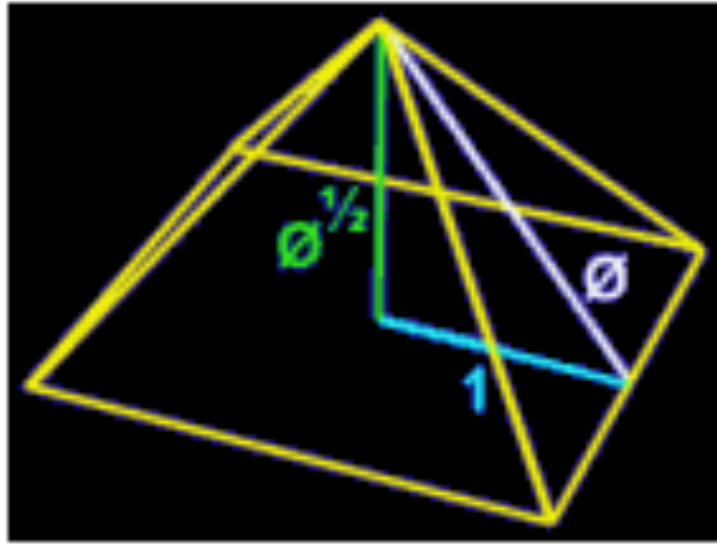
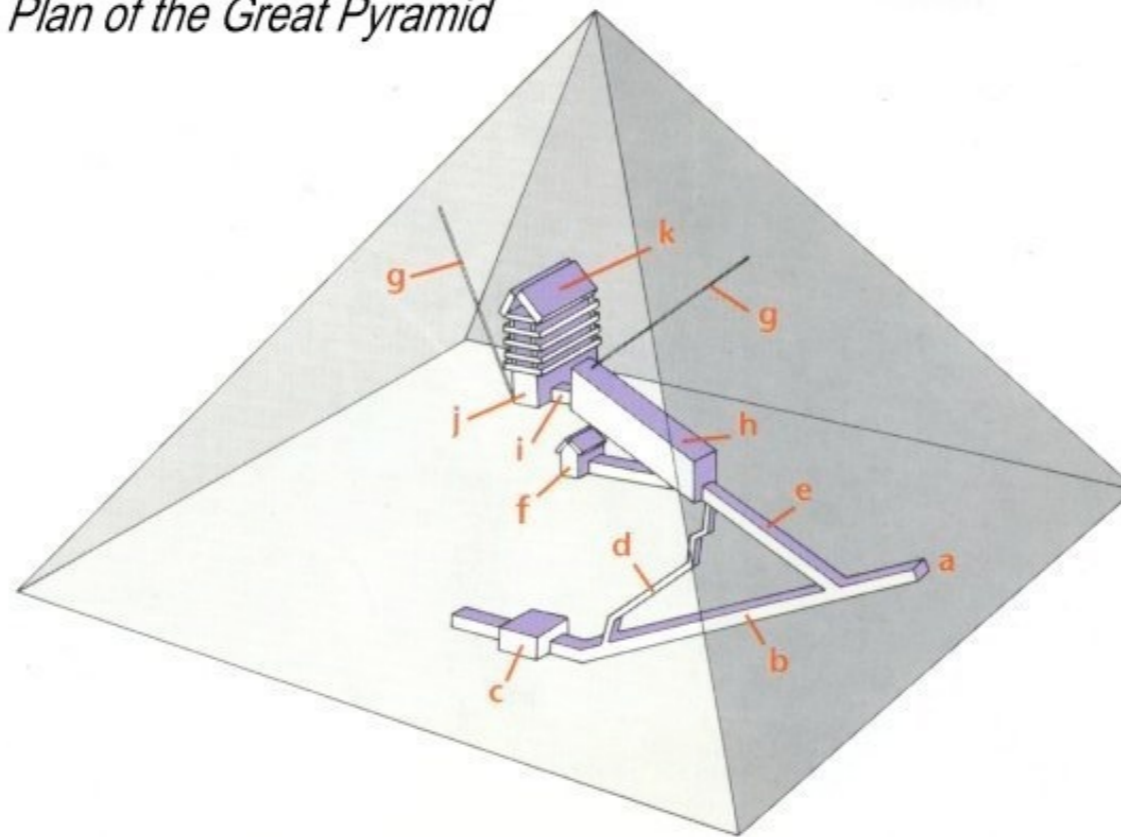


