Non-Fiction

Group 3

How was the Compass Invented

ESF Sha Tin College, Chiu, Jensen – 13

Before the compass was invented, people could only determine the directions through the sighting of landmarks or sampling mud from the seafloor. Other cultures such as the Polynesia would observe birds, winds, sea debris, and sea state. The Norse used a type of sun compass, Vikings used a refracting crystal during the day and astronomical knowledge at night.

In 206 BC, the Han dynasty of China, the first compass was created with lodestone which is a type of magnetized iron. At that point, the compass was not used for navigation, instead it was used for fortune-telling and geomancy. During the Song dynasty, it was called the "south pointing fish" or the "south-governor" and it was used for land navigation. Originally, the compass was a model of a fish made with lodestone which its head would always point south if placed in a bowl of water. The Chinese people had a geomatic principle of "feng shui" where compasses were used to order and harmonize buildings as lodestone would always point in a specific direction if suspended. That made the Chinese think that the areas the lodestone pointed towards are the best areas to grow crops, build houses, and search for treasures.

Only until the year 1040, during the Song dynasty of China, was the compass used by Chinese scientists and Chinese armies for land navigation. In the year 1111, compasses were also used for sea navigation which was very useful as it allowed travelers to travel to unknown areas of the world without known landmarks, travel during times of heavy fog, as well as allow sailors who wanted to travel far from land to know the direction they are headed towards. This was the beginning of the discovery age.

The first account of the compass was in "Kuan Shih Ti Li Chih Meng" which translates as ("Mr Kuan's Geomantic Instructor"). Another account of the compass was called "Chiu Thien Hsuan Nu Chhing Nang Hai Chio Ching" which translates as ("Blue Bag Sea Angle Manual") which was more detailed as it also implicitly depicts magnetic declination. In the text "Chung Hua Ku Chin Chu" by Ma Kao written in the 920s, the compass was described as a mysterious needle and the needle's shape was compared to a tadpole, lodestone spoon, and iron needle. In the 11th century. The first reference to a direction finder device was found in a book from the Song dynasty that dates to the 1040s. In the book, there was a description of a "south-pointing fish" made of iron and put in a bowl of water which is best used for orientation during nighttime. In another book translated as "Collection of Most Important Military Techniques", the "south-pointing fish" is used when troops encounter dark and gloomy weather and cannot orientate using landmarks as a guide.

It is widely accepted that China invented the compass, however some say that the Arabs brought the compass into Europe from China, while others say that the compass was brought to Europe and the Islamic world through the Indian ocean. Some scholars have even suggested that Europeans made an independent discovery of the compass. In the year 1190, Europe had been acquired with the compass which, unlike the Chinese where their compass pointed south, the compass of the Europeans pointed north. By the year 1232, Muslim explorers also used the compass for navigation. However, unlike both the Chinese and Europeans, Muslim compasses, which were called Qibla, pointed towards the Kabba in the province of Mecca as it is the holiest site in Islam.

One of the methods that the Ancient Chinese used to create the compass was to rub lodestone onto a needle's tip with lodestone before hanging it on a strand of silk. When prepared this way, the needle would sometimes point north and sometimes point south. In the 11th century, the Chinese found another method of creating the compass which is by heating a piece of steel of a really high temperature then rapidly cooling the steel in water. The cooling in water allowed the steel to orientate itself towards the Earth's magnetic field. This type of magnetization is called "Thermoremanent Magnetization" and can be used to understand the magnetic fields of ancient Earth.

The compass is one of China's greatest inventions as it allowed the world to be mapped and guided explorers into unknown areas of the world. Without the compass, we would need to use stars to navigate. However, we cannot see stars in foggy places. Moreover, a hike in the forest or flying a plane would be impossible without the compass as we would easily get lost. Christopher Columbus needed the compass to be able to discover North and South America without getting lost in the middle of the ocean. It allowed explorers to spend more time on necessary work such as finding food and shelter instead of wasting their time navigating without a true idea of their direction. The compass has allowed us to trade technology and knowledge as well as create maps of the Earth. Developing from the ancient Chinese lodestone spoon, we now have dry compasses, bearing compasses, liquid compasses, electronic compasses, just to name a few. The world would be a completely different place if the compass never existed; many say that it is the greatest invention of mankind.

In conclusion, the invention of the compass allowed the world to be discovered to its true extent. Before the invention of the compass, sailors would avoid the open sea in fear of getting lost. When the compass was created in 206 BC, it was used for fortune-telling and feng-shui to point towards the best positions for farming, growing crops, and searching for treasures. In the year 1040, the compass was used for navigation and it was described as the "south-pointing fish". Many decades later, needle compasses were created which alleviated the fear for Chinese sailors of getting lost when they explore the open sea. There were many accounts in ancient China of what we now call a compass for uses of geomancy as well as navigating. In the year 1200, compasses were brought to Europe and the Islamic world, but it is not clear how they were acquired with it. In spite of this, it is clear that Europeans chose to point their compass towards the north pole, while the Muslims chose to point their compass towards Kabba. The Chinese also had more than one method to create the compass such as by rubbing lodestone onto a needle's tip or by heating and quenching steel in water. From the ancient geomantic use of the compass, to the great maps created of the world for many to explore, the invention of the compass in ancient China has changed the earth in many ways that we are affected by everyday.

China's Enduring Legacy of Inventions

ESF South Island School, Kim, Jiyoo Jennifer – 12

China's rich history of inventions has left an indelible mark on the world, shaping our daily lives and pushing the boundaries of human ingenuity. From ancient wonders like paper and gunpowder to visionary advancements in energy distribution and social platforms, Chinese inventors have consistently pioneered groundbreaking ideas. This essay delves into both the remarkable inventions of the past and explores the exciting possibilities for future innovations, showcasing the enduring spirit of Chinese creativity.

China's ancient inventors were masters at blending practicality with innovation, resulting in creations that continue to influence modern society. Among China's most influential inventions, paper revolutionized communication and knowledge dissemination. Its invention in the Han Dynasty (around 200 BCE) transformed the way information was recorded, preserved, and shared, laying the foundation for the development of written culture. This remarkable creation led to the proliferation of literature, the preservation of historical records, and the democratization of knowledge.

Similarly, gunpowder, initially developed as an elixir of immortality, eventually found its way into military applications. The discovery of gunpowder's explosive properties revolutionized warfare, enabling the invention of powerful weapons and changing the course of history. However, its peaceful uses, such as in vibrant fireworks displays, showcase the versatility of Chinese inventiveness and their ability to find beauty and joy in their creations.

Chinese cuisine is a testament to the country's culinary ingenuity, with two remarkable contributions standing out. The invention of noodles, dating back over 2,000 years, demonstrates China's early mastery of gastronomy. Noodles quickly spread across the Silk Road, becoming a staple food worldwide and a symbol of cultural exchange. Today, noodles come in an array of shapes, sizes, and flavors, offering a versatile and delicious culinary experience.

Moreover, the origins of ketchup can be traced back to China. The Chinese sauce "ke-tsiap," made from fermented fish, became a favorite condiment. This sauce eventually evolved into the tomato-based ketchup we know today, signifying the enduring influence of Chinese culinary inventions and their impact on global taste preferences.

China's influence extends beyond technological achievements; it also encompasses economic systems and financial innovations. The Chinese experimented with different economic systems, from the early agrarian-based model to the establishment of market towns during the Song Dynasty. These experiments laid the groundwork for China's later economic prowess and contributed to the development of trade and commerce.

One of the most remarkable financial inventions was the creation of paper money during the Tang Dynasty (7th century CE). This revolutionary concept replaced cumbersome metal coins and facilitated trade and economic growth. The introduction of paper money transformed the way people conducted business, making transactions more efficient and expanding economic opportunities. This innovation became the precursor to modern currency systems and played a pivotal role in the rise of China as an economic powerhouse.

China's inventors demonstrated remarkable resourcefulness in harnessing their natural environment. Centuries ago, they discovered natural gas and ingeniously used bamboo piping systems to distribute it to villages. This early energy distribution system, reminiscent of modern infrastructure, showcases their foresight and sustainable practices. By utilizing bamboo, a renewable resource, they created an efficient and environmentally friendly means of delivering energy to communities. This invention highlights the Chinese commitment to finding innovative solutions that harmonize with nature.

Furthermore, the invention of toilet paper, albeit several centuries after the appearance of toilets, exemplifies the Chinese commitment to hygiene and sanitation. In the 6th century, during the Sui Dynasty, the use of paper for personal hygiene gained popularity. The invention of toilet paper reflects their dedication to improving the quality of life for their people and their foresight in addressing public health concerns.

Chinese inventors also made significant strides in military technology, including the development of early missile systems. Their understanding of projectile mechanics allowed them to create advanced weapons that greatly enhanced military capabilities. These advancements showcased their scientific prowess and propelled military strategies to new heights.

China's inventive spirit extends to the present, with impactful contributions that shape the modern world. Chinese social media platforms, such as WeChat and TikTok, have revolutionized communication and connectivity. These platforms have become integral parts of people's lives, enabling instant messaging, video sharing, and content creation. Their innovative features and user-friendly interfaces have inspired global imitations, highlighting China's ability to create innovative digital ecosystems that transcend borders.

Chinese video-sharing websites have also left an indelible mark on the digital landscape. Platforms like Youku and iQiyi have cultivated a thriving online entertainment industry, providing a vast array of content to millions of viewers. These platforms have not only transformed the way people consume media but have also influenced the evolution of online content consumption worldwide.

China has emerged as a global leader in the production of solar panels, fostering the growth of renewable energy. With a commitment to sustainability and environmental conservation, China's investment in solar technology has propelled the world towards a cleaner and greener future. By harnessing the power of the sun, China has reduced relianceon fossil fuels and contributed to mitigating climate change. Their advancements in solar energy technology have made renewable energy more accessible and affordable, paving the way for a sustainable energy transition on a global scale.

Furthermore, China's advancements in electric vehicle (EV) technology have contributed to the global shift towards eco-friendly transportation. Recognizing the need to reduce carbon emissions and combat air pollution, China has prioritized the development and adoption of EVs. Through government incentives and investment in charging infrastructure, China has become a driving force in the pursuit of sustainable mobility. Their efforts have not only reduced dependence on fossil fuel-powered vehicles but have also stimulated innovation in EV technology, making electric transportation more efficient and affordable.

In conclusion, China's rich history of inventions is a testament to the country's enduring spirit of innovation. From ancient marvels like paper and gunpowder to visionary advancements in technology and sustainability, Chinese inventors have consistently pushed the boundaries of human creativity. Their inventions have shaped our world, revolutionizing communication, warfare, cuisine, finance, and more. As we look to the future, inspired by the past, we can anticipate even more remarkable inventions emerging from the depths of Chinese ingenuity.

The legacy of China's inventors serves as a reminder that the spirit of innovation knows no bounds and that the pursuit of new wonders continues to shape our world. China's inventors, both ancient and contemporary, have left an indelible mark on society, improving the quality of life and driving progress in various fields. As we embrace the future, we must recognize the importance of fostering an environment that nurtures creativity, supports scientific research, and encourages collaboration across borders. By unleashing the full potential of Chinese ingenuity, we can envision a future where groundbreaking inventions continue to transform our lives, inspire generations to come, and contribute to the betterment of humanity as a whole.

Invisible Stars

German Swiss International School, Ling, Sophia – 12

In the vast night sky filled with stars named after famous inventors, many are Chinese inventors, such as Shen Kuo, who invented the first magnetic compass, and Zhang Heng, who created the first seismoscope. They have all made immense contributions to science and technology. However, one Chinese pioneer whose invention established China as the global leader in the textile industry remains conspicuously absent.

Her name is Huang Daopo. She invented the pedal spinning wheel almost 500 years before the spinning jenny was invented in Britain. She paved the way for the development of textile manufacturing in China, and is commonly known as "The Mother of Textile". Despite this, we have many unknowns about her: we're uncertain about her hometown, we do not know her actual name, we're not even sure if her family name is Huang. She mechanised textile manufacture with her invention, yet faded into obscurity.

The widely told story of Huang Daopo begins in 1255 CE when she was just twelve years old. Huang Daopo was one of the unlucky girls at the time - a child bride sold into marriage. After bearing constant abuse, she decided to sneak out of her house. She boarded a ship to the distant isle of Hainan - not just fleeing the oppressive fate of an unwilling marriage, but also choosing to write her own destiny. On the island of Hainan, she learned advanced cotton weaving techniques from the local Li people and eventually became an expert in weaving. During her time in Hainan, she unleashed her potential. She improved cotton planting methods and innovated various techniques related to cotton processing and weaving. After spending four decades in Hainan, Huang Daopo returned to her hometown Songjiang. Upon her return, she discovered that the local women were struggling with the inefficient technique of peeling cotton seeds, which affected their ability to meet the demands of the cotton levy. Huang Daopo spent many nights designing a machine to solve this problem. With the help of a local carpenter, she brought this vision to light. Not content with the initial design, Huang Daopo further improved the machine, changing the original one-foot-long bamboo bow to a four-foot-long wooden bow. She also had the bold idea of transforming the original hand-operated spinning wheel with one spindle into a pedal spinning wheel with three spindles. This innovation spread throughout Songjiang and revolutionised cotton production.

Huang Daopo's invention brought about a dramatic transformation in the lives of Chinese women by making their daily tasks significantly easier and more efficient. But if her invention was so helpful, why did she not achieve the same degree of fame as other male inventors? Was this because her invention was not as significant as the others? Or was it because she was just a woman?

There are a few key reasons for this oversight. Historically, China has discriminated against women. During a time when education was not available to women, there were very few literate women, let alone women inventors. Womens' achievements may not have been properly documented or attributed to them as historical records at the time tended to focus on the accomplishments of male figures.

Additionally, her invention centred around textiles and manufacturing efficiency, which was considered an unimportant field. The pedal wheel was also an incremental improvement rather than an entirely new technology or flashier breakthroughs like gunpowder, so its significance may have been underappreciated. As a result, Huang Daopo slipped through the cracks of history despite leaving such an indelible mark in China's textile industry.

Huang Daopo's story of being overlooked despite her groundbreaking contributions is not unique.

In the past, women have faced social and cultural barriers that have hindered their participation in innovation. Societal expectations dictated traditional roles for women, often relegating them to domestic responsibilities rather than encouraging their involvement in intellectual pursuits. Moreover, limited educational opportunities barred women from accessing scientific and technical knowledge, further exacerbating the gender gap in inventing. These societal and educational constraints prevented many talented women from exploring their inventive potential and realising their ideas.

Despite the challenges, very few pioneering women inventors have still emerged and made significant contributions. However, their achievements often went unrecognised or were attributed to male counterparts. For example, Hedy Lamarr, an accomplished actress, co-invented frequency-hopping technology during World War II that laid the foundation for modern wireless communication. However, her work received limited acknowledgment during her lifetime, and it was only in recent years that her contributions have been more widely recognized. This pattern of women's inventions being overshadowed or attributed to men has had a long-lasting impact on the visibility and representation of women inventors.

Even today, the problem persists to some degree.

The underrepresentation of women in science, technology, engineering, and mathematics (STEM) fields has had a direct impact on the number of women inventors. Stereotypes and biases perpetuate the notion that women are less capable or suited for technical and scientific pursuits, discouraging their involvement in innovation. From an early age, girls are often steered away from STEM subjects, limiting their exposure to the fields where many inventions originate. The lack of female role models and mentorship further exacerbates this gender gap. Without sufficient representation and encouragement, women face an uphill battle in pursuing inventive careers and gaining recognition for their contributions.

A study of US patent applications by Yale researchers found that only around 10% of all US patent inventors are female. This is despite women making up half the population. The study also found that applicants with an obviously female name were less likely to have their application approved. The lack of patents does not entirely capture the full scope of women's innovative work, but it does demonstrate their continued underrepresentation. Some breakthrough women inventors like Margaret Knight, who invented the flat-bottomed paper bag folding machine and cloth winding machine, saw their patents questioned on grounds that "a woman couldn't have invented it." Mary Anderson, who invented the windshield wiper, also faced immense obstacles in securing her patent.

Contemporary woman innovators face issues like difficulty securing funding from male-dominated venture capital networks and being taken less seriously in technical fields dominated by men. However, there are now also encouraging signs of progress. The number of women awarded patents has more than doubled in the past two decades. Recently, Jane Poynter became the first woman to be granted a patent for her work on life support systems for space habitats. Today's young girls are also becoming more inspired by the achievements of contemporary women in STEM. Role models like Mimi Aung, who was the project manager of Ingenuity, the Mars helicopter, and Tu You You, Nobel Prize winner for her medical research and had a star named after her, have the potential to light a passion for invention in a new generation. Hopefully, at the current rate of increasing proportion, we can reach gender parity by 2070 or sooner.

In China too, efforts are being made to uncover 'invisible' women inventors from history, such as Huang Daopo. As more women inventor's stories are shared more widely, today's Chinese girls can find inspiration in these 'new' tales and unleash their own potential as an inventor. While much remains to be done to overcome disparities, I believe we can see more 'Huang Daopos' as stars in the future night sky.

The Hidden Legacies of Ancient China: Unveiling the Origins and Secrets of Remarkable Inventions

HKUGA College, Sun, Yan Yuet Andrea – 14

China has always been renowned and praised for their remarkable inventions dating back to centuries ago, such as the "Four Great Inventions" being the most well-known, due to them being revolutionary to the world. Not long after, inventions from China soon spread to the rest of the world like wildfire, influencing our daily lives. However, many people may not realize most Chinese inventions possessed more important purposes in the past than they do today. Throughout this writing, I'll dive deep into inventions we've used before but never quite knew the origin and original usage of!

Our first special invention can take you back to your childhood and give you a sweet taste of nostalgia. First built by philosophers, Mozi and Lu Ban in the 5th century BC, the kite is a light frame covered with vibrant, colorful cloth, with a string attached to it. Holding the string by its end, children would often run around while the kite flies in the air, a toy that's simple yet fun. I myself still vividly remember the days when I always looked forward to releasing a kite whenever I went to outdoor meadows on weekends! The earliest form of a kite was made using wood and resembled the shape of a bird, also known as a "muyuan". Although nowadays, a kite is mainly for entertainment purposes and is seen as a mere toy, it was first used as an important tool during wartime in ancient China. For example, in the Han Dynasty, General Han Hsin used a kite to fly over enemy territory and used the length of the string to estimate the distance soldiers needed to tunnel to reach under the city wall, ending up victorious through this strategy. Kites were also often used by the military to send secretive messages and signals to each other, helping to facilitate communication. Kites contributed immensely to China's warfare, much more than you think.

Another invention we might've seen around a lot, especially when traveling mainland China, is oil-paper umbrellas. Whether they are displayed as art or sold in local souvenir shops on the bustling streets, you can find these umbrellas almost everywhere. Created using a bamboo frame and paper made of tree bark, the oil-paper umbrella embraced the cultural craftsmanship and beauty of China's traditions through delicate paintings or poems drawn and written on them. Tracing back to the Warring States Period, the wife of Chinese carpenter and inventor, Lu Ban, invented the first ever umbrella in the world, known as oil-paper umbrellas, a type of paper umbrella. Though it is now used to provide shade from the scorching sun, oil-paper umbrellas, including the colors, served different purposes as well. Used as a traditional wedding item in Chinese weddings, the bridesmaid would cover the bride with a red oil-paper umbrella upon arrival, driving off evil spirits and bad luck. Meanwhile, purple umbrellas symbolize longevity for elders, and white umbrellas were used for funerals. Oil-paper umbrellas were also said to give wealth and prosperity to the person owning them, and what I found intriguing was that the colors of the umbrellas not only had multiple meanings, but also determined the bearer's social status as well.

