



Cultural Heritage of the Korean Nation

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PREFACE

Since they evolved on the earth, humans have made strenuous efforts to conquer nature and, in the course of this, created civilizations and cultural traditions.

The Korean nation has a time-honoured history and excellent cultural traditions, including the Taedonggang Culture, one of the five major civilizations of mankind.

Living on their land for 5 000 years, they have created outstanding national culture and left a large number of valuable inventions and other creations by dint of their resourcefulness, wisdom and skills, thus rendering positive contributions to the development of human civilization.

The cultural heritage they have created in the metal, architectural, astronomical, military, meteorological, medical, linguistic, literary, artistic and other fields from the ancient days to the modern times constitute a source of their pride.

This book introduces part of the large number of tangible cultural heritage the Korean nation have created and handed down historically.

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1. METAL WORKS, ARCHITECTURE AND ASTRONOMY

The Korean nation produced iron in ancient times to make living tools with it, and developed craft industries with gold, silver and bronze.

This chapter deals with such metal works as lute-shaped dagger and narrow bronze dagger, with which they fought the enemy, and sun-shaped gold and bronze openwork, such architectural structures as the Three Tombs in Kangso and Chomsongdae Observatory and Sökkul Hermitage in Kyongju, and such astronomical observation relics as charts of constellations and rain gauge.

Lute-shaped Dagger and Narrow Brass Dagger

Lute-shaped dagger is a brass weapon, which was used by the Korean people from the early 3000s BC to the late 2000s BC.

Its body (the part of blade) looks like *pipha*, a kind of Oriental lute.

This dagger has been unearthed only in the areas where the Koreans lived in ancient times.

It is characterized by the long blade along the body centre, and the body, haft and haft's case separated to be assembled into a complete unit.

As a major weapon in the ancient times, warriors in those days fought the enemy with this dagger; it was also used in their daily living.

Narrow brass dagger is a weapon that succeeded to the lute-shaped dagger and was used from the late 2000s BC to the latter half of the 1000s BC.

This dagger is also a peculiar piece of relics unearthed only in the areas where the Koreans lived.

It has common characteristics with the lute-shaped dagger in that it can be assembled and the former's general features appear in it in a little different styles. The difference is that its blade is narrower, longer, sharper and solider. On the blade of lute-shaped dagger is a columnar arbor with sharp edges on the right and left. But on the blade of narrow-shaped dagger is a

hexagonal arbor at the centre with chamfer; there are peculiar scrapes on both edges of the blade and a joint in the arbor paralleling with the scrapes; the grasp fixed on the short root of the lower part, like lute-shaped dagger, consists of various parts. It is a perfect brass artifact in terms of variety of forms and refined processing methods.

Mirror with a Fine Thread Pattern

The Koreans had possessed surprising brass casting and processing techniques already in the period of Ancient Joseon in the latter half of the 1000s BC.

Mirrors with a fine thread pattern have been unearthed in several places such as Taedong County in South Phyongan Province and the city of Hamhung in South Hamgyong Province.

In those days they set a correct ratio of alloy elements in conformity to the utility of objects.

According to lab analysis of the brass tools from those days, the ratio of tin was limited reasonably to 19% for weapons such as narrow brass dagger and to 25% for fixtures such as mirror with a fine thread pattern.

When the ratio of tin, which hardens its alloy with brass, is 19%, both hardness and elasticity are guaranteed. However, if the ratio is over 19%, the hardness can be ensured but not elasticity, so it is easy to be broken. Therefore, 19% was set as the critical point for the ratio of tin in making daggers, which were a weapon. In the case of fixtures such as the mirror with a fine thread pattern, hardness, precision and colour had to be ensured, so it was rational to add certain amounts of lead and zinc to tin while increasing the tin's ratio to a certain degree.

This relic showcases excellent workmanship of the Korean people.

Since the days of Ancient Joseon, they decorated the reverse side of a mirror with peculiar patterns inside geometrical shapes such as a triangle or a circle; all lines are very fine, none of them being dented or crisscrossed.

With the development of brass-refining techniques, these patterns developed, from simple ones into complicated and refined ones.

This type of mirror spread to neighbouring countries.

Sun-shaped Gold and Bronze Openwork

This relic, a metal work from the period of Koguryo, is 22.5cm wide and 13cm high. It was unearthed in tomb No. 7 in Ryongsan-ri, Ryokpho District, Pyongyang.

It looks like a half-split peach seed, looking like leaning a little to one side. Patterns of gold pieces cut by using filigree craftsmanship are inscribed on the edge, and in its inside various exquisite patterns are perforated by cutting off the remaining parts without doing any damage to other parts.

Its workmanship is so excellent that it looks like not openwork but craftwork made by weaving thin gold and copper wires delicately.

The front side is decorated with a pattern of a cloud that looks like flames flaring up combined with a pattern of phoenix worked by way of perforation.

Each line of the perforated pattern is very elaborate, dense and vibrant like the lines of blue dragon and white tiger drawn on the tomb murals from the days of Koguryo.

On the centre is the openwork of a three-legged crow spreading its wings.

In particular, the back side is a wooden board paved with beautiful gold-green wings of the beetle, so the beautiful colour and rhythmic lines look clearer and more elegant.

The method of using such wings of the beetle for decoration was used in decorating saddles unearthed in the Gold Crown Tomb from the days of Silla and other decorations.

Seven-branched Sword of Paekje

This sword was made by the technicians of Paekje.