Real Life Mathematics





Plan of the Great Pyramid

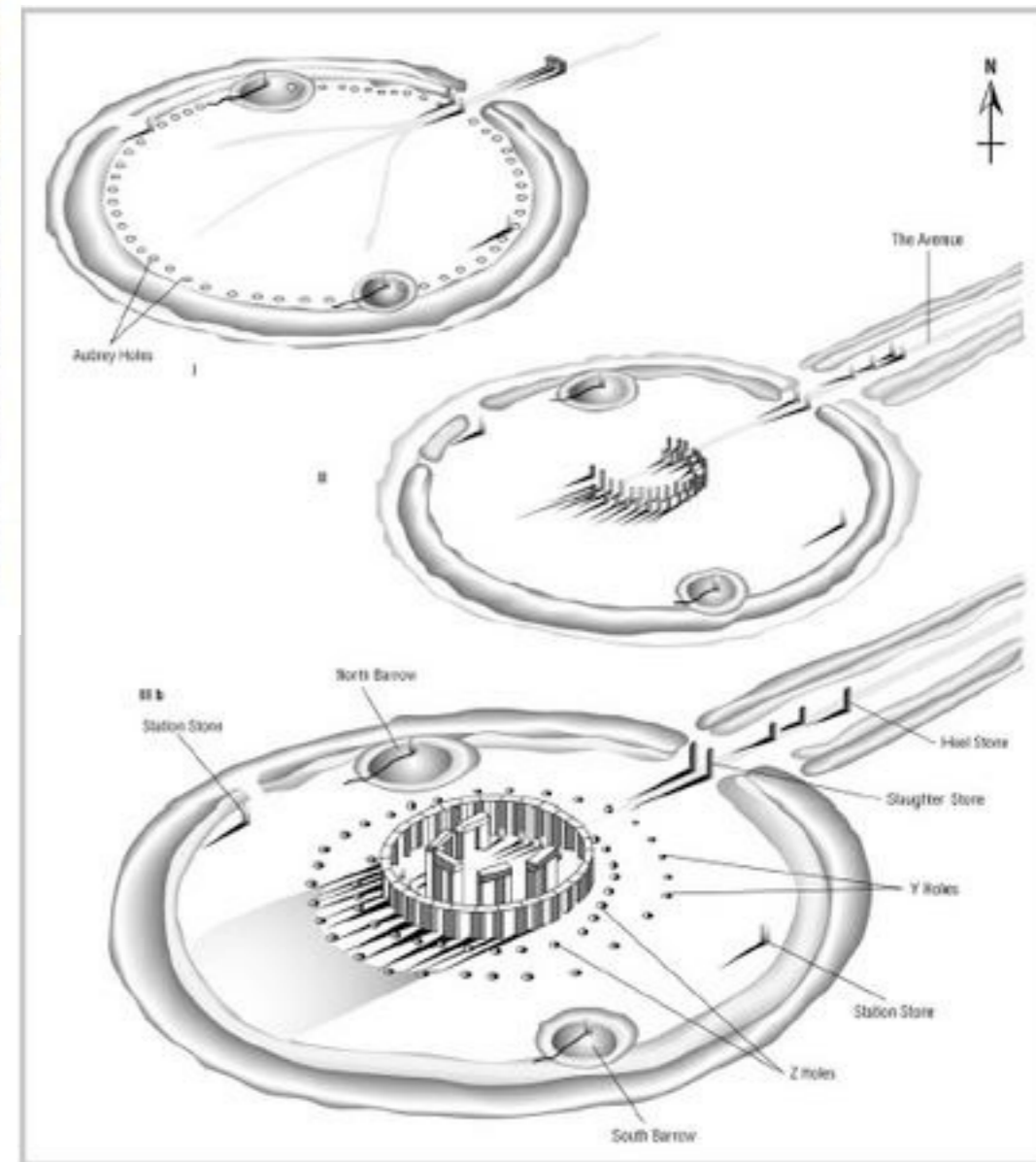


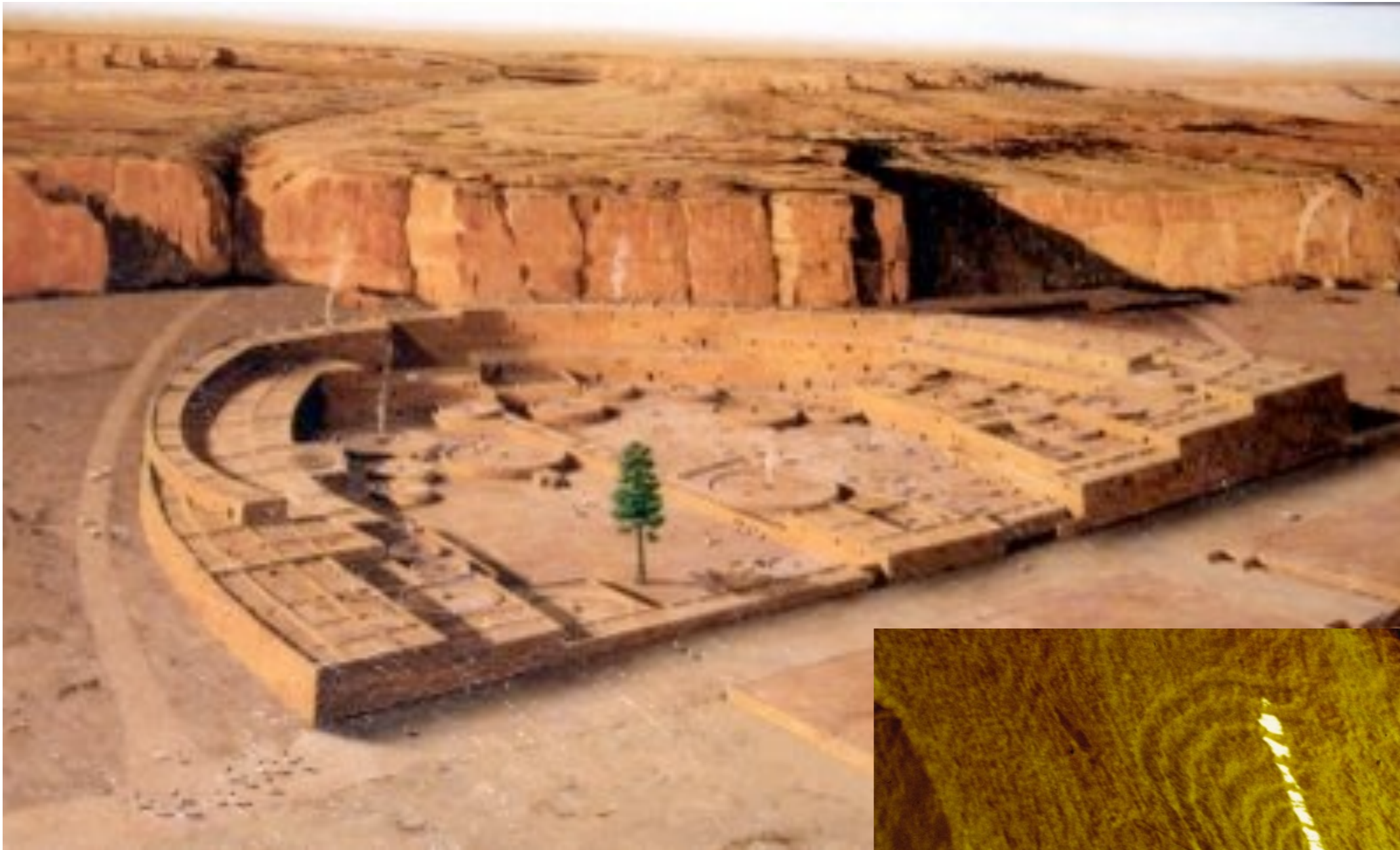
AXONOMETRIC VIEW OF THE PYRAMID OF KHUFU

