
9.30 A.M. TO 5.pm. DAILY.

CONCESSIONS £ 2-00
ADMISSION: ADULT £ 3-00 CHILD £1-00

ST. MAGNUS THE MARTYR

FISH STREET HILL. TO THE SOUTH, LEADS TO ST. MAGNUS THE MARTYR (A WREN CHURCH). ALONGSIDE WHICH, IS THE ANCIENT FOOTPATH WHICH LED TO THE FIRST LONDON BRIDGE.

Three sides of the base carry inscriptions in Latin. The one on the south side describes actions taken by King Charles II following the fire. The one on the east describes how the Monument was started and brought to perfection, and under which mayors. Inscriptions on the north side describe how the fire started, how much damage it caused, and how it was eventually extinguished. In 1681, the words "but Popish frenzy, which wrought such horrors, is not yet quenched" were added to the end of the inscription. Text on the east side originally falsely blamed Roman Catholics for the fire ("burning of this protestant city, begun and carried on by the treachery and malice of the popish faction"), which prompted Alexander Pope (himself a Catholic) to say of the area:

Where London's column, pointing at the skies,
Like a tall bully, lifts the head, and lies.
– Moral Essays, Epistle iii. line 339 (1733–1734).

SCAPEGOATING

Scapegoat: A person or group that is made to bear blame for others. According to the Old Testament, on the Day of Atonement, a priest would confess all the sins of the Israelites over the head of a goat and then drive it into the wilderness, symbolically bearing their sins away.

Wren's collaborator Robert Hooke (1635-1703) originally designed the interior as a giant telescope, with lenses at the top and bottom giving views from a small laboratory at the base. The flaming urn on top has a small trapdoor that opened to allow a view of the sky. (In fact, he – and not Wren – almost certainly designed the whole structure.) Hooke thus used the column as a zenith telescope.

A number of trap doors in the column were opened and the urn at the top was lifted (it was hinged). Lenses were then placed at various heights which permitted various astronomical observations to be carried out. Wren and Hooke were both surveyors of the city of London after the Great Fire and both member of the Royal Society and a noted experimenter. Besides Hooke's telescope, he used the Monument's 311 steps – all exactly six inches high – to measure the effects of different heights on atmospheric pressure. The experiments were soon discontinued because of the constant vibration of traffic.

The Monument ended up as what has to be London’s largest scientific instrument. Hooke and Wren designed its steps to hug the wall so there was a clear view all the way up the middle to the urn, which still conceals a pair of iron doors opening to the heavens.