They melted iron long ago to make quality iron plates, farming tools and weapons. This technology spread at home and even to Japan. According to *Chronicles of Japan*, an old historical record book, Paekje used to give 40 iron plates to a Japanese mission when they were going back.

In the latter half of the fifth century, the king of Paekje gave a sword, called Seven-branched Sword, to the king of a state set up by the immigrants of Paekje in

Kitakyushu, Japan. It is still preserved at the Isonokami Shrine in Nara Prefecture, Japan.

In those days, the iron-makers of Paekje melted iron at the temperature of 1 200⁰C and forged it 80 or 100 times before making a sword.

There are three branches each on both sides of the blade in the Seven-branched Sword; the sword is 74.9cm long and its blade is 65cm long. The words engraved on the sword read, “This sword is made on May 13 of the fourth year of the reign of Thaehwa with the iron piece forged 100 times in the daytime. As it can match all other weapons, it deserves to be given to the king of the vassal state. There has been no weapon like this so far. This is why I, king of Paekje, give you, king of the vassal state, this sword. You shall hand it down generation after generation.”

Bell in the Pongdok Temple

This bell, which is preserved in the Pongdok Temple in Kyongju, North Kyongsang Province, is the biggest and the most elegant of the remaining bells in Korea. It was cast by four talented technicians including Pak Han Mi

in 771. The bell is 3.33m high and 26cm thick, with the mouth of 2.47m in diameter. It was made by casting 72 tons of metal alloy at a time.

What was particularly important in the bell casting was to improve the fluidity of the molten metals by properly regulating the ratio of copper and zinc for ensuring its complex and exquisite form and to adjust the hardness of bronze for perfect sound.

History of Koryo writes that the bell's sound was so great that it could be heard even in a place 40km away.

As far as its artistic and formative aspects are concerned, this bell has its own characteristics which distinguish it from others: for its round silhouette, it looks rich and sublime; its shoulder and mouth are engirdled with the patterns of dainty flowers; there are four quadrilateral divisions below the girdle of the shoulder, each with nine bas-relief motifs of flowers in each division and also beautiful flowers are inscribed on the part where the clapper was to strike; the four religious figures on the waist look like flying, fluttering their hems while sitting on the lotus flowers.

On its head is a resonance box that can be found only

in the Korean-style bell and the ring on the top is a sculpture of the shape of a dragon.

Carved on the waist are over 1 000 letters about the details of why it was cast and by whom and when.

It was found that the bell's sound is peculiar because two sounds interfere with each other, repeating the rhythm cyclically for a while. So its sound is called *Chonjiinumhyang* (the sound echoes on the heaven, under the ground and on the ground at a time.)

Over 1 200 years have passed since it was cast, but the sound has not changed.

Three Tombs in Kangso

These three earthen tombs with stone coffin chambers from the days of Koguryo, built around the seventh century, are located close to each other. They are situated in Sammyo-ri, Kangso District in the city of Nampho. The name of the locality is called so as there are three tombs (*sammyo* in Korean).

The one in the south is big-sized, and among the two in the north, the one in the west is medium-sized and the one in the east is small-sized.

There are murals in the big-sized and medium-sized tombs, but not in the small-sized tomb.

The tombs all have one chamber each. The chambers are similar in size; they are built with well-dressed granite slabs; the walls of the big-sized one are built with 2-3 long and square slabs and its ceiling is formed by well-toothed parallel and triangle cornerstones.

The light curved lines and slightly-inclined walls give a cosy feeling.

The murals in the big-sized and medium-sized tombs are painted directly on the walls and ceilings. The theme is four guardian gods; a blue dragon on the eastern wall, a white tiger on the western wall, a phoenix on the southern wall and a tortoise-serpent on the northern wall. The ceilings are decorated with vine patterns and the drawings of religious figures, mountains and animals.

Chomsongdae Observatory

Chomsongdae was a structure which did what today's astronomical observatory does.

In the period of Ancient Joseon, the Korean people

made astronomical and meteorological observations and recorded them in detail. They also made and used a calendar related to farming.

In the period of the Three Kingdoms, astronomical and meteorological observation was conducted by the state, and astronomical chart was drawn by the officials in charge of astronomy and the astronomers.

The Chomsongdae observatory in Kyongju, North Kyongsang Province, is renowned in the world as the oldest one of its kind that still remains. Built in the first half of the seventh century, it is about 9.1m high. Experts went in and out of it through the opening (about 1m²) in the middle. They then climbed up through the ladder and reached the framework on the top for observation.

The observatory is excellent in its architectural shape as well; it is composed of the square stylobate, round body and square framework. The body is formed with 27 rounds of 400 dressed quadrangular granites slabs, each 30cm high; under the body is a 6m-wide stone floor. The 28 rounds symbolize 28 constellations.

In this way, the designers reflected the astronomical knowledge in the structure—square opening on due south,

the theory that the sky is round and the ground is square and the figure 28.

The exterior looks well-balanced and safe like a large flower vase as the two-thirds are curved and the upper one-third is straight.

Sokkul Hermitage

Situated in Mt Thoham east of Kyongju, North Kyongsang Province, this is the largest cavern-style Buddhist temple in Korea.

It is said that it was built when the Pulguk Temple was expanded in 751.

This temple stands towards east on the breast of Mt Thoham so that the sun can shine on it in the morning. When the sun rises in the East Sea, the sun beats down on the White Tiger on the central part of the forehead of the big stone Buddhist image, and the reflected light makes the interior of the cavern a mysterious world.