- a. Entrance
- b. Descending corridor
- c. Underground chamber
- d. Service corridor
- e. Ascending corridor
- f. Queen's room
- g. Air shafts
- h. Great Gallery
- i. Antechamber
- j. King's chamber
- k. Weight relief chambers

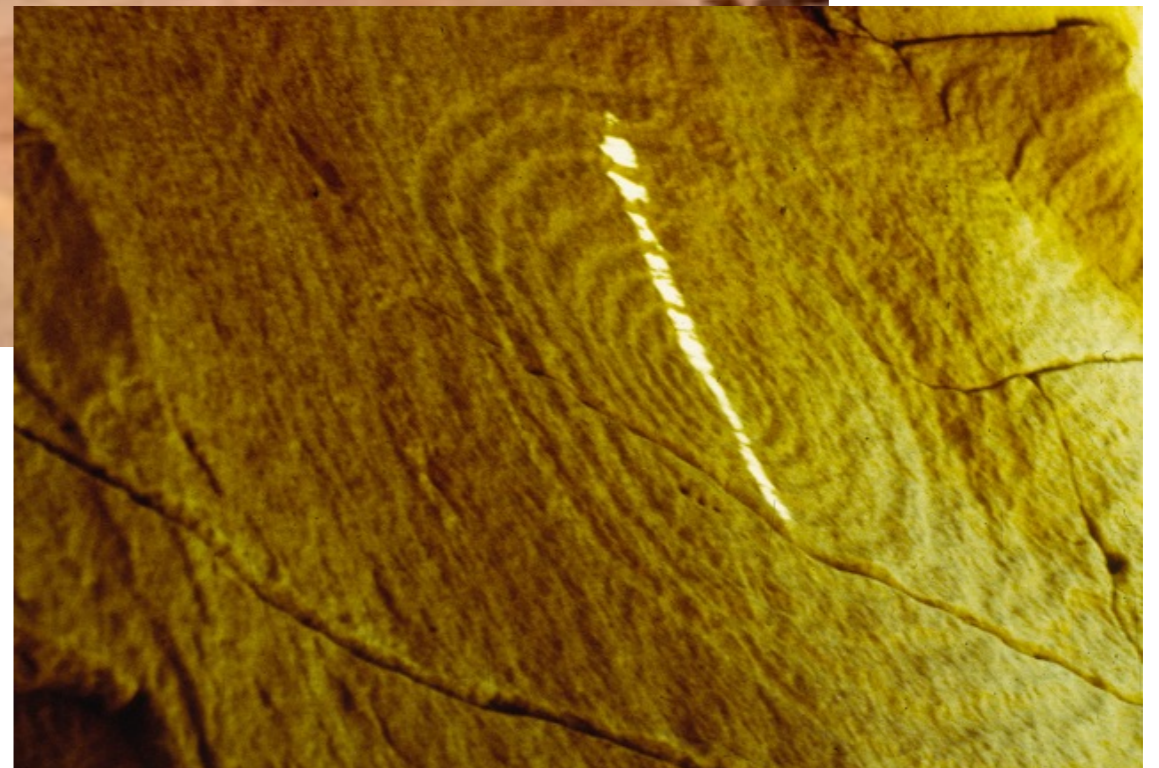


Stonehenge





Chaco, New
Mexico USA

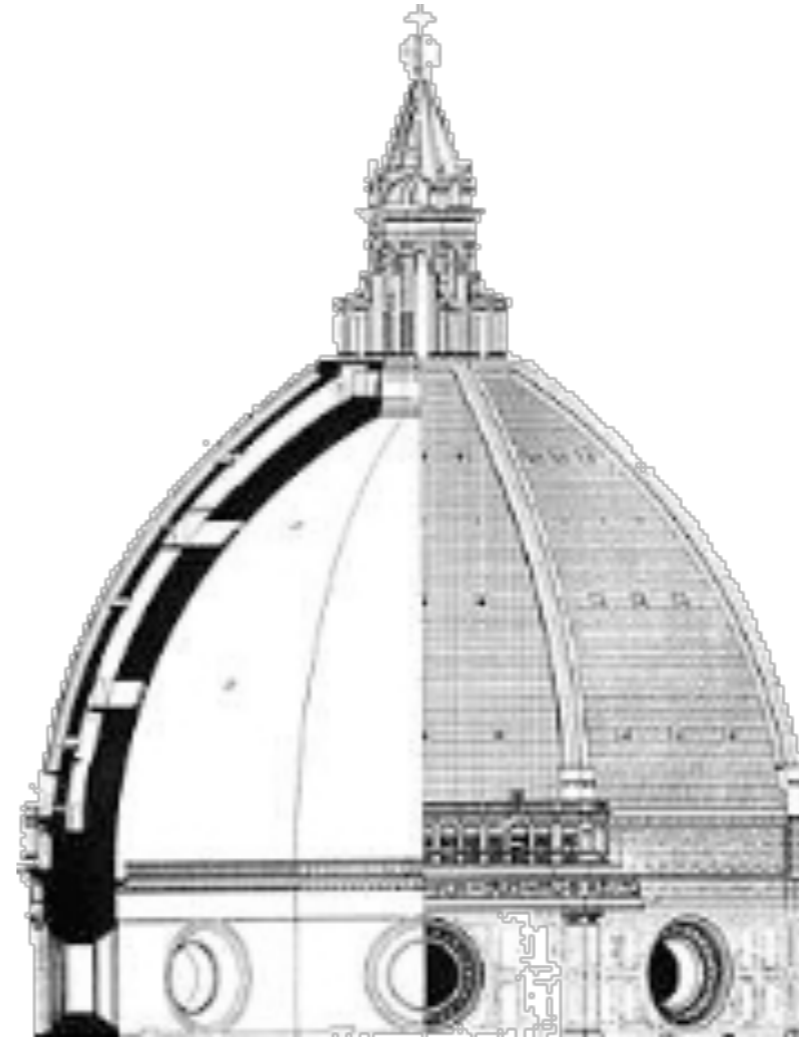




