

Section 2: Historical Antecedents: A Glimpse



Introduction

Human civilization had prospered in the ancient times out of necessity for survival and the endowed talent and skills of the people.

Science and Technology has been around from the beginning of time. It evolved from the everyday efforts of people trying to improve their way of life. Throughout history, humankind has developed and utilized tools, machines, and techniques without understanding how or why they worked or comprehending their physical or chemical composition

Science and technology have had an immeasurable influence on the formation of our understanding of the world, our view of society, and our outlook on nature. The wide variety of technologies and science discoveries produced by humanity has led to the building and development of the civilizations of each age, stimulated economic growth, raised people's standards of living, encouraged cultural development, and many other human activities.

The impact of science and technology on modern society is broad and wide-ranging, influencing such areas as politics, medicine, transportation, agriculture, communications, and many more. The fruits of science and technology fill every corner of our lives.



Desired learning Outcomes

At the end of this session, the students must have:

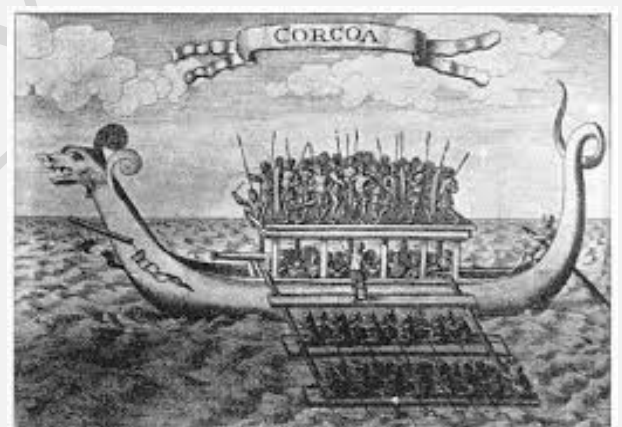
1. discussed how ancient inventions and discoveries changed the world over the course of history;
2. explained how these ancient inventions and discoveries made their impacts to the cultural, political and economic perspectives of the people;
3. discussed the scientific and technological developments in the Philippines.



Lesson Proper

ANCIENT TIMES

In the ancient times, people were concerned with transportation and navigation, communication and record-keeping, mass production, security and protection, health aesthetics, and agriculture.



SUMERIAN CIVILIZATION

Sumer was the southernmost region of ancient Mesopotamia (modern-day Iraq and Kuwait) which is generally considered the cradle of civilization.

The name comes from Akkadian, the language of the north of Mesopotamia, and means "land of the civilized kings". The Sumerians called themselves "the black headed people" and their land, in cuneiform script, was simply "the land" or "the land of the black headed people" and, in the biblical Book of Genesis, Sumer is known as Shinar.



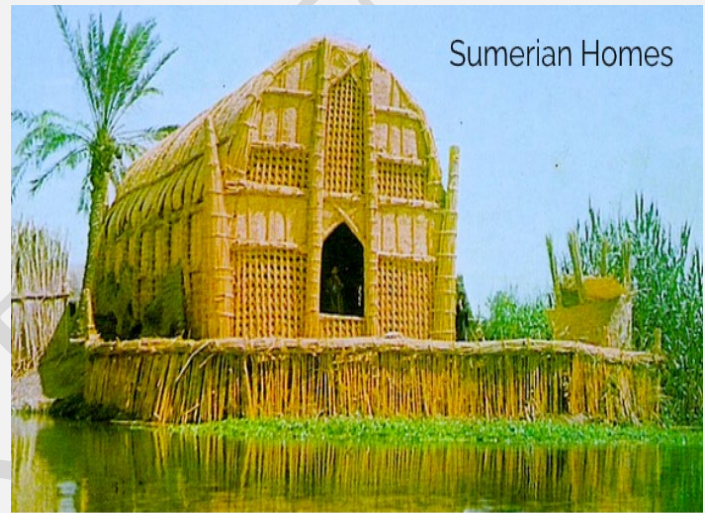
The Sumerians lived from 3500 B.C. – 2000 B.C. although other sources say that the civilization started as early as 3000 B.C

Way of Living

The Sumerians built small square houses built of mud. The Sumerians lived in Mesopotamia or the Fertile Crescent. This area is between the Tigris and Euphrates Rivers and runs along the eastern side of the Mediterranean Sea.

The word Mesopotamia is a Greek word meaning "Land between the Rivers."

The Sumerians were very inventive and hardworking. They were mostly farmers and had well organized communal (community) life.



Sumerian Homes

The Sumerians were also skilled in the use of such metal as copper, gold, silver and had developed by 3000 B.C. Fine artistry as well as considerable knowledge about technology. They were not only craftsman and farmers, but scribes, scholars, priests, priestesses, and merchants also.

Their Hero

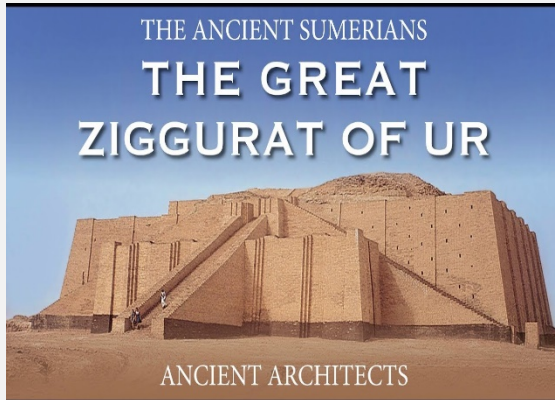
The ancient Sumerians were great story tellers. Thousands of years ago, they created the story of Gilgamesh, an epic, a long story about a hero

Gilgamesh is one of the oldest recorded stories in the world. It's about an ancient King of Uruk who may have actually existed and whose name - Gilgamesh - is on the Sumerian King List.

According to the epic, Gilgamesh was not just a hero. He was the first superhero! He was part god and part human. He had many special powers.

Worshipping

The Sumerians built temples called ziggurats in the center of their cities. They were used as a house for the cities' gods. The temple was raised on a platform, and was made of thousands of mud bricks.



Some of the gods that they worshipped were Anu, the heaven god, Ea, the water god, and Enki, the god of wisdom. In all, there were over 3,000 of them

INDUSTRY CREATION

They developed trade, and established industries, including weaving, leather work, metalwork, masonry, and pottery, frying pans, razors, cosmetic sets, shepherd's pipes, harps, kilns to cook bricks and pottery, bronze hand tools like hammers and axes, the plow, the plow seeder, and the first superhero, Gilgamesh. They also used looms to weave cloth from wool and because they traded heavily throughout the Persian Gulf, they invented the sailboat.

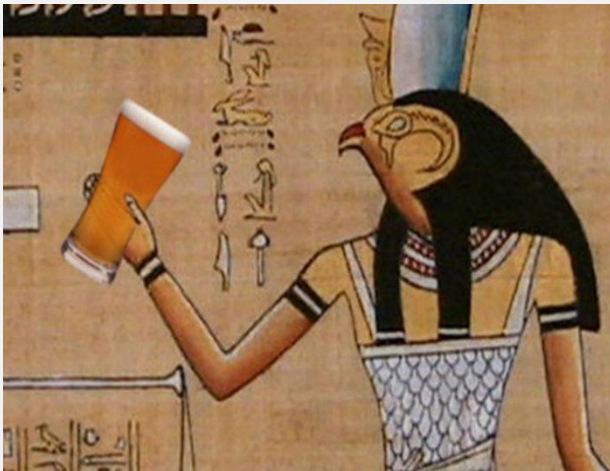
The primitive pictograms of the early Sumerian (i.e. Uruk) era suggest that "Stone was scarce, but was already cut into blocks and seals. Brick was the ordinary building material, and with it cities, forts, temples and houses were constructed. The city was provided with towers and stood on an artificial platform;



the house also had a tower-like appearance. It was provided with a door which turned on a hinge, and could be opened with a sort of key; the city gate was on a larger scale, and

seems to have been double. The foundation stones - or rather bricks - of a house were consecrated by certain objects that were deposited under them."