This Buddhist hermitage is characteristic in its structure in that, unlike the similar ones in other countries that were built in natural caves, it was dug by

humans on the breast of a mountain and the chamber was built with granite slabs before being covered with the earth.

What is worth seeing is the Buddhist images. There were 40-odd images made of elaborately and delicately dressed granite. These images of various themes are situated with the image of Buddha at the centre.

Tabo and Sokka Pagodas

The Tabo and Sokka pagodas at the Pulguk Temple in Kyongju, North Kyongsang Province, have preserved their original appearances until today, over a thousand and several hundred years later since they were built.

In designing the Tabo Pagoda, architects chose the width of the surface of the earth in that part as the standard unit, and based on this, defined the size of every part of the pagoda reasonably; in other words, going upward, the geometric ratio increases by 16:8:4:2:1. That is why it looks slender, solid and balanced.

According to the historical records like *Chronicles of the Three Kingdoms*, after the pagoda was built, several earthquakes and various other natural disasters hit the

Kyongju area and a thunderbolt hit the Pulguk Temple, but the pagoda has preserved its original appearance. This showcases the level of the knowledge of mathematics and dynamics and outstanding architectural skills of the Korean people in those days.

The Sokka Pagoda standing symmetrically to the Tabo Pagoda was also built with its parts increasing in geometric ratio going upward. If a regular triangle is drawn with the plinth as the bottom side, its peak coincides with the central point on the bottom side of the first storey.

The two pagodas were designed in the same structural ratio, but because of the difference in shapes, the Tabo Pagoda represents feminine delicacy whereas the Sokka Pagoda, masculine solemnity.

Taedong Gate

The Taedong Gate was built as the eastern gate of the inner wall of the Walled City of Pyongyang in the mid-sixth century, and repaired and reconstructed several times later. The present-day one is that which was rebuilt in 1635.

Hanging on the gate tower is a plaque that reads *Uphoru* (Upho Pavilion), which means that the gate stands by a river going well with the beautiful natural scenery so one can scoop up the river water if one, standing on the tower, stretches one's hand down to the river.

As it opens to the south across the Taedong River, it was the most important gate in the Walled City of Pyongyang.

The gate is a model of Korean-style gates on a wall in view of its majesty, beauty and suppleness.

The gate is composed of a rainbow-shaped gate at the centre, an embankment built with delicately dressed granite slabs and a two-storeyed tower on the embankment.

The gate is 19m high, and the tower on the gate has three-bay front wall (15.91m) and also three-bay side wall (10.34m).

The structures of the tower with a gable roof such as pillars, beams and rafters are all made with thick materials which are processed in a sculptural way.

The tower is decorated with beautiful colours, which make it look more gorgeous and solemn.

The gate goes well with the nearby Taedong River, Ryongwang Pavilion and the house of the Pyongyang Bell, demonstrating its architectural beauty.

Sunspot Observation Records

In the period of Koguryo, the Korean people discovered the sunspot and recorded it.

The part of Koguryo in *Chronicles of the Three Kingdoms* reads: In September 640 the sun lost its light and shone after three days. *The sun lost its light* means that there were many spots or balls, which one can find with naked eyes around sunrise or sunset when the sun looks yellowish brown.

By inheriting the tradition of the people of Koguryo, the people of Koryo made constant efforts to observe and record astronomical and meteorological data. In the part of astronomy of *History of Koryo*, there are scores of observation records of sunspots between January 21, 1105 and the later years of the Koryo era. In particular, there was a record that on March 2, 1151 a sunspot was the size of an egg. Since then, the size of

the sunspots was recorded, in many cases, in comparison with the size of egg, peach, pear and plum. In the recording of 1185, there is a material about sunspot observations on January 10, February 24, February 27, March 17 and March 18.

Charts of Constellations (Astronomical Chart)

Since the period of Koguryo, the Korean people were able to conduct astronomical observation on a high level, because it was an inevitable requirement of the development of farming and there were excellent astronomical observation instruments and charts of constellations (astronomical charts) at that time.

In the period of Koguryo, some people in charge of astronomical observation, under a certain system and discipline, conducted observation and recorded the results correctly day and night. The original of these recordings does not exist now, but parts of it are recorded in *Chronicles of the Three Kingdoms* and *History of the Three Kingdoms*.

According to the geographical part in *Chronicles of*

King Sejong and Tonggukyojisungnam (Handbook of Korean Geography), there was an astronomical observatory 1.2km away from Pyongyang. Through observation on such an observatory, the people of Koguryo had a relatively correct understating of the constellations. Many constellations are painted in the murals of the Koguryo tombs; typical tombs with such murals are Anak Tomb No. 1, Poksa-ri Mural Tomb, Ssirum Tomb, Ryongsan-ri Tomb No. 4, Tokhwa-ri Tomb No. 2 and Yaksu-ri Tomb. The mural paintings of the constellations in Ryongsan-ri Tomb No. 4 and Tokhwa-ri Tomb No. 2 are accurate and exquisite.

In the days of Koguryo there was an astronomical chart carved on a stone believed to be made between the late fifth and the early sixth centuries. On the chart (about 2 metres long and 1.2m wide) were marked 1 467 stars centring on the North Pole, forming 282 constellations and the data needed for astronomical theory and calendar calculation including the equator, the North Pole, ecliptic and longitude line. The stone astronomical chart was lost during an invasion by foreign aggressors in the late Koguryo period, but a

printed copy was discovered in the early period of the feudal Joseon dynasty. The date of making the stone chart was calculated with the help of the words that explain the revision of the constellations in 1395, when *Chonsangryolchabunyajido* (Astronomical Chart of the Spherical Cosmos) was made. In other words, the astronomical chart carved on the stone was made about 900 years before *Chonsangryolchabunyajido* was made.