Next, the sky lantern, also known as a Chinese lantern, is a small, hot-air balloon designed like a thin paper shell, being launched for play or traditional festivities such as Mid-Autumn Festival and Lantern Festival. Invented by military strategist and sage, Zhuge Liang, also addressed as Kongming, in the 3rd century BC, the sky lantern came to life after he used a message written on the lantern in order to summon help when surrounded by enemy troops, ultimately saving his life. Following this folklore, sky lanterns were also called "Kongming lanterns" due to his sharp-witted intelligence, attribution to this invention, and resemblance of his hat. Even though sky lanterns are used to celebrate festivals and promote the unity of families now, they also used to be strategically used in wars. Similar to kites, sky lanterns acted as ways of transmitting signals, spying and surveillance during ancient China warfare. As the military laid siege on cities at night, the lanterns were launched, illuminating the sky. In present time, during festivities, people would release lanterns in hopes of carrying away their troubles, and according to myths, the higher the lantern went, the better luck they would receive.

Lastly, we have an inkstone. Although it's rarely seen or sold nowadays, it was in great demand during the Tang dynasty, being even more popular in the Han dynasty. Dating back from the 3rd century BC, an inkstone is a traditional Chinese stationery made of stone, known as a stone mortar. Being used to grind ink sticks into liquid ink, it is commonly used for Chinese art and calligraphy. But before this, inkstones were often given as gifts to many, most importantly the imperial family, due their intricate and beautiful designs. It was even known that the Qianlong Emperor had his very own imperial collection solely dedicated to the precious inkstones. Even though they were mainly regarded as a form of art, it also served as both a token of friendship and a diplomatic gift between nations, having texts or images carved into them. The value of inkstones had a variety of ranges, depending on the design, quality and scarcity of them. Some could even go for thousands of dollars in today's money! To this day, despite the fact that the inkstones are still unfamiliar to many, there are still devoted collectors who collect old inkstones in antique shops as an expensive hobby, as well as inkstones artisans who craft these exquisite masterpieces by hand.

To sum it all up, past inventions in China served different, important purposes before its common use in the present day. Who would've known that a paper lantern was invented to save someone's life? As time goes by, humans will continue to let their creativity soar, much like the kites and lanterns. Eventually, we will discover new ways to use other inventions in different ways, contributing to the traditions passed on from generation to generation. Throughout my research, it allowed me to have a more in-depth understanding of inventions from my motherland, as well as add onto my admiration and appreciation for these achievements. And what many should know by now, is that there are definitely more to China's inventions than what meets the eye!

China: Cradle of Invention

Singapore International School Hong Kong, Ye, Zikai – 13

From the early stirrings of technology, the first mechanical clock developed from water wheels, to the man who made alcohol from fermented rice and honey, Chinese inventors have left their indelible mark on history with their revolutionary creations and genius. China has always been a cradle for innovation itself, nurturing the inventions that shaped our present and past. Why is China so prevalent and powerful in their creations? Let us explore the numerous remarkable inventions of ancient China and speculate on where China will take us in the future.

China can be credited for inventing modern time itself, pioneering the creation of clocks. Before China's Yi Xing developed the first mechanical clock based on calculations and mechanics, sundials and hourglasses were commonly used. However, they are quite ineffective since they take a long time to set up, while hourglasses often require constant management.

Our story starts with Yi Xing, a Buddhist monk, in 725 A.D. The Tang court, which was in power then, appointed him in charge of the sector investigating astrology combined with geodetic surveys, or astrology. In his life, he had a number of impressive achievements, such as calculating the number of positions in a go-chess game, which bolstered his popularity and fame. He drew inspiration from many famed individuals, such as Zhang Heng, who was the first to apply hydraulic pressure power, such as a waterwheel in mechanical engineering. Another source of his ideas was Li Lan, a Daoist local who was an expert on water mechanisms, creating balances for weighing water, and combined with the followers of Ma Jun, who employed waterwheels, it provided the perfect environment for his revolutionary invention.

The mechanical clockwork, first invented by Yi Xing, whose invention was described as a "Water-driven Spherical Clock," was operated by explicitly calculating the amount of dripping water it takes to complete one full rotation on a wheel for 24 hours, then precisely applying the calculations to create the first mechanical clock. The clock features intricate and delicate systems of overlapping gears and mechanisms regulating the water flow to drive the clock's movement. Yi Xing's clock not only demonstrated the Chinese's deep understanding of celestial mechanics but also built the foundation for future advancements in timekeeping through a mechanical manner, influencing other inventors such as Su Song, who developed a more sophisticated version of this clock, known as the Cosmic Empire 1092, which was astoundingly developed 200 years before the first mechanical clock in Europe. Although he has long passed, his legacy continues to inspire clockworkers and the field of timekeeping to this day.

Our next invention relates to something we still have not fully understood, which is the numerous natural disasters that plague our earth. Although we may not fully comprehend how they form and impact us, observation and prevention measures date back to the Han Dynasty, when the first earthquake detection measure was invented by Zhang Heng, another prominent inventor, astronomer, mathematician, engineer, and geographer at the time.

His most renowned invention was the earthquake detector, which was said to be able to detect the direction of earthquakes from even hundreds of miles away. Zhang's ingenious device, known as a seismoscope, consisted of a large bronze vessel adorned by eight dragons, who caught a small bronze ball in their mouth, and made up the primary compass directions, and eight large toads standing ready to catch the balls. This system may seem questionable and unconventional at first; however, by hanging the bronze ball on a loose stick, in the event of

an earthquake, the stick would topple, causing the ball to fall into one of the toads with an ominous clang, alerting everyone around it to the potential danger.

In 138 AD, the bronze ball dropped menacingly in the imperial palace, received by the toads in the direction of Luoyong, the capital city at the time. Imperial officials were doubtful, questioning the legitimacy of the mechanism. In a twist of events, a Luoyong messenger arrived a few days afterward, confirming that there was an earthquake that did ravage the city around the time Zhang's seismoscope had set off.

Scientists are still fascinated by the simplicity yet effectiveness of Zhang's invention. In 2005, a group of scientists decided to recreate his prodigious seismoscope and used it to detect simulated earthquakes based on four real life earthquakes that happened close to China, near Vietnam. Miraculously, this phenomenal invention was not only able to detect it, but the data was accurate with those based on modern seismoscopes. This experiment proves that Zhang Heng's innovation was amazingly refined, remarkable, and ahead of its time.

Alcohol, known to some as liquid courage or even referred to as intoxication, has been and always will be a staple of both Chinese and Western culture. Although many assume alcohol to have a Western origin, recent discoveries in 2013 have discovered 9000-year-old pottery found in the Henan province had the presence of alcohol, almost 1000 years earlier than the earliest documented Arabian-produced alcohol, who were widely believed to be the first brewers of this golden beverage.

In China, alcohol is named "Jiu" and is traditionally made through the brewing and careful fermentation of a diversity of ingredients such as rice, fruits, and honey. This drink was not only used by officials and common folk alike to relax in social gatherings but was also a standard treatment used in medical remedies and methods in religious rituals.

During social gatherings, offering alcohol symbolizes shared hospitality and camaraderie, while its consumption is linked to celebrations, such as banquets, festivals, or weddings. In prayers or offerings to the spirits or higher powers, alcohol was presented as a libation, a drink as an offering to deities. Offering alcohol was a means of respect, often seeking blessings or favors from the gods in return. In addition, some doctors even use alcohol for its therapeutic abilities or used to dull pain and cure specific ailments.

By building upon the legacy of these honored Chinese inventors, modern society currently stands on the cusp of infinite possibilities, teetering between a crossroad of ideas and exciting prospects. With the rapid rise of technology and artificial intelligence, improving and further revolutionizing existing yet simple inventions, such as the mechanical clock by Yi Xing, is a real possibility for future inventors.

One possibility is implementing artificial intelligence and machine learning into a simple mechanism such as the clock, by allowing the clock to learn your sleep patterns, time, and quality of sleep, allowing the machine to learn from your habits to provide personalized suggestions on optimized sleeping times to maximize productivity and rest. While many trivialize the importance of healthy sleep, it supports a healthy brain and functions to maintain physical health. Designing this device that teaches and promotes a healthier lifestyle helps create a favorable environment for growth and mental development.

Another potential idea for upgrading Zhang Heng's seismic detector is to link it to nationwide security alarms, and when a sizable seismic activity is detected, indicating an earthquake, automatic signals are sent to cities and densely populated areas where damage would be the greatest, such as large buildings. For most earthquakes, deaths and injuries related to building collapse and giving citizens invaluable minutes to escape and evacuate could mean life and death.

China's focus on communication and social media communication is evident with recent inventions such as WeChat, allowing families to transcend geographical boundaries and connect in tough times. COVID-19, the recent virus that rampaged the global stage and caused lockdowns all around the world, separated many families from one another, young teenagers from their parents, and families from their elders stranded overseas with no support. China's ingenuity saved many from succumbing to loneliness from lack of support and attention, rescuing those overwhelmed by feelings of isolation and forsakenness.

The inventiveness of ancient China and their continued contribution to modern society today have left their ineradicable mark on human history forever. From clocks, seismoscopes, and alcohol to revolutionizing communication and the potential implementation of artificial intelligence, their inventions have undoubtedly shaped the course of human progress.

As we stand on the shoulders of ancient Chinese inventors, let us continue to foster an environment of growth and progress, nurturing an environment of creativity and curiosity. Inspiring future generations and pushing the boundaries of possibility, China is one of the critical factors that usher us into a new era of innovation and progress.

AngelEyes – The Wings of Perception for the Blind to Take Flight

St. Paul's Co-educational College, Seto, Ching Grace – 16

China's contributions to human civilization are as diverse as they are significant. From ancient times to the modern era, Chinese inventors have pioneered groundbreaking technologies that have revolutionized various aspects of life. The Four Great Inventions of Ancient China are classic examples of her consistent innovations, yet new tales of China's inventions have been entering the scene following the rise of technology. Beyond the familiar, commonplace narratives, the Chinese together orchestrate inventions of imagination and brilliance, creating momentous feats of human ingenuity.

According to the World Health Organization, approximately 253 million people worldwide have visual impairments, with 36 million of them classified as blind. Conventional pleasures of life that the average person is entitled to, from reading a book to watching television, come across as unattainable to the blind. Undoubtedly, success stories remain, such as Helen Keller writing up to 14 books, but such exceptional cases are but a needle in a haystack. Blindness permanently scars an individual's quality of life, independence, and access to opportunities – be it education or employment. Fortunately, AngelEyes recognises this long-standing issue and addresses it.

AngelEyes is an extraordinary wearable technology that has emerged as a new thread sewn into the tapestry of China's inventions – a pair of smart glasses designed to assist blind individuals in navigating and perceiving the world around them. Developed by NextVPU, a pioneering software development company based in China, AngelEyes utilizes artificial intelligence (AI) and sensors similar to those used in autonomous cars to provide a range of functionalities.

Contrary to popular belief, this gadget that assists the blind is not a pair of glasses. In terms of the "Wearable Version", it is rather a device attached to the temple of glasses. It is identifiable by its rectangular shape, with a touch bar in the center and a camera at one end. The power button and charging jark are located at the side of the device for wearers to easily locate by touch. For the "Desktop Version", the device is shaped in a conical frustum with an camera extension at the top to scan items placed in front of it. The power key as well as USB inlets align at one side of the frustum, again for ease of access. Despite a slight divergence in their specifications, the two AngelEyes Versions share the same remarkable features.

One of them is its ability to detect objects, enabling blind users to navigate their surroundings more safely and independently. By leveraging AI and sensor technologies, the smart glasses can identify and alert the wearer to potential hazards in their path. Thus, AngelEyes provides a platform for the visually impaired to freely travel, uninterrupted by obstacles. In addition to object detection, AngelEyes also incorporates other functionalities to enhance the blind user's experience. It can recognize different banknotes, enabling individuals to independently identify and handle money. The glasses also assist with text reading, allowing users to access written information, such as signs, menus, or documents, through optical character recognition (OCR) technology. OCR begins with capturing an image of the text to be recognized, using a scanner or a specialized OCR device. Once the image is secured, OCR software performs preprocessing steps to enhance the image quality and optimize it for character recognition, involving operations like noise reduction, skew correction, and normalization of the image with OCR algorithms. Post-processing steps are then applied to improve the accuracy of the recognized text, including dictionary look-up, language modeling, and context analysis to refine the results and enhance the overall accuracy of the recognized text. Moreover, AngelEyes is equipped with the capability to recognize colors, enabling users to differentiate between various hues. This feature can enhance their perception of the environment and aid in distinguishing objects or elements based on color cues. The glasses can also detect different levels of light intensity, providing valuable information about the brightness of the surroundings.

Ultimately, one of the most impressive aspects of AngelEyes is the compactness and portability of the technology. Founder Feng Xin Peng has managed to fit a powerful AI system into a mere 45-gram pair of glasses, alongside the necessary sensors and processing capabilities. This maximizes the convenience and subsequent satisfaction derived from putting AngelEyes into use. The achievement is notably commendable, considering that similar technology would have been deemed impossible to fit into such a miniscule form factor just a few years ago.

The development of AngelEyes represents a significant advancement in the application of AI and wearable technology to improve the lives of blind individuals. By providing unprecedented functionalities, the smart glasses embody an international breakthrough in human intelligence, offering greater independence and access to information for the visually impaired.

Over the past years, China has made numerous efforts to elevate the quality of the life of the blind. Students from the Kunning University of Science and Technology, for example, invented the helmet Eye See to detect obstacles within three meters using a laser radar, while professors from Zhejiang University developed a pair of glasses to collect information about the wearer's surroundings, converting it into audio signals. The aforesaid inventions are undoubtedly great leaps in human technology, yet pose inconveniences to users in real-life contexts and interactions, not to mention the robotic mechanics attracting unwanted attention from passers-by. Thus, the preceding inventions, though impressive by themselves, pale in comparison to AngelEyes. They set the stage for AngelEyes to ameliorate and, even, completely eradicate the concerns of the blind.

Though possessing numberless perks, AngelEyes still bears room for improvement. To further refine and enhance AngelEyes, connectivity and accessibility should be emphasized: the smart glasses can be connected to other devices or networks, enabling seamless access to digital content, applications, and services. For instance, this connectivity can facilitate the integration of screen readers, navigation apps, voice assistants and other assistive technologies, providing a more comprehensive and holistic support system personalized for individuals with visual impairments.

AngelEyes serves as a testament to China's commitment to technological innovation, pushing boundaries, and finding creative solutions to address societal challenges. Bold and groundbreaking, it exemplifies how advances in AI, miniaturization, and sensor technologies can be harnessed to create revolutionary inventions that positively impact people's lives.

A Seed of the Future

St. Paul's Secondary School, Lau, Tsz Yi Stella – 12

In a world where human desire and inventive thought are the primary means of weaving time together, an enigmatic force known as Fibre Optics is at work. It is more than just a tool; Sir Charles Kao Kuen's inventive genius gave rise to a conscious being. It is a real-life illustration of human ingenuity as well as the limitless potential of the human mind and the unbroken power of perseverance.

The story of Fibre Optics history is not merely a history; rather, it is a tale that encompasses time and the tremendous history of human ingenuity. It began at a pivotal moment: the illustrious Nobel Lecture delivered by Sir Charles Kao on December 8, 2009. In the hallways, Kao's words transformed into an insightful hymn which honoured the brilliance of technological progress while resonating with the sounds of contemplation.

However, the roots of Fibre Optics can be found far further back in the fertile ground of Professor Kao's inquisitive mind. In 1966, he posed two key questions, setting off a global scientific inquiry into previously unheard-of technological domains: "Is the Ruby laser a suitable source for optical communication?" along "What material possesses sufficiently high transparency at such wavelengths?" These inquiries served as catalysts for the birth and growth of Fibre Optics, much like seeds planted in innovation that has the power to totally change the communication landscape.

Kao's questions sparked a strong wave of resolve and interest that spread across the scientific research channels. As they responded to Kao's provocations, the labs were bustling with activity. Extensive tests and theoretical discussions sought to reveal viable sources and materials with outstanding transparency. In pursuit of elusive solutions, scientists navigated a complex network of experiments. Their dedication extended beyond just studying science and took the form of an unwavering quest for technological progress, a resilient tapestry, and sleepless evenings filled with the excitement of discovery. In addition to looking for parts and laser sources, the mission was to establish a connection that would enable the transmission of human speech over hitherto unimaginable distances. The incessant efforts being made in laboratories around the world were driven by the goal of connecting people, communities, and worlds together.

Fibre Optics evolved gradually over several iterations, rather than appearing completely from nowhere. It came about as a result of extensive experimentation, constant recalibration, and trial and error. Every thread that was woven into this cutting-edge technology symbolised not just scientific discovery but also the tenacious pursuit of seemingly impossible goals and the resiliency of the human spirit. Nevertheless, a solid support system worked discreetly in the background amid the scientific intensity. Gwen May-Wan Kao was a silent force behind the scenes, but she was a tower of support and unwavering encouragement. Her unshakable faith in Sir Charles Kao's ideas and unsaid contributions laid the foundation for his ceaseless search for innovation.

The history of Fibre Optics is intricately linked to the everlasting innovation of Chinese people throughout history. It was a monument celebrating China's rich history of ground-breaking discoveries rather than just a single story about a person or a breakthrough. It highly regarded a range of modern and historical innovations weaved together to represent the country's constant commitment to innovation across time. It went beyond being a single incident or technical turning point, representing a long history of innovations that show how committed China has been to innovation throughout her history.

The historical journey of Optics goes beyond simple historical recall, echoing into the present and the future rather than simply existing as a light echo from the past. It is a captivating suspenseful composition that captures the unwavering creative force that entices individuals to explore new frontiers. This timeless tale stands as a testament to the creative capacity of the human intellect, showing that anything is possible if one has unwavering resolve, an insatiable curiosity, and an unrelenting drive for progress.

The epitome of innovation, Optics, muses over the convoluted path that led it to the universe of endless time. Optics weaves a path through the complex tapestry of its origins, illuminating the gleaming threads that result from the never-ending search for the perfect source and the ongoing development of materials. These memories bring us to a time when the discovery of light-guiding strands represented more than just a scientific finding; instead; it symbolised unwavering dedication and relentless pursuit of an endeavour.

This journey provides insight into the past as well as the future. In this reflection circumstance, Fibre Optics imparts consciousness to its existence in this reflection state. It sees itself as more than just a conduit; it wants to be an ethereal link that connects communities and continents, allowing voices and data to travel at speeds beyond the realm of the possible. It yearns to be the link that shrinks vast distances across the globe to fleeting moments, surpassing tangible barriers and uniting individuals on a global scale.

The tale of Fibre Optics and the understated yet vital part presented by Mrs. Gwen May- Wan Kao are perfectly interwoven in this radical story of invention. Her unwavering support and inconspicuous contributions were crucial in fostering Sir Charles Kao to pursue his ceaseless quest for novelty. Her silent support became an unseen but essential thread woven into the fabric of Fibre Optics' birth, highlighting the crucial support in the journey of trailblazing invention.

China's magnificent historical inventiveness melds smoothly with Fibre Optics, highlighting its contemporary technological marvels and enhancing its history of ancient inventions. Both historical innovations like the compass and paper, as well as today's incredible technological marvels like solar panels, WeChat, and TikTok, demonstrate China's unwavering devotion to innovation. The story of Fibre Optics' development gains layers of complexity and depth from this diverse terrain.

Fibre Optics' account of its development serves as a striking example of how technology is advancing, honouring Sir Charles Kao Kuen, the remarkable intellectual whose insight sparked a revolution. This narrative combines creativity, history, and the resolute nature of the human spirit to tell the tale of how this ground-breaking technology came to be. The way the plot unfolds is reminiscent of an old tapestry, with each thread cleverly woven together to form a timeless story. However, the story of Fibre Optics transcends time; echoing like a symphony, it echoes not only as a remnant of the past but also as a melody extending into the time to come. It democratises access to human knowledge and cultivates universal connectivity: marking a new era in history. It represents a sense of expectation and the unwavering core of ingenuity.