The most impressive and famous of Sumerian buildings are the ziggurats, large layered platforms which supported temples. The Sumerians also developed the arch, which enabled them to develop a strong type of roof called a dome. They built this by constructing several arches. Sumerian temples and palaces made use of more advanced materials and techniques, such as buttresses, recesses, half columns, and clay nails.



Let's not discount the making bronze from copper and tin and beer brewing. Chemical analysis has identified a 6,000-year-old brewery at an archaeological site in what is now modern Iran. The evidence, which was published recently in the scientific journal *Nature*, suggests that fermentation of barley was first practiced in Sumer between 4000 and 3000 BC.

WRITING AND SCHOOLS

After Egyptian hieroglyphs, the Sumerians' cuneiform writing system is the next oldest which has been deciphered. The status of even older inscriptions such as the Vinča signs and the even older Jiahu symbols is controversial. Since hieroglyphs are considered "pictures", the Sumerians invented the first writing system, with actual "letters" developing Sumerian cuneiform writing out of earlier proto-writing systems by about the 30th century BCE. The earliest literary texts appear from about the 27th century BCE.





Several centuries after the invention of cuneiform, the use of writing expanded beyond debt/payment certificates and inventory lists to be applied for the first time, about 2600 BC, to messages and mail delivery, history, legend, mathematics, astronomical records, and other pursuits. Conjointly with the spread of writing, the first formal schools were established, usually under

the auspices of a city-state's primary temple.

You wanna know how ridiculously smart they were?

Take for instance the cuneiform seals they created. This was their mail system. A scribe would write on a piece of clay, backwards so when it was sent to the message receiver, they would take the seal and roll it out on a soft piece of clay. Then they would be able to read what was sent. A Dyslexic's dream job.



3000 BC	2800 BC	2500 BC	1800BC	600 BC	
					an (sky, heaven)
					ki (place; ground, earth, land, country)
					lu (who(m), which, man, ruler, person)
					munus (woman)
					kur (underworld, land, country, mountain(s), east, east wind)
					geme (female worker)
					saĝ (head, person, capital)
					kag (mouth)
					ninda (bread, food)

The Sumerian language remained in official and literary use in the Akkadian and Babylonian empires, even after the spoken language disappeared from the population; literacy was widespread, and the Sumerian texts that students copied heavily influenced later Babylonian literature. Some Mesopotamian words are still in use today. Words like crocus, which is a flower, and saffron, which is a spice, are words borrowed from the ancient Mesopotamia.

INVENTIONS

Sailboat

The Sumerians made many contributions to modern civilization. They invented the sail. This allowed them to trade up and down the Tigris and Euphrates. Sailboats were of utmost importance to them as transportation was essential to their culture. Five thousand years ago Mesopotamians started using sailing boats. Since Mesopotamia was situated between two famous rivers, namely the Euphrates and the Tigris, they needed water transportation for travel and trade.

Boats and ships and the world's first cities in Mesopotamia



The Sumerians had three main types of boats:

- skin boats comprised reeds and animal skins
- sailboats featured bitumen waterproofing
- wooden-oared ships, sometimes pulled upstream by people and animals walking along the nearby banks.

Cuneiform

The term 'Cuneiform' has been derived from the Latin word 'Cunus' which means wedge. They pressed wedge shaped marks on soft clay tablets with the help of sharp reed pen. They hardened these tablets by drying them up in the sun.

These Cuneiform writings of the "Sumerians were read from right to left. Thus the development of Cuneiform script was the outstanding contribution of Sumerians to the civilisation of mankind Uruk city & The Great Ziggurat of Ur: Uruk (modern Warka in Iraq) where city life began more than five thousand years ago and where the first writing emerged was clearly one of the most important places in southern Mesopotamia.

Wheel and Cart

A great contribution of the Sumerians to the history of mankind was 'wheel'. This wheel accelerated the progress of Sumerian civilization.

The potter made pottery of various shapes and sizes through this wheel. The wheeled carts facilitated trade and commerce on land route. This invention of wheel by the Sumerians made them immortal in the annals of history.

Evidence of wheeled vehicles appeared in the mid 4th millennium BC, near-simultaneously in Mesopotamia, the Northern Caucasus (Maykop culture) and Central Europe. The wheel initially took the form of the potter's wheel. The new concept quickly led to wheeled **vehicles** and mill wheels.

Near the northern side of the Caucasus several graves were found, in which since 3,700 BC people had been buried on wagons or carts.



of



Agriculture (Irrigation, Dikes and Plow)

Sumerians ushered in the age of intensive agriculture and irrigation.

The Sumerians knew that they had to control the Tigris and Euphrates Rivers. In the spring the rivers flooded, and when they receded and left natural levees behind. The Sumerians built the levees higher and used them to keep back the flood waters. In the summer, when the land was dry, the Sumerians poked holes in the levees. The river water ran through the holes and made irrigation channel in the soil. An irrigation system took which took planning in draining the marshes for agriculture.



Wheat, barley, sheep, and cattle were foremost among the species cultivated and raised for the first time on a grand scale.

Civilization rose alongside fresh water rivers. The land may have been fertile, but the ancient Mesopotamians learned the rivers could not be trusted to flood their fields when they needed them to.

Rain was also something that could not be counted on. So, the Mesopotamians invented irrigation. They dug a maze of ditches and waterways from the rivers to their fields, creating a dependable source of water for their crops.

Throughout history, great cities and civilization would not have risen without a source of clean and drinkable water. The economy of the Sumerians relied heavily to agriculture. Agriculture provided the people food made from several crops. Lettuces, beans, and onions provided nutrients to the Sumerians. But the most widely cultivated crop was barley. Barley allowed the Sumerian to produce bread and also alcohol, in particular, ale. Ale became an important part of Sumerian society.



Road

The oldest constructed roads discovered to date are in former Mesopotamia, now known as Iraq. The location in the land of the Sumerian people offered fertile soil and, with irrigation, crops and livestock were raised successfully.



The Sumerians used meticulous brick-making skills, forming identical mud bricks for building. After drying they would take them to the site of a temple and set them in place with bitumen. Bitumen is the natural sticky black substance in asphalt.

Math and Astronomy

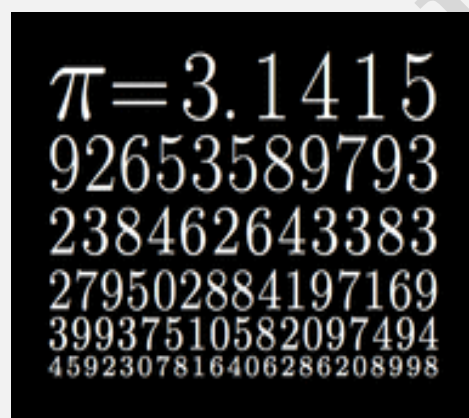
All these accomplishments imply that the people of Sumer were advanced in math for their time period.