The astronomical chart is the oldest of its kind in the world and one of the most correct celestial charts.

The Oldest Record in the Observation of Comet and Aurora

The Korean people recorded the observation of comets and aurora long ago.

Unlike solar eclipse or lunar eclipse with its own cycle, a comet appears at any time and in some cases disappears after several days or more than a month.

Among the records on the comet observation in the part of Koguryo in *Chronicles of the Three Kingdoms*, the record made in November 46 (the third year of the

reign of King Minjung) is the oldest one in Korea.

The Korean people also observed and recorded aurora.

The record made on July 5, 1519 reads in part: That night there was a mysterious astronomical phenomenon over Kyongju, Kyongsang Province. In the early evening, the moonlight was so bright and a gleam of light was seen between clouds after there was a slight sign of clouds in the west. It looked like lightning but was not lightning; it looked like flames. It changed in hundreds of ways, like moving slowly like arrows, disappearing like meteors, jumping like a red snake, emitting sparks, bending like a bow, and splitting like pigtailed hairpin ... It gradually moved from the west to the east and disappeared at about 3 a.m.

Chugugi (Rain Gauge)

The Korean people made strenuous efforts to correctly measure precipitation, and invented a scientific measuring gauge such as *Chugugi* in the 15th century.

In August 1441, Soungwan (a government office in charge of observing the astronomy, earthquake and

so on) made the iron rain gauge, which is about 40cm high and about 16cm in diameter, for measuring precipitation scientifically.

In other localities, such rain gauges made of china or earth were set in the yards of the government office buildings, and the amount and time of precipitation were recorded. All the records were collected by Soungwan.

Jakyongnu (Automatic Water Clock)

Mankind has exerted tireless efforts to make a device for correctly measuring, recording and effectively using the time.

The Korean people made a water clock called *Kyongnu* in 1398, and set it on Jongno, the central part of Hansong (capital city), informing the people of the time.

However, this clock had several shortcomings, so another automatic water clock, called *Jakyongnu*, was made in June 1434 by eliminating the shortcomings. This water clock was set up in a building called Poru Pavilion; there were two water jars on certain heights

and water flowed down into one of the other two jars under them. With the increase of the water amount, a stick popped up out of the water and pushed the pallet containing a metal ball, making it roll down on the one side of the iron plate under it. Then the other side of the iron plate was lifted up to make the doll's hand move so that the hand hit the bell hanging on in front of it at an interval of 2 hours, 12 times a day. At night the times were subdivided, beating a gong between the times the doll hit the ball. What was important here was to make the amount of water flowing down from the water jars even, and the designers of those days conducted the mathematic calculation very minutely and ensured the precision of the component parts.

This complicated and precise clock was built by Jang Yong Sil, a technician of government slave origin in Tongnae, Kyongsang Province.

2. MILITARY, MEDICAL, PUBLISHING AND PRINTING TECHNOLOGIES

The Korean nation manufactured powerful combat weapons to defend their country against foreign aggressors, created Koryo medicine that now enjoys attention of the medical circles of the world, and developed publishing and printing technology.

This chapter introduces weapon-making technology, medical books, and alphabet unique to the Korean nation and printing by means of metal types.

Origin of Multiple Rocket Launch Pad

Noteworthy in the technology of producing powerful military hardware by the Koreans is *Singijongi*.

It was a sort of launch pad which was made of wood and can shoot 100 arrows on fire in succession or at once after loading them.

The arrows were divided into small, medium and large ones according to size and structure.

The small ones were a sort of two-stage rockets: they moved forward by the power of the gas emitted backward when the “powder keg” at the tail was set off; when the explosive was burnt out, the “powder keg” in front was set afire, firing the arrows to a distant place.

The medium ones had three “powder kegs” each and the large ones, four.

Especially, the large ones each had a wing on the middle part, so the arrows could make correct flight towards the target.

The launch pad had seven layers, the lower layer with ten chambers and other layers with 15 chambers each.

Each chamber had a round launching tube, its interior being covered with iron plate. Going to the front side, the calibre of the tubes became smaller.

The launch pad was generally mounted on a wagon. As the pad can turn around on a fixed shaft, the azimuths and angles of firing could be set freely.

According to the historical record, a five-volley jet-propulsion weapon was developed in April 1395.

Soenoe: Mechanical Bow

As a man had to shoot arrows by hand, its firing ability and range were limited.

To overcome such weakness, the Koreans developed a mechanical bow and named it *Soenoe*.

They made *Soenoe* in the days of Ancient Joseon, and developed it in the days of Koguryo and Koryo.

The bow was divided into a single-firing one and volley-firing one. The string of the bow was made of the tendon or hair of animals

Originally, the mechanical bow was a single-firing one, but developed into a three-firing one, into a nine-firing one, and then into a multi-firing one.

The multi-firing bow had a launch box on its string; it could shoot “bullets” loaded in the launch box when the strength of the string was transmitted through the box.

So it could shoot arrows on fire or stone easily and safely. And it had a good marksmanship.

This one was developed into a gunpowder-propelled multi-firing bow.

At first, the gunpowder was put into the launch

box and tamped, then the striker was placed, and last “bullets” were loaded. These “bullets” were fired by the power of the string and the explosive power of the gunpowder.