This story is an enduring tale that honours the boundless powers of the human mind and the unbridled heritage of wisdom. It is, above all, a monument to the never-ending pursuit of progress. The innovative and historically splendid story of Fibre Optics is a monument to human perseverance and the eternal potential of intelligence; this victorious seed is continually germinating and growing to an everlasting future.

Creative Writing

Non-Fiction

Group 3

Ancient Chinese inventions: Pioneering achievements that shaped the world

ELCHK Lutheran Academy, Poon, Lok Tung Hilary – 12

China is a country with a particularly rich and ancient civilization, that can look back on an incredibly long history. Over the millennia, China has made enormous progress. The Chinese have contributed to various fields such as art, philosophy, literature, science, technology, governance and so on. Chinese civilization is known for its long history of remarkable and significant inventions and technological achievements. Let us go embark on a journey through time and discover the extraordinary innovations that have left an indelible mark on our modern world. The invention of paper is an advanced science and technology in ancient China. The invention of paper traditionally dates back to 105 AD, when a chamberlain of Emperor Ming (Cai Lun) gave paper to the emperor in the first year of the Yuanxing era. The invention of paper had a great impact on mankind. In ancient China, paper was often made from bamboo. To make paper, you first cut the bamboo. Finally, the paper had to be pressed to dry to remove the water and then hung it up to dry.

Why did the Chinese have to make paper? Because the Chinese engraved characters and symbols on animal bones and turtle shells. However, there is a problem when you use these things for writing, because if you write on them, you cannot erase your writing because it has enlarged in the bone or shell, and it's very annoying if you must rewrite the whole text because of a misspelled word. It's not so great for the turtles either, because sometimes the Chinese engraved letters into living turtles, and that's not so nice for the turtles. So, some Chinese thought of using bamboo to replace the turtles so it wouldn't hurt them, but there's another problem: bamboo is too heavy to carry a book around, and you need two men to carry it. They invented an ink that could be used with the silk, it was light and portable, but silk is very expensive and the process of making silk kills a lot of silkworms and it's a lot of work to make silk.

Given these challenges, the invention of paper revolutionized the writing and communication systems in ancient China. It provided a light, easy to make, and cheap product that had a big impact on the world and continues to help people in modern life.

The discovery of gunpowder in ancient China was a crucial milestone in Chinese history. Gunpowder is a mixture of saltpeter also known as potassium nitrate, sulfur, and charcoal. Together, these substances will burn quickly and explode. Chinese monks discovered this technology in the 9th century BC when they were looking for a kind of immortality medicine.

The Chinese believed that the power of gunpowder could drive away evil spirits and confer immortality. However, the Chinese quickly recognized the explosive properties of gunpowder and began to explore its military uses. The Chinese used it from the 11th century onwards. It was originally used against enemies in the form of fire arrows and flaming projectiles. The discovery of gunpowder in ancient China had a significant impact on warfare, leading to the development of firearms and changing military history. It changed the battles that were fought, and it contributed to the decline of traditional chivalric warfare.

Today, gunpowder is no longer the primary explosive used in modern firearms and explosives. Nevertheless, the discovery of gunpowder in ancient China was a crucial milestone in human history, influencing technology, warfare, and some global interactions.

Then, we have Chinese acupuncture. It was invented a several millennia ago around 8000 years ago. The oldest Chinese medicine book "Nejing" also known as "The Classic of Internal Medicine of the Yellow Emperor" tells us that acupuncture was often used as a therapy in China a long time ago. Besides that, various kinds of acupuncture needles were discovered in Prince Liu Sheng's tomb. Prince Liu Sheng died at around 200 B.C. This is further proof that acupuncture was already in use in China more than two thousand years ago. Earlier instead of needles, sharpened stones and long sharp bones were used around 6000 BC for acupuncture treatment.

How was acupuncture performed? Acupuncture is done by using needles that are as thin as your hair. The needles are then inserted onto your body, onto your skin or sometimes deeper into the muscle. The needle is inserted onto a point that produces a sensation of pressure or ache, needles may be heated during the treatment. Acupuncture points are believed to stimulate the central nervous system. This releases chemicals into the muscles, spinal cord, and brain. These biochemical changes may stimulate the body's natural healing abilities and promote physical and emotional well-being. Some people say that acupuncture has minimal pain where the needle is inserted. Some people report acupuncture makes them feel energized, whereas others say that it really hurts.

Next, we have the earthquake detector. The earthquake detector was invented nearly 2000 years ago in 132 AD by a Chinese inventor called Zheng Heng. The earthquake device was remarkably accurate I could measure earthquakes from far away, the device did not rely on shaking or movement. In the past Chinese people didn't understand that earthquakes were caused by the movement of the technic plates on the earth's crust. Although we still cannot accurately predict earthquakes, we have come a long way in detecting, recording, and measuring seismic shocks. A Lot of people don't realize that the earthquake detector was invented over 2000 years ago. Zhang Heng's earthquake detector was able to determine the direction of an earthquake hundreds of miles away.

Zhang's earthquake detector was a giant bronze vessel, it was almost 6 feet in diameter. Eight dragons snaked face-down along the outside of the barrel, marking the 8 compass directions. In each dragon's mouth was a small bronze ball. Beneath the dragons sat eight bronze toads, with their broad mouths gaping to receive the balls. His device also included a vertical pin passing through a slot in the crank, a catch device, a pivot on a projection, a sling suspending the pendulum, an attachment for the sling, and a horizontal bar supporting the pendulum. The mechanism that caused a ball to drop in the event of an earthquake is still unknown. But one theory was that a thin stick was set loosely in the center on the barrel, and the earthquake would cause the stick to fall down and fall onto one of the 8 directions causing a dragon to open its mouth and release a ball.

In 2005, some scientists in Zhengzhou (China), Zhang's hometown, succeeded in recreating Zhang's earthquake detector and using it to detect simulated earthquakes based on four different real earthquakes, and all the data collected by the scientists was very accurate and all the tests were consistent with previous results!

Then, we have the compass, the compass is a navigational device that shows direction. It was invented by a Chinese person the compass was first used for worshiping, and fortune telling and geomancy, which means the art of aligning buildings.in the late 11th to the early 12th century, some Chinese sailors adopted this gadget for astronomical and terrestrial navigation purposes. Making a new era in the history of navigation.

How does the compass work? In the compass a small, long, magnetized needle is placed on the pivot so that it may rotate freely in the compass. It uses earth's magnetic field to exert a force onto the compass needle causing it to rotate in the same direction as the magnetic field. That is how it can tell you the direction of where you are going!

The Chinese also invented alcohol. Alcohol was invented at around 1600 BC. Alcohol is known as Jiu in China and is often used as a spiritual offering to Heaven and the Earth or ancestors in ancient China. In 2013, a 9000-year-old pottery found in Henan province, this revealed that the presence of alcohol has existed very long time ago. Chinese people used to make alcohol in clay pots, it has been revealed that people were making an alcoholic beverage from fermented rice, millet, grapes, and honey.

There are so many notable ancient Chinese inventions, but these inventions represent just a fraction of the remarkable contributions made by ancient China. The Chinese have created so many unique inventions from edibles to gadgets! China is a very interesting country. The country has come a long way since everything started. I think that the Chinese have created many great inventions! The Chinese had made things from groundbreaking technological achievements to amazing creations. These remarkable inventions not only transformed their own society but also had a profound impact on civilizations far beyond China's borders.

The Story of Tea

Good Hope School, Ip, Kalam – 12

After pouring boiling water into a cup filled with tea leaves, the water then turns into a bright, beautiful, orange-brown, the steam and aroma arise from the cup and stimulate the senses. This is tea, a fragrant beverage brewed from leaves that captivated people all across the globe. With a wide variety of flavours, its bitter yet soothing taste attracted everyone and has now become one of the world's most-loved drinks. One whiff of it can make you feel energetic, drunk and in love. However, tea was not always how it is now.

Legend has it, on a breezy day, the first Yan emperor Shennong was resting after a long tiring journey with his men. Feeling thirsty, he asked his servant to prepare him some water. The way he preferred his water was rather unusual. He liked his water first boiled and then served. As a herbalist, his water always needed to be cleansed before consumption. Upon serving the water to Shennong, a dead tea leaf carried by wind went into the cup of water the servant was grasping. It was served unnoticed by the servant. The drink had turned into a subtle brown colour that intrigued the emperor. He drank it and found the taste and aroma emitting from the drink quite peculiar yet refreshing. He was taken aback by the sensational taste. A lot of people believe that this was how tea as a beverage came about.

Some people believed that it was discovered as a medicine first before being considered as a drink. Shennong was known for being a great herbalist alongside his role as the emperor. He tasted and tested numerous leaves to see if they were useful for his medicine research but he had fallen sick after consuming 72 poisonous leaves. His condition was fatal, he could've died at any moment. That's when some leaves fell next to him. Even though the stakes were high, he swallowed it regardless due to his curiosity. He then felt more energised so he kept craving for them. He ate more and more until the poison had left his body. It was then that tea leaves were recognised as a medicine and made their debut.

Even though tea was not used as medicine among citizens, herbalists from the Han Dynasty (206 BC - 220 AD) continued to study and enhance the use of tea for medicine. As tea contains L-theanine (an amino acid), caffeine and theophylline (medication for asthma and chronic diseases), it is great for all kinds of ailments. Making it also popular among medical workers.

After the introduction of drinking tea, it took ancient China by storm. It was quickly normalised in high society. The nobility considered rare or expensive tea as proof of their status and wealth. Just having tea was seen as a luxury. The rich also drank tea for energization and peace of mind instead of using it for medical purposes. After years of development, drinking tea became habitual to everyone despite their classes. Commoners drank tea as pleasure rather than proving their rank. It then became proper etiquette to serve tea to guests or visitors upon their arrival as a gesture of respect, or even friendship and affection.

"荼" (pronounced as "tú") — the old Chinese character for tea then became a household name. As it was used as medication, the character carried the definition of medicine. However, from the Jin Dynasty (265-420 CE) to the Tang Dynasty (618-906 CE), a stroke was removed from the character. It then became "茶" (pronounced as chá) after the simplification and is used to this day.

"The Classic of Tea: Origins & Rituals" (《茶經》) by Lu Yu (a native of JingLing) was a book about what tea was, what it contained, the tools for tea, the methods of brewing tea and its use. It is a renowned book and still considered the best monograph of tea ever written. Even though tea was already popularised by everyone, the book helped it reach new heights to the point where tea became an important part of Chinese history.

The fame of tea carried on to modern times. It spread even wider to foreign countries. In the United Kingdom, tea is consumed on a daily basis by a majority of people across the country. It is preserved as one of their cultural beverages as tea became such an impactful drink to the lives of many. In India, tea has had a great influence on households. They consume it in domestic and official surroundings, with sometimes an addition of milk. Furthermore, it is regarded as an important part of Japanese food culture. Green tea is often served alongside dishes and tea ceremonies. It substitutes water and adds the finishing touch to a meal. Tea has an effect on all parts of the world, with billions of people drinking it daily, it is now a widely-known beverage.

Tea has a huge variety of kinds such as black tea, green tea, oolong tea, Earl Grey tea, chamomile tea, et cetera. And it all leads to the complicated production of tea. Firstly, tea leaves have to be harvested from Camellia sinensis after years of cultivation. Secondly, the harvested leaves have to be dried and processed. There are different flavours of tea because each is processed differently. Some are wilted, some are not. Some are oxidised while some are untouched. That is how different tastes and colours are made. Then people add different ingredients to it to make the flavour unique. Many add lemon and sugar to turn it into lemon tea. Milk is also commonly added to tea, making the drink thicker, hence the given name "milk tea". It is experimented by many, there are countless possibilities on how one can go about tea, making it revolutionary with its diversity. It has the ability to evolve and keep its position as one of the best beverages ever served.

As tea contains a large sum of caffeine, it is used as an energiser. The caffeine in tea makes people forget about their drowsy, tired selves. It helps workers stay on their feet and finish their work. It helps students stay awake during long exhausting study sessions. Consuming tea early in the morning is the start of a fresh new day for a lot of people. The energetic feeling makes people productive and efficient. It does wonders. Therefore, it can be found in many cafés and offices.

To this day, serving tea to guests and visitors remains a common courtesy. It is not a proof of position anymore, but a way to initiate a conversation. That's how the term "afternoon tea" was formed. Afternoon tea is a light meal enjoyed during the time between lunch and dinner, around 3-5 p.m. Hence the name '"afternoon" tea'. The meal is made of snacks such as sandwiches and sweet pastries and rich tea. High-quality tea is the main highlight of the meal, it completes everything with a hint of its bitterness. Long conversations take place during this peaceful and calming gathering. It helped grow tea's reputation and its daily consumption.

Who would've thought that mixing hot water and leaves can create such a sumptuous drink? Shennnong's discovery led to a magnificent custom. Tea is enjoyed all over the world with people thirsting for more. Its luscious taste allured people into its cage. Tea has countless variations, with infinite forms and tastes. I believe tea will become the best beverage in the world, surpassing coffee and alcoholic drinks. It certainly has left me an unforgettable experience. The mesmerising scent is what makes me feel amazing in the morning. It has helped me through my long journey of school which has more to come. Tea has changed many souls and has become engraved in our fruitful lives. It will evolve and turn into something better than ever. The journey of tea has much more to come.

New Tales of China's Trends of Inventions

Po Leung Kuk No. 1 W. H. Cheung College, Chung, Sze Ting – 14

Nowadays, all the things we use in our daily lives are invented by the people in the past. Most of us are familiar with inventors like Thomas Edison and Albert Einstein because their inventions and discoveries have influenced us very much. But what about Chinese inventors? We might know Cai Lun who invented the paper and Zhang Heng who created the seismoscope. However, we know foreign inventors more but fewer Chinese inventors. Therefore, I am going to introduce two Chinese inventors in both the ancient and modern.

To begin with, Sun Yunqiu was an inventor in the Ming dynasty. He was born in 1628. Even though he died at only 34 years old, he had plenty of achievements in creating eyeglasses and mirrors. He wrote a book about mirror history and some records of optical instruments. Sun Yunqiu's mother was knowledgeable so he was inspired to learn and explore mathematics in the categories of mensuration, calculation and geometry. However, Sun Yunqiu was forced to stop learning since his dad died when Sun was about 13 years old. Later, he continued to learn and thus he was successful.

Sun Yunqiu invented different lenses for eyeglasses to correct short-sightedness or other eye problems. People might be short-sighted or long-sighted. They might have astigmatism or presbyopia. These are the common eye problems in Ming. Sun learned everywhere to find teachers in Hangzhou and finally, he could grind lenses to make various types of lenses in order to correct eye problems and to help people. Eyeglasses were rare in the Ming dynasty and they were expensive. His creation of many kinds of lenses affected the industry of eyeglasses greatly in Suzhou and later in China. The glasses became cheaper and more and more people could afford to buy them.

Besides eyeglasses, Sun Yunqiu invented a wide range of mirrors. For instance, there are simple telescopes, magnifiers, microscopes, etc. Different mirrors have different uses. People could observe different images when looking at the mirrors. People could see images far away by using telescopes, small images by using magnifiers, and much smaller images by using microscopes. They were intriguing. Sun wrote a book recording the history of mirrors and lenses including his inventions. Although the mirrors didn't have a great influence at that time, people read the book and created the mirrors according to it and therefore the mirrors exist now and we can use them.

In my opinion, Sun Yunqiu wasn't known by many people but he gained a victory. First of all, the skills to grind lenses were developed by him in China. His teacher learned the study of light from the Western people and taught the Sun about it. After talking with other investigators, Sun mastered the skills to grind lenses. He put a substantial effort into improving eyeglasses. I appreciate that he was willing to research for it instead of doing simple jobs such as being a teacher in school and working for the government. The development of eyeglasses in China was important too. Because of his accomplishment, eyeglasses became more common so we can buy a pair of glasses at a reasonable price now. In addition, there were only monocles at that time and Sun made bicle which is most of the eyeglasses we see today. A pair of glasses is more convenient and safer. It is also more suitable for Asians as we can't hold a piece of glass easily. His inventions of lenses and bicycles made us buy a pair of eyeglasses to let us hold the glasses with less difficulty and see things.

On the other hand, Sun talked with other researchers and learned from teachers, which showed that he was humble. He was eager to learn so he looked for teachers. If he studied by himself without consulting anyone, he wouldn't have had such great achievements. He would not be known by us now too. Discussing with researchers, Sun acquired knowledge and was inspired by them. They studied light together so Sun benefited from their discussion. I think this was because the power of a group of people is much larger than the power of an individual. "Unity is strength.' When there is teamwork or collaboration, anything can be achieved. Furthermore, Sun stopped learning at 13 because of his dad's death but he learned again later. He needed to take care of his mum and himself so he worked and sold things to make money to live in that period. He persisted in learning and wasn't affected by the incident. Therefore, I think he was a remarkable person.

Not only did Sun Yunqiu invent lenses and glasses which help us nowadays, but also his good qualities which we can learn from him. For example, he was modest and we can also learn from his perseverance. Having similar qualities, another inventor I want to introduce made a great success too. She is a modern inventor called Tu Youyou.

She was born in 1930. She is a malariologist and pharmaceutical chemist. She has invented medicines to cure diseases. Studying Chinese and Western medicine, Tu Youyou found artemisinin and dihydroartemisinin, which are used to treat malaria. In the 20th century, malaria was widespread in more than 100 countries in tropical and subtropical zones. 150 million to 300 million people died in the 20th century alone. Her medicine can decrease the patients' mortality rates of malaria, saving millions of lives in South China, Southeast Asia, Africa, etc. Moreover, she got several prizes for the achievement. She got the Nobel Prize in Physiology or Medicine jointly with two other people in 2015. She is the first female in China to receive a Nobel Prize in any category. Apart from this, she also got the Lasker-DeBakey Clinical Medical Research Award and the Warren Alpert Foundation Prize.

Tu discovered a chemical compound which can heal malaria. This saved many people at that time. Her discovery was not a piece of cake. When she was studying in secondary, she suffered from tuberculosis, forced to stop her academic. After two years, she was getting better so she started to go to school again. She studied at Peking University and graduated in 1955. She worked from that time including the period of the Vietnam War. Before discovering ways to treat malaria, Tu studied a way of using herbs to treat schistosomiasis. It is related to Chinese Medicine. It was like a preparation for finding artemisinin. Since malaria killed many people in China, Tu was invited to join the research group to find a drug to cure malaria.

The major contribution of Tu is artemisinin. Her mission was to carry the team to find out anti-malaria drugs. By 1969, scientists from all over the world had tested for 240000 compounds but nobody succeeded. At the age of 39, Tu thought she could test Chinese herbs because they would not appear in foreign countries. She collected over 2000 herbs and summed up 640 prescriptions. She wrote all the details in A Collection of Single Practical Prescriptions for Anti-Malaria. Experiencing 380 failures and improving extraction methods, Tu finally accomplished the mission. She then developed the medicine and it was used for treating malaria in 1972. The exploration rescued over a million patients of malaria, influencing the world deeply.

She got recognition from the World Health Organization for the anti-malaria drug. The Nobel Prize was also given to Tu in 2015. Not only did her dedication save lots of people infected by malaria, but also gave a huge development in Chinese medicine. As she has

been a researcher and scientist in China, she made a great impact on medical studies. She was a teacher too and she brought up a few master's graduates and one doctor's graduate. Furthermore, she wrote theses about medicines which favor future generations and push evolution. Scientists can read them so as to know the research of artemisinin and may get some other ideas for other investigations. Bai Chunli, the President of the Chinese Academy of Sciences said Tu Youyou's award is the pride of the Chinese scientific sector. This shows that Tu had significant success and influence on society.

Although her achievements were not recognized by China as her contribution, she didn't care much about it. She continued to do research and teach students at school. This shows that she didn't care about fame and fortune. Being selfless, Tu still helped to develop medicine for China in 2019. She wrote many articles about artemisinin—her major achievement. This allows future generations to read them and know more about science, mainly medicine. In my point of view, she is keen on learning and exploring nature science too. She has been learning and researching almost her whole life. She persevered with it. She was 93 years old this year and she helped the future generation in developing the research on artemisinin. She was still energetic enough to do that, which made me respect and admire her. I hope I will be so healthy and love learning like her at a later time.