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They invented and developed arithmetic by using several different number systems including a mixed radix system with an alternating base 10 and base 6. This sexagesimal system became the standard number system in Sumer and Babylonia. They made a system of numbers that, unlike today's Base-10 System, was Base-60.

For example: how we tell time, 24 hours in a day, 60 minutes in an hour, and 60 seconds in a minute. It is amazing they invented something so critical that we still use today.



The Number Six

The Sumerians had a counting system based on the number six, and they made a system of tracking time based on this system. This is why our modern system of time uses numbers that are divisible by six: 60 seconds, 60 minutes, 24 hours.

They also divided up the circle into 360 degrees. They had a wide knowledge of mathematics including addition, subtraction, multiplication, division, quadratic and cubic equations, and fractions. This was important in keeping track of records as well as in some of their large building projects. The Mesopotamians had formulas for figuring out the circumference and area for different geometric shapes like rectangles, circles, and

triangles. Some evidence suggests that they even knew the Pythagorean Theorem long before Pythagoras wrote it down. They may have even discovered the number for pi in figuring the circumference of a circle.

And because of their trading they created a sophisticated accounting system. They kept a written records of how much was given, to who, and when, along with calculating inventory



They also invented the calendar. By studying the phases of the Moon, Sumerians created the first calendar. It had 12 lunar months and was the predecessor for both the Jewish and Greek calendars. A Lunar calendar that is more accurate than the Gregorian Calendar we use today. The Babylonian calendar was a lunisolar calendar with years c by decree. The calendar is based on a Sumerian (Ur III) predecessor preserved in the Umma calendar of Shulgi (c. 21st century BC). consisting of 12 lunar months, each beginning when a new crescent moon was first sighted low on the western horizon at sunset, plus an intercalary month inserted as needed.

The Sumerians were among the first astronomers, mapping the stars into sets of constellations, many of which survived in the zodiac and were also recognized by the ancient Greeks.

They were also aware of the planets that are visible to the naked eye. Their astronomers developed advanced mathematical functions to permit them to accurately plot and forecast - for many hundred years ahead - cyclical planetary orbital movements

and alignments. Some of our familiar zodiacal 'animal' names are found in Sumerian records.



The zodiac is the term used to describe the circle of twelve $30\frac{1}{2}$ divisions of celestial longitude that are centred upon the ecliptic - the path of the sun. The term zodiac derives from Latin *zōdiacus*, which in its turn comes from the Greek *ζῳδιακός κύκλος* (*zōdiakos kuklos*), meaning "circle of animals".

From the earliest of times, the zodiac has been universally used to predict or reflect characteristics of personality, whether from the Chinese, Mesopotamian, Indus Valley, Egyptian or any other culture, echoing the ancient philosophy 'As above - so below'... what we today call astrology.

Astrology, in its broadest sense, is the search for purpose in the heavens.

We know from ancient records that the Greeks inherited their knowledge of the heavens primarily from the Mesopotamians, who in turn inherited their knowledge from the Sumerians

The zodiacal map was used for practical mathematical & observational purposes. The Zodiac of Sumer, definitely complete by the time of Babylon, was adopted by the Greeks much later.

Babylonians and the Chinese were using the 19 year Sun-Moon cycle in their calculations - by the 6th Century BCE. Today it is called the 'Metonic' cycle after a Greek who wrote of it some hundred years

Cities

Some of the most well-known cities in the Sumerian civilization were Uruk, Ur, Kish, Erida, Lagash, Nippur, and Sumer.

Within Uruk, the greatest monument was the Anu Ziggurat on which the White Temple was built and dedicated to the sky god Anu, this temple would have towered well

above the flat plain of Uruk, and been visible from a great distance even over the defensive walls of the city.

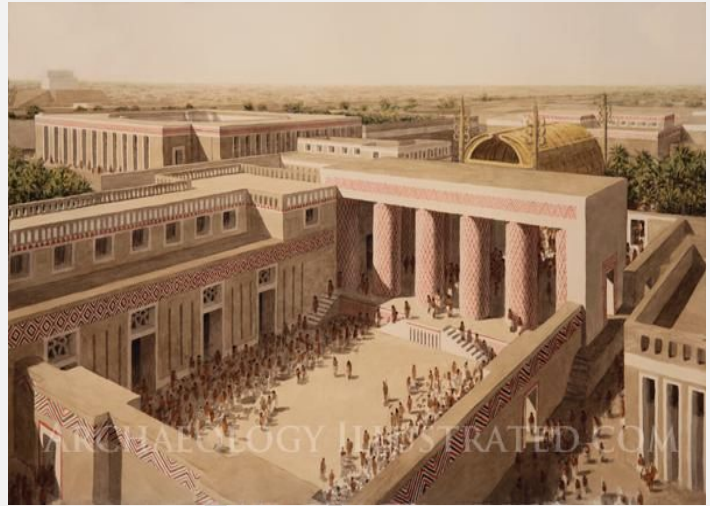
Architecture

Rulers lived in large palaces.

Most Sumerians lived in houses with many rooms around a small courtyard.

Mud bricks were the houses' main building blocks.

A ziggurat, or pyramid-shaped temple tower, rose above each city.



The Arts

Sculptors produced many statues of the gods for their temples.

Jewelry was a popular item made from imported gold, silver, and gems.

Engraved cylinder seals are one of Sumer's most famous types of art.

Other examples of Sumerian technology include



- tools and weapons: saws, chisels, nails, pins, rings, hoes, axes, knives, arrowheads, swords, glue, daggers, armor



hammers, braces, bits, lancepoints,



Boots and sandals (footwear) - evidence exists for the use of leather by the ancient Sumerians as far back as 6000 BC. Preserved specimens of leather dating to 5000 BC have been found. Egyptian stone carvings of about the same date show leather workers.



The Sumerians also developed a complex system of sewers and flush toilets to rid cities of waste and unhealthy effects of swamps.

The inventions and innovations by the Sumerians placed them among the most creative cultures in human pre-history and history. Sumerian scientific achievements were important to the modern world.

BABYLONIAN CIVILIZATION

Babylonian civilization emerged near the Tigris and Euphrates Rivers.

The Babylonians were great builders, engineers, and architects.

One of their major contribution is the Hanging Gardens if Babylon, one of the seven wonders of the ancient world.

Hanging Gardens of Babylon

It is a famous from stories of historians and is painted to portray the place. Historians believes that The Hanging Gardens of Babylon is a structure made up of layers upon layers of gardens inside that contained several species of plants, trees and vines.

The legends say that it was made by the great Babylonian King Nebuchadnezzar II, for his wife, Queen Amytis. However, no physical evidence has been found to prove the existence of the said garden.

People have been debating about the existence of the said mythical place. And some said it was just a product of the creative imagination of the great king because it lacked documentation or archaeological evidence.



On the other hand, if it really existed, it must have been destroyed by war, erosion or an earthquake. True or not, hearing the stories and description of the place would be enough to inspire awe to anyone.

EGYPTIAN CIVILIZATION

Well-known for their engineering feats especially the infrastructures established by Pharaoh, the Egyptians also contributed other practical things that the world now considers as essential.

Paper or Papyrus

One of the earlier contributions of Egyptians

Papyrus – a thick type of paper made from the pith of the papyrus plant, *Cyperus papyrus* (plants that grew abundantly along the Nile River in Egypt).



They were able to process the plant in order to produce thin sheets on which one could write down things.

Lighter and thinner than clay tablets, it was easy to carry and store.

A major accomplishment in Egyptian record-keeping and communications.