A typical gunpowder-propelled multi-firing bow was made in 1032.

Arsenal, a Japanese book on the history of development of military science and technology of the world, introduces two kinds of relics of Ancient Joseon, commenting: The unearthed *Soenoe* and *Nogi* have very simple structures and cunning characters, surprising the modern people. It is very interesting that they act like a modern rifle. It is unbelievable that these relics were made 2 000 years ago. Armament specialists should study the ideas of the ancient peoples as well as modern science.

***Picha*: Father of Aircraft**

In ancient times, seeing birds flying in the sky, people wanted to fly like them.

The Korean people made a flying device, named *Picha*, in the days of the Imjin Patriotic War (1592-1598).

According to a book by Sin Kyong Jun (1712-1781), a scholar of the Silhak School, when a castle in Kyongsang Province was surrounded by the Japanese invaders, a man, outstandingly skilled before the war, made a device that looked like a kite and flew on it to make contact with the outside world.

Another historical document reads that a big “kite” carrying a man was used in the 13th and 14th centuries.

Ri Kyu Gyong (1788-1863), a Silhak School scholar in the mid-19th century, recorded that a device that could be controlled for its direction by a rope fastened on the wing carried four persons as far as 12km; he analyzed that there were wings that could be moved up and down and a leather bag containing wind, that the parts of the device were connected by ropes for control, that the leather bag was used only when taking off and landing, and that the device flew with the help of the wind in the sky.

***Pigyokjinchonroe*: Father of Time Bomb**

Pigyokjinchonroe was invented after the Imjin Patriotic War started.

Ri Jang Son, a technician of humble origin, devoted

inexhaustible thinking and passion to finding a way of killing more of the Japanese invaders.

Thus, he succeeded in reforming *Jinchoroe* (meaning thunderbolt that shakes heaven), which had been used on few occasions, so that it could be fired by a sort of gun, *Taewangu*. Capable of firing a round metal ball or stone 30cm in diameter, the gun fired *Pigyokjinchoroe* as far as 750-900m; then the metal ball exploded at a set time.

The time of explosion was set by means of the fuse in the barrel in the way of regulating the length of explosion line (a sort of fuse) bound in the barrel.

During the war this bomb struck the enemy with terror with the power of its explosion, splinters and thunderous sound.

This happened on one day in September 1592, when a battle was fought to retake the Walled City of Kyongju.

That evening the local people, who stealthily approached the wall, fired the bomb towards the yard of a government building. Not knowing what it was and curious about it, the enemy soldiers gathered around it, some feeling it with their hands and others rolling it.

After a few moments, the bomb exploded, killing them en masse; even among those who were some distance away from it, many were thrown away by the power of explosion.

Those who narrowly escaped death called it a “wonder of mysterious divine power,” and ran away from the city.

Turtle Ship: The First Armour-clad Ship in the World

The turtle ship, the first armour-clad ship in the world, was used by the Koreans in the days of the Imjin Patriotic War.

Very stable and solid, the ship carried various types of guns.

In its inside, the outside was seen well, but from outside, its inside was not seen at all.

It was so structured that it could gain fast speed. The ratio of its length to width was about 8:1 and that of width to height was about 2:1; in other words, it took a parabolic shape, long lengthwise and relatively low; it looked like a low flower basket.

There were ten oars on each side (four men pulled an oar) and the sail, laid down, was raised when necessary to gain speed.

To achieve the stability of the ship's movement, the weapons, metal things and other heavy things were placed at the bottom of the ship, and the wooden deck inside was flat.

As its structure inside and outside was so reasonable that a man of Ming China wrote in his book, "Korea's turtle ship can sail at any time whether the wind blows or not and whether it is a high tide or low tide as its sail can be laid down or raised."

When the enemy vessels were surrounded by the Korean vessels, the turtle ship would dash into the area, striking them stem on, shooting guns in a volley, and emitting sulphur and niter smoke through the dragon's mouth on the bow so as to throw the enemy into confusion and create a smoke screen for the Korean vessels.

On the contrary, neither the enemy vessels could use their rams to destroy it, nor their soldiers could go aboard it for a close battle, nor they could fire guns from afar to check its approach.

Gunpowder Weapons and Armed Vessels

In the latter half of the 14th century, developing new powerful gunpowder weapons was urgent for repulsing the uninterrupted invasion by foreign forces from the north and south.

The main thing in the battle with the Japanese aggressors was to repulse them before they landed on the Korean territory, and this badly demanded equipping vessels with gunpowder weapons.

Choe Mu Son (1326-1395), convinced of the significance of fire attack in sea battle, conducted research for scores of years and at the same time had brainstorming sessions with the people.

In the course of this, he succeeded in discovering niter (nitrate, sodium acetate or potassium acetate compound) and combining it with an appropriate amount of sulphur and carbon.

On this basis the Koryo state set up an organ in October 1377, which launched study and development of gunpowder weapons full steam. Next year a specialized corps equipped with various guns, fire

arrows and bombs was organized.

The Navy of Koryo, in order to prevent the vessels from shaking when the guns were fired, restructured them by lowering the height of the boards and reinforcing the decks.

And a new method was developed for protecting the weapons from moisture.

The armed vessels fully displayed their might in the battles with the Japanese aggressors.

Typical example is the Jinpho battle in 1380. In August that year over 500 vessels and tens of thousands of troops of Japan invaded as far as the sea off Jinpho in the lower reaches of the Kum.

A fleet of Koryo formed with over 100 vessels and commanded by Choe Mu Son destroyed them with cannon balls.

