TIMELINE – CHAPTER 3

THE HUMAN ORGANISM AND THE BEHAVIOUR OF FLUIDS

2005 **Kyoto Protocol on reduction of CO_2 emissions comes into force**

The Kyoto Protocol was ratified by 156 world nations—among those opting out were the United States and Australia. Members of the protocol have as their objective the reduction of greenhouse gases (most notably carbon dioxide, nitrous oxide and methane) that have a huge negative impact on Earth's climatic systems. The member countries also are required to publish inventories of their greenhouse gas emissions and establish programs aimed at reducing climate change. However, this treaty has been criticized and questioned by certain scientists who insist that human activity is not responsible for global warming and that the Kyoto Protocol will entail unnecessary and pointless spending.

1955 **Invention of the hovercraft**

The hovercraft, an amphibious vehicle on a cushion of propelling air, is used for the transport of passengers and vehicles, and also serves as a military vehicle. The first patent for the hovercraft was granted to French engineer Clément Ader around 1904. Invention of the first commercial hovercraft is attributed to English engineer Christopher Cockerell. Soon after in France, engineer Jean Bertin played an important role in perfecting the hovercraft. This type of vehicle is equipped with a supple base (skirt) that limits air leaks and permits passage across uneven and varied terrain such as ground, water, mud, sand, snow and ice.

1931 **Use of freon gas for refrigeration**

This was the beginning of the use of this type of gas as a cooling fluid in air-conditioning and refrigeration systems, replacing more toxic gases such as ammonia. These gases are among the group of CFCs (chlorofluorocarbons), gases made up of chlorine and fluorine, that are harmful to Earth's ozone layer and gradually being taken off the market.

1881 **Invention of the sphygmomanometer for measuring blood pressure**

Known commonly as a "blood pressure meter," this instrument replaced the mercury manometer invented in 1819 by French doctor and physicist Jean-Louis Poiseuille, of which the measurement scale of units in mercury millimetres is still in use today. In 1896 Italian physician Scipione Riva-Rocci invented the modern inflatable cuff, which has facilitated the measurement of blood pressure.

1850 **Invention of the hypodermic syringe**

Nearly two centuries after introduction of the injection syringe, the hypodermic syringe was invented by French physician Charles Pravaz. It features a hollow needle and an adjustable plunger to control the quantity of a substance injected into the body, such as morphine to relieve pain. Around 1878 Émile Roux, a collaborator of Louis Pasteur, developed a syringe made entirely of glass that could be sterilized for vaccinations.

1797 First recorded parachute jump

The parachute, conceived by Italian inventor Leonardo da Vinci around 1490, was not employed to slow the fall of a person until 1797 when André-Jacques Garnerin of France jumped from a hot-air balloon over Parc Monceau in Paris. He patented his invention in 1802. The first use of a parachute to jump from an airplane came a number of years later, in 1912, over Saint Louis, Missouri, by an American named Albert Berry. He was followed in 1913 by Adolphe Pégoud of France, who jumped into the air with a parachute over Châteaufort near Versailles.

1783 Invention of the hot-air balloon

The hot-air balloon was designed by French inventors Joseph and Étienne de Montgolfier in 1782. Later French physicist and chemist Jacques Charles invented and flew a gas-filled balloon. The gas was oxygen, which had been discovered a little earlier in 1774 by English chemist Joseph Priestley. Jacques Charles continued his work with gases and was first to formulate the law of dilation of gases.

1738 Demonstration of Bernoulli's principle, which explains air currents

This principle is the basis for fluid mechanics. Swiss doctor, physicist and mathematician Daniel Bernoulli established the parameters for hydrodynamics, or the study of the behaviour of fluids—liquid or gas. It is this principle that allows for the design of wings capable of supporting planes heavier than air.

1690 Design of the steam-driven piston pump

The first steam-driven piston pump was conceived after a number of trials by French physicist and inventor Denis Papin. This atmospheric steam-powered machine never had an industrial use, but led to the invention in 1698 of the steam engine by Thomas Savery.

1643 Invention of the barometer

This instrument, used to measure atmospheric pressure, was invented by Italian physicist and mathematician Evangelista Torricelli, a student of Galileo. The first barometer was made from a glass tube containing mercury under a closed, airless space. The barometer was invented after it was discovered that air exerts pressure. Around the same time, French physicist and mathematician Blaise Pascal demonstrated that air pressure decreases with altitude, as well as the connection between changes in air pressure and meteorological change. Since then, we have used the barometer to help us predict the weather.

CIRCA 600 Beginning of the use of windmills

An ancestor of the wind turbine, the windmill is used to produce mechanical energy by harnessing the force of the wind and was placed into service to turn a mechanism for grinding grain or pumping water. Vertical-axis mills were used in Persia (now Iran) as early as 600 to irrigate farmland. Later in the 15th century the windmill was widely used in Europe, notably Holland, to power pumps for draining land at an altitude below sea level. Eventually the steam engine took the place of the windmill in this system.

CIRCA 50

Invention of the fountain-feeder water pump

Greek engineer and mathematician Heron of Alexandria designed a number of hydraulic machines, including a fountain called *Heron's fountain*. The vertical spout of this fountain was powered by compressed air and could function for a number of hours.

CIRCA –100

Construction of the first watermill

In a watermill, the force of a current was harnessed to turn a stone used for grinding grains and extracting their oils. This type of mill, older than the windmill, was first built in the region of Turkey and consisted of a horizontal wheel powered by water energy. The system is described in a work by Roman architect Vitruvius. For many centuries, this was an important source of energy and an essential tool of daily life in Europe and Asia.

CIRCA –5000

Invention of skis

Skis were long an important means of transport in northern countries such as Siberia, Sweden and Norway, as well as an important tool for hunters. Long strips of wood, simply crafted and equipped with rudimentary bindings, allowed for the body's weight to be distributed over a surface area instead of bearing on one spot and sinking in the snow. Ski design was improved through the centuries until skiing became a popular winter sport early in the 20th century.