In conclusion, Sun Yunqiu and Tu Youyou both have different qualities that we can learn from. From humility to perseverance, we can adopt them not only in learning but also in working and developing hobbies. If we have these qualities, we may achieve our goals in a particular aspect or even life goals. Additionally, their inventions which helped all people around the world, made me feel impressed. They gained glory for their country. Thus, people may have a good impression of China too.

Non-Fiction

Group 4

New Tales of China's Inventions

ESF King George V School, Yang, Edward – 14

China is a country of rich cultural heritage, a goldmine of ancient traditions from evanescing civilizations. Standing as the second most populous country in the world, China's innovative history is inscribed onto the stones of humanity's chronicles. Spanning from the building blocks of the economy today, to the 'immortal elixir' of gunpowder, Chinese inventions have revolutionized the world to how it thrives in the present.

No matter how corrupted the economy may be, no matter how high inflation rates may be, the basic units of economics remain unchanged - the copper coin and the paper bill. Queen Elizabeth II on the ten pound bill and George Washington on the United States dollar bill - none would be possible without the ingenious thinking of the Chinese in the Tang Dynasty. From the mid-7th century to early 8th-century, the Chinese developed a form of 'flying money', primarily utilized by merchants to transfer substantial values of money across distances. Copper coinage was deemed too heavy, and too tiresome to carry across countries, from city to city. Thus, a promissory note developed using paper from mulberry bark was formed, however, were only introduced in regions around Chengdu at origin. With the conception of paper bills, gone are the days of laboriously carrying strung-together coins over thousands of miles on foot. Ultimately, these promissory notes were officialized by the Chinese government during the Song dynasty, steadily evolving into a household commodity for each civilian. Despite facile storage, paper money was easier to forge. No longer did counterfeit currency need to be metallically forged one by one, only to fabricate coinage worth one dollar. Governmental bodies responded to this by establishing factories to produce printed paper money using woodblocks of six different colors, each consisting of different fiber mixes. Nonetheless, as economic advancements took China, and the rest of the world, by storm, so did the development of forgery. The supply of counterfeit notes rapidly increased, yet so did real bills. However, it proved to be more expensive, and more difficult to distribute these notes across regions in China, much less the entire world. Moreover, once governments did bite the bullet, paper money increases the rate of inflation. When the supply of paper currency becomes larger than the supply of goods and services, the value of these currencies decreases significantly, and thus begins a potential crisis in economic status, constituted distinctly in Zimbabwe's economic history. In the year of 2008, inflation, or rather hyperinflation, in Zimbabwe peaked at a colossal five hundred billion percent, but managed to settle down years later with nearly three billion percent less at its current state of one hundred and fifty percent. Despite these drawbacks, governments and manufacturing agencies have persevered over the last few decades to design exquisite characteristics of the paper bill, increasing the quality of the ink, watermarks, colouring and print quality. Moreover, the addition of the paper bill stimulated economic growth from all around the world as a common, globally accepted method of exchange. Through the Silk Road trade routes, paper bills were spread across the neighboring regions of China. Merchants rapidly disseminated this knowledge across the entire European continent, and, within a short period of time, the West had complete understanding of the unique concept introduced by the Tang scholars and merchants. Further along the historic invention of the paper bill, banks had introduced the idea of banknotes - central, standardized units of currency unique to their own land, entirely constructed upon the original Chinese promissory paper note. Ultimately, the present day monetary systems are all based on the original paper note of the Tang merchants, revolutionizing global economic systems and the flexibility of monetary exchange. Paper currency has since reformed the facilitation of trades from all across the world, whether it is something as minute as the interchange from individual to individual, or as the expansive magnitude of trades involving countries. Without the ingenious thinking of the Chinese in the Tang Dynasty nearly one and a half thousand years ago, you would not be able to purchase the latest iPhone, or even a bag of chips, without slinging a bag full of copper coins.

Shortly before the ingenious invention of the promissory note in the Tang Dynasty, the Chinese discovered a way to find the direction, without aid from the sun setting. Historians globally believed China to be the first civilization to create the basic directional exploration tool - the compass. However, perhaps what they did not realize at the time, was how significant this would be, not only to human exploration, but also the revolutionization of navigation throughout the oceans and lands. Travelers' journeys without this foundation instrument were dependent on the stars of the night sky, and the breeze of the winds, to chart their courses. Long gone are the days of terror, of uncertainty, and of vulnerability. The compass still stands today, tall, as one of the greatest achievements of Chinese civilization, and humanity in general. This critical navigation instrument did not, in fact, appear first as a digital software built into electronics. Developed during the Han Dynasty, the original compass was named 司南 (sīnán), or "south governor" and 指南魚 (zhǐ nán yú) "south pointing fish" by the Chinese people. This was due to the fact that the compass always indicated South, through the presence of lodestone. Lodestone was the primary component in the original invention of the compass in China as it is a naturally magnetized mineral, and naturally pointed towards the magnetic poles. The theory in which they constructed upon was that the suspension of the lodestone compasses would allow it to turn freely. Since it consistently aligns itself with the Earth's magnetic field, the ancient Chinese compass was developed. Despite its alterations and advancements further along its timeline in human history, the basic Chinese lodestone compass served as the first ever instance for a significant jump in maritime navigation. By the late 11th to early 12th century, the compass had been deemed serviceable to human navigation, as Chinese sailors had adopted the directional mechanism for maritime, astronomical, and general terrestrial navigation. The famous Christopher Columbus in the fifteenth century would not have discovered the 'New World', or set along his journey if not for the Chinese compass. However, as the compass advanced, as did other technologies. Since the entire compass was based upon the natural reading of the Earth's magnetic field, it was highly susceptible to magnetic interference, especially around metallic objects or nearby electromagnetic fields. Now, in the modern day, compasses have been developed onto digital devices, discerning this issue. Not only have the invention of the compass facilitated the maritime and terrestrial navigation of humans for centuries without celestial guides, it has facilitated the revolution of the cultural exchange. Allowing for simplified human navigation also allowed for the exchange of ideas and knowledge throughout countries, around the world. The scientific advancements brought by the compass have increased humanity's understanding of natural metals, the Earth's magnetic fields, and most importantly, its understanding of space travel. The astronomical aspect factors in significantly when the compass was developed, and during its development throughout the centuries. Similar to the paper bill, the Chinese compass left an indelible mark on humanity, serving as one of the primary building blocks of human travel throughout the oceans, lands, and space. Without the directional utensil, transportation could not have been thriving as it

is today. Planes would not soar high in the air, cars would not zoom across roads. A symbolic testament to humanity's exploration of Earth, the compass fostered continental networks, constructing indestructible bonds amongst ourselves through travel and exploration.

War has been a common recurring theme throughout human history, and is no shock that warfare technologies have advanced each year. Infamous, fatal instances such as the First World War displayed machine guns, artillery, rifles and trench weapons. However, all of these boil down to one type of weaponry - guns. Despite its use being discontinued in the late nineteenth century, it played a significant role in machinery and the development of gun warfare. Although controversial in its use, there is no doubt that it has been proven to be pivotal in humanity's technological development. Gunpowder was invented in China by an alchemist by the name of Wei Boyang, otherwise known as "The Father of Alchemy". Produced first in the tenth century CE, gunpowder was the earliest known chemical explosive. However, gunpowder was simply a byproduct of Taoist alchemists and pharmacists' "elixir of life", an attempt to create a solution to cure all diseases and grant eternal life and youth on Earth. Historians have since discovered original recipes of gunpowder, that tracks back to approximately the eleventh century CE, containing primary ingredients sulfur, charcoal and saltpeter. Additionally, it was also dated back to the eleventh century that Song pharmacists had already developed explosive and incendiary weaponry using gunpowder. This technology originally remained unknown to foreign forces, until the Mongols arrived in the twelfth century. Over the duration of the twelfth to thirteenth century CE, the Mongols conquered the largest land empire ever recorded. With this, the technology of warfare utilizing the new gunpowder spread like wildfire across Eurasia and overseas to Africa. Although the secret of the Chinese engineers had been revealed, it proved to be a hidden benefit to the world, as it would go on to revolutionize war and weaponry. Despite being used for controversial and deadly purposes, it did serve as useful protection methods, and even gave birth to a spark of an invention - fireworks. From New Year's celebrations, to unique cultural festivals, gunpowder serves as a captivating display of dazzling colors. But even outside the realm of conflict and the joy of celebration, it holds strong practical use. Gunpowder posed as a requisite segment of mining, and construction of structures of magnitude. Its explosive properties may be utilized to efficiently clear debris, such as immense boulders, and be used to extract certain materials from rocks. In modern day, a major percentage of gunpowder has been displaced by smokeless propellants such as cordite, being superior in ballistic characteristics, and its residue-free burning traits, relative to the original gunpowder. Nonetheless, gunpowder has posed as a vital part of humanity and its history, both as an essential tool in warfare, but also as practical aspects outside of the battlefield. Its historical significance in shaping human history has illuminated the world. An accidental invention - yet unmatched in uniqueness and use.

There is no doubt of the profound significance in the aspect of impact that China has left upon the world. The everlasting effects of China's ingenious inventions throughout the centuries have made China stand alone as one of the most innovative and influential regions of the world, in history. Despite the aging of different Chinese inventions, they nonetheless serve as significant pillars of humanity, even in modern times. Through the compass connecting cultures, the paper bill single-handedly shaping modern economic systems, and gunpowder exploding throughout the times, one may deem that China's innovative history has been indeed, inscribed onto the stones of humanity's chronicles, revolutionizing not just its own civilization's lives, but the entire world, for centuries to come.

New Tales of China's Inventions

HKUGA College, Chan, Chun Fai Felix – 15

Being an absolute enthusiast in both history and science, I have always been fascinated by the creativity of the inventions made by people from the past or present. Recently,I participated in a Hong Kong Museum school tour, and what caught my eye was definitely the 'Miles upon Miles: World Heritage along the Silk Road' exhibition, which was a temporary event held in that historical archive. It showcased a wide range of priceless ancient Chinese artifacts and inventions,from bronze compasses, countless books and papers made from plant fibers and organic materials, ancient dollar bills, to even compact repeating crossbows made for self defense and gun powders used for rockets and fireworks. As I pressed my nose against the display glass to admire such timeless, ingenious relics, it made me wonder how the ancient Chinese were able to put together such magnificent inventions. The tour captivated me, encouraging me to delve deeper into the realm of Chinese inventions.

Many Chinese inventions have significantly influenced our daily lives, which most people have definitely overlooked. Have you ever wondered where the books we read originated from? How about where the money bills we use to buy things originate from? How are cities nowadays able to withstand many natural disasters such as floods and earthquakes, or even where the idea of the sport soccer originated from? In fact, there are still many more daily necessities we use nowadays that are heavily influenced by past Chinese Inventions, which we should acknowledge and be grateful for the convenience they bring to our daily lives.

Development of civilization

The most useful and famous creation from China in my opinion would definitely be the invention of the compass during the Han Dynasty, which was invented more than 2000 years ago. During that period , lodestone ,which is a magnetic ironstone, was discovered. It was used to create the first compass known to man. By hanging the stone, it could freely rotate and would always point towards a magnetic pole. When the stone was thrown on the ground, it would always point towards the south, so people named the compass 'South Pointing Fish'.

The compass served a huge role in ancient China's daily lives , such as planting crops, finding places that are suitable for building infrastructure ,but most importantly, for navigating. It not only helped China in developing its own nation, but because of navigation, it made it possible for this developing civilization to explore new lands and nations. This ultimately led to the development of 'The Silk Road' during the Han Dynasty as the Chinese facilitated trading with the west,flourishing its own economy.

In addition, the compass also revolutionized maritime exploration. Soon after the compass was invented, a person named Shen Kuo further refined the compass during the Song Dynasty as it was not accurate, causing sailors not to be able to plan their route precisely. He found out that by placing a chunk of lodestone on a small piece of cloth which is floating on water , the stone was able to self correct its direction and align with the Earth's magnetic field .Based on the discovery, he used a pivot to pin a thin lodestone needle to a case with markings of different directions.This refined version of the compass allowed people out at the sea to plan their route more meticulously,minimizing the chance of sailors getting lost out in the ocean. It also helped in the expansion of The Silk Road by facilitating maritime trading, thereby hitting two birds with one 'stone' .

Trading also brings the need for a common currency. China also has one of the earliest known forms, where copper coins that were cast from a mold were used for different transactions. These copper species are also known as 'Ban Liang Qian', with its distinct feature of having a rectangular hole in the middle of the coin so that people could thread multiple coins through a string for better transportation. Soon, more coins were made and some were made from lead, gold and even made out of jade to trade with others. Though coins are hard to be counterfeited and durable enough to last for centuries, they all share the same problem: portability.

Try to think about this: Assume that you are a regular Chinese peasant and your daily salary is around 100 of these coins. The average weight of these coins is around 7 to 10 grams per coin. This means that you would be carrying an extra kilogram of coins everyday! It is not only inconvenient, but also bothersome.

This ultimately led to the invention of banknotes. It is quite well known that the first paper currency which functions like the banknotes we use currently appeared during the Song Dynasty, and were referred to as 'JiaoZi'. They were developed since the supply for metals that were used to make coins were declining. However, what many people do not know is that the first concept of banknotes actually emerged from the Tang Dynasty, around 80 years before the Song Dynasty even started, though it functioned more similarly to receipts. Those who were trading would document how much money should be paid soon, so merchants were not required to bring bulks of copper coins everywhere. Paper currency not only provided a more efficient exchange medium for merchants, but also reduced the cost of transactions and even enhanced monetary policies, since all the banknotes were issued by the central government and the government could easily regulate interest rates and control inflation.

Civilisation Preservation and Protection

With a growing civilization and economy, China must also develop safety measures to protect itself from natural disasters like jolting earthquakes and flash floods, otherwise it could potentially cause massive destruction to one's economy, hinder a civilization's growth, and cause loss of many lives.

Earthquakes were one of the main threats to China back then when technology was limited. An earthquake was recorded in ancient China which happened in modern ShaanXi around 2700 years ago.The earthquake was so severe that it dried up 3 whole rivers and a mountain collapsed. Other records also stated that some earthquakes that affected China during the Ming Dynasty could be felt from the northern lands to the southern coast of China.Even though it was not recorded of how many lives were lost, if the power of the earthquake was able to shatter alps and peaks, the death toll is something that people should not underestimate.

Fortunately, a genius astronomist and historian named after Zhang Heng in the Han Dynasty designed a mechanical seismoscope that was able to detect which direction an earthquake was happening. The scope was built with its recognisable bronze dome that has eight carved dragon faces facing different directions similar to the compass mentioned earlier. Each dragon head would carry a tiny bronze bead, and there were 8 carved toads with their mouths wide open underneath each head ready to catch the bead when it fell. Though the mechanism inside the 6-feet in diameter dome has not been confirmed by archaeologists just yet, it was believed that a loosely placed thin rod was hung in the center of the dome. And when an earthquake happened, the thin rod would fall over and hit the dragon heads, causing the bead to fall and people would then know which direction the earthquake was from.

The invention later proved to be useful and potentially saved many lives. An article stated a few years after the seismoscope was created, a grade seven earthquake took place near the present-day Gansu Providence. Though people in the capital did not feel the slight vibrations before the earthquake struck, the ingenious machine did, and a bead from the dragon head on the western side dropped. Message then quickly spread out that an earthquake was going to happen on the western side and the government dispatched assistance rapidly to minimize the loss. A few days later, messengers came back and verified that the earthquake was real and many lives were preserved, proving the successful concept of this fascinating, smart machine.

On the other hand, Flash floods also happen very frequently in China, especially in coastal areas during summer, where the rainfall starts to kick up a notch. Modern archaeologists recently discovered that the Yellow River had suffered a serious flood around 3000 years ago during the Xia Dynasty, with water heights reaching one third of the height of the Empire State Building. "This was one of the largest known floods on Earth over the past 10,000 years," said Darryl Granger of Purdue University in West Lafayette, who was a study coauthor and geologist. But not only in the past, flooding is also very serious in the present. Take the recent heavy flooding in Beijing during the summer of 2023 as an example, it caused around 59000 houses to collapse and destroyed 15000 hectares of land for cultivation.

This is also where ancient Chinese wisdom truly shines. As the rain hits the Min Mountains in SiChuan the water would flow down the mountain at relatively high speeds, causing river banks in the SiChuan Basin to overflow easily. Qin governor and hydrologist Li Bing decided to study the river and came up with some solutions. He finds out that building a dam is not possible, as the country was at war at that time and wanted to keep a clear path for supply vessels. He then came up with a genius idea — to split the river. But how? The speed of the water gushing was strong enough to erode steel and destroy barricades. He decided to tie rows of rocks together with bamboo and stuffed them together to create a levee, and named the project 'DuJiangYan'. By doing this, not only was it able to split the fast incoming waters into still rivers that were used for irrigation down in Chengdu Plains, but the built levee was also cheap and replacable. Men would come down to replace these satchels of rocks once in a while, and this tradition still lasts until now. 2000 years after the DuJiangYan was built, it somehow still functions and there were no recorded floods in that area again after the DuJiangYan was built. This shows how ancient Chinese are able to use such simple solutions to stop such serious problems, which is what truly fascinates me.

Chinese inventions from the past not only serve a noble cause, but also influence the majority of our daily lives. Since technology was still primitive in ancient times, it was incredible how ancient Chinese people were able to put together these intelligent inventions. Besides, not only in the past, modern and future Chinese inventions are also equally appealing.

Speculations of Future Inventions

Since the latest 5G communication technology was publicly released, China has been the top dog in implementing 5G technology into our daily lives, such as making cars drive themselves, refining our navigation systems to have laser precision, enhancing internet speed so medical treatments can be operated across the globe while minimizing human errors, and much more. With the added factor of the COVID-19 pandemic which forced people to work and shop at home, communication technology has been advancing at the speed of light. Here are some of my ruminations towards future inventions from China.

Firstly, Compact 3D Building printers will be invented by China in the future. A 3D printer is a machine that is able to print out materials to create a 3 dimensional object with

the use of a gantry that can move in a vertical, horizontal and depth axes, and as its name suggests, 3D Building printers print out housings and buildings with concrete as a filament. Currently there are some machines that are able to print out buildings that are made in China but also in Western countries as well, but most of them are gigantic and costly. Since China's navigation technology does not only excel in the past ,but in the present as well with their own 'Beidou Satellite Navigation System', Inventors in China will definitely implement this technology into tailor-made drones and use them to print out buildings and different infrastructure without using a gigantic gantry, thus reducing the cost and space required.

Compact 3D Building printers would most certainly help speed up the infrastructure development in rural areas of China. Many rural areas in China have often been neglected since they are located too far away from the city center, and accessing some of these areas is difficult. With the use of drones, we can finally overcome this obstacle to gain a more balanced regional development.

On the topic of technology, China excels in quantum computing and they may be the first to invent phones that run on quantum computing. In fact, the first quantum satellite was actually invented by the Chinese, which proves that China must have the expertise in developing quantum computers. Quantum computing is a way of computing which utilizes quantum mechanics, which enables it to make large calculations. The major problem of these computers is mostly their gigantic size, taking up an entire basement for a single computer. But with the rapid improvement of technology, being able to fit one of these super computers into your smartphone would not be a pipe dream anymore in the near future of China.

If quantum computing is applied to phones, it would absolutely change the world. Not only would it enhance the security for different softwares, it would also enhance predictions, such as weather and climate forecasting by simulating our complex atmosphere. Quantum computing phones may even drastically improve the speed of communication and networking, allowing you to communicate with your relatives across the globe with almost no delay!