Tongguk Pyonggam

Tongguk Pyonggam (Military Book of the Eastern Country) is a representative book on military science with 37 accounts of wars from the late 2nd century BC to the late 14th century.

This book was authored by historians including Ri Sok Hyong and consisted of 2 volumes.

In 1955 its translated version carrying notes was published.

The first volume deals with 20 accounts of the wars fought in Korea between 108 BC and the late 10th century-the early 11th century. The second volume describes about 17 accounts of the wars fought from the early 12th century.

The book, reflecting patriotism, resourcefulness and courage displayed by the Korean people in the wars, records various strategies and tactics used in them, thus constituting a precious material for studying the history of wars in those days from the angle of military strategy.

Pyonghak Jinam

This is a military book compiled by a military officer, Choe Suk, in the early 17th century.

It consists of five volumes, and was revised and published in 1787 as suited to the situation of that time.

The first and second volumes describe in a detailed way how to command with flags and drums the soldiers in making up formations, the third and fourth volumes contain the drawings of how to make up formations, and the fifth volume deals with how to fight in a walled city, on the field and on water.

For example, the book describes that when taking a rest at night after marching, the soldiers should build a camp with establishments around it, lay an ambush for a possible assault by the enemy and deploy guards in the surrounding areas; it stresses that the ambush must never allow others to enter the camping area without grant by the commander, but fight to the last man when the enemy make an assault.

Hyangyakjipsongbang

Hyangyakjipsongbang is a clinical encyclopaedia that was written after reviewing the successes in the traditional Korean medicine and the experiences in curing diseases with the help of indigenous medicines until the early 15th century.

This book gives prescriptions made up of mainly

the indigenous medicinal materials together with the popular names of individual medicinal herbs so that anyone can easily understand it, and for major medicinal herbs it gives the names of the places and regions where they occur.

Renowned traditional physicians like Ro Jung Rye, Yu Hyo Thong and Pak Yun Dok started compiling the book in 1431 and published it in 85 volumes in 1433.

It was republished several times including in 1478 and 1633.

It is divided into two parts—the part of clinical treatment (volumes. 1-75) and the part of traditional pharmacy (volumes. 76-85). The part of clinical treatment divides all diseases concerning surgical, gynaecological and paediatric departments into 959 diseases by cause, symptom, prescription and folk remedy, giving 10 700 prescriptions and 1 479 remedies by means of acupuncture and moxibustion.

The part of traditional pharmacy incorporates successes achieved in the medical research so far and systematizes them into a discipline.

It consists of two parts—general part and individual part;

the general part deals with the composition of diagnosis, the methods of preparing corresponding administration, the dosages and the methods of preparing 205 kinds of medicines; the individual part gives in ten sections explanations of 700 traditional medicinal materials including 105 kinds of mineral materials, 189 kinds of medicinal roots and herbs and 130 kinds of animal materials.

The part of individual medicines, giving the names of medicines and the places of their habitats, is rich for that time as it explains the natures, efficacies, indications, periods of extraction, way of processing and incompatibility of combination, quoting them from other medical books and comparing them with those written in the latter.

Analysing the symptoms of TB, it writes that it is spread by an insect and kills all family members.

At that time people were not aware of the carrier of the disease and had a superstitious understanding of it, but the book put forward a simple and yet advanced view, having a certain degree of practical significance in preventing TB. Eel, Amur cork powder that contains much berberine, and sophorae radix, a botanical

herbicide, indicated by this book, are still efficacious for curing TB.

This book also describes the way of surgical operation that is similar to the modern way of removing the swelling on the eye. It also distinguishes small pox from measles, the two diseases which had so far not been distinguished from each other, clarifying their names and symptoms.

Uibangryuchwi

This book was compiled between 1443 and 1445 by Ro Jung Rye from Jiphyonjon, an academic research institute, and other physicians. Originally, it consisted of 365 volumes. After three rounds of revising, it was republished in 266 volumes in May 1477, 32 years after the publication of its first edition.

Collected in this book are the successes made in the traditional Korean medicine from the days when it began to be systematized till the early 15th century and the extracts from 153 medical books at home and abroad.

Three volumes are devoted to the general description of medical examination, prescription, administration of

drugs, traits proper to doctors and principles of medical treatment.

The remaining 263 volumes deal with 95 branches of medical sciences—internal medicine, surgery, ophthalmology, dentistry, dermatology, gynecology, paediatrics, etc. as well as the causes for relevant diseases, symptoms, preventive measures and remedies (traditional medicines, acupuncture, moxibustion, massage, diet and physical training).

As an encyclopaedia of Koryo medicine that had developed for thousands of years, it is unique in editing and rich in contents, including folk remedies and prescriptions, and is well known in the world.

For example, the gynecological section gives over 5 400 prescriptions and the ophthalmic section, some 1 380.

Tonguibogam

Ho Jun, a famous physician of Korea, began to write this book in 1596, when the country was in the throes of the Imjin Patriotic War. He completed its writing in 1610. It is an encyclopaedia of Koryo

medicine that was practised in the days of feudal Joseon dynasty.

Along with *Hyangyakjipsongbang* and *Uibangryuchwi*, it ranks among the three major medical classics of Korea.

As a reference to the medical achievements of those times, it is still widely consulted for the purpose of putting Koryo medicine on a scientific footing, systematizing folk remedies and treating patients by traditional methods.

The first part deals with human body's internal organs. The second deals with the externals, like the head, face, eyes, ears, teeth, hands and feet, giving a relatively detailed account of relevant diseases by referring to the anatomical, physiological and pathological features.