Ink

Invented by the Egyptians used to write in papyrus. Made by combining soot with different chemicals to produce inks of different colors. Withstands the elements of nature since it was used to record history, culture, and codified laws. Tamper-proof so that it could not simply tinker with those written down by authorities.

Hieroglyphics



Formal writing system used by the ancient Egyptians that combined logographic and alphabetic elements.

Hieroglyphs – a character of the ancient Egyptian writing system.

Egyptians used cursive hieroglyphics for religious literature on papyrus and wood. Can be seen today and remains to be as famous as the pyramids where they were found.

Cosmetics



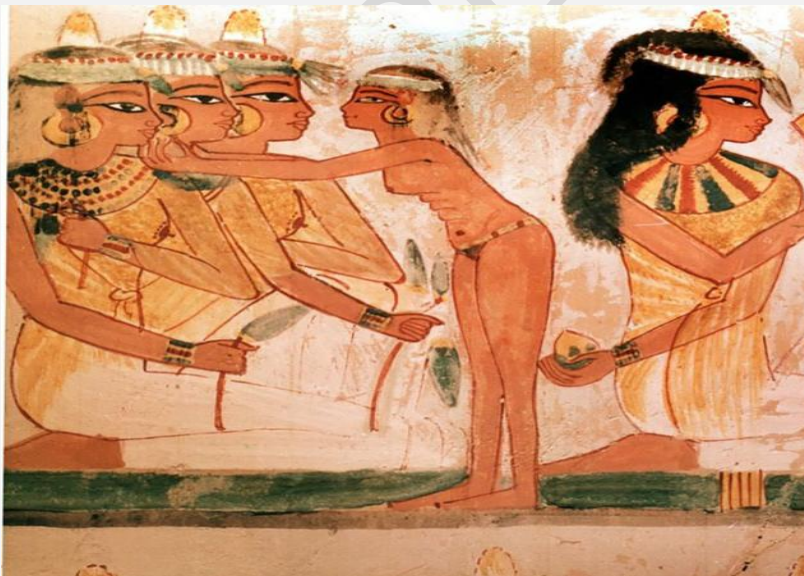
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	B	leg		M	owl		X	cloth
	C	cup		N	water		Y	feathers
	D	hand		O	chick		Z	bolt
	E	feather		P	stool		CH	tether
	F	viper		Q	hill		KH	sieve
	G	pot		R	mouth		SH	basin
	H	wick		S	cloth		MAN	
	I	feather		T	loaf		WOMAN	
	J	cobra		U	chick		ANKH	
	K	cup		V	viper			

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Used for both health and aesthetic reasons

Kohl – used around the eyes to prevent and even cure eye diseases. It is created by mixing soot or malachite with mineral galena.

Egyptians also believed that a person wearing make-up was protected from evil and that beauty was a sign of holiness.



Wig



Another cosmetic invention of ancient Egyptians.

Worn for health and wellness rather than aesthetic purposes. Used to protect the shaved heads of the wealthy Egyptians from harmful rays of the sun, better than putting on scarf. Considered cleaner than natural hair because it prevented the accumulation of head lice.

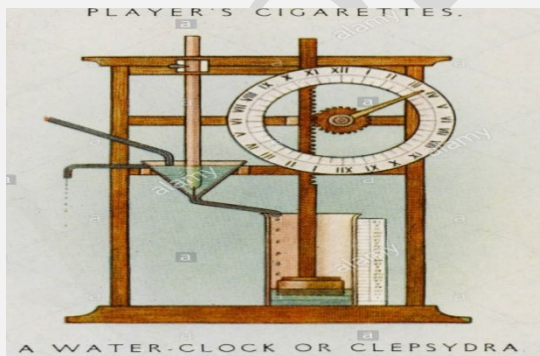


Water clock/Clepsydra

A device that utilizes gravity that affects the flow of water from one vessel to the other.

The amount of water (or its height, depending on the methods used) remaining in the device determines how much time has elapsed since it is full.

In the process, Time is measured. Widely used as a timekeeping device during the ancient times.



The Great Pyramids



Built during a time when Egypt was one of the richest and most powerful civilizations in the world, the pyramids—especially the Great Pyramids of Giza—are some of the most magnificent man-made structures in history. Their massive scale reflects the unique role that the pharaoh, or king, played in ancient Egyptian society.

Did you know?

The pyramid's smooth, angled sides symbolized the rays of the sun and were designed to help the king's soul ascend to heaven and join the gods, particularly the sun god Ra.

Ancient Egyptians believed that when the king died, part of his spirit (known as “ka”) remained with his body. To properly care for his spirit, the corpse was mummified, and everything the king would need in the afterlife was buried with him, including gold vessels, food, furniture and other offerings. The pyramids became the focus of a cult of the dead king that was supposed to continue well after his death. Their riches would provide not only for him, but also for the relatives, officials and priests who were buried near him.

GREEK CIVILIZATION

Alarm clock



One of the most utilized gadgets today. Used to tell an individual when to stop or when to start.

Used large complicated mechanism to time the alarm. They use of water (or sometimes small stone or sand) that dropped into drums which sounded the alarm.

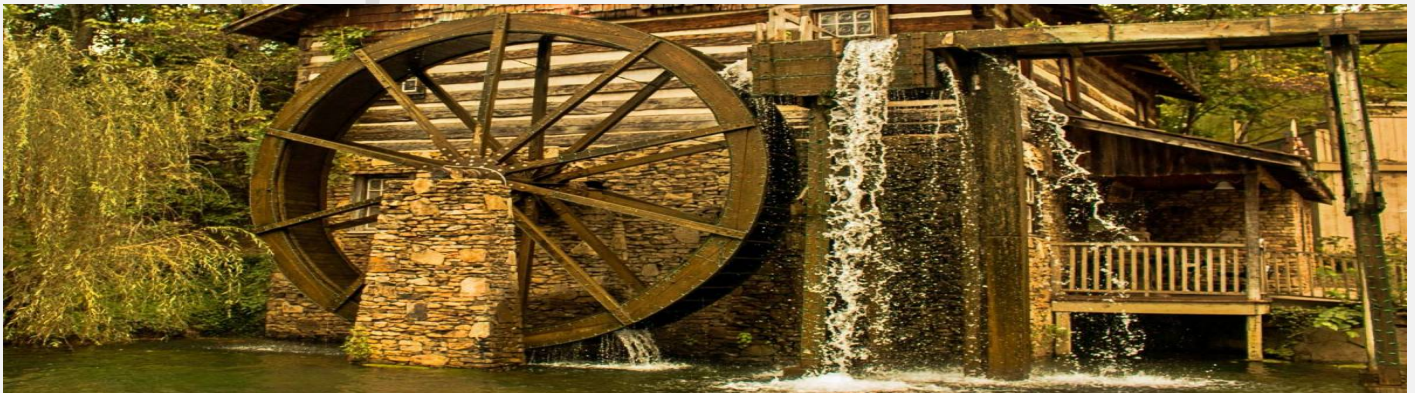
Plato – believed to have utilized an alarm clock to signal the start of his lecture. His version used four water vessels lined up vertically. The upper vessel supplied the water which dropped to the vessel below it, which was set to be filled in a given time. After it was full, water was siphoned off at a faster rate into the third vessel which would cause the expulsion of contained air, creating a whistling noise. Afterwards, this vessel would empty towards the bottom vessel

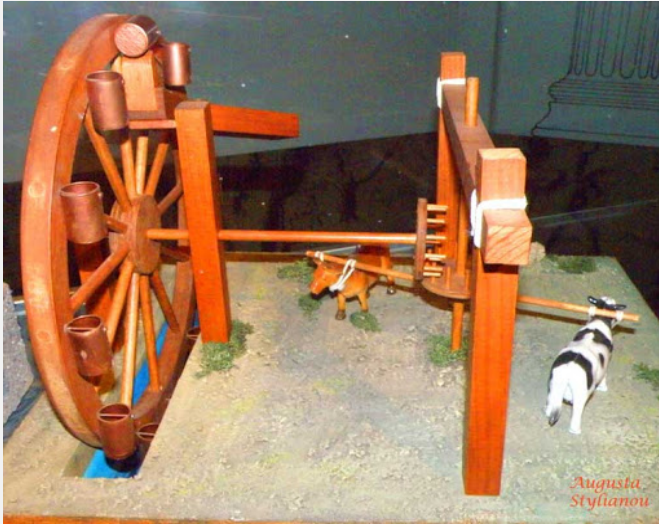
Water Mill

Also considered as one of the most important contributions of the Greek civilization to the world. Commonly used in agricultural processes like milling of grains which was necessary for food production during that time.