Besides, I speculate that air transportation will be invented by China in the near future. Did you know that the Ehang technology company in Guangzhou was the first to develop commercialized 'Air Taxis'? These two passenger flying cabs are fully autonomous, able to travel at around 70 knots, 9800 feet in air. The invention of commercialized air taxis from China demonstrated that our current transportation systems will likely undergo drastic changes in the future, whilst China would be the one leading this revolution. Future transportations options like aerial coaches will definitely be invented by China, being capable of transporting passengers in bulk but also lowering the costs. These coaches would soar through the city skies at high speeds that would be much faster than coaches on wheels, capable of overcoming extreme terrains, and ready to land anywhere,anytime.

Powered with electricity, vehicles like these would not only reduce transportation costs and time, but might also help China in reaching the zero carbon emission goal before 2060 and slowly cool down the Earth, helping our environment.

To wrap up, Chinese inventions from the past are ingenious and mind blowing. Ancient Chinese somehow used such primordial technology to put together all these magnificent creations, which ultimately influenced our daily lives. Modern Chinese technology and China's future inventions are also what keeps my eyes peeled, with all the benefits they can bring towards society. Inventions like paper money and seismoscopes paved a road for future improvements, it made people's lives easier, and it facilitated the growth of a country to an entire civilization. But most importantly, it shows how creative Chinese people truly are.

New Tales of China's Inventions

HKUGA College, Chan, Chun Sum Samuel – 16

China is the technology powerhouse that has influenced many places all around the globe. The country has evolved from a debilitating state to now what we call the 'empire of science'. Even more astounding is that China underwent the transformation in a jiffy; During the Industrial Revolution China was merely recognised as a strong country, foreign countries were an overwhelming threat. They ridiculed our nation. However, in just four decades, even the strongest nations pay extra attention to China. It was truly a remarkable journey that China endeavored to plow through adversity.

To witness the odyssey of China, I decided to visit the national museum of China; The place that holds the records of all inventions of China. Passing through a transparent revolving door, I voyage through the fragments of time. A piece of time- worn, yellowish paper sealed within a protective casing caught my sight. This was where it all began, the invention of a form of unified written communication by the first emperor of China—Qin Shihuangdi. In daily life, I always questioned the origins of Chinese characters. Unlike some other languages, Chinese words are complicated but coordinated at the same time. This piece of artifact should give me my long-awaited answer.

Long before time had a name, ancient China was just mere scattered states that run their own politics and self maintain. During the Spring and Autumn Period at around 770-476 BCE, there were 8 major states in China. They were 'Jin', 'Chu', 'QI', 'Qin', 'Zhao', 'Yan', 'Wu' and 'Yue'. Old Chinese is the oldest authenticated form of Chinese, it was a prominent and influential written language before the unification of all written languages in China. Old Chinese was written with several early forms of Chinese characters, including Oracle Bone, Chinese bronze inscriptions and Seal scripts. These three scripts were dominant among other scripts but still the written languages of China had many variations. Hence many forms of Chinese characters and words circulated throughout the mainland.

The Oracle Bone Script got its name from the materials on which it was written–turtle shells and various animal bones collectively known as oracle bones. The Oracle Bone Script mainly serves as purposes of divination by the royal court and aristocracy of the Shang dynasty. People wrote questions about the ethics of human life, agriculture, weather etc. Those words were carved and etched onto the bones. Heat is then applied to the bones causing the bones to crack. Resulting patterns formed by the cracks were interpreted as answers to the questions the diviners asked. Characters of the Oracle Bone Script all have a photographic vibe, they resemble drawings or representations of objects, animals or natural phenomena.

Chinese bronze inscriptions refer to ancient scripts engraved on bronze vessels during the Shang and Zhou dynasties. These inscriptions often provide insights of political, social and cultural aspects of that era. Ritual vessels were a common place for bronze inscriptions to be found, short phrases, names, dates and ancestral records were commonly seen engraved on these vessels. A script named "Large Seal script" is used in Bronze inscriptions. The characters are also pictographic but they are more standardized and abstract compared to the Oracle Bone Script.

The seal script is an ancient form of Chinese writing that was popular during the Eastern Zhou dynasty. It was given its name because its characters are often engraved on seals which pose as personal identification purposes. Seal script characters are highly intricate with many

strokes and curves packed into a small character, just like cramming tuna fishes tightly into a small metal can.

Three types of different written language, how do you expect different states to communicate with one another? This is where the ancient Chinese emperor Qin Shihuangdi stepped in. He led the Qin dynasty and unified China from eight states into one. He invented the small seal script also known as Qin script. The Small seal script consists of simplified characters, the script adapted characters with reduced number of brush strokes from previous ancient scripts. The structure of the characters have also become more square and uniform with more straight lines and sharp angles, sculpting a more balanced appearance. In addition, some variations of the characters were banished further defining each unique character. Unified written language perfected timely communication and accelerated the economy of China.

I moved on as I inspected the last of the long engraved passages around that glass sealed piece of artifact and continued onwards. I advanced and came to a stop before a corridor, above me was a lighted banner adorned with the spelled-out words 'Technological Advancements and breakthroughs in ancient China'. In the midst of the corridor showcased inventions of ancient China that involved the use of science and mostly mechanical technology. I walked towards the row of glass sealed artifacts. To no surprise, everyone crowded around the display of the four great inventions of ancient China; Paper making, printing, gunpowder and the compass. It is true that these four inventions were revolutionary but what caught my attention were the row of artifacts displayed just on the periphery of the frame.

I closed my distance, and what stepped into view before my eyes were marvelous. On my right was a golden pot with eight dragons attached upside down in formation of a ring around the upper part of the pot while eight frogs were placed directly below each respective dragon. This device was called the seismoscope, its purpose was to detect the occurrence of earthquakes.

Back at that time, China was beset by earthquakes routinely. Earthquakes occur the most in densely populated areas, causing thousands of deaths every time. Just as waves of earthquakes ravaged the land of China, Zhang Heng, a Chinese polymath and scholar stepped in. He was credited with the invention of the world's first seismoscope, a device that was capable of detecting earthquakes. Inside the seismoscope, there is a mechanism that involves pendulums and levers. The pendulum is placed in the crux of the vessel which is attached to the dragon heads via the lever. When an earthquake occurs, the shaking of the ground would induce pendulum motion also triggering the lever mechanisms. The levers cause the dragon mouth to open making the bronze ball in the dragon's mouth drop. The corresponding direction of that dragon reveals the direction of the occurring earthquake and its epicenter.

Knowing the direction and location of earthquakes before things get hectic allows the government to evacuate the area effectively and save more than thousands of lives. Looking at sectional drawings of the vessel's interior design, I found it fascinating that such an easy contraption could save not only a few lives but also guaranteed the safety of densely populated areas back then. The existence of the seismoscope further proves that impactful inventions do not need to be flashy, it is good as long as it can finish the job.

I traversed through the corridor and passed numerous glass containers. Finally at the end of the corridor, a small delicate artifact seized my interest. It was a whole collection of needles. At first, I thought the needles served for knitting purposes but a diagram of the human body with ancient Chinese descriptions next to the needles made me retract my hypothesis. In fact, according to the description below the display, the needles are acupuncture needles which serve for medical purposes.

Acupuncture practices started in China approximately 3000 years ago. It is a medical practice that involves inserting very thin needles through skin at strategic points on the human body. It is a common method to treat pain and to manage stress in different parts of the body. Ancient Chinese acupuncture practitioners believed in the concept of life energy otherwise known as 'Chi' that flowed through pathways in our body. The insertion of needles into pinpoint specific spots along those pathways allow our energy flow to be balanced, ameliorating the everyday operation of our bodies. I have always wondered, 'Why do our bodies not bleed significantly when immense amounts of needles penetrate our skin?'. It turns out the answer lies within the size of the needle. Acupuncture needles are made through a process called wire drawing. Metal used to craft the needles are first processed into wire form. After sterilization, wires are drawn through a conical die with small holes with decreasing diameter. This process is essential to reduce the wires diameter and also for lengthening the wire. Lastly the wires are cut into different needle lengths and sharpened. The series of processing cultivates the extremely small needle tips that were used in acupuncture treatments.

I stepped out of the corridor and headed to the next exhibition area. Commuting through an escalator I arrived at the second floor of the museum. At first glance, the glass containers that were commonly seen on the first floor were nowhere to be seen. In replacement, holograms, virtual reality experience and 3D projections were present as if they were particles of air. No doubt, it was the exhibition area of modern inventions of China.

I stepped into the 3D projection exhibition, words hovered above my head and spelt out 'Rockets'. Although China was not the first country to go to space, believe it or not, China was credited with inventing and utilizing rockets. As everyone knows, gunpowder was one of the four great inventions of ancient China. It was an achievement attributed to ancient Chinese alchemists back in the Tang dynasty. The ancient Chinese people found the potential in gunpowder, and they integrated it with different devices to serve for different purposes. Some ancient uses of gunpowder in forms of rockets include fireworks and the "fire arrow"(a rocket-propelled arrow). The former was basically a scaled down version of the rockets that we all know nowadays while the latter served as artillery in military forces to safeguard the country. These early rockets were commonly made of bamboo tubes filled with gunpowder and propelled by the thrust generated by explosive force from combustion reactions.

Yet, the Chinese were ambitious; they continued to perfect and refine rocket technology over the centuries. The country has achieved several milestones over the years. The Long March Rockets are the primary rockets used to transport all sorts of cargo into space to accomplish various missions, including satellite launches, crewed space flights and moon exploration. China also developed their own space station by transporting various parts using their rockets. Building a space station was a global effort before, as it was an extremely hard task to accomplish by one single country. However China not only succeeded in constructing a functioning space station that is able to self sustain, their space station was actually more advanced than the national space station that involved multiple powerful countries like the United States. This showcases the unparalleled proficiency of rocket building skills that China has developed. It also illustrates that China's inventions have ascended China to 'new heights', pun intended.

The 3D projection continued to project holograms. This time it was an introduction to the future of 5G technology. Although China was not the first country to develop 5G technology, many useful applications of 5G technology originated from China. It is amazing that even the 3D hologram in front of me uses 5G synchronization technology originated from China to coordinate all projectors in order to give a seamless representation of virtual

entities. 5G technology is the fifth generation of wireless technology; it is the most high-end specification for mobile communication. 5G networks are superior against 4G as they use higher radio frequencies compared to 4G. These higher frequencies known as millimeter waves allow larger amounts of data to be transmitted per second with higher transmission speed. 5G technology is also implemented in small cells to overcome the limitation of being easily blocked by walls and having a shorter range. The dense network of small cells on numerous infrastructures can facilitate signal transmission of 5G, making it the most versatile and reliable wireless communication technology.

Although 5G technology was not invented by China, China is the country that has had the most breakthroughs with the technology. Having the largest 5G user base in the world, China has integrated advanced 5G technology into various industries, including transportation, manufacturing and healthcare. Chinese companies and researchers are constantly involved in 5G research and development. Although 5G tech is still in development, the technology has boundless potential in the future of China. One speculation of mine is the application of 5G technology to the 'Internet of Things'(IOT). The IOT refers to a network of interconnected devices that can communicate and exchange data with each other via the internet. These devices come in a diverse selection, from our smartphones, home appliances to vehicles and even industrial machinery. The IOT enables the feature of collective data meaning that the devices share real time data, allowing for increased automation, efficiency and convenience in our daily lives. The IOT brings more to the table for China, as China is a country with various automation applications. A decade ago, people in China had to go to taxi stops to efficiently find a taxi but now with a click on the phone it is the taxi that comes to you. There are infinite possibilities encased within IOT applications in China.

As I was about to leave the museum, the Alipay logo in the souvenir shop was caught in the corner of my eyes. It reminded me of one of the greatest achievements of modern China– the large-scale implementation of digital currency.

Digital currency refers to a form of currency that exists only in electronic form or digital form. The currency is transferred electronically, and it can be used for various purposes including online transactions and investments. There are generally two types of digital currencies which are Central Bank Digital currencies(CBDCs) and Cryptocurrencies. The former is a type of digital currency where it is issued and regulated by a country's central bank. CBDCs are designed to operate along with fiat currencies (i.e. gold, silver) to ensure its value while taking advantage of the versatility of digital currency. On the other hand, the latter operates on blockchain technology which is a secure system that allows multiple parties to maintain a shared database without the need for a central authority. Cryptocurrencies are not regulated by a central bank but are secured by cryptographic technologies.

Digital currencies were once only seen in fantasies - its practicality and safety remained a huge obstacle to developers over the years. However in China, digital currency is not an alternative for paper money but instead the dominant payment method. Almost everyone in China uses their phones to pay, some Chinese netizens even make jokes saying, 'My wallet is out of battery'. Many shops in China don't even have a cashier; instead a QR code is seen on the counter. Digital currency in China can also be integrated into the IOT to bring out even more functions. Digital currencies not only provide us a more convenient way of living but can also quantify market information as all transactions are recorded, which will boost China's economy and increase living standards.

To wrap up, China's inventions have brought the country from humble beginnings to great success. Inventions no matter modern or from the past have benefitted the human race in various ways. Inventions like the seismoscope and acupuncture medical treatment saved lives and helped cure diseases; rockets ascended humans to new heights; 5G and digital currencies made peoples' lives more convenient.Without the small seal script, the whole of China would not be able to unite and create all those amazing inventions that brought on revolutionary changes. Each and every invention of China mattered, no matter what form it took. To conclude, China has changed the world with its inventions. We should be aware that all those astonishing technologies we see today originated from the blood and tears of ancient inventors.

Fly, Bamboo Dragon

St. Paul's Convent School, Kwok, Yan Wing Hannah – 16

'The brave men didn't kill dragons. The brave men rode them.' — Game of Thrones

Amidst a tapestry of sacrificial casualties and arduous setbacks, mankind has never deterred itself from mastering the skies, steadfastly pursuing for new limits. Now, in the 21st century, our technological prowess has advanced at an unprecedented rate, bestowing us the dominion to glide across the limitless firmament in our creations, the helicopter and the commercial plane. Yet, if we cast our gaze backward to more ancient times, we discover that the luxuries of convenience we take for granted today, are owed to the intrepid curiosity and boundless imagination of historic inventors, during a time when flight was but a clouded mystery, a mere figment of the naivety in children. Such a story started in Ancient China circa 320 AD, when a humble contraption was invented and named, the bamboo dragonfly. Overtime, it became the muse that unfurled wings of possibility for modern innovations. Ideas and breakthroughs like the bamboo dragonfly, unbeknownst to their creators, allowed the Chinese and the world to spread its wings metaphorically, and literally ascend beyond the horizons of imagination.

The contraption, also known as the bamboo-copter, consists solely of two pieces of diligently carved bamboo. It contains a small stick and a single rotary blade cut out on opposing edges perpendicularly attached to it. To view it in its complete splendour, simply spin the vertical dowel vigorously with both bands and release it towards the sky. How oddly simple it is to operate. Then how complex would the science theory be? The answer lies plainly with the momentum theory. As the propeller rotates, it directs the wind flow downwards, and consequently, the rebound reaction generates an upward force to thrust the bamboo dragonfly upwards. Afterwards, it gracefully descends due to air resistance. 'Take dragons… they first rise using the clouds as steps, and after they have attained a height of forty li then they rush forward effortlessly,' wrote Ge Hong, a Daoist philosopher of the Jin Dynasty. He perceived the profound potential of this machine, as mankind's first step to ruling the skies, similar to how Chinese dragons did in ancient mythology. In spite of his insight, Ge Hong was a minority, for though the toy was met with much awe and joy from the people of the Jin Dynasty, many indulged in it as only entertainment, others relating its ability in flight with external supernatural forces! Nonetheless, over the millennia of development, our knowledge on aviation and its underlying physics has unfurled exponentially. Now, in the 21st century, we stand at the intersection of aerial dominance, a testament of our ceaseless odyssey for the skies, from folklore to reality, from antiquity to the vanguard of modernity.

During the Jin Dynasty of Ancient China, the bamboo dragonfly emerged from its ponds, growing from nymphs and metamorphosing into mature adults for the people's enjoyment. Alas, the identity of this inventor was lost to history, so we can only speculate on their sources of inspiration for this humble toy based on their environment, surroundings and culture. Amongst the many theories, two stand out: propeller seeds, and the restless creatures the contraption is named after — dragonflies themselves.

Given that most people of Ancient China were farmers, it is only natural for the creation to spout from inspiration of nature. The Chinese Ash Tree is one of the species that produces winged seeds in the form of samaras. These seeds, also known as 'whirlybirds' are dispersed as the fruit ripens, embarking on their journey to disperse as they glide swiftly in the wind to produce a chaotic spectacle across the Chinese landscape. When the wind is consistent, its propeller seed can travel up to one mile away from the parent plant! This majestic sight would have surely been a feast for the eyes, and made a lasting impression on the inventor, which may explain how the propeller seed bears an uncanny resemblance in form and in motion to the whimsical bamboo dragonfly toy.

Another contributor and significant catalyst is none other than the dragonfly itself. Venerated for its unparalleled swiftness and agile aerial manoeuvres, as well as its intricate wings and sleek movements, the mystique of the dragonfly is believed to have intrigued the inventor. They borrowed the diaphanous wings of the dragonfly, canonising it for centuries to come in a cast of bamboo. The dragonfly, with its ability to hover in mid-air and to change course in their flight with nimbleness, contrasts the bamboo dragonfly which can only ascend vertically. Still, the influence of the dragonfly is evident in the *zhuqingting,* especially for its name and emulation of their flight, a tribute to the insect.

This inventor, regardless of their background, was closely linked to and enlightened by nature, paying homage to the meek propeller seed and dragonfly. They monumentalised them as part of the core breakthroughs that will benefit society timelessly.

A first indication that this toy would not die out in history is its perpetuating popularity amongst children, even in face of drastic transformation in society. Surrounded by forests of bamboo and in need of entertainment, the bamboo dragonfly became a common household toy that many Chinese families had made and passed down to their children for generations. Its history as a toy for children stands till this day, just more commercialised as a traditional sign of Hong Kong, regions across China and around the world. Many continue to find joy in the plastic rendition of the bamboo dragonfly, its longevity in history has also allowed it to transcend age boundaries, attracting both children and adults alike to enjoy the delight it brings. Though its material has evolved with the convenience of producing plastic, the essence of the toy remains unaltered. Children are equally amazed seeing their 'dragonflies' gracefully ascend and descend, just like youngsters in 400 AD, while adults regain a taste of nostalgia and reminisce about the precious memories of their childhood.

Notwithstanding this, the bamboo dragonfly has become much more than just a toy throughout the years.

With the burgeoning promotion of foreign trade and initiatives like the Silk Road, it was inevitable for the original bamboo dragonfly to enter and assimilate into the Western society, which it did in the early 1400s across Europe. The child plaything caught the eye of renowned scientists including Leonardo da Vinci and Sir George Cayley. Da Vinci, in particular, was said to have made various theoretical sketches for helical flying machines based on the bamboo dragonfly. Although da Vinci's concepts were never physically realised, these sketches became renowned in the field and were a heavy inspiration for later inventions of aeronautics. Sir George Cayley of Britain, also known as the 'Father of Aviation', was one of many captivated with the intricacies of Ancient Chinese technology, which he had investigated in depth to inspire him with his creation of modern aeronautics. The bamboo dragonfly was a humble toy for the Chinese, but its introduction into European society, coinciding with the periods of innovation, the Renaissance and Enlightenment, allowed these concepts to be expanded and magnified upon, raising the bamboo dragonfly to a stage for grander purposes.

The year was 1939, and its glorious purpose had been fulfilled at last. The bamboo dragonfly was monumentalised in the form of the helicopter. The maiden flight of the

VS-300 by Igor Sikorsky, displayed a machine that drew inspiration from the structure, fundamental principles and design of the bamboo dragonfly's rotor. This groundbreaking invention revolutionised the understanding and possibilities of aviation in search and rescue operations, military applications and aerial photography. It opened a new gateway for further innovations in aerodynamics, engine technology and control systems. Helicopters in today's world provide services with greater efficiency, whether as a man's toy or a vehicle for tourism. Similar to how the propeller seeds would disperse over vast distances, the helicopter now has the capability to swiftly transport and disperse humans to their destinations.