The third is devoted to the study of other diseases— injury, fatigue, vomiting, coughing, jaundice, dropsy, malaria, trauma, etc., as well as the description of physical examination and causes of diseases; the last section of this part focuses on gynecological and paediatric diseases.

The fourth deals with traditional medicines and the

fifth one, acupuncture, moxibustion and standard chart of meridian points for acupuncture and moxibustion.

Whereas *Hyangyakjipsongbang* is a collection of the traditional Korean therapies and *Uibangryuchwi*, of those in the East, both published in the 15th century, *Tonguibogam* can be called an encyclopaedia that created a high level of medical science, called Koryo medicine, by collecting the achievements of the Eastern therapies and developing them into an integral system.

Chijongbibang and Chijongjinam

Both written by Im On Guk and his disciples, these two books were published in the mid-16th century.

In those days surgery was restricted to simple procedures like treating abscess.

Im On Guk pioneered and developed audacious and proactive methods quite similar to modern surgery.

Chijongbibang divides abscess into three categories—carbuncle, hardened carbuncle and fistula—and suggests scientific remedies in relation to relevant symptoms, saying that the affected parts should be treated by different methods even though they are of the same disease.

It indicates following detailed surgical procedures and prescriptions: In case of a carbuncle on the head, acupuncture should be applied to remove the bloody pus, the affected part be cleansed with salty water boiled at the ratio of one bottle of water and 0.3 pint of salt, the hair around the part cut and taro plaster applied to remove the poison. The book stresses that abscess should be cut in the shape of cross (+ or X).

This surgical procedure was innovative even though the conventional method of acupuncture was used. Compared with the same surgical operation in the neighbouring countries of those days, it was advantageous, and the cross-shaped cutting was quite scientific.

Im On Guk's surgical techniques are recorded in a more detailed way in *Chijongjinam*, a book compiled by his disciples.

This book does not restrict itself to the surgical treatment of abscess; as a rare surgical book, it deals with the operation techniques for various surgical diseases and some internal diseases, lavage, relevant external preparations and so on. Its appendix describes the outline of medical treatment and administration of

drugs, including 19 kinds of external preparations for surgery.

***Hunminjongum* (Correct Sounds to Educate the People)**

The world recognizes the excellence of *Hunminjongum*, an alphabet peculiar to the Korean nation. Following is an interview between the author of the world-famous book, *Alphabet*, and linguists from several countries.

Q: Which nation's alphabet was designated as a memory of the world register of UNESCO on October 1, 1997?

A: *Hunminjongum* of the Korean nation.

Q: UNESCO conducted research to find out the most appropriate alphabet among over 2 900 kinds of languages across the world between 1998 and 2002. Which alphabet has received the highest estimation?

A: *Hunminjongum*.

Q: Which alphabet was formulated in a correct way in creation, letters, right to institution and ideals among the alphabets across the world?

A: *Hunminjongum*.

Q: Which alphabet is recognized as the simplest and most excellent in the world?

A: *Hunminjongum*.

Q; Which language occupied the first place according to the result of marks made by Oxford University in terms of rationality, scientific accuracy, originality and practicability?

A: *Hunminjongum*.

Q: Japan built a museum of nations in the world in Osaka and displayed their alphabets across the world. Which alphabet has the caption, reading, *The Most Scientific Alphabet*?

A: *Hunminjongum*.

Q: Which is the one and only alphabet whose vowel can be freely typed by the right hand and consonant by the left hand on the computer?

A: *Hunminjongum*.

Q: Which alphabet has imitated after the movements and actions of pronunciation organs and phonetic characteristics and has the appearances of the sky, land and human being?

A: *Hunminjongum* again.

The answer was always the same to all the questions. Hearing it, those who were present there, raised an enthusiastic cheer.

Publishing and Printing Technology

The Korean nation invented metal types for the first time in the world and widely used them. Moreover, they invented the first-ever lead types and type-setting, thus demonstrating their fame as a pathfinder in the printing technology.

On the basis of the development of woodblock printing with a long history, they invented the metal types, and developed letterpress printing.

In the period between 1234 and 1241 a book (50 volumes) of the laws and moral rules of Koryo was printed by metal types.

It is believed that the metal type was developed between the late 11th century and early 12th century at the latest.

The metal type of Koryo unearthed about 300m west of the site of the Sinbong Gate of Manwoltae in Kaesong, the site of the royal palace of Koryo, gives a

glimpse of the aspect of printing technology in those days.

The metal type is 8mm high and the surface in which a letter is inscribed is 10mm long and wide, respectively. Its main ingredients are copper, tin and lead and the subingredients are silicon, iron and aluminium.

Even though the metal type was created in the first half of the 12th century at the latest in Koryo, it was invented for the first time in the world. In 1972 an exhibition, *History of Books*, was held as part of the celebration of The Year of International Book under the auspices of UNESCO in Paris, France. Displayed at the exhibition was *Jikjisimgyong* printed at the Hungdok Temple in Chongju in Korea in 1377, drawing attention of the visitors. It was because this book was the oldest one in the world among those printed by means of the metal type. The book clearly writes that it was printed by means of the metal type moulded at the Hungdok Temple in 1377, and this was confirmed by modern technical engineering analysis.

Before this fact was opened to the public, the world believed that Laurens Coster of The Netherlands

printed with the movable type as early as 1423 and Johannes Gutenberg of Germany invented metal type and printed books in 1450, regarding that the metal type was invented and printing with it started around the 15th century.