Considered better the mills powered by farm animals which required less effort and time to operate since it only required access to rivers or flowing water where a mechanism of a large wheel with small “buckets” of water attached to it could be installed.





ROMAN CIVILIZATION

It is the major contributions of Roman, it known as gazettes contained announcements of the Roman Empire to the people. These gazettes were engraved in metal or stone tablets and then publicly displayed.

When paper was invented, it became easier for the Romans to "publish" matters that needed the attention of the Roman citizen. These documents were edited and published on the same day that they were recorded.

Bound Books or Codex

With the invention of paper, it became easier for the civilization to write down everything that happened in their time. Record keeping was much easier since paper did not easily break, was lightweight and did not occupy much space.



but later on replaced by animal skin which proved to be stronger and long lasting.

As a result, civilization became fond of record-keeping especially historical events and newly legislated laws. According to sources, Julius Caesar started the tradition of stacking up papyrus to form pages of the book. The earlier covers were made of wax but later on replaced by animal skin which proved to be stronger and long lasting.

Roman Architecture

It is one of the most visual contributions of the ancient Roman Empire to the world. Roman Architecture was still regarded as pioneering since the Romans were able to adapt new building and engineering technology on architectural designs established. Romans are also creative, redesign old architectural patterns to adapt the new trends at that time. These majestic Roman structures can be seen by the way they withstood time and harsh elements of the environment.



The History of Books

- Codex: a type of book cut into sheets of parchment and sewn together along the edge, then bound with thin pieces of wood and covered with leather.



Roman Numerals

Although other number system had already been established before the Roman Numeral , these old system could not keep up with high calculations requirements due to the increasing rate of communication and the trade among nations.



CHINESE CIVILIZATION

The Chinese civilizations considered to be the oldest civilization in Asia, if not the world. Also known as the middle kingdom, China is located on the far east of Asia. It was famous among other ancient civilization because of its silk trade.

Silk



One of the things that connected far east china to the world.

Although silk is naturally produced by silk worms, the chinese were the ones who developed the technology to harvest the silk and process it to produce paper and clothing.

The silk production resulted in the creation of the product for trade. The silk trade opened china to the outside world, making way for cultural, economic, and scientific exchanges. It bridged the gap between western world and the Middle Kingdom.

It is silkworms that naturally create silk, however, it is Chinese people that invented how to harvest the silk and use it in clothing and paper thousands years ago. The oldest silk, which was found in Henan Province, came from the Chinese Neolithic period and dates to around 3,630 BC. Silk excavated from the Liangzhu culture site in Zhejiang Province date to roughly 2570 BC. In ancient China, silk was not only a vital invention for life but also a bridge connecting China to the outside world. The 2,000-year-old Silk Road is still an important path for cultural, commercial and technological exchange between East and West.

Silk, one of the oldest fibers, originated in China as early as 6,000 years ago. The earliest evidence of silk was discovered at Yangshao culture site in Xiaoxian County, Shanxi Province, China where a silk cocoon was found cut in half, dating back to between 4000 and 3000 BC. Chinese people mastered sophisticated silk weaving tech and closely guarded secret, and the West had to pay gold of the same weight for the silks. In ancient times the silk was a very important item made in China and for many centuries businessmen transported this precious item from China to the West, forming the famous Silk Road.

Alcohol

The earliest alcohol makers in Chinese legend were Yi Di and Du Kang of the Xia Dynasty (about 2000 BC—1600 BC). Research shows that ordinary beer, with an alcoholic content of 4% to 5%, was widely consumed in ancient China and was even mentioned on oracle bone inscriptions as offerings to spirits during sacrifices in the Shang Dynasty (1600 BC–1046 BC). After that, Chinese discovered that adding more cooked grain in water during fermentation could increase the alcohol content, so stronger drinks began to appear. Around 1000 BC, the Chinese created an alcoholic beverage which was stronger than 11%. The potent libation was mentioned in poetry throughout the Zhou Dynasty (1050 BC–256 BC). Meanwhile, no beer in the West reached 11% until the 12th century, when distilled alcohol was first made in Italy.



The inhabitants of the Arabian Peninsula were widely believed to be the first brewers. However, in 2013, a 9000-year-old pottery found in Henan province revealed the presence of alcohol, 1000 years before Arabian. Alcohol is known as Jiu in Chinese and is often used as a spiritual offerings to Heaven and the Earth or ancestors in ancient China. Study shows that beer with an alcoholic content of 4% to 5% was widely consumed in ancient China and was even mentioned on oracle bone inscriptions of the Shang Dynasty (1600 BC–1046 BC).

Mechanical Clock



The mechanical clock is an invention we all use today. According to historical research, the world's first clock was invented by Yi Xing, a Buddhist monk and mathematician of the Tang Dynasty (618–907). Yi's clock operated with water steadily dripping on a wheel that made a full revolution every 24 hours. As time went on, clocks were made with an iron and bronze system of hooks, pins, locks and rods, but still followed Yi

Xing's clock design. Hundreds of years later, Su Song, an astronomer and mechanist of the Song Dynasty (960–1279), created a more sophisticated clock, making him the ancestor of the modern clock.

The world's first mechanical clock -Water-driven Spherical Birds – was invented by Yi Xing, a Buddhist monk in 725 A.D.. It was operated by dripping water which powered a wheel that made one revolution in 24 hours. Hundreds of years later, the inventor Su Song developed a more sophisticated clock called the Cosmic Empire in 1092, 200 years earlier before the mechanical clock was created in Europe.

Tea

Tea is a beverage produced by pouring not or boiling water over crushed or shredded dried tea leaves.

It was believed that first tea was drunk by a Chinese emperor Tea production was developed when an unknown Chinese inventor created a machine that was able to shred tea leaves into stripes.

The machine was done using a wheel-based mechanism with sharp edge attached to a wooden or ceramic pot. Because of the invention, Chinese were able to increase their production of tea and trade with other nation.

China thus became known for its tea exports aside from its silk production. Tea production developed by the ancient Chinese may have resulted in making tea as one of the most popular beverages in the world today.

According to Chinese legend, tea was first drunk by the Chinese Emperor Shen Nong around 2,737 BC. Then, an unknown Chinese inventor created the tea shredder, a small device that used a sharp wheel in the center of a ceramic or wooden pot that would slice the leaves into thin strips. During the Tang (618–907) and Song (960–1279) dynasties, tea production developed rapidly, and tea became a popular drink around the country and the world. Cha Jing, written by Lu Yu in the Tang Dynasty, is widely recognized as the world's first scientific work about tea production.