We have finally mounted the skies, on the backs of our dragons.

This is similar to the case of drones, with its miniature size for agility and convenience, which bears yet another resemblance to the bamboo dragonfly. Initially used for military purposes in WW1, drones nowadays have integrated various technical elements to adapt them for extensive use. Many similarities can be drawn between drones and helicopters, but an element that stands out is agriculture. In China, traditional farming practices have witnessed a notable decline, to sustain the needs of the country's people for food, the agricultural sector is rapidly industrialised through the use of technology. Certain drones are designed to carry heavy height, allowing them to be attached to containers of pesticides, fertilisers that can cover large areas of farmlands in significantly less time and using less manpower. Others are equipped with advanced artificial intelligence to facilitate data collection and processing, improving farm management and enabling corresponding actions to be taken effectively. It is truly awe-striking, that the bamboo dragonfly toy took centuries to transition out of the countryside to urban areas, only to return to its rural roots in the 21st century. This serves as a testament to the cyclical relationship between nature and human creations along our developmental path. Inspired by the events of nature, drones now act as humble servants, perfecting the harmony between the integration of technology and preservation of nature from issues such as overgrazing.

Aside from the practical uses, the bamboo dragonfly has also found its place in fictional entertainment. As its influence spread beyond China, one of the places it has flown to and became immensely popular was Japan. The bamboo dragonfly has often been compared in parallel with Doraemon's 'takecopter', a gadget that appears frequently in the anime series. The takecopter is a propeller that could be attached to any part of a character's body, allowing them to traverse across vast distances for their adventures. With the fictional bamboo dragonfly, Doraemon, the iconic robotic cat led his friend Nobita on thrilling escapades with the fantastical flying gadget. This series presented the desire for adventure and temporary escape from the real life of Nobita and the audience alike.

Ultimately, when we trace back to the first creation of the bamboo dragonfly in Ancient China, we come to realise and be grateful for the gift bestowed upon us — nature herself, a selfless provider of materials, inspiration and joy. The propeller seed encapsulates the simplicity and potential of the bamboo dragonfly, which became the predecessor of many modern innovations we rely on today. In the same way that a tiny seed holds the promise of sprouting into a majestic evergreen, the bamboo dragonfly was humanity's seed of ingenuity and progress. The dragonfly's ability to gracefully navigate through the air reflects the connection and harmony humans have always shared with nature, as well as becoming a stepping stone towards civilization. Bamboo, its original material, also harks back to the history of China and her people's pursuit of higher ideals. This toy represents the complicated history of China, marked by periods of immense suffering, yet also signifies the resilience within them to overcome these challenges, to rise above adversity to become a country of great global status today.

When you are asked to name a famous Chinese invention, one might think of the four Great Inventions of Ancient China: paper making, printing, gunpowder or the compass. The bamboo dragonfly might not immediately come to mind, maybe it is a tale you have not heard of at all, yet it is these lesser-known contributors who have played a part in shaping our world today. Next time you see a helicopter soaring across the horizon, you can be reminded of the unassuming Chinese bamboo dragonfly, which spun its tiny wings so the dragons of today could flex theirs.

Creative Writing

Non-Fiction

Group 4

My Encounter with Great Chinese Inventors

CUHK FAA Thomas Cheung Secondary School, Chen, Daokang – 17

China is one of the four ancient civilizations in the world, with a long history of 5000 years. As the only existing ancient civilization, China has a large number of extremely sophisticated and influential inventions, including Zhang Heng's seismograph and Cai Lun's papermaking technique in ancient times. In modern times, there are also some groundbreaking innovations like artemisinin, an antibiotic invented by Tu Youyou and optical fibers invented by Gao Kun. These two inventions have made great contributions to the world in the fields of medicine and communication technology respectively. These inventions are the walnuts and pears the inventors plant for human race. It can be said that without these inventions, there would be no better world today. These inventions have made tremendous contributions to society at that time and have benefited the humanity. Why can our outstanding scientists think of such wonderful inventions? What kinds of spiritual support or inspiration enable them to come up with inventions that shocked the world? Let's explore the truth.

Thousands of years ago, China already had many outstanding scientists, such as Zhang Heng and Cai Lun. They are all inventors who made outstanding contributions to ancient China. Zhang Heng, who invented the world's earliest seismograph, was a famous scientist in the Han Dynasty, but his path to this invention was not a smooth sailing. He had to tolerate this distrust and mockery of the people around him as well as overcame lots of obstacles before he could finally achieve success. Before inventing the seismograph, Zhang Heng was not valued by the emperor and was only an official responsible for transmitting documents. However, even though his official position was not high, he still cared about his country and people. As part of his duty, he often received news of earthquakes from various places of the country. Every earthquake always caused heavy casualties and put people in pain. The emperor's support could not help people in a timely manner. After learning this news, Zhang Heng felt very distressed. He began to think about how to help people affected by earthquakes. Therefore, the idea of inventing seismographs gradually emerged in his mind. He began to think about ways to predict the occurrence of earthquakes faster and more accurately so as to reduce the impacts of earthquakes as well as the number of casualties. When the idea of a seismograph first came to his mind, he began to manufacture it. When others heard of his idea of making a seismograph, they all thought he was only daydreaming. Who could create something that could predict earthquakes? In the eyes of the people at that time, this was an unfulfilled wish. Everyone was urging him to give up this useless dream as soon as possible. Zhang Heng ignored people's persuasion and continued to devote himself to inventing seismographs because he sincerely hopes that he could help people avoid the harm of earthquakes for the sake of the country and the people. However, people continued to mock him, thinking that he was not doing his job properly. People believed that Zhang Heng had a job and stable income, and therefore, he should be very satisfied. However, he always wanted to invent the seismograph even though people didn't understand his inner thoughts. Not knowing this invention will benefit society in the future, most people at that time laughed at his foolishness and persistence. . With Zhang Heng's unremitting efforts, the

seismograph was finally invented and predicted the occurrence of earthquakes precisely and accurately, allowing people to avoid the undesirable impacts of earthquakes. Zhang Heng's resolute personality and extraordinary spirit of exploration ultimately led him to success. He ignored the ridicule of others and focused on his own invention. No matter what others said of him, he still insisted on his idea of inventing the seismograph. In the end, Zhang Heng fulfilled his wish and made his dream come true, benefiting the country and the people.

Zhang Heng is not the only great inventor in the history of China. In the Han Dynasty, there was another outstanding inventor, Cai Lun. His invention is known as the the Four Greatest Inventions of ancient China, making people's lives more convenient for generations. His great invention is paper. Have you ever thought about what people used to write before paper appeared? Before the invention of paper, ancient Chinese people wrote on turtle shells and bamboo. People not only could not write a large amount of text on these things, but they are also very heavy, so moving books was a very difficult task. As an official beside the emperor, Cai Lun saw thousands of heavy bamboo slips that the emperor had to inspect every day and how difficult it was to transport them. Therefore, he thought of making paper. What is the lightest thing thatcan be written on? Cai Lun then visited the whole country in search of any materials that could be used for papermaking, no matter fishing nets, bark, or even rags. This process was very cumbersome, and everything went through many processes However, in the end, he found out that they may not be suitable for papermaking. Under such unremitting spirit, Cai Lun finally found the right material for papermaking and ultimately achieved his goal. The invention of paper has greatly facilitated people's lives, making writing more convenient. More importantly, it also left an extraordinary achievement in the history of invention in China.

The spirit of perseverance and exploration of these inventors has been passed down to generations for thousands of years. Nowadays, it still deeply influences everyone in China. In modern times, another great inventor Gao Kun has also demonstrated this spirit of perseverance and exploration. Gao Kun was born in Shanghai in 1933 and was born into a relatively wealthy family. He initially studied at an international school in Shanghai. When he was 16 years old, he followed his family to live in Hong Kong. After spending his student life in Hong Kong, he started to work abroad. He first studied information and communications technology at a telecommunication company in the UK. At that time, communication mainly relied on transmission of information by using copper wires. Gao Kun felt that this method was too slow, so with the joint efforts of him and his team, he improved the efficiency of copper wire transmission by nearly 50. Even so, he was still not satisfied. He began to imagine faster communication methods that could enable people on the other side of the ocean to immediately receive information from the other end of the earth. Coincidentally, the laser industry was developing rapidly at that time, so Gao Kun began to envision using lasers to transmit information through glass that was even smaller than a strand of hair. In this way, the transmission of information can become faster and more effective. However, his idea was not accepted at first because glass companies at that time only made glass decorations and bottles, and no company would produce thin glass fibres used for transmitting information. Even though Gao Kun published a groundbreaking paper on optical fiber transmission, he did not receive any response as if his findings had sunk into the sea . Everyone thought he was crazy. How could there be glass as thin as a strand of hair? Nevertheless, Gao Kun is such a perseverant person. The more others thought it was impossible, the more he had to do it in person in order to show that he was right. He always insisted on his research on light brazing and constantly tried testing his new theories and improved his invention. Finally, four years later, a glass company produced glass that was as thin as a strand of hair. Upon learning this, Gao Kun was very excited, indicating that his research could be taken one step further and the possibility of transmitting information with optical fibers has greatly increased. In the end, communication through optical fibers was achieved with the untiring efforts of Gao Kun. After decades of research and exploration in the filed of science and technology, Gao Kun was not afraid of starting his research over again even if it failed, Instead, he continued to study optical fibers repeatedly and hence finally achieve unprecedented success in information technology, which make way for the emergence of Internet and other applications, allowing people to live more convenient and enjoyable lives. It can be said that without Gao Kun, there would be no world with advanced technology. The information technology such as 5G network we use was invented with the development in the use of optical fibers. Gao Kun's invention has taken the world's technological development one step further.

Outstanding inventors like Zhang Heng, Cai Lun and Gao Kun not only have brought their outstanding inventions to future generations, but also passed on the spirit of persistent exploration to future generations, allowing us to still hear their stories, learn their spirit, as well as find the inspirations from their stories today. Their spirit of exploration and innovation is constantly influencing young people, inspiring them to create more new inventions. For example, Tiktok, which is a videostreaming platform founded by Zhang Yiming, enables people all over the world to share their shop clips and watch videos. This platform makes our life more interesting, boost our creativity and widen our horizons. Mr Zhang successfully made Tiktok popular worldwide by overcoming all the challenges in the process of accomplishing his goals. Another example is Taobao. Taobao is an online trading platform founded by Jack Ma Yun. Thanks to the innovative online trading system, online transactions between retailers and customers have become more convenient and efficient as potential customers can buy things from all over the world anytime and anywhere. However, before the invention of Taobao, online trading platforms were not favored because most people regard such platform as not user-friendly and unsecured. However, Mr Ma did not give up. On the contrary, he regarded these negative comments as motivations for himself, telling himself not to give up and to stick to his dreams and goals. Finally, Taobao has made shopping no longer limited to traditional way but allows people to shop anytime, anywhere. This has greatly facilitated the shopping process, improved the shoppers' experience and hence raised their quality of lives. These two examples has shown that the spirit of exploration and perseverance has remained unchanged for thousands of years, successors of different generations have therefore inherited these invaluable qualities and created even more influential innovations. Eventually, these qualities will be brought forward to our upcoming generations. By allowing generations to see how the past elites faced failure, persisted in their efforts, and ultimately succeeded, the stories of our innovators have deeply influenced each of us, encouraging our innovators and inventors continue to explore the unknown and strive for excellence.

Looking into the future, the spirit of our Chinese inventors will constantly encourage us to be brave, adventurous and persistent. Just like for China's aerospace technology, with the efforts of every Chinese aerospace scientist, they are all making unprecedented achievements in terms of exploring the unknown space. In order to help people live a better life and make the country stronger, they make untiring efforts in doing research and investigations day and night, only to make more contributions to our country and make our country stronger and more prosperous. This is also what we have always said about inheritance. This spirit of exploration and perseverance has already incorporated into our culture, making us never give up. We believe that in the future of China, there will be more excellent scientists and

inventors who will selflessly contribute to people's wellbeing and happiness, sacrificing their time just to make people live a better life and make our country stronger. The spirit of exploration and perseverance of Zhang Heng and Gao Kun has been passed from generations to generations, leaving seeds for China's development.

The invaluable spirit demonstrated by our outstanding Chinese inventors is worth learning for each and every one of us. The spirit of exploration and perseverance demonstrated by Zhang Heng, Cai Lun and Gao Kun has benefited me a lot. As a high school student, I often encounter problems in my studies. Facing various problems, I always cannot cope with them. Sometimes I feel like giving up and not wanting to continue with my study, which is a very difficult challenge for me. However, whenever I think of inventors like Zhang Heng and Gao Kun and their unwavering spirit, I am encouraged and become enthusiastic about my study again. Our Chinese inventors have never given up in the face of thousands of failures, but rather as a part of the road to success. Without failures, successes cannot be achieved. They treated failures as a part of their successes and did not give up easily. Seeing that they inspire themselves with failures, I am also inspired to learn the spirit from their experience. Whenever I want to give up, I will think about Gao Kun's deeds when he invented the light drill. Since he never gave up on the difficult tasks of inventing optical fibers, why should we, who only need to learn, give up? Whenever I think of our great Chinese inventors, I am always inspired by their perseverance and bravery and wish I can explore my true self and talents, make contributions to my country and help everyone live happily.

New Tales of China's Inventions

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All of us are enjoying the benefits of advanced technology nowadays. It seems like most of these inventions come from the Occident while China is just starting to be a great power in the world. However, China was once very powerful and advanced in history for a long time. Chinese people were good at Mathematics, Medicine, and inventing many things which had become the fundamental technology for the modern world. This brings us to the topic of "The Four Great Inventions", also known as the Four Great Ancient Inventions of China. It is renowned as four significant technological and scientific breakthroughs which contribute a profound impact on human civilization. They are papermaking, printing, compass, and gunpowder. Each of these inventions revolutionised various aspects of human life including society, culture, and warfare, from communication and knowledge dissemination to warfare and navigation. We are going to delve into the history, significance, and impact on our lives of these immortal inventions.

Considered to have played a crucial role in the development of civilization, papermaking revolutionized communication, education, and the dissemination of information. Imagine the time without paper, when the knowledge of a generation couldn't be recorded easily and efficiently, the later generation didn't have enough prior information and had to explore the world by themselves. Of course, the study of all subjects was slow. In fact, not only did papermaking facilitate the spread of literature, art and ideas, and the advancement in science, philosophy, and culture, but it is also essential for wrapping, packaging, towelling, insulating, and photography nowadays.

The origin of paper can be traced back to ancient China, where it was first developed during the Han Dynasty. Before paper, various materials such as bamboo slips, silk, and wood were used for record-keeping, but these were expensive and cumbersome, making them impractical for widespread use. Therefore, Chinese people tried to use the inner bark of certain plants, such as mulberry and hemp, which were more flexible, and durable compared with those stated above.

It all started back in AD 105 with Cai Lun, an official serving the Imperial Chinese court. He managed to craft paper from mulberry and various other bast fibres, as well as old rags, fishnets, and hemp waste. The fact that he even could produce paper from such rudimentary materials is quite stunning. In those early days, the process was extremely labour-intensive, involving the gathering of raw materials, the preparation of fibres, the shaping of the paper, and finally, its drying. During the spring or early summer, when the fibres were strongest and most flexible, the bark was collected and soaked in water to soften it. The retting process, in which stone hammers or wooden mallets were used to beat the bark into smaller pieces, followed. The fibres were then rinsed and cleaned to remove impurities and boiled to soften them and enhance their flexibility.

Once the fibres were ready, they were mixed with water in the form of a slurry. It was poured into a deckle, a rectangular mould made of bamboo or wooden slats, and dipped into a bucket of water after that. Gentle shaking of the mould to get a uniform sheet and drain away excess water was needed before drying. Finally, it was dried in the sun to prevent warping or wrinkling of the paper.

Over many years, the technique invented by Cai Lun underwent improvements to refine the quality of paper and increased production efficiency. For example, by applying a thin layer of gelatinous material to the surface of the paper, ink absorption was reduced and thus the ability to hold writing or printing ink is increased.

After Cai Lun invented this technique, it was very popular with the Chinese people as it was cheap and convenient. It is even spread to the rest of the world by the Silk Road. Starting from this time, using paper is no longer limited to the rich but accessible to ordinary people. It increased literacy rates and the democratisation of knowledge. Enabling the creation of books and documents, it is possible to record and preserve knowledge in an organised way. It had a great effect on cultural and economic aspects also through preserving historical records and cultural heritage and creating job opportunities at that time. The impact of papermaking is far-reaching when you think of our everyday life.

When you think of books nowadays, you cannot help associating papermaking with printing. That is another renowned invention of Great China which further facilitates the dissemination of information. Students must have the experience of being punished by their teacher for copying textbooks. And that is how books were produced by hand copying, a time-consuming, labour-intensive, and inaccurate method. Suppose without printing, the production of books would be unbearably slow.

According to information from various sources, printing technology emerged in the 6th century during the Tang Dynasty. People were seeking efficient methods to reproduce written materials when they found copying troublesome. The earliest form of printing was woodblock printing, which involved carving characters onto wooden blocks. By applying ink to the carved surface with a paintbrush, the patterns carved can be pressed onto paper. However, this method was still labour-intensive and time-consuming. Each wood block can only print a certain piece of work and a long indispensable time is needed to carve the characters precisely. In addition, the intricate process of carving made it difficult to reproduce complex and detailed images.

In about 1041-1048, Chinese alchemist Pi Sheng invented movable type, which greatly improved the shortcomings of woodblock printing. In the book Brush Talks from Dream Brook written by Shen Kuo in the same period, the Northern Song Dynasty, Pi Sheng conceived of a movable type made of an amalgam of clay and glue hardened by baking. Each character was engraved on the convex surface with a depth of 1 to 2 mm and baked to make it hard. When printing, he placed the types close together in an iron frame. When the paste was slightly melted by fire, he took a smooth board and pressed it over the surface so that the block of type became even. As a rule, he kept two forms going. While the impression was being made from the one form, the type was being put in place on the other. When the printing of one form was finished, the other was ready. In this case, he could print rapidly by using two plates alternately. The movable type printing, including wooden, clay, metal, and ceramic types, provided much greater flexibility and versatility compared to woodblock printing. Texts could be reproduced efficiently with few errors.

Although in 1313, Wang Chen, a magistrate, had had a craftsman carve more than 60,000 characters on movable wooden blocks to publish a treatise and invented horizontal compartmented cases that revolved around a vertical axis, the technology was not followed up in China. Fortunately, it was assimilated by the Uighurs who lived on the borders of Mongolia and Turkistan and transmitted to Korea, Japan, Vietnam, and the Philippines. Nevertheless, movable type printing did not spread to Europe as papermaking did. Not until the 15th century did Europe develop printing technology when Johannes Gutenberg

originated a method of printing from movable type. China's invention of printing technology advanced the development of the rest of the world.

The impacts of printing technology were not limited to knowledge dissemination, literacy, and education increase. Printing technology played a significant role in standardising languages and spelling. It reduced spelling variations and inconsistencies and as a result, contributed to grammatical rules and the development of national languages. Moreover, it helped the printing industry to become a significant sector, fuelling the growth of publishing houses, paper mills, ink manufacturers, etc.

While China contributed a lot to papermaking and printing, it also played a pivotal role in exploring the planet. Without compasses, humans could not determine direction accurately or travel to other parts of the world. It was very important for people to shape the course of civilisation, enabled seafaring journeys, trade routes, and the discovery of new lands and consequently, fostered cultural exchange in the past.

There are a few versions of how compasses were invented. One of them says that Si Nan, which was invented in the Han Dynasty and consisted of a magnetic metal spoon that aligned itself with the Earth's magnetic field, pointing south, was the earliest form of compass. However, according to studies by Professor Liu Bingzheng from Northeast Normal University in 1956 and by Sun Ji from the National Museum of China in 2005, the device recorded was not a real compass.