1200 years ago

al-Kitab al-muhtasar fi hisab al-jabr wa'l-muqabala

("Compendium on calculation by completion and balancing")



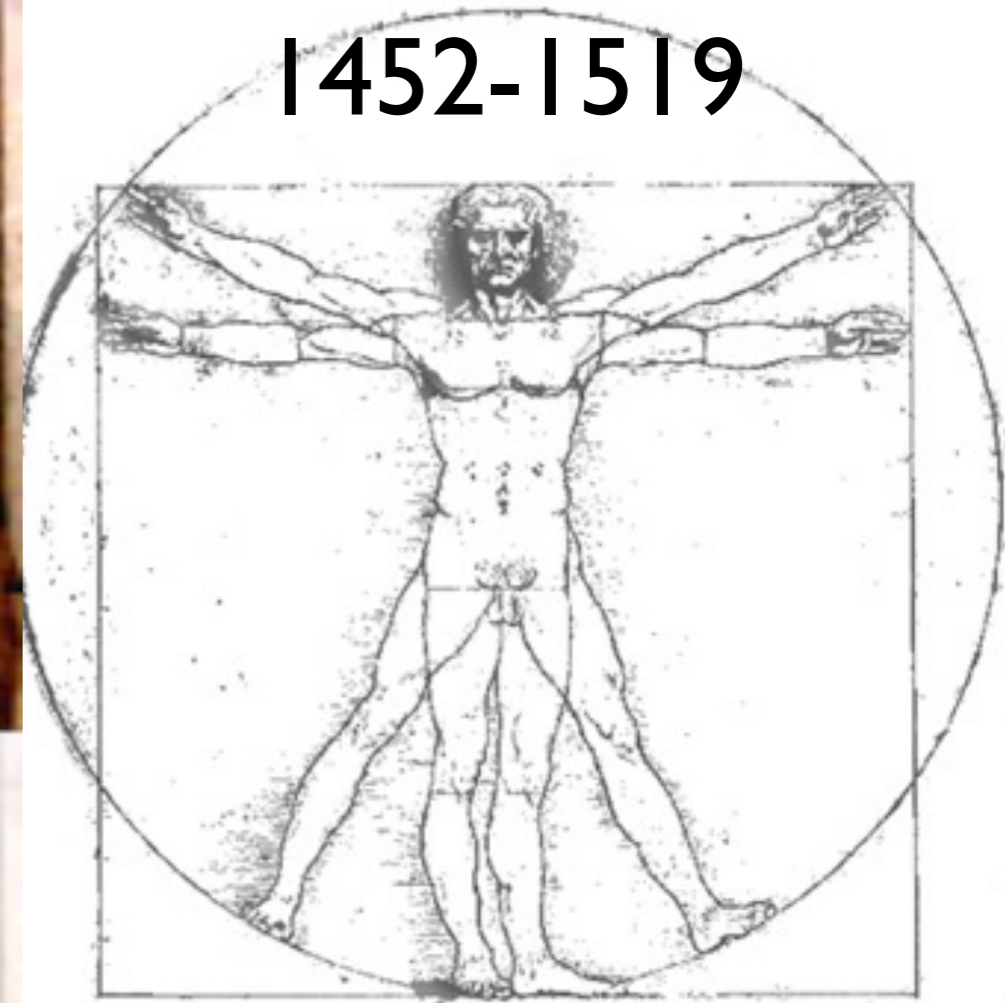
**Brunelleschi's dome
Florence, Italy
late 1400's**

Perspective



Flagellation of Christ by Piero della Francesca, late 1450s; in the National Gallery