Iron and Steel Smelting

Archaeological evidence revealed that iron smelting technology was developed in China as early as 5th century BC in the Zhou Dynasty (1050 BC–256 BC). During The Spring & Autumn and Warring States periods (776-221 BC) China went into a flourishing period for iron smelting. In the Han Dynasty (202 BC –220 AD) central government monopolized the iron smelting, seeing remarkable development.

It has been confirmed by archaeological evidence that iron, made from melting pig-iron, was developed in ancient China in the early 5th century BC during the Zhou Dynasty (1050 BC–256 BC). During the Shang Dynasty (1600 BC–1046 BC) to the Eastern

Zhou Dynasty (1050 BC–256 BC), China went into a flourishing period for steel smelting.

In the Han Dynasty (202 BC–220 AD), private-enterprise iron-making was abolished and was monopolized by the state, creating an iron-smelting bloom. The first famous metallurgist in ancient China is



Qiwu Huaiwen of the Northern Wei Dynasty (386—557 AD), who invented the process of using wrought iron and cast iron to make steel.

Porcelain

Porcelain is a very specific kind of ceramic produced in the extreme temperatures of a kiln. Porcelain, of course, originated in China; which is how China gets its name. Early in the 16th century BC during the Shang Dynasty (1600 BC—1046 BC), the ancient prototypes of porcelain had already appeared in China. In the Tang Dynasty (618—907), the skill of making porcelain was perfected, while in the Song Dynasty (960—1279), the art of Chinese porcelain reached its peak and became popular and famous throughout the world. In 1708, the German Physicist Tschirnhausen invented European porcelain, thus ending the Chinese porcelain monopoly.



Compass

The earliest Chinese compasses were probably not originally invented for navigation, but to harmonize environments and buildings in accordance with the geometric principles of Feng Shui. It is proved that the earliest Chinese reference recording a magnetic device used as a "direction finder" is in a Song Dynasty book dated during from 960 to 1279.

The earliest record about the actual use of a magnetized needle for navigation is Zhu Yu's book Pingzhou Table Talks, written in 1102. The invention of compass greatly improved the safety and efficiency of travel, especially oceanic navigation.

A compass is a navigational instrument that shows directions. The compass was invented by Chinese between the 2nd century BC and 1st



century AD. It was first used in Feng Shui, the layout of buildings. By 1000 AD, navigational compasses were commonly used on Chinese ships, enabling them to navigate. Arab traders sailing to China might have learned of the tech and brought it to the West.

Gunpowder

The gunpowder is one of the most interesting inventions in China. Originally, it was developed by Chinese alchemists who aimed to achieve immortality. They mixed charcoal, sulphur, and potassium nitrate, but instead of creating an elixir of life, they accidentally invented a black powder that could actually generate large amounts of heat and gas in an instant.

Gunpowder, known since the late 19th century as black powder, is a mixture of sulfur, charcoal and potassium nitrate. Because it burns rapidly and generates a large amount of heat and gas, gunpowder has been widely used as a propellant in firearms and as a pyrotechnic composition in fireworks.



In ancient China, gunpowder and gunpowder-based weapons were invented and widely used by military forces to dispel invasion at the borders.

Gunpowder was invented by Chinese Taoist alchemists about 1000 A.D. when they tried to find a potion to gain human immortality by mixing elemental sulfur, charcoal, and saltpeter. It is generally believed that gunpowder spread to Europe during the Mongol expansion of 1200-1300 A.D.. The interesting fact is that Chinese used this discovery mainly for firecrackers while Europeans created cannons and guns and dominated China in the mid-1800s.

Movable-type Printing

The Chinese invention of Woodblock printing first appeared over 2,000 years ago, and produced the world's first printings. In the Tang Dynasty (618–907), Chinese began to

print with carved blocks. Then in the 1040s, Bi Sheng of the Northern Song Dynasty (960—1127) invented movable clay type printing, which marked a beginning of a major revolution in the history of printing.



Woodblock printing was already a widely used technique in the Tang Dynasty. However, this kind of printing tech was expensive and time-consuming. Until the Song Dynasty (960-1279), a man named Bi Sheng (990–1051) invented movable type printing, making it quicker and easier. He first carved individual characters on pieces of clay and then harden them with fire. These movable type pieces were later glued to an iron plate to print a page and then broken up and redistributed for another page. This kind of printing tech rapidly spread across Europe, leading up to the Renaissance, and later all around the world.

Paper Making

It is known to all that China was the first country in the world to make proper paper. The invention of papermaking is one of China's significant contributions to the spread and the development of human civilization. According to research, paper was first made during the Western Han Dynasty (202 BC—9 AD).



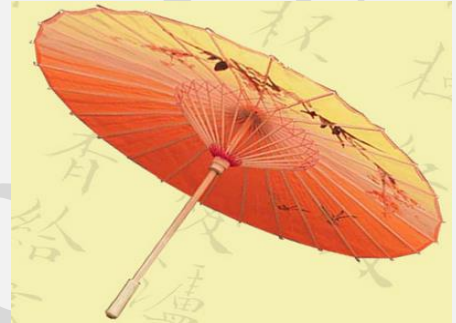
Cai Lun of the Eastern Han Dynasty (25—220) successfully invented the world's first batch of paper using fish nets, tree bark, bits of rope and rags.

Before paper was invented, the ancient Chinese carved characters on pottery, animal bones and stones, cast them in bronzes, or wrote them on bamboo or wooden strips and silk fabric. These materials, however, were either too heavy or too expensive for widespread use. The invention and use of paper brought a revolution in writing and paved the way for the invention of printing technology.

The invention of paper greatly affects human history. Paper already existed in China since 105 A.C, however, a eunuch named Cai Lun (ca. 50 AD – 121) made significant innovation and helped drive its widespread adoption. His advanced paper-making technology then spread to central Asia and the world through the Silk Road

Umbrella

The inventions of umbrella can be traced back as early as 3500 years ago in China. Legend has it, Lu Ban, a Chinese carpenter and inventor created the first umbrella. Inspired by children using lotus leaves as rain shelter, he created umbrella by making a flexible framework covered by a cloth.



Acupuncture

The oldest Chinese medicine book “Neijing”, also known as “The Classic of Internal Medicine of the Yellow Emperor”, shows that acupuncture was widely used as a therapy



in China much before the time it was written. Besides, various kinds of acupuncture needles were discovered in the tomb of Prince Liu Sheng who died around 200 B.C. This is a further proof that acupuncture were already in use in China more than two thousand years ago

Earthquake Detector

According to court records of the later Han Dynasty, a seismograph was created by the brilliant inventor Zhang Heng (78-140 AD) in 132 AD. Its function is to determine the direction of an earthquake. In 138 AD, this instrument indicated an earthquake occurring in Longxi a thousand kilometers away. It was the first time that mankind to detect an earthquake.

Modern seismographs only began development 1848 in Europe.



