Lesson N°05

Sixteenth and seventeenth centuries

I. The Renaissance [16th century: 1450-1600]:

This is the period in which modern, experimental science was born, and is identified with the Renaissance, a broader social transformation that also included changes in society, culture and, in particular, art. The 16th and 17th centuries involve [**20** ; **21**].

- ❖ The birth of a new state of mind
- ❖ Criticism of the old conceptions that had dominated biology
- ❖ The systematic use of observation, experimentation and quantification
- ❖ In biology, the invention of the microscope at the end of the 16th century and its development during the 17th century.

⇨ We will differentiate two periods with quite different characteristics [**22**] :

1. Sixteenth century (16th) :

Biological and medical sciences underwent two major developments during this period :

- ⇨ Progress in the description of human anatomy
- ⇨ The publication of numerous illustrated works on zoology and botany

2. The 17th century :

In the 17th century, the "scientific revolution" was made possible by the mathematization of science. This century was characterized by the significant growth of experimental methods and mechanistic interpretations of the living world, and by the introduction of the microscope to biological observations [**23**].

- ⇨ **Dissecting the human body**
- ⇨ **Printing**: in the Middle Ages, books were copied by hand by monks. Around 1450, **Jean Gutenberg** invented printing with movable type for each letter: this technique made it possible to print books in large numbers.
- ⇨ **Astronomy**: in 1543, the work of Polish astronomer **Nicolas Copernicus** demonstrated that the Earth is not at the center of the universe (as was believed in the Middle Ages) and that it revolves around the Sun.
- ⇨ **Zoology**, **botany**, **medicine** and other **natural sciences** in particular developed during this period.

The very **first microscope** was created in **1595**, during the reign of King Henry IV. It was **Zacharias Janssen**, a Dutch eyeglass manufacturer, who came up with the idea of

superimposing two lenses (the spectacles of the time) in sliding tubes, in order to zoom in on very small things.

80 years later, **Antoine van Leeuwenhoek** and **Robert Hooke** made a number of modifications, to observe things that were invisible to the naked eye! In particular, they observed human cells, protozoa and bacteria.

II. Examples of 16th and 17th century savants

Savants	Years	Theory and discovery
Léonard de Vinci	1452-1519	Dissects animals and human cadavers Recognizes the 4 cavities of the heart
André Vésale	1514-1564	The greatest anatomist of the century: revolutionizing anatomy
Michel Servet	1511-1553	Perfects the description of "small circulation"
Gabriel Fallope	1523-1562	studies the nervous and reproductive systems
Fabrice d'Acquapendente	1533-1619	Gives the first (Western) description of human venous valves
Bernard Palissy	1510-1589	Father of paleontology
Francesco Redi	1626-1697	He proves experimentally that spontaneous generation does not exist
Von Leeuwenhoek	1632-1723	describes red blood cells, bacteria and spermatozoa
Robert Hook	1635- 1703	describes a fly's eye and a plant cell
Marcello Malpighi	1628-1694	demonstrated that the animal comes from the egg (fertilization of the spermatozoon and an ovum in the Fallopian tubes (preformation theory)
Nehemiah Grew	1641 – 1712	plant sexuality
Andréa Césalpin	1519-1603	uses analysis of the entire plant, in particular flower, fruit and seed
John Ray	1627-1705	physiologist, classifies over 18,000 plants
Joseph Pitton de Tournefort	1656-1708	of a natural system (plants), senses the genus of the current system