Leonardo Da Vinci 1452-1519



related to an artistic technique called *trompe l'oeil* (French for "deceiving the eye", produce a "trick" image, but the difference lies in the nature of the trick. For an anamorphosis, the image is distorted and only makes sense when viewed conventionally, and so he or she must seek out the unconventional viewer, standing in one particular (and usually conventional) place, is tricked into seeing a different image. A famous example of the technique is the fresco painting on the ceiling of the Church of Saint Ignace in Rome. The circular roof is transformed into a fantastic picture of the heavens, in which Saint Ignace is





Magic Square Cathedral

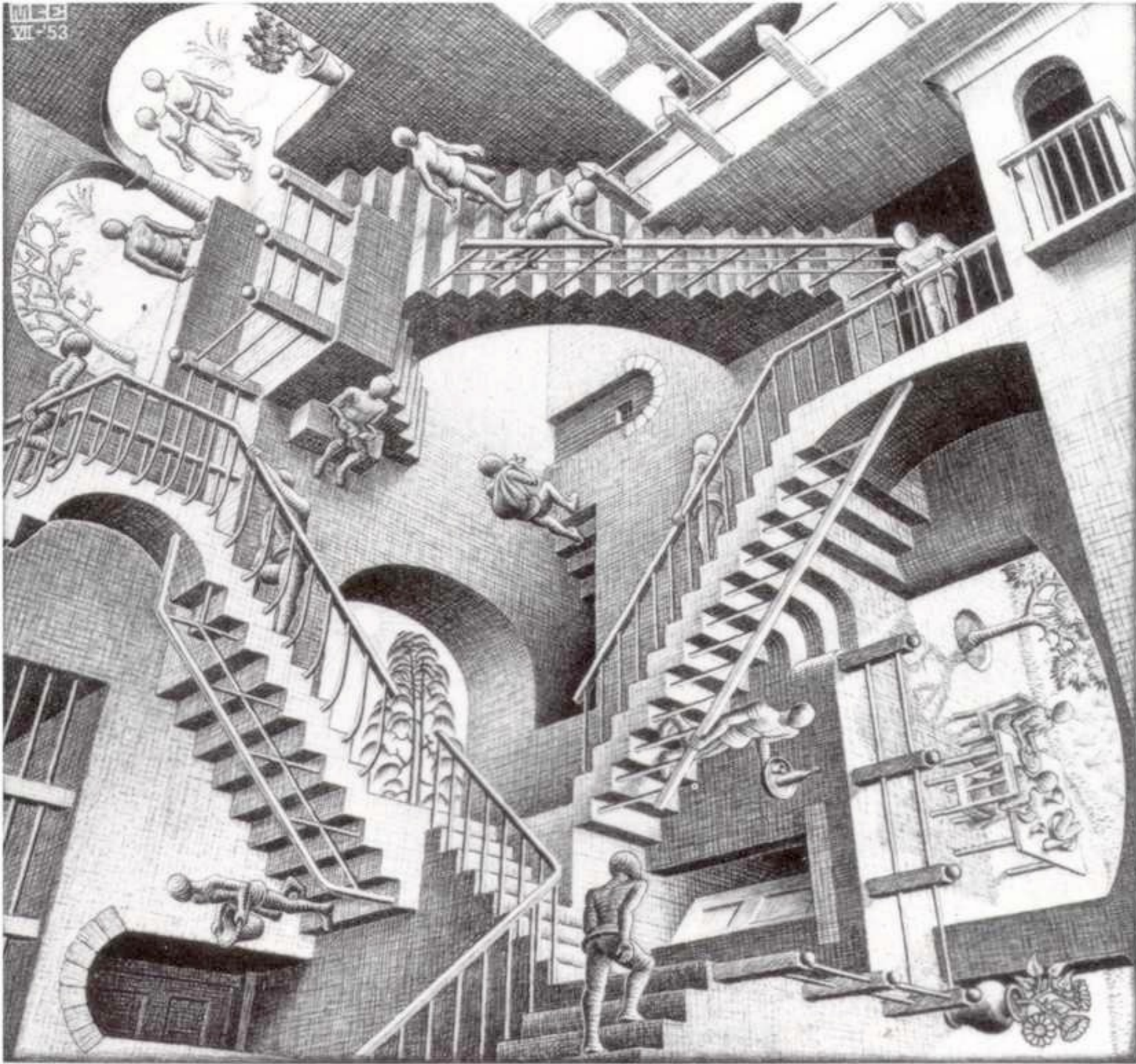


**antoni gaudi
late 1800's**





VI-53



TWON







Möbius Strip Temple