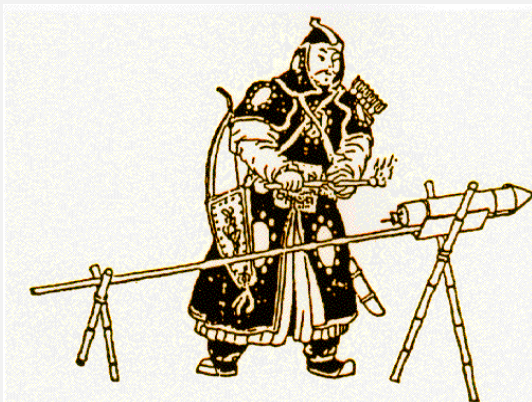
Rocket

in

China is hometown of rockets, ancient Chinese inventors created rockets by applying counter-force produced by ignited gunpowder. According to history, in 228 A.D. the Wei State already used torches attached to arrows to guard Chencang against the invading troops of the Shu State. Later the Song Dynasty (960-1279) had adapted gunpowder to make rockets. A paper tube stuffed with gunpowder was attached to an arrow which can be launched by a bow. This kind of ancient rockets and

Bronze

The skill of produce bronze was mastered by ancient Chinese by 1700 B.C. The Shang Dynasty (1600–1046 B.C.) and Zhou dynasties (1046-256 BC) brought China into the Bronze Age and the making of bronze wares reached its peak in this period. Bronze was mainly used to make weapons, bronze tools and ritual vessels at that time. improved ones were widely used in military and entertainment activities in China.



Compared to counterparts in other regions of the world, the Chinese bronze wares stand out for their inscriptions and delicate decorative patterns.



The Kite

The kite was developed around 3,000 years ago by ancient Chinese. The earliest kites were made of wood, called Muyuan (wooden kite). In early times kites were mainly used for military purposes such as sending a message, measuring distances, testing the

wind and signaling. Over time kite flying developed into playthings and kite flying is now enjoyed worldwide.

The Seed Drill



The seed drill is a device that plants the seed into soil at a uniform depth and covers it. If without this device farmers had to plant the seeds by hand, resulting in waste and uneven growth. According to records, the Chinese using of seed drills can be dated back to the 2nd Century BC. The device made farmers' job easier and highly improved the agricultural output in China.

Row Crop Farming

In other parts of the world, farmers still scattered seed onto the fields randomly. While ancient Chinese started planting crops in rows from the 6th century BC. They planted individual seeds in rows, thus reducing seed loss and making crops grow faster and stronger. This technology was not used in the western world until 2200 years later



Toothbrush

The bristle toothbrush was invented in 1498 by Chinese who made toothbrushes with coarse horse hairs attached to bone or bamboo handles. It was later brought to the new world by Europeans.

The Paper Money

Paper money were first developed by the ancient Chinese, who started using folding money at the end of the 8th or beginning of the 9th century AD. Paper bills were originally used as privately issued bills of credit or exchange notes. A merchant could deposit his cash in the capital, receiving a paper “exchange certificate” which he could exchange for metal coins in other cities.



Actually Chinese are responsible for countless inventions that have helped shape the world history. Without these inventions by the ancient Chinese, the humankind would have taken more centuries to develop to the current phase

The Great Wall of China

Once considered the only man-made structure that could be seen from outer space, The Great Wall of China is said to be the largest and most extensive infrastructure that the nation built. It was constructed to keep out foreign invaders and control the borders of China. Made with stone, Brick, Wood, Earth, and other materials, it showcased the extent of Chinese engineering technology at that time. The structure was so massive and strong that it was said to have literally divided China from the rest of the world. The wall's construction put the nation among the powerful civilizations during the ancient times. It was the pride of their land and their crowning glory. Today, with some sections already in ruins, The Great Wall still continues to be a world attraction due to its historical significance and architectural grandeur.



MEDIEVAL/MIDDLE AGES

The start of middle ages was marred by massive invasions and migrations. Wars were prevalent during this time. As such, great technology was needed in the fields of weaponry, navigations, mass food and farm production, and health

Printing Press

After the Chinese developed woodblock printing, Johann Gutenberg was able to invent the printing press, a more reliable way of printing using a cast type.

Many events in human history are of great importance for the way we live today. Johannes Gutenberg's invention of the "movable type" printing press is one of the most important.



Microscope

Zacharias Janssen was able to develop the first compound of microscope. With this device.



People were able to observe organism that were normally unseen by the naked eye.

Telescope

The Telescope was another great invention in the Middle Ages. Galileo was considered the first to invent the telescope but there is confusion between Hans Lippershy and Galileo. Galileo was born in Italy in Pisa in 1564 and died in 1642. The telescope was invented in the fall of 1609 in Venice. Galileo also made a book by using the Telescope called The Starry Messenger. The Telescope magnified 10 times what you could see with out it. The Telescope was made out of wood and leather, which had a convex main lens and a concave eyepiece.



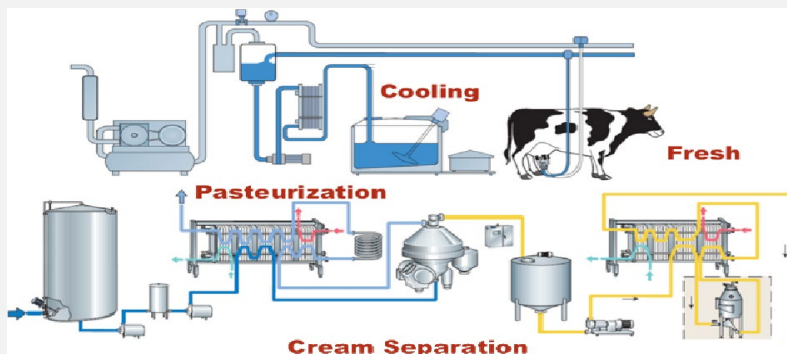
The telescope is one of humankind's most important inventions. The simple device that made far away things look near gave observers a new perspective. When curious men pointed the spyglass toward the sky, our view of Earth and our place in the universe changed forever.

MODERN TIMES

The booming world population during the 19th century onwards demanded that more goods be produced at a faster rate. people needed efficient means of transportation to trade goods, machines that needed animals to operation must be upgraded
faster communication to establish connections between and among nations.

food and medicine was some of their biggest challenges since health was of great concern.

Pasteurization



The process of heating dairy products to kill the harmful bacteria that allow the food to spoil faster. In this process, milk could be stored and consumed for a longer time.

Petroleum Refinery

Better means of powering homes and transportation.



At first the used animal oil for generating light to illuminate their homes. Samuel M. Kier was able to invent kerosene by refining petroleum and it was later referred to as "illuminating oil" then it was widely used in the industry.

An oil refinery or petroleum refinery is an industrial process plant where crude oil is transformed and refined into more useful products such as petroleum naphtha, gasoline, diesel fuel, asphalt base, heating oil, kerosene, liquefied petroleum gas, jet fuel and fuel oils.

Telephone



The development of telephone by Alexander Graham Bell was one of the most important inventions because it was used as a way to easily maintain connections and communications and the government used to allow them to administer their states well.

Calculator

It was made to compute large numbers faster and easier. This device is easy to carry.

Calculators have not only greatly enhanced our ability to perform the regular computations that are involved in everyday life, but provided humans with the ability to understand mathematics on a greater scale than ever imagined.



TELEVISION

Telegram television (also known as a TV) is a machine with a screen. Televisions receive broadcasting signals and change them into pictures and sound. The word

Telegram television (also known as a TV) is a machine with a screen. Televisions receive broadcasting signals and change them into pictures and sound. The word "television" comes from the words tele (Greek for far away) and vision (sight).

The Scotist Jhn Logie Baird is largely credited for the invention of the modern television. Baid successfully televised objects in outline in 1924, recognizable human faces in 1925, and moving objects in 1928. Baird's television technology caught on really swiftly. In fact, the British Broadcasting Corporation (BBC) used this for the earliest televison programming in 1929.