While this has been proved wrong, others are more authentic. According to the record in the book Complete Essentials for the Military Classics written in the mid-11th century, a guide to fish, which was made by rapid cooling of iron from Curie temperature (about 600°C to 700°C) to room temperature by putting it into water in a specific angle to make it magnetic and sealing it after, was invented in the 4th century. When it is in need, place it on a calm water surface. Until now, you may have been surprised by the intelligence and scientific knowledge of Chinese astronomers and geomancers in the past and their fascinating way of making artificial magnetic compasses. This is far earlier than the compasses made by lodestone discovered by mariners in Europe.

Apart from this, another kind of compass called Luo Pan, recorded by De Barbaris Oceani occidentalis Annales, was well used during the period of the Ming treasure voyages, in which Zheng He was ordered by the Yongle Emperor to project Chinese power and wealth to the known world and make other countries as tributaries. It has been an essential factor and reliable tool for the exploration of foreign countries.

Several technical improvements had been made after the invention of compasses. In the book Brush Talks from Dream Brook written in the 11th century, Shen Kuo said and proved that compasses did not point exactly to the south, but sometimes a bit biased to the east. His observation preceded the West by 400 years, considering English mariner Robert Norman discovered this phenomenon. Since then, using compasses to tell directions could be even more accurate.

The inventions above seem to bring human-only blessings, but the following one has burdened us. This is gunpowder, which has contributed a lot to scientific, technological, and military advancement, while it has made many people perish and destroyed many structures and artefacts. Still, it was not the fault of the Chinese who invented gunpowder unintentionally. Instead, we should praise the significant impact they have brought us. Think of the tunnels underground or underwater we travel through every day, whether by cars or trains, they are mostly built by using gunpowder to blow the rocks except some new ones adopted more advanced ways.

Gunpowder is believed to have originated in the Tang Dynasty of China before the 10th century. It was originally not invented to facilitate warfare. Instead, Chinese monks and alchemists were questing for an elixir of life when they discovered the formula for making gunpowder. The technology was only used for medicinal purposes until it was found to be incendiary and immediately applied to warfare. In modern chemistry, we know that gunpowder is composed of saltpetre (potassium nitrate), sulphur and charcoal and it was the same in the past although the percentages of its content were not refined at that time. The earliest manufacturing process was simply grinding the ingredients together into a powder using a mortar and pestle.

During the Song Dynasty, Chinese alchemists and military engineers figured out the optimal ratio of saltpetre, sulphur, and charcoal, which ensured replicable, stable, and explosive gunpowder. It was used in flamethrowers in the Song Dynasty and even extended to making fire arrows, which were the prototype of rockets, and thunderclap bombs, which were launched from early forms of cannons during the Yuan Dynasty. You may know that the Yuan Dynasty was established by Mongolians if you have learnt Chinese History. The ambitious and violent Mongolian conquests and invasions of China acted as a vehicle for gunpowder to spread to the rest of the world. It is documented that the technology had reached the Middle East by the 13th century. Sorrowfully, it is the European countries which used gunpowder for their empires, causing countless unnecessary tragedies.

Not only did the Chinese invention of gunpowder help people build structures and explore resources, but it also increased the trading of ingredients and cultural exchange. More remarkably, its combustion and explosive nature indirectly cause people to think about the theory behind it, leading to the chemical revolution and the rapid development of science.

The Four Great Inventions of China have revolutionised many aspects of human history, including the promulgation of knowledge, the technology for extracting resources, the exploration of the world, and the pursuit of science. Now, China, as a great country, is still endeavouring to invent a lot more fantastic new technologies in this extremely interconnected modern world. The innovative spirit and ingenuity of the Chinese, which are exemplified by their lasting inventions, will surely persist in the future, and continue to contribute to the world.

Chinese Inventions: The Past, Now and The Future

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China, a mighty country with a history of over 5000 years, has a lot of precious physical and spiritual legacies which reinforce our standard of living in modern society. Flipping through the gallery of China's achievements, those cutting-edge inventions should be placed on the podium of the most glorious kinds of the nation.

When we mention Chinese invention, I bet the memory of the four great inventions will be aroused in everyone's mind. The eminence of them is not about how eye-catching and fascinating they are. These innovations have one collective characteristic which is decisive to their popularity and commendations, which is that they all change human lives slightly, to a degree that we may not recognize. However, our lives are genuinely altered, either to a brighter future or to a grim dystopia.

Past

Being one of the four great inventions, paper making would be a skill that improves our lives most. Could you count how many products that surround our daily life are made of paper? For a student, they could be textbooks, comics or novels; for an adult, they could be documents, reference materials or important hardcopies of contracts. Thanks to the plain and snowy white paper, we can have every word printed while being visible. Nevertheless, can you imagine what would happen if once the technique of paper-making vanishes?

Let's go back to the ancient world thousands of years ago. Before paper was invented in China, people around the world used various types of materials to record their culture and history. The one with the best fame would be papyrus, which was developed by Egyptians in around 3000 BC Made of papyrus plant, however, it was not pliable enough to fold without cracking, also fragile and susceptible to both moisture and excessive dryness. Other materials such as parchment, palm leaves and tapa were used all over the world. The reason why they were all with very short lives was that most of their surfaces were irregular, which was difficult to write on and the use of them was often with constraints such as environment and climate.

Therefore, here we are to trace back to 105 BC in China. In the past, it was a traditional practice that every book and document was to be written on bamboo and wooden slips. These bamboo slips were ponderous and not flexible enough to be carried everywhere. Envision when you are reading an enchanting book but it is time to go back home. Would you like to carry loads of bamboo slips to your home? Later, a better alternative- silk and cloth seemed to have addressed the issues properly. However, they were indeed very expensive and ordinary people couldn't afford a bulk amount of them. Cai Lun, a eunuch, was initiated to improve these media and was determined to invent a light and cheap one. He boiled materials namely bamboo, hemp waste, old rags, fishnets and bark from trees to a pulp that was beaten with a wood or stone mallet and mixed them with a large amount of water. After processing with wooden sieves and removing excess water, 'paper' was formed. To commemorate his achievement, this paper was called 'Cai Hou Paper'. No sooner had Cai invented this easy and cheap paper-making method than it went viral all over the

world. In 600 AD and 610 AD respectively, paper-making expanded to Korea and Japan. It also travelled to the West on a journey very similar to the Silk Road, from Central Asia to Samarkand in Uzbekistan.

Another significant invention of the four great inventions could be mentioned together with paper making, which is movable type printing. Effective printing was a long eagerly awaited desire of ancient Chinese. Chinese, unlike English, already has over 10000 different characters in the Tang Dynasty. Relying on human-written books is not only time-consuming but also expensive to produce and unfavorable regarding on distribution of knowledge. Therefore, the Chinese worked hard on inventing different printing methods. Woodblock printing, known as xylography today, was the first method of printing applied to a paper medium. Since carving the blocks is skilled and laborious work, and if one character is mistakenly carved, the whole woodblock has to be discarded and everything needs to be carved again. It is a waste of manpower and a drain of resources, isn't it? Bi Sheng, an artisan and engineer in the Song Dynasty, had a great and detailed overview towards the pivotal drawback of woodblock printing and thus invented a brand new method called 'movable type printing' in 1041. Bi Sheng took sticky clay and shaped it into the Chinese character that was going to be used. When he wished to print, he could just take an iron frame and set those character models on the iron plate, slightly burn them and put the medium to be printed on the plate. Eventually, words were printed uniformly and clearly on the medium used. The skill was later spread around the sinosphere including Korea and Japan. Metals were used to replace clay as a better alternative. Until typesetting with computers became prevalent in the 1900s, movable type printing was abandoned and retired out of our sight. Doubtless to say, Chinese inventions on paper and printing have brought unprecedented impacts to the world. Jim Rohn, an American motivational speaker once said 'reading is essential for those who seek to rise above their ordinary.' Books are a crucial medium to carry and propagate the culture and language of a nation. Without paper and methods of printing, we are not able to get in touch with diverse knowledge in the world. Most people may take these for granted and neglect the efforts behind these inventions. That's the reason why I mentioned that we may have overlooked the impacts of these Chinese inventions.

The second-last great invention is the compass. It was actually invented in China during the Han Dynasty between the 2nd century BC and the 1st century AD. Compass, at first, was not used for navigating. It is related to the concept of 'feng shui', a kind of esoteric geomancy that claims to use energy forces to harmonize individuals with their surrounding environment. The prototype of the compass is called 'si nan'. It is made with lodestone, a form of the mineral magnetite that is a naturally occurring magnet and aligns itself with the Earth's magnetic field. The middle of 'si nan' is not a needle like a compass, but a spoon-like object. You may wonder why it must be spoon-like, and the answer is related to the Big Dipper, a large asterism consisting of seven bright stars. In the past, as the Big Dipper was quite prominent and easy to recognize, ancient Chinese used it to clarify their direction. Also, the Big Dipper is one of the most important references for fortune teller to do their divination. Hence, when the Chinese discovered that the magnet would always point toward the magnetic poles, they tried to imitate the shape of the Big Dipper during the manufacture of the magnet. In the end, a spoon-like object was crafted. 'Si nan' had also become essential equipment for 'feng shui' gurus to make their judgements until now. Later, 'si nan' was transformed into a compass in the Song Dynasty by the military for navigational orienteering by 1040-44. The invention of the compass made an indispensable contribution to the Age of Discovery by enabling mariners to navigate safely far from land. Within China, the invention of the compass helped with the development of the maritime Silk Road. The maritime Silk Road connected China to Persian and Arab traders to export a lot of China's products towards other countries such as porcelain, spices and herbs. Not only does it help boost China's economy, but it also facilitates cultural communication between China and Southeast Asia countries. This can also account for the Chinese's spirits on inclusion and racial integration.

Last but not least, we have gunpowder as an invention that has affected us much. Sun Simiao, king of medicine in China had mentioned in one of his books that 'mixing sulphur, saltpeter will form a substance that catches fire. However, since some Taoist alchemists were obsessed with the elixir of immortality, they still tried to mix them with carbon to see what would happen. Eventually, as gunpowder couldn't bring them eternal life, it was taken for military use. The earliest surviving chemical formula of gunpowder dates to 1044. As a result of the Mongol conquests during the 13th century, knowledge of gunpowder spread rapidly throughout Asia and Europe. Besides peaceful usage like matches and fireworks, gunpowder was used for a more violent and brutal purpose: weapons. The explosive and flammable nature of gunpowder had been specifically attractive to strategists. Since then, canons and guns have predominantly occupied the field of war, replacing swords and trebuchets. This invention was innovative and pristine enough, but it was definitely a double-edged sword. We could use it for celebrative purposes such as firecrackers as one of the Chinese traditions, or military purposes, which is disapproving.

Spirits behind

The four great inventions have clearly demonstrated personalities that most Chinese own. British Sinologist Medhurst once said 'the Chinese people's genius for inventions has manifested in many aspects very early' in his book 'China, its State and Prospects'. This comment refers to the four great inventions. As described above, we know that these inventions are prompted by certain challenges, for instance, economic issues faced when using bamboo strips, convenience issues faced when using silk, etc. When these challenges are here as an obstacle faced by the Chinese, they wouldn't give up trying. Instead, they would make use of what they had learned in the past. Through thousands of trials and errors in order to achieve or come up with a solution. In ancient China, the belief that is rooted in the Chinese mind would be Confucianism, which focuses on the importance of personal ethics and morality. Scholar Xunzi once said 'Learning cannot be stopped' in his famous article 'Exhortation to learning'. Obviously, learning was of paramount importance to the Chinese. Having this attitude, when they have any new and innovative ideas, they can manage to accomplish them step by step with concrete and reliable knowledge.

There is also a reason why the Chinese could be that creative in inventing such useful products. Chinese have a curious soul in discovering the structures and mechanisms behind the world. In fact, the number of myths in China transcends those in foreign countries. Chinese love to find an explanation towards everything in the world. For example, the reason why there is only one sun in the sky would be that Houyi shot the other nine suns down because of the extremely hot weather. Everything you could imagine, from heaven to hell, has its own story relating to different gods. Books such as 'Strange Tales from Liaozhai' or 'Journey to the West' also show the imaginary world in the Chinese brain. Undoubtedly, the Chinese aren't fearful towards these unknowns or uncertainties. Furthermore, their perseverance in overcoming these unknowns should be praised and learned. Combining these with the Confucian or Mohist belief – to love and treat everyone well, it is not difficult to know why the Chinese could invent so many beneficial products for the world. Gunpowder

could be an exception, but it depends on how we use it. We couldn't deny that it indeed brought some advantages to our lives by providing things like fireworks. It also stimulated some kinds of new technology.

Now

After the Chinese economic reform, everything is going back on track. However, it seemed that the Chinese didn't get back their spirits for a while. A few years ago, some scandals had built some distrust towards Chinese new inventions. One of the biggest ones was the 2008 Chinese milk scandal. Once everyone thought that the Sanlu Group had invented a type of cheap and nutritious milk powder and was proud of it. However, it was soon discovered that the milk was adulterated with the chemical melamine, which would result in kidney stones and other kidney damage. Many Chinese and many foreigners couldn't trust Chinese products anymore since this scandal broke out.

The history of Chinese inventions may contain marvellous stories such as the four great inventions, or scandals that deteriorate Chinese products' credit. Nonetheless, the spirits of the Chinese are always in their blood, existing at any moment. After the scandal broke out, the Chinese government worked hard to monitor the quality of Chinese products in order to rebuild the confidence of people in them. Chinese haven't and never give up on making new inventions. In the past ten years, every Chinese enterprise strived to innovate so as to grasp the opportunity to compete with foreign tycoons. They cling to create something that nobody has tried before. Not only because of making money, but also to restore national glory and bring more and more unbelievable creations to the sight of people around the world.

Particularly, I would like to mention a few inventions that swamped the global market in recent years. One of them must definitely be 'short videos'. TikTok, established seven years ago, introduced a new concept of videos to the world. In the past, we usually watched long YouTube videos by turning our phones horizontally. Also, we often have to spend a few minutes to finish watching one single video. Under such circumstances, it is not likely that we could finish it without pausing in the middle. This offered dissatisfied experiences to users. Chinese entrepreneur, Chang, spotted this problem faster than anyone else. He predicted that everyone would own a phone in the future and thus stepped into the technology industry. With his clear mindset, he established 'Toutiao' and 'Tiktok' respectively. Both of them were to offer users quick and targeted information. And now, different social media adopted the same techniques, such as YouTube's 'shorts' and Instagram's 'reels', they all originated from Tiktok's short videos. To have a successful creation that could be widely accepted around the world, the crucial condition is that the inventor clearly understands the demand of the market. As Chinese can learn new things rapidly, they can in fact have a clearer image and thus could put themselves into others' shoes. Inventing something that customers want. This is what we should learn about and take advantage of.

In recent years, Chinese enterprises often faced sanctions by foreign countries such as the United States, especially Huawei. The daughter of the CEO of Huawei was even arrested by the Canadian government. However, Huawei showed its spirit of perseverance with its innovative nature. When Android no longer supported Huawei, it invented its own engine called 'HarmonyOS', which is functioning well. What everyone should learn from this is that invention is a one-way path and stopping is not allowed. Whenever we faced obstacles, we couldn't just give up our project directly as there must be another way that could work exactly or even better than the original one. Invention is not only about creativity, but it's more about persistence. We may not see the bright side of the tunnel as there is still a long way until the

end, but we have to remain committed to what we believe in. One day, we could eventually make it to our long-awaited products. Chinese, as the 'descendants of the dragon', must know this very well.

Future

China has held a place in different fields such as astronomy and artificial intelligence. It is believed that China can continuously proceed with further inventions on things such as spaceships that can carry tourists to space or artificial intelligence that can chat with people normally like a human. Despite the fact that China has a promising future in innovation, young people in China are facing severe social issues. In China, although the economic growth is significant, it doesn't really benefit young people. As most of them are poor, they are not able to achieve their dreams and can only tolerate the long '996' working schedule. At last, they choose to stay at home and become a lying-flat in response to the emotionless society. The Chinese government has to tackle this problem by providing more support to young people as they are the pillars of society in the future. Without their ideas, it would be difficult to keep China as an innovative country.

From my own perspective, the successful stories of all inventions in China are really encouraging. It would be fabulous if I could become one of them one day. However, even though the government provides a lot of support to Hong Kong youngsters to work on innovations, the details are still not very clear. It is about time the government exposed more statistics reflecting the current situations in the Greater Bay Area so that people could understand the feasibility of achieving their dreams there.

Living in the 21st century, we should be grateful that we are able to enjoy the fruits of the great inventors of the past. Indeed, these inventions improve our lives a lot. We should also be honoured to be one of the Chinese as our ancestors had completed works that may have changed the world. Being Chinese, and also a member living in the world, we should try our best to contribute to our beloved society. Maybe we are not creative enough to invent new products, but we can learn from their spirits and finish our jobs in a favourable manner. No matter we are an inventor or not, we can still make our steps and change the world slightly. Let's prove that the Chinese are not the 'sick man of Asia' by our own efforts.

China's Inventions

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Mobile payment refers to a payment behavior in which users use mobile terminals (including smartphones, tablet PCs and other mobile tools), access communication networks or use short-distance communication technology to complete information interaction, so that funds are transferred from the payer to the transferee.

China has become the world's largest mobile payment market, with a leading position in terms of mobile payment user scale, transaction scale and penetration rate. In today's China, whether it is the urban agglomeration in the north or the remote countryside in the west, mobile payment such as cell phone "Sweep" has become one of the most commonly used means of payment in daily consumption such as catering, shopping, transportation and medical care.

With the increase in the penetration rate of smartphones, the decrease in the cost of mobile data access, the continuous improvement of government regulatory policies, and the increasing purchasing power of the people, mobile payment has developed rapidly, integrating and innovating with related technologies and business models, resulting in a wide range of mobile payment services, which have provided people with a convenient, safe, and rich way of consumption, accelerating the development of China's digital economy and the process of digitalized life.

1. The development of China's mobile payment market

Today, mobile payment has changed people's lifestyle in ways that were unimaginable a decade ago. Ten years ago, payment methods were mainly cash and card payments. 2000 to 2009, domestic operators, commercial banks and third-party payment institutions have made a lot of efforts to explore mobile payment, but because of the conditions in all aspects are not yet in place, the mobile payment business and the scope of application did not realize the quantitative leap, and it is difficult to significantly expand the market scale.

In June 2011, the central bank issued third-party payment licenses, and 27 companies, including UnionPay, Alipay and Caixit, were granted licenses and became the first licensed payment institutions in China. In the summer of the same year, with the emergence of taxi software, the small and high-frequency application scenarios matched with mobile payment products, and mobile payment gradually penetrated into people's daily life, and taxi payment became the first popularized area of mobile payment. During this period, smartphones began to be popularized in the market, the differences in mobile payment technology were basically eliminated, mobile payment application scenarios were promoted, and mobile payment entered the period of market development. Enterprises with mature payment technology and a large number of users showed positive development, and through continuous innovation and application, they not only adapted to the market needs, but also created market demand, which contributed to the growth of the mobile payment market.

In 2013, Alipay launched the "Balance Treasure" program, opening the way from mobile payment to universal financial management. The launch of "Balance Treasure" has increased the user stickiness of Alipay and opened a window for ordinary people to manage their finances, allowing many people who did not think they needed financial services to take the initiative to manage their finances and realize the preservation and appreciation of their wealth.

In 2014, WeChat launched the WeChat red packet function, which pushed WeChat payment into a rapid development channel. in December 2015, China UnionPay launched the "cloud flash payment" product, in February 2016, Apple Pay officially entered the Chinese market, and Samsung Pay was launched by Samsung in March of the same year, while Xiaomi Mi Pay and Huawei Huawei Pay were officially launched in August. Samsung Pay was launched by Samsung in March of the same year, and Xiaomi's Mi Pay and Huawei's Huawei Pay were formally launched in August, with commercial banks and cell phone providers joining the mobile payment camp on the basis of their user bases.

