TIMELINE – CHAPTER 2

THE HUMAN ORGANISM AND THE POWER OF ENERGY

1998 Inauguration of the windmill park at Cap-Chat in Gaspésie

The windmill park at Cap-Chat began operation at full capacity with 76 horizontal-axis wind turbines. The site also contains the highest vertical-axis wind turbine in the world, nicknamed "Éole," measuring 110 metres tall. The Le Nordais windmill park, which includes the Cap-Chat site, was completed in 1999 at a second site located near Matane, which has 57 additional wind turbines. It is now the biggest windmill park in Canada, and one of the largest in the world.

1976 Invention of the snow cannon

The snow cannon that preceded today's snow cannon was developed in France to improve the start and finish of the season for ski resorts. By shooting pressurized water into the air, tiny crystals could be made. These crystals would then turn into snowflakes before falling to the ground. For these operations to be successful, an equilibrium is needed between the conditions of coldness and humidity of the air. In 1985 the first Québec-made snow cannon began operating at Stoneham in Québec City.

1944 Establishment of Hydro-Québec

The foundation of Hydro-Québec was the first phase in the nationalization of the electricity services on the island of Montréal, which until then had been the property of the Montreal Light, Heat and Power Company. At the time, the company owned only four power stations for the production, transportation and distribution of electricity: Chambly, Les Cèdres, Rivière-des-Prairies and Beauharnois. In 1963 the second phase of the nationalization of electricity began: Hydro-Québec extended itself throughout Québec and acquired little by little the other private distributors of electricity.

1886 Electrical lighting of the streets of Montréal

The first electrical streetlights appeared in Montréal, gradually replacing gas-fired lamps. By 1889 the entire city was lighted by electricity. Between 1880 and 1890 Toronto and Winnipeg were also among the first cities in Canada to offer electrical lighting. At the 1878 Exposition universelle de Paris this new means of lighting was introduced as being one hundred times brighter than gas-fired lamps.

1876 Development of the four-stroke engine

Following a patent application in 1862 by French engineer Alphonse Beau de Rochas, German engineer Nikolaus Otto built the first gas-powered four-stroke engine. This type of engine operates on a cycle characterized by the four movements, or strokes, of a piston from the top to the bottom of a cylinder. The design was a fundamental step toward the invention of the automobile and today the four-stroke principle is still the one most commonly used in vehicle engines and in many types of tools.

1850 Invention of the air conditioner

In 1850 American doctor John Gorrie invented the first air-cooling system for his patients with high fever. He attached containers filled with ice under ceiling fans. Since cold air is heavier than warm air, the air around the patients was rapidly cooled. The following year Dr. Gorrie patented the first ice-making machine. Although it was not until 1902 that the modern air-conditioning system was invented by American engineer Willis Haviland Carrier, Dr. John Gorrie is considered the father of air conditioning and refrigeration.

1831 Invention of the match

The principle of the friction match was discovered in 1827 by English chemist John Walker. In 1831 Charles Sauria of France made these matches less dangerous by adding white phosphorous. At the same time, Stephen Von Roemer of Austria was conducting similar research that led to the similar concept of a phosphoric friction match. In 1845 Austrian chemist Anton von Schrötter replaced this toxic substance with red phosphorous, which is less harmful and safer. Later, around 1845, a group in Sweden invented the safety match (also known as the Swedish match), the first to be struck on a special surface covered in a composition of red phosphorous and other substances.

1800 Invention of the pile battery

In the course of his work on electrical phenomena in living organisms, in particular the nerves and muscles of the frog, Italian physicist Alessandro Volta invented the battery. It was composed of a pile of disks (hence the term "pile" battery) made of two metals, zinc and copper, separated by cloth or cardboard soaked in a saline solution. To generate electricity (the first continuous current), Volta's battery made use of the differing electrical potentials of two metals linked by a liquid conductor. The saline solution was later replaced by an acid solution. Discovery of the battery is the origin of the study of electric current.

1742 Invention of the Celsius scale

The Celsius scale, initially called the *centigrade* scale, was the brainchild of Swedish physicist and astronomer Anders Celsius, who invented the first relative temperature scale, of which the unit of measurement is the degree Celsius. At first the scale used zero as water's boiling point and 100 degrees as water's freezing point. Later, around 1744, the scale was reversed to become the one used today.

1698 Patent for the first steam engine

The first steam engine was patented by English engineer Thomas Savery. The engine transformed the thermal energy of steam into mechanical energy and was placed into service to pump water out of coal mines. Savery was thus first to apply steam power for industrial use. He later worked with another English engineer, Thomas Newcomen, on developing a more powerful steam engine. This was the beginning of an important industrial revolution since man could now produce energy without depending on natural conditions such as with windmills and watermills.

CIRCA –250

Invention of the thermoscope, precursor to the thermometer

Around this time, Greek engineer Philo of Byzantium constructed an instrument that allowed him to detect an increase in air temperature. The instrument was based on the principle of the dilation of air (increase in volume of gas) from the effect of temperature. Although the thermoscope could only indicate simple changes in temperature, the thermometer is a more exact tool that can measure temperature. Based on the principle of the thermoscope, Italian physicist Galileo developed the first gas thermometer in 1593, and in 1612 Italian physician Santorio Santorio invented the first water thermometer for use in caring for his patients.

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Discovery of glass

According to one historian of the era, Middle Eastern merchants by chance discovered glass while making a fire on the beach: sand and sodium carbonate (from their wares) that melted and fused together. From that date on, the art of glassmaking grew, especially in Egypt. The oldest man-made utilitarian glass objects date from this period. Mostly bowls and flasks, these objects were moulded around a structure made of sand or clay. The technique of glassblowing, which permitted slightly greater production, was invented many centuries later, around the first century B.C., and spread throughout the Roman Empire.

CIRCA –3000

Discovery of oil

Oil is a thick black liquid mineral comprised of carbon and hydrogen. It is also known as *rock oil* (petroleum or crude oil), *mineral oil*, *natural bitumen* or even *black gold*—this last name has been known since antiquity. Oil that welled up to the ground surface was used to make the hulls of boats waterproof or burned in lamps. Ancient civilizations made use of oil for medical purposes and attributed to it all sorts of beneficial and healing qualities.

CIRCA –450 000

Taming of fire

Homo erectus was the first hominid to tame fire. Contrary to popular belief, fire was not discovered by rubbing two flint stones together—this produces only useless sparks that do not ignite. Early man used two methods to start fire: In the first, a flint stone was rubbed on marcasite or pyrite (stones containing iron disulphide), which made sparks that could light vegetable matter, then dried twigs. In the second, two sticks of hardwood were rubbed together to produce heat, which ignited the sawdust produced by the rubbing of the wood. By mastering these techniques for igniting fires, man was able to provide warmth and cook food.