**Ch. 2 *A Brief History***

***of Astronomy***

I. **Ancient Astronomy** (Sec 2.1)

A. Early Knowledge of the Night Sky

1. The earliest societies of hunters &

gatherers needed to know the

.

2. Later,  needed to know

when to plant, harvest, etc...

3. Later still, stars were important for

. Ex/ North star

B. Ancient 

1. –

Heelstone marked the Summer





2. Big Horn Medicine Wheel

- North American – Plains Indians



3.  Mayan temple

Even tracked  (for sacrifices)



Name 

4. Machu Picchu ()



C. Ancient Chinese Astronomers

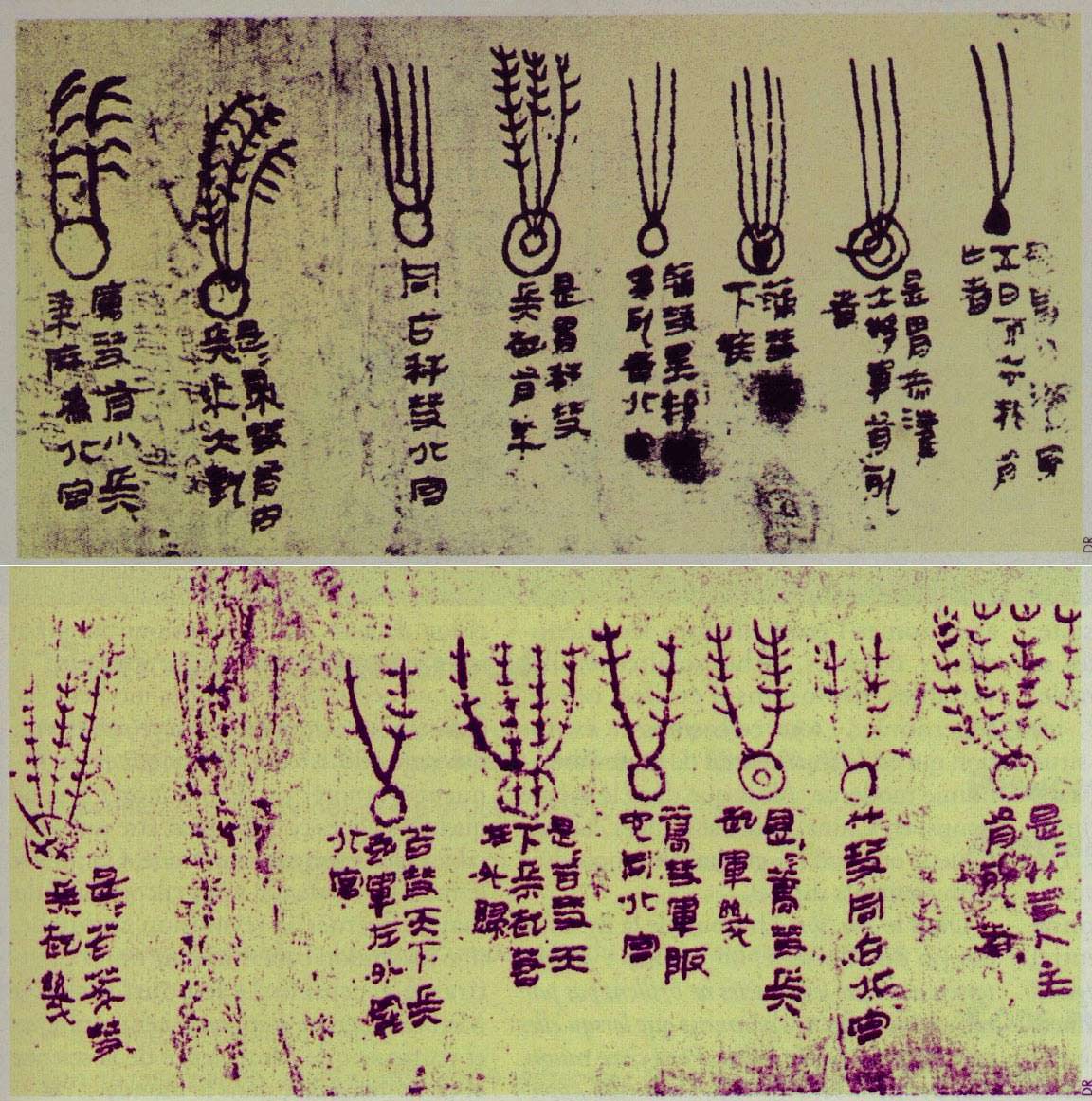
1. The Chinese kept careful records of

unusual or rare occurrences.

2. "Guest Stars", for example, was

their term for 

3. They also tracked .



II. **Classical Astronomy** (2.2)

A. Celestial motion

1. Stars seem to have a

position, so ancient

people could explain them easily.

2. The Sun and Moon have seemingly

 orbits and could also

be explained somewhat easily.