There are currently a large number of third-party mobile payment companies in China, but those that are closely integrated with the digital scene are doing better. Relying on Alipay and Mobile Taobao, Alibaba has opened the way to mobile payment based on mobile e-commerce, while Tencent has rapidly entered the mobile payment market with WeChat Pay through its WeChat instant messaging application. According to the research report, Alipay and WeChat occupy the absolute share of China's third-party mobile payment market, reaching 92.53%.

2. Mobile Payments Born Out of Momentum

Mobile payment technology, as the most important innovation element on the supply side, has aroused the public's need for new payment methods. The demand for convenient and secure payment in the huge Chinese payment market has accelerated the integration of mobile payment technology with the market.

The mature application of remote payment and near-field payment technology is the main technical driving factor for the rapid development of mobile payment, which not only guarantees the security of mobile payment transactions, but also promotes the simplification of mobile payment procedures. Remote payment is mainly network payment, which is mainly based on the Internet and realized through online banks or third-party payment platforms. 5G mobile communication technology, which is still in the preliminary application stage, will provide more possibilities for remote payment innovation. Near-field communication interaction technology plays a key role in the development of near-field payment. At present, the technical realization of near-field payment mainly includes barcode payment technology, NFC, face swipe payment, sound wave payment and other major solutions. From the perspective of the development results in recent years in China, barcode payment has become the mainstream.

The development of mobile payment has fundamentally changed the traditional payment mode. Driven by the development of the Internet, mobile payment has provided new impetus for economic development and improvement of people's livelihood.

Promote the transformation and upgrading of traditional industries. Mobile payment not only changes the payment method, compared with traditional payment methods, but also shortens the time loss of the payment process, reduces the cost of "trust" between people, improves the efficiency of payment services, and innovates a variety of payment business models, which brings not only the flow of funds to the main participants in the market, but also the flow of talents and logistics attracted behind the funds. It brings not only capital flow to market participants, but also talent flow, information flow and logistics flow attracted by capital. Mobile payment covers all industries in society, deepens the intersection of various advanced technologies, promotes the transformation and upgrading of traditional industries, and is a gas pedal for China to build a moderately prosperous society in all aspects.

Efficient and convenient mobile payment gives people a greater sense of "access". The development of mobile payment with Chinese characteristics is in line with the people's

livelihood and the wave of social development, and to a great extent breaks through the limitations of time and space on the payment industry, and its portable and simple payment characteristics meet the people's demand for cash-light and efficient life, and enhance the people's sense of well-being. While changing people's payment life, mobile payment has also entered the field of public services, helping to improve the efficiency and quality of government public services, so that the public can do less errands, less queuing, or even do not have to run once.

3. China's Mobile Payment Ecosystem

From the QR code payment in supermarkets and convenience stores to the instant recharge of phone bills, from the cell phone purchase of train tickets to the password-free payment of online car travel, etc., mobile payment is subconsciously integrating into the lives of the public, making daily consumption more convenient, fast and hassle-free. Mobile payment has spread its tentacles to various industries and involves several parts of the economy and society.

3.1 Government and People's Livelihoods

Mobile payment has an inherent advantage in enhancing the government's digital governance capability, effectively improving the intelligence of government services, forming a benign interaction among the government, enterprises and the public, and using mobile payment as an entry point to achieve a one-network, complete identification, business processing, and fund flow, forming a closed loop of the entire business. For the public, the value of the program is that it reduces the burden of action, and by using technologies such as online application, face recognition, and mobile money transfer, they can complete procedures that would otherwise require them to run through multiple government windows without leaving their homes. For the government, the value is: moving all government affairs to the cloud, making them more transparent, more open and more honest; cracking data silos, integrating data from departments such as industry and commerce, taxation, labor insurance, environment, safety supervision and fire prevention, etc., and realizing data integration within the governmental affairs system.

3.2 Medical services

The combination of mobile payment and medical service will, to some extent, indirectly affect the reform of the medical industry. China's high-quality medical resources are generally scarce, the traditional medical process is cumbersome, difficult to register to see the doctor and other problems have been accumulated for a long time, medical services access to mobile payment application services, can greatly save the doctor and patient consultation time, enhance the efficiency and level of medical services. At present, there are two application scenarios of mobile payment in hospitals, namely: the user prints the medical guide sheet at the hospital self-service terminal, and completes the payment by actively scanning the QR code; the user pays the fee at the hospital fee window, and the fee collector completes the payment through the scanning equipment by scanning the QR code. In the future, through mobile payment to create a smart version of medical health services, you can move the registration, diagnosis and treatment and payment processes to the line. Early booking, online calling, first see the doctor and pay later and other modes, will effectively solve the previous difficult to register, queuing for a long time, slow payment and other problems, to enhance the comfort of medical treatment, to ease the relationship between doctors and patients.

3.3 Transportation

At present, mobile payment facilitates transportation, mainly in three aspects: First, the bus and subway to realize the scan code ride. In many cities, code-sweeping has gradually become another major way for citizens to pay fares. In addition to bringing passengers a convenient and efficient travel payment experience, this application can also help the Internet transformation of public transportation agencies and promote the upgrading of the business model of the public transportation industry. Second, highway toll payment. By binding the third-party mobile payment account with the license plate number, the system automatically recognizes the license plate when the vehicle owner crosses the highway intersection and automatically deducts the payment directly from the third-party payment platform without arranging manpower to collect the payment. This method can not only improve the traffic efficiency of the highway, but also enhance the smart attributes of the city. Third, parking lot charging. Through automatic license plate recognition and sensorless payment technology, parking lots have opened up businesses such as "Stop Simple", without the need for manual time charging or the installation of charging equipment at the entrances and exits of parking lots. In addition, the mobile payment portal can also provide the service of reserving parking spaces, and even open up the data interoperability between shopping mall consumption and parking fee waiver, so as to realize the effect of promoting consumption through parking.

4. Risks to the development of the mobile payment industry

4.1 Technology Risks

The technical risks of mobile payment mainly include technical security risk and technical system risk. Technical security risks are mainly reflected in the cracking of payment passwords and leakage of user information; technical system risks include system vulnerabilities in the payment process and improper system protection of payment funds. As the main carrier of mobile payment, cell phone is prone to theft and loss, and there are certain risks of payment information leakage and loss of payment account.

4.2 Control system risk

The risk of the control system of mobile payment mainly includes the internal control system and risk warning mechanism. As an important part of the financial industry, the internal personnel of an organization needs to have high moral quality, the ability to control and manage large amounts of funds, and the ability to master financial laws and regulations. Secondly, the industry has not fully established a mature and unified risk warning mechanism, and the ability to grasp unknown risks is still lacking.

4.3 Industry Regulatory Risks

In the past ten years, China's mobile payment has gone through a phase from initial emergence to rapid development. However, due to the late development of China's mobile payment and its rapid development, the relevant laws and regulations in terms of state supervision are still not perfect. Regulators have issued some supporting laws and regulations, but compared with the rapid development of the industry, there is still a certain lag in leading the industry rules.

Non-Fiction

Group 5

New Tales of China's Inventions: Acupuncture: the past, present and future

Maryknoll Convent School (Secondary Section), Wong, Hiu Ka Kabi – 16

China is a land of invention and creation, where many such innovative inventions have been created to completely rewrite the history of mankind. China never stops surprising the world with its remarkable inventiveness, from papermaking to mobile payment systems. The technologies that continually set new boundaries of the world allowed people to witness the constant waves of tales about China's inventions. As we enter a new era, it is important for us to look back at our previous inventions so that we can understand more about what future discoveries will emerge. One of the past inventions, acupuncture is widely practised though few people know its origin.

Acupuncture is an ancient medical practice rooted in China that became increasingly popular all over the world, especially among Western countries, during recent years. The power of healing through acupuncture is still an amazement to the world due to its non-invasive and holistic treatment approach. Acupuncture has its origin in ancient Chinese philosophy, from the concept of yin and yang, that is the balance, circulation of Qi (pronounced "chee"), which means life force or life energy. This concept proposed that if the flow of Qi is imbalanced and interrupted, it can result in illnesses and physical issues. These philosophical principles led to the development of acupuncture as a way through which balance and harmony can be restored in the body.

The first proof about acupuncture goes back to the time of Shang Dynasty (1600-1100 BC) in China. At this time, bone needles and sharp stones were put in the skin at definite points along the body's meridians. These are the channels that are believed to transport Qi in all parts of the body. These early acupuncturists were dependent much on natural observation to observe the works and disturbances of the human body.

Over the ages, acupuncture developed and during the Han Dynasty (206 BC – 220 AD), a medical compendium called Huangdi Neijing or The Yellow Emperor's Inner Canon was created which helped to standardise acupuncture treatment. The meridians, the points of acupuncture and their curative effects are discussed in full measure. As inner Canon integrated acupuncture as one of the major treatises on Traditional Chinese Medicine (TCM), it became its foundation for further development.

In the 19th and early 20th centuries, acupuncture's long history was interrupted by a new phenomenon – Westernization that led to the development of modern medicine. By the time of the May Fourth Movement, acupuncture techniques were widely ridiculed and had become obsolete in the Western world even inside China. But acupuncture was revived in the 1950s when Chairman Mao Zedong, leader of People's Republic of China spoke well about traditional Chinese medicine and that it had a lot to offer. This led to the establishment of acupuncture clinics and the popularity once again.

In the modern era, acupuncture is admitted as a complementary and alternative medicine (CAM) practice. While its efficacy has been substantiated by numerous scientific research,

the mechanism of actions is not yet fully understood. It is believed that introducing thin, sterile needles into particular acupuncture points stimulate the nervous system and release endorphins which promote self-healing by the body.

Nowadays, acupuncture is practised in many parts of the world and several regulations have been set to ensure that it becomes safely used. It is frequently valued for pain relief, stress control and overall well-being. In the Western world, acupuncture is often used as an integrative treatment apart from standard medicine where it involves both traditional and modern methods.

In short, acupuncture is an ancient Chinese practice that forms part of traditional Chinese medicine. So based on the philosophies of yin-yang and circulation of qi, it has been utilised as a way to restore balance in an individual's body hence promoting healing for thousands of years. While acupuncture has had its fair share of hurdles in the past, it is still considered an essential and respected form of medical practice that enjoys worldwide recognition. Its ongoing development and distribution also show its continued significance in medicine.

Chinese inventions

Pui Kiu College, Lee, Ying On – 17

Whenever we talk about Chinese invention, we always think of papermaking, printing, gunpowder and the compass - the four great inventions of ancient China which have significant contributions of the Chinese nation to world civilization. Counting the impressive, splendid invention from china in the epoch of technology, artificial satellite, the space station, electric vehicles, the evolutional 5G and 6G are of top-notch. However, in my point of view, the most worth mentioning Chinese invention is the hybrid rice, not only it is a revolutionary act, but also it benefit all of people of the globe and contributes a lot to our daily lives in terms of food supply and details of it are expounded below.

The current food crisis is probably the worst in a decade. With the consequences of climate change coinciding with trade restrictions and conflict, years of progress in the battle against hunger and poverty are being rapidly reversed.

Many countries are responding with policies that amount to food protectionism, which on a global level will only lead to further food insecurity as richer countries outcompete poorer ones in the race for scarce resources. The majority of analysts believe there is an urgent need to make structural changes to global food systems, rooted in both sustainable food and agricultural practices and adequate planning.

Yuan Longping, the world-renowned "Father of Hybrid Rice," is an outstanding agronomist from China and winner of multiple awards including the National Science and Technology Award, the WIPO Gold Medal for Inventors, the UNESCO Science Prize, and the World Food Prize. He has devoted to hybrid rice research since his early 20s and has established a technological roadmap for super hybrid rice breeding. His accomplishments have contributed to China's food self-sufficiency and the world's food security.

Hybrid rice can be divided into three categories of strategic development: the three-line method, the two-line method, and the one-line method. As the application method becomes simpler, the efficiency increases. The level of heterosis is increasingly strong, which varies from species to subspecies and even includes distant heterosis.

The three-line method utilizes heterosis in the following three lines: the nucleo–cytoplasm interaction male sterility line (i.e., male-sterile line), the male sterility maintenance line (i.e., maintainer line), and the male sterility recovery line (i.e., restorer line). The male-sterile line provides a material basis for the production of a large number of hybrid seeds, the maintainer line is used to propagate the sterile line, and the restorer line is used to pollinate the sterile line to produce male-recovered hybrid rice seeds with heterosis. Chinese three-line hybrid rice was first used successfully in 1973, becoming a classic method of utilizing heterosis.

The two-line method requires only sterile lines and restorer lines to utilize heterosis, while the most successful method is to utilize photo-thermo-sensitive genic male-sterile (PTGMS) lines, which display male sterility during long days and high temperatures, and male fertility during short days and low temperatures. Hybrid seeds are produced during the sterility period and sterile lines are produced by inbreeding during the fertility period, rendering the maintenance line unnecessary.

Two-line hybrid rice was a significant scientific and technological achievement for China's agricultural community. First achieved in 1995, its annual planting area now accounts

for more than 50% of hybrid rice varieties. The achievement "Research and Application of Two-line Hybrid Rice Technology" won the 2013 National Science and Technology Progress of China Special Prize. Third-generation hybrid rice, which can also be considered as a two-line method, in a sense, achieves heterosis through the self-breeding of common recessive nuclear male-sterile lines via genetic engineering technology. These varieties are currently being tested for production.

One-line hybrid rice breeds hybrids with fixed heterosis and no separation, and does not require annual hybrid seed production. This technology is still being developed.

China has been a leading exporter of hybrid rice. Hybrid rice technology is listed by the Food and Agriculture Organization of the United Nations as the preferred method for increasing food production and solving the problem of food shortages in developing countries. Many people come to China to study and exchange information about hybrid rice technologies, including senior experts from the United States, Japan, and India,

At present, Chinese hybrid rice has been successfully tested or developed in more than 60 countries including India, Bangladesh, Vietnam, the Philippines, Pakistan, the United States, Indonesia, Myanmar, Brazil, and Madagascar, with planting areas exceeding 6 × 106 hm2·a−1. In this way, China is providing a solution to global food-shortage problems.

When grown under the same conditions as comparable purebred rice varieties, it can produce up to 30% more yield. there are more than 2.2 billion acres of rice fields in the world, covering 150 million hectares. If half of them, 75 million hectares, are planted with hybrid, assuming an increase in yield of 2 tons per hectare, 75 million hectares will produce an additional 150 million tons of rice, which can feed around 400 to 500 million people. Take the Philippines as an example: Since 1995, the Philippines has taken the development of hybrid rice as a strategic decision to solve food problems and develop the economy. In 2005, the area planted with hybrid rice reached 370,000 hectares, with an average grain yield of 6.5 tons per hectare, which is 80% higher than the average yield of other conventional rice. In essence, the hybrid rice is indeed imperative to all residents of the world, it increases food supply, and ease food shortage to a large extent. So, among all the superior invention made from china, hybrid rice is definitely the most honourable, it contributes significantly to all of us, it leads us to better lives, a better world.

In conclusion, through unwavering dedication, Chinese scientists successfully invented the hybrid rice, improving the breeding method from three line to two line, and it is envisaged that there will be one line in the future, and I believe it can come true.

China's Inventions and Why Are They So Important

St. Joseph's College, Lee, Cyrus Chi Hin – 16

According to the statistics released from the China National Intellectual Property Administration (CNIPA), from January 2023 to July 2023, the number of invention patents granted in China was 515,000, with a year-on-year growth of 9.49%. The innovative industry in China is emerging, however why are inventions so important such that not even the society pursues new inventions, but also the government is determined to expand this industry? The 'Three Step' Development Strategy established by the Chinese Government has 3 stages: The first stage in 2020 aimed to develop an innovative system with Chinese characteristics; during the second stage in 2030, China will surpass USA to become the top innovative country; finally at the last stage in 2050, China hopes to become world dominant power in science and technology. In what ways inventions are important? This will be discussed in the remainder of this essay.

First and foremost, how did the Chinese create their own inventions? What makes them different from other cultures so that they can have their own unique inventions? The Chinese nation is known for their diligence and their strict education to children. Yet in an era which demands innovative ideas and creative thinking, are these really the key elements which has brought them to their success? Personally, I think to invent a brand new design, circumspection and flexibility is the most important traits one must own.

To begin with, investors has been carefully observing details that appear in our daily life, has been inspired by these signs, and has came up with ideas which then successfully turns into reality. Cai Lun, the inventor of paper, by observing the way how paper wasps made their nests, he noticed that he could produce paper from a similar fashion therefore he came up with his new method of making paper: using bamboo, hemp waste, old rags, fishnets and bark from trees as the materials. The materials were boiled to a pulp that was beaten with a wood or stone mallet before being mixed with a large amount of water, at last processed with wooden sieves and removed from excess water to make paper. Had Cai Lun not been inspired by the way paper wasps make their nests, he would not have come up with this invention which benefited human civilization to this date.

Moreover, a person needs to have a flexible mind to come up with ideas which are astounding enough to keep them unique. Dayu, the inventor of chopsticks, invented chopsticks out of sheer starvation. On a cold and windy night, when Dayu was cooking meat in a pot to compensate for his hunger, he suddenly realized that the meat was too hot for one to use bare hands to fetch it. He saw a tree and cut its branches off, then used 2 of the straws to clamp the meat from the pot. Dayu's flexible mind has allowed him to discover the limitations of humans, and how we can make use of tools to solve problems. To summarize, inventions are made only when people are circumspect and flexible.

Now we know that the Chinese have achieved their success because of their circumspection and flexibility, you may wonder: Why is it so important to make inventions then?

How is the innovative industry so powerful in a way such that no other jobs can substitute it?

Firstly, each invention is a commitment to the society, and in the long term inventions might lead to the prosperity of a country. In other words, inventions improve our society and increase the quality of people's lives. The BeiDou Navigation Satellite System was invented and gradually applied in China, installed in vehicles and fishing vessels to assist navigation and to tackle emergency situations or remind motor vehicles of road accidents, fishing vessels of bad weather by knowing the latest changes in traffic or weather. By reducing the number of accidents and the impact of accidents, the efficiency of urban life has been facilitated. Additionally,people's livelihood and even national security has been improved. In such ways the society has been benefited. To think further, the BeiDou Navigation Satellite System can greatly reduce the number of deaths in China every year, promote China into a safe country and further contribute to the prosperity of China. This tells us that inventions can have a major impact on a country as time goes by.

Furthermore, inventions aid the survival of humans. To elaborate more, inventions keep human civilization alive so that civilization does not break down. Using 5G communication technology as an example, it has already covered 95% of China's territory, and although it gave birth to new technologies such as unmanned aerial vehicles, smart cities and even smart healthcare, most crucially it supported the mobile network of the 1.4 billion people in China. Imagine if 5G communication technology never existed, what would happen to those 1.4 billion people? Without a network, they would not have been able to call food delivery for a takeaway lunchbox, keep in touch with the Internet, or even communicate with their loved ones to tell them that they are safe through mobile apps such as LINE or WeChat. How would humans adapt to such an environment in a short period of time? Order would have been disrupted, chaos would have been everywhere, everyone in the world would have been driven mad! We should be grateful that inventions are satisfying different needs of humans so that civilization is kept unharmed until today.

You may be asking yourself, why are these dumb people not caring for their own fame or benefits but are serving the community? Well, we have seen how inventions changed other people's lives. However, does that mean Cai Lun or Dayu do not live on other people's inventions? Certainly not, one cannot invent all the inventions therefore humans sometimes need to fetch their companions for help when they are in vain. Always remember that humans are interconnected and can only live interdependent lives. If the rest of the world died, one would not be able to survive as he needs other people's help with affairs he cannot manage alone; these wise scientists have realized that humans cannot sweep the snow from their own doorstep. As another human being, we should also remember their spirit: to care for others and lend them a helping hand, so that we can pass on human civilization to the next generation.