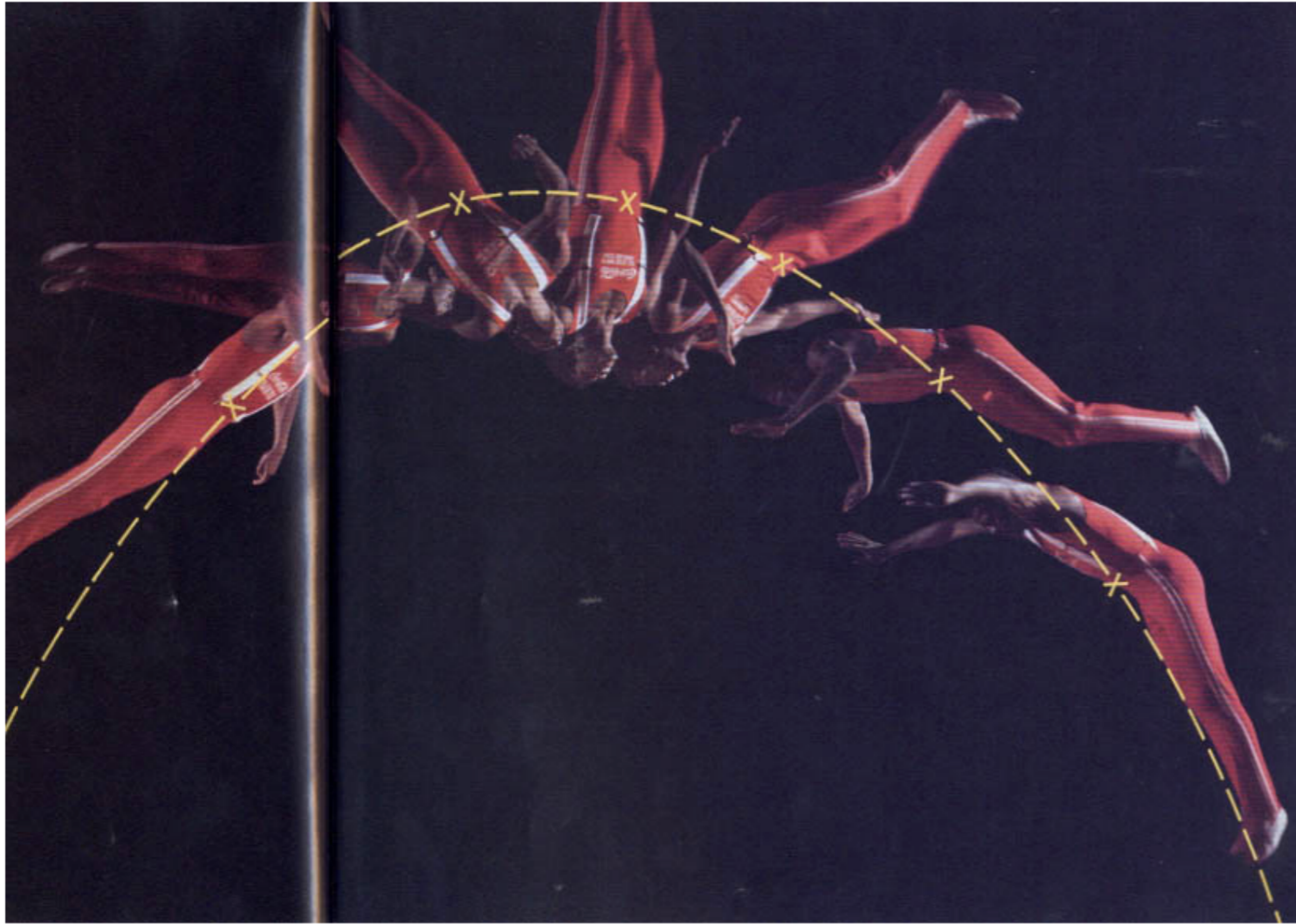
modern

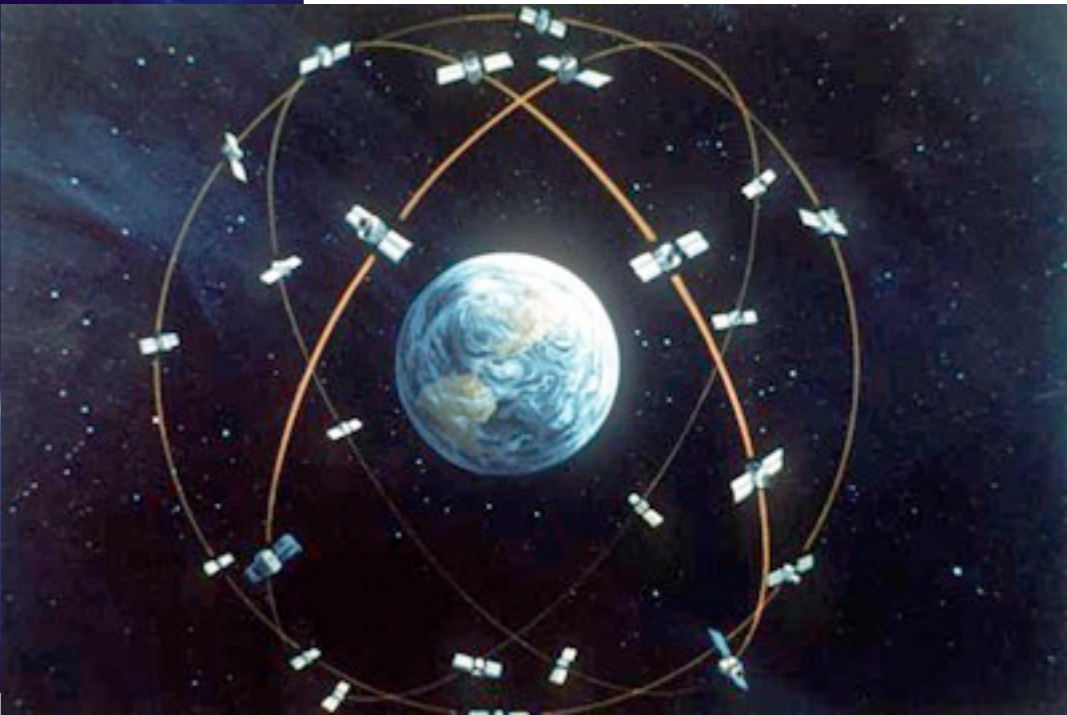
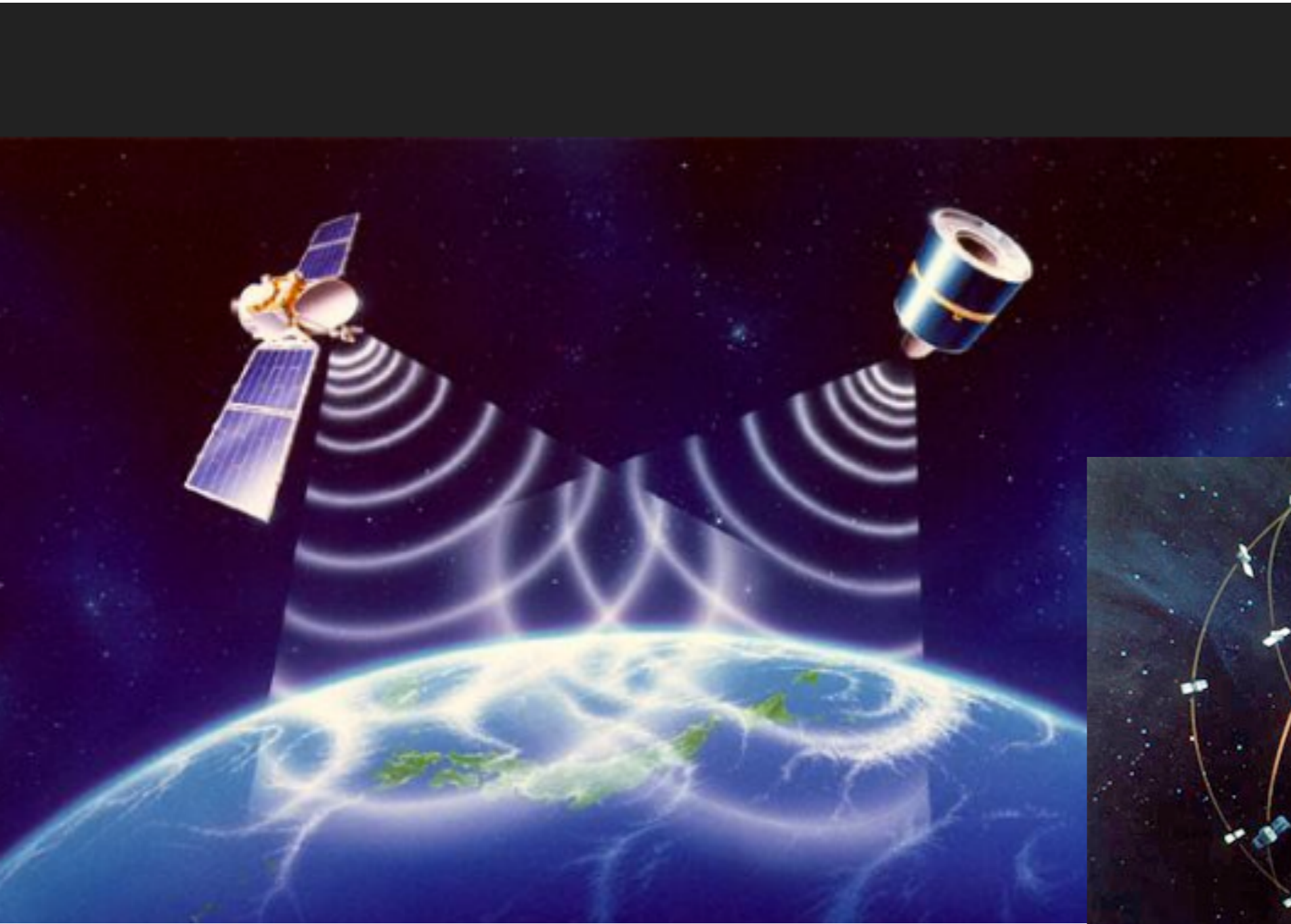


Pentagonal, Phyllotactic Greenhouse and Education Center

Cornwall, England's [Eden Project](#) is home to the world's largest greenhouse, composed of geodesic domes that are made up of hexagonal and pentagonal cells. The social, environmental, and arts/education