3. But the  known planets, or

“Planetas”, seemed to wander!

a. Why 7 days of the week?

b. Variable  is due to

their varying distance, but the

ancients didn’t understand. But

there was a bigger mystery…

c.  **Motion**: The

apparent  motion

of planets in the sky. Ex/Astrology



B. Ancient cosmology

1. **Aristotle** (300's B.C.)

a. Brilliant thinker who supported the

 model.

b. And, this philosopher thought

orbits should be !

2. **Ptolemy** (A.D. 140)

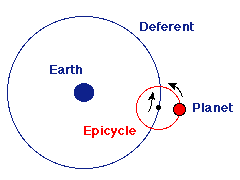
a. Wrote hugely influential book

called Syntaxis, or "*The*

*”*

b. He used “ to

explain retrograde motion



3. **Aristarchus** (200's B.C.)

a. Proposed a crazy idea – the

 theory!

b. Arguments he faced:

i. Earth doesn't seem to 

ii. No strong  as we orbit

iii. NO  *detected*

Note: This is a perfectly

reasonable argument against the

theory & why it didn’t catch on.

4. The Middle Ages (or “Dark Ages”)

a.  astronomy was at

the forefront of math and science.

b.  ancient knowledge,

including books such as The

 (the Great Book)

c. Arabic 

still used today Ex/ 

III. **Birth of Modern Astronomy**

(Sec 2.3)

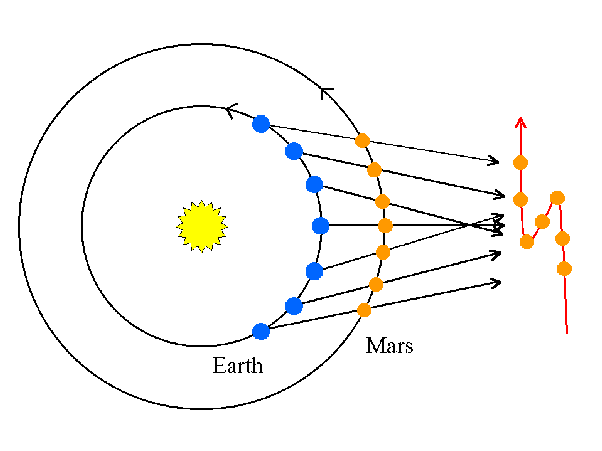
A. **Copernicus** (1500's)

1. Revived the long-forgotten

 **theory**

2.Why? Because he could explain

 motion



3. Kept  orbits, though

4. Books written in  only

- "*de Revolutionibus*" Why?

5. Church, scholars were critical, but

he preferred to  than face scrutiny!



B. **Galileo** (1564-1642)



1. Was a modern scientist in that he

conducted .

a. Created 

– Study of distance, speed, etc..

b. His most famous experiment

supposedly in town of 

c. He showed that \*All objects

 at the  rate

d. The catch – this is true when there

is no  resistance. Ex/

2. Embraced 

Ex/ Built and used one of the first

 Dec. 1609

a. 's craters / mountains

b. First to see !

c. Measured Sun's 

\*d. Discovered the 4 large moons

 and showed they

were not !

e. Observed phases of 

3. Book in 1610 - "*The *

*”*

4. Later… Church condemnation/trial

a. Giordano  (1600)

b. Galileo – House arrest

IV. **Laws of Planetary Motion**

(Sec 2.4)

A. **Tycho Brahe** (Late 1500's)

1. Built an 

called Uraniborg.

2. Last great naked-eye astronomer

3. Using sextants, etc.. calculated

accurate  positions

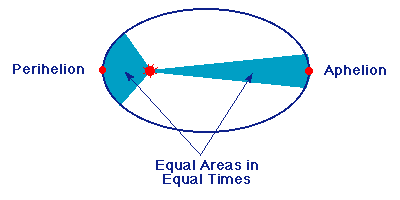
B. **Johannes Kepler** (1571-1630) &

his 3 Laws of Planetary Motion

1. Orbits are , meaning they have an ***eccentricity*** > 0

2. Planets carve out equal areas in

equal amounts of time (1609)



a. Therefore… planets must

  near Sun!

b. NASA uses this all the time – it’s

nicknamed The 

Effect! Ex/ 

3. Law of Harmony (1619)

Square of  ~ Cube of 

T2 ≅R3

a. The farther away a planet is, the

longer it takes to orbit the Sun.

b. It’s not the “radius”, but ‘a’

After thousands of years, the model was correct!! But what causes this motion…

V. **Newton** (\*1642-1727) (Sec 2.5)



A. Early Years

1. Famously left Trinity College of

Cambridge due to the 1665 plague

2. First related linked a falling

 to motion of the Moon.

3. Became a great mathematician and

studied optics and alchemy (oops!)

4. Developed an intense rivalry with

Robert  , became a recluse

B. Sir Isaac Changes the World

1. Edmund  persuaded

him to write / publish his epic book

a. "*The ”* 1685

b. Most influential physics book ever

2 Basis for **Newtonian **

a. 3 Laws of 

b. Law of 

3. Invented  (Leibniz)

4. Invented reflecting 