Despite the first television invented, Baird's television was later on criticized for its fuzzy and flickering images, primarily because it was mechanical compared to electronic versions that were developed much later.



PHILIPPINE INVENTIONS

Philippine is known to be one of the most vulnerable countries in terms of Natural disaster. Some of their build is from material indigenous materials or created to adapt to the harsh tropical environment.

Salamander Amphibious Tricycle

Philippine is known to be one of the most vulnerable countries in terms of Natural disaster. Some of their build is from material indigenous materials or created to adapt to the harsh tropical environment.



Salt Lamp

One of the major needs in the Philippines, as a developing nation, is electrification. Electricity powers various type of machines, including light sources. A young Filipino inventor named Aisa Mijeno was able to invent a lightning (SALT) lamp, an environment friendly friendly light source that light on saltwater. Salt lamp is

safer as it poses no risk of time and no toxic gases.

Sustainable Alternative Lighting (SALT) Lamp



"To light up the rest of the Philippines sustainably" was the vision of Filipina scientist Aisa Mijeno when she made the Sustainable Alternative Lighting (SALT) lamp.

The SALT Lamp is an environment-friendly and sustainable alternative light source that runs on saltwater, making it suitable to those who live in coastal areas. It can also function well in remote barrios. With just two table spoons of salt and one glass of tap water, this ecologically designed lamp can run for eight hours.

Because of its inspiring vision and ground-breaking innovation, the SALT lamp has received various awards and recognition from organizations in the Philippines, Singapore, Japan, and South Korea. It has also won in several competitions here and abroad.

Eco-Inventions
Source: bit.ly/filipinoinventions

Medical Incubator

Dr. Fe del Mundo a Filipino pediatrician and the first Asian woman admitted into Harvard Medical Scholl, devised a medical incubator made from indigenous and cheap materials which did not run on electricity.

Triumph from Tragedy

A story of a little lady with a big heart who dedicated her whole life to the care of children.

Fe del Mundo was born in Intramuros Manila, the sixth of eight siblings, four of whom died as children. This family tragedy turned the young Fe towards the medical profession. In 1933, she earned her medical degree at the University of the Philippines Manila, graduating with top honors.

"I feel that if you give the world the best that you can,
the best will always come back to you."
- *Dra. Fe del Mundo*

First female student at Harvard Medical School

In 1936, she became the first woman and the first Asian to study at the Harvard Medical School.

After a two-year research fellowship at Harvard's children's hospital, she went on to earn a medical degree in bacteriology at Boston University in 1940.

Mosquito Ovicidal / Larvicidal Trap System

Dengue, a mosquito borne viral illness, is endemic tropical and subtropical areas, including the Philippines. This viral is usually transmitted by *Aedes aegypti* mosquito, rampant during the rainy season.

The DOST-ITDI OL trap research team designed the trap to detect, monitor, and control the population of the dengue-carrying *Aedes aegypti* mosquitoes. The trap works by attracting female mosquitoes to lay eggs on the paddle drenched with an organic solution



E-jeepney

A major innovation that changed the transportation industry in the Philippines was the development of the jeepney.



Artificial Coral Reefs

Angel Alcal has more than thirty years of experience in tropical marine resource conservation, Angel Alcala is considered a world class authority in ecology and biogeography of amphibians and reptiles, and is behind the invention of artificial coral reefs to be used for fisheries in Southeast Asia.



Erythromycin

Dr. Abelardo Aguilar, a Scientist from the Philippines who discovered the Erythromycin in 1949. Dr. Abelardo was testing samples of soils from his backyard and

isolated micro-organisms – a bacteria that lead to the development of the Antibiotic called Erythromycin.

Back then, Dr. Abelardo Aguilar was working for a U.S Pharmaceutical company Eli Lilly Co. – a global company based in Indiana U.S.A founded by a Pharmaceutical Chemist and veteran of the American Civil War. The Filipino scientist sent a soil samples to his employer Eli Lilly Co., and the company manages to isolate the Erythromycin from the metabolic products of a strain of *Streptomyces Erythreus* found in the



samples sent by Dr. Aguilar.

Banana ketchup or banana sauce is a popular Philippine fruit ketchup condiment made from mashed banana, sugar, vinegar, and spices. Its natural color is brownish-yellow, but it is often dyed red to resemble tomato ketchup. Banana ketchup was first produced in the Philippines during World War II, due to a lack of tomatoes



and a comparatively high production of bananas.

Filipina food technologist Maria Y. Orosa (1893–1945) is credited with inventing a banana ketchup recipe.

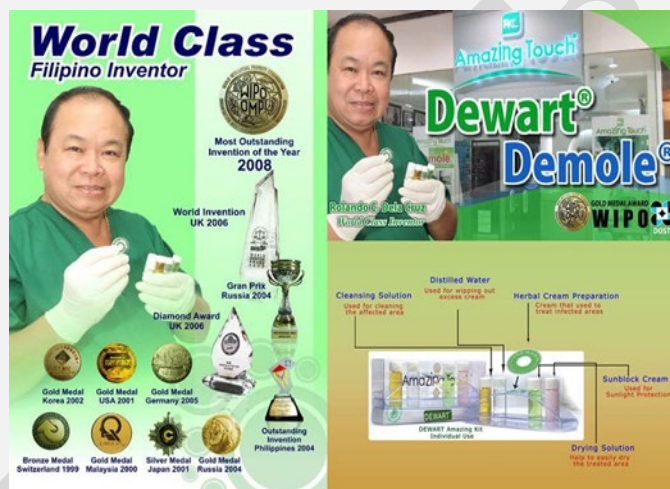
In 1942, banana ketchup was first mass-produced commercially by Magdalo V. Francisco, Sr. who founded the brand name Mafran (a portmanteau of his given name and surname) which he registered with the Bureau of Patents. Francisco sought funding from Tirso T. Reyes to expand his business and thus, the Universal Food Corporation (UFC) was formed 1960.

She was passionate about a self-sustaining Philippines and made it her life's work to study native food, and the use of fermentation and various preserving techniques to educate and uplift people in need.

Mole Remover

Rolando de la Cruz is a multi-awarded Filipino scientist and inventor who developed an ingenious formula that could easily remove deeply grown moles or warts from the skin without leaving marks or hurting the patient. His formula was extracted from cashew nut (*Anacardium occidentale*), which is common in the Philippines and locally known as "kasoy".

He was able to formulate a cream to remove warts and moles on the skin and later, a painless treatment for the most common type of skin cancer, which the Department of Science and Technology (DOST) recently hailed as the outstanding invention of the year.



In March 1997, de la Cruz established RCC Amazing Touch International Inc., which runs clinics engaged "in a non-surgical removal of warts, moles and other skin growths, giving the skin renewed energy and vitality without painful and costly surgery."

In September 2000, The formula won for de la Cruz a gold medal in International Invention, Innovation, Industrial Design and Technology Exhibition in Kuala Lumpur. De la Cruz's latest product called DeBCC, purportedly an effective cure for skin cancer garnered another two international gold medal awards, the first from the Archimedes Inventors' Show in Moscow, Russia in March 2005, and the second one from the IENA International Inventors' Forum in Nuremburg, Germany in November 3, 2005. The same invention also got the highest score from a panel of international judges, and was awarded the top World Invention Winner – Diamond Award and the Overall Inventors' Award for 2006 in the British Invention Show last October 21, 2006 in London.

Dela Cruz is also recipient of the Department of Science and Technology's Tuklas Award for Most Outstanding Invention in 1998 for his DeMole and DeWart products that are now available in malls.