Digital Images

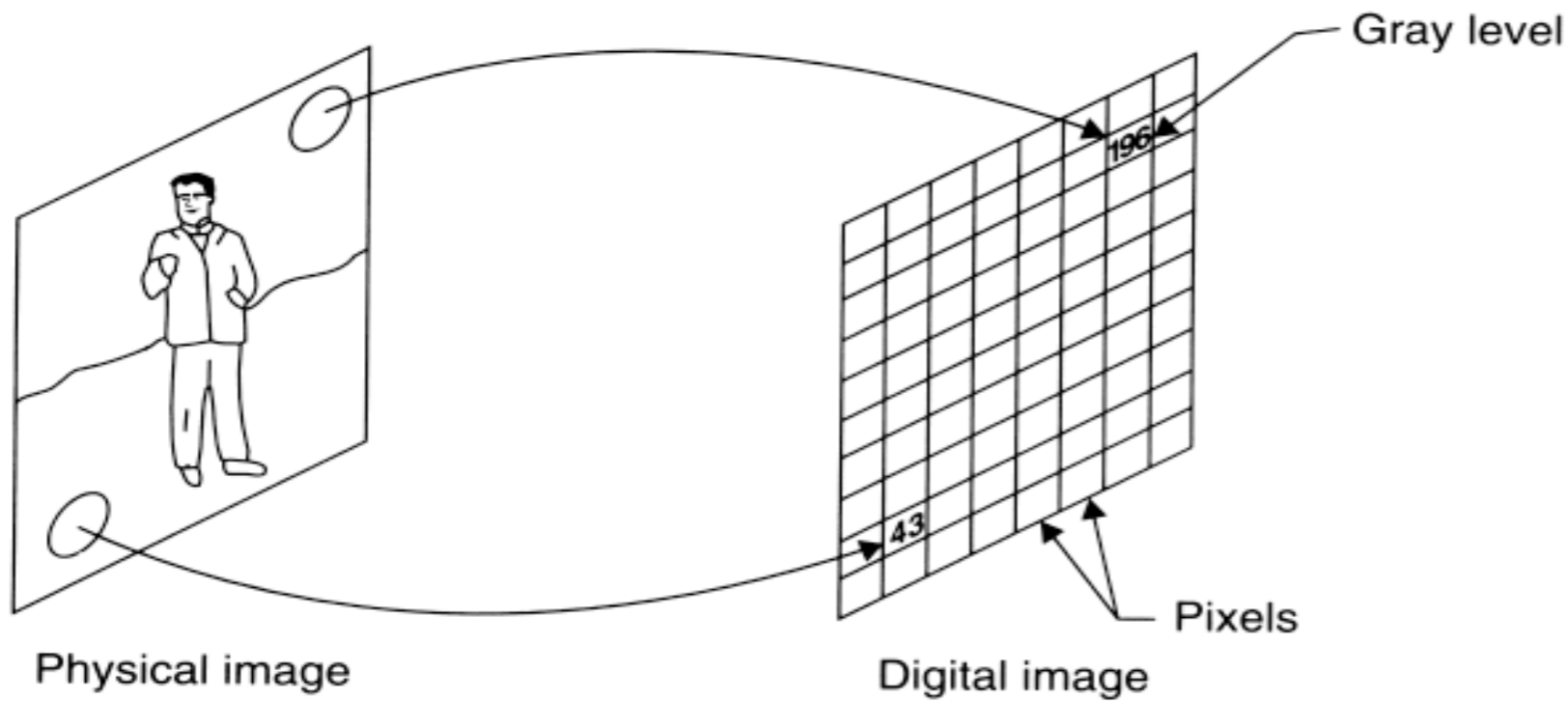


Figure 1-1 A physical image and a corresponding digital image

Averaging numbers « smoothing or reducing image size

Idea of averaging: take an image

Replace each point by average with its neighbors

$$\frac{70+22+57+22+2+2+37+1+6}{9} = 24\frac{1}{3}$$

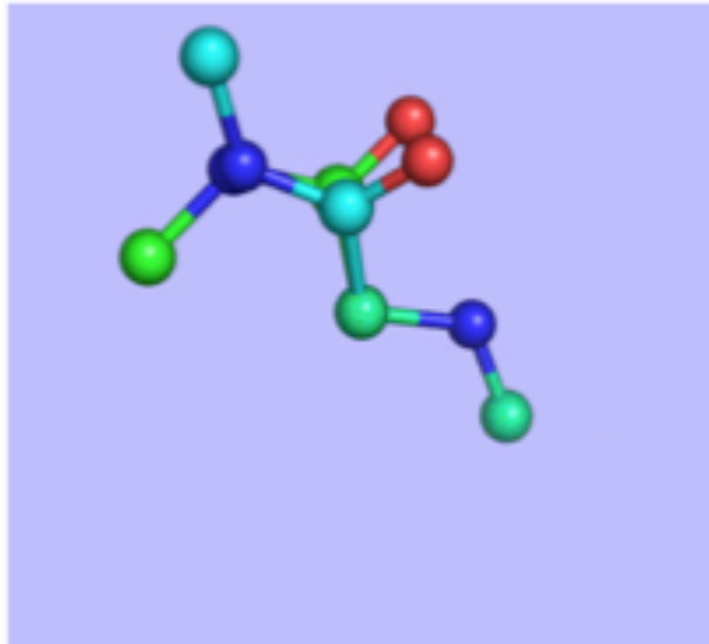
80	81	80	80	80	80	77	77	37	11
81	80	81	80	80	80	77	37	9	6
80	80	80	80	80	80	37	11	2	11
80	80	80	80	80	77	66	66	66	54
80	80	80	80	77	77	77	80	77	80
80	80	79	77	66	54	66	77	66	54
77	80	77	70	22	57	51	70	51	70
77	73	70	22	2	2	22	37	37	22
77	77	54	37	1	6	2	8	2	6
77	70	70	22	2	2	6	8	8	6

MATHS IN MEDICINE



Medical imaging - how to reconstruct the shape of a tumor from CAT scans, and other medical measurements. Lots of new geometry and other math was (and still is being) developed for this.

Protein modeling. Much of the function of a protein is determined by its shape and how the pieces move. Mad Cow Disease is caused by the introduction of a 'shape' into the brain (a shape carried by a protein). Many drugs are designed to change the shape or motions of a protein - something that we are just now working to model, even approximately, in computers, using geometry and related areas (combinatorics, topology).



MATHS IN NATURE



Dorling Kindersley

MATHS IN BIOLOGY



- **Physics, chemistry, biology,**
- Symmetry is a central concept of many studies in science - and also the central concept of modern studies of geometry. Students struggle in university science if they are not able to detect symmetries of an object (molecule in stereo chemistry, systems of laws in physics, ...). the study of transformations and related symmetries has been, since 1870s the defining characteristic of geometric studies