But the historical records and material evidence that the metal type was already invented and widely used already in the 12th century in Korea struck the people with wonder.

With the modernization of printing industry, every country used basically lead alloys as the material for moulding metal type.

The Korean people, who accumulated experience and foundation for wooden block printing and wooden type printing technology since long ago, invented and used metal type for the first time in the world and further developed it to a higher stage in the days of the Koryo dynasty. A type moulding and printing institute was set up in 1403, which moulded numerous printing types with several kinds of metals.

They introduced many inventions in ore extraction, dissolution and moulding, and in the course of technical improvement, grasped the most rational printing

engineering features of lead as the main material for printing types. And in 1436 they invented first-ever lead type.

In 1420 they had invented a new method of type-setting that served as the origin of modern type-setting. Before the invention of this type-setting method, they used beeswax type-setting method by pouring melted beeswax and moulding types in it; but beeswax types became cracked or wore out too early for it is soft; sometimes the types fixed in the beeswax would move, demanding re-moulding.

After making painstaking efforts to remove such shortcomings, the technicians invented new method of type-setting—arranging types on the copper board directly first and then lining the order of letters in a delicate way before printing with them.

The chronicles of the feudal Joseon dynasty records that as the sizes of the copper board and printing types were the same not only the letters were correctly printed but also several hundreds of sheets of paper could be printed a day, adding that the invention of this technology helped save manpower and cost and that human's skills were endless.

80 000 Blocks of the Complete Collection of Buddhist Scriptures of Koryo

The Korean people achieved rapid progress in the techniques of wooden block printing.

What is of noteworthy is the 80 000 blocks of the complete collection of Buddhist scriptures, which was made by embossing letters on 80 000 pieces of wooden blocks for 16 years from 1236.

This precious cultural asset, which represents the excellent publishing culture of the country in the early 13th century, divides the colossal amount of Buddhism-related literature into their categories.

The collection, totalling 6 793 volumes, was made with difficulty when the wooden blocks of the complete collection and its subsidiary edition of the previous days were destroyed by the foreign aggressors and when the Koryo feudal rulers moved the capital to Kanghai Island owing to the aggression by foreign aggressors.

For over 70 years, from 1011 to 1087, a complete collection was embossed on the wooden blocks and printed, and in the latter half of the 12th century a well-

known monk at the organ specializing in compiling. Buddhist literature again embossed on the wooden blocks 4 769 volumes of 1 000 kinds, thus replenishing the former collection. These books are called subsidiary edition.

However, these books were destroyed in 1231 by the foreign aggressors.

Proceeding from the religious view of checking the aggression of foreign aggressors with the help of Buddha, in the 13th century Koryo conducted the work of embossing typefaces for a complete collection on Kanghwa Island, the then capital, for 16 years under the difficult situation in which it was waging a war against foreign aggression.

This is the Complete Collection of Buddhist Scriptures that has been handed down until now. It is also called the Koryo Complete Collection of Buddhist Scriptures.

Even in the difficult wartime situation the people and handicraftsmen cut birch and white birch trees from mountains and islands across the country, and made 80 000 wooden blocks, each 24cm wide, 69.6cm long and 3.7cm thick.

They embossed 14 letters on each of the 23 vertical lines on a block with knives; they then engirdled the four corners with bronze strips and fixed them with nails, and attached wooden pieces on both ends so that the block would not be distorted; they coated the surface of blocks with lacquer to prevent them from getting rotten or being eaten by worms.

Containing the doctrine of Buddhism and its interpretations and biographies of the monks who had earned fame for propagating Buddhism, this Buddhist encyclopaedia is a precious cultural asset that showcases the unusual wisdom and talent of the Korean nation.

Korea printed a bibliographical explanation of the complete collection in 25 volumes and published them.

Korean Paper

A piece of paper discovered in the relics on Kuksa Peak in the Taesongsan Fort proves that the quality of paper was very high already in the days of Koguryo. The piece discovered in a stone box was made of vegetable fibre; its whiteness was ensured on a high

standard, and the fibre was very hard-grained.

In those days paper was a bestseller in the neighbouring countries.

Tamjing, a monk and painter of Koguryo, propagated the paper-making techniques in Japan when he was invited there.

Chronicles of Japan records that the Koguryo people produced quality paper as they conducted calligraphic activities and propagated paper-making techniques to neighbouring countries.

In the period of the Three Kingdoms paper was widely used in ordinary daily life as well as calligraphic activities.

People wrapped things, made a kite and covered window frames with paper. The raw materials were paper mulberry and hemp.

Paper-making techniques were further developed in the days of Koryo. This was one of the major conditions for the creation of metal type and the development of the printing techniques. In this period paper was made with various kinds of raw materials, and its colour was varied and its quality was high. Paper made with paper mulberry was white, glossy and high

in quality. Having misunderstood that it was made with cocoon, people in other countries praised it, saying, “The Korean paper is good for it is white, as flexible as silk fabrics and good for writing with Indian ink. Such paper is not available in China, and it is an uncommon thing,” and “This is the first-class article in the world.”

Bibliography in Korea published in Paris in 1894 describes in detail the excellence of the Korean paper; “As the Korean paper used in books of any period was soft and flexible, the old books of thin paper have lasted long. This is proved by the fact that books of the days of Koryo, discovered in temples and European archives, have not become yellowish in colour, nor worm-eaten. It is not clear when the paper-making industry was inaugurated in Korea, but books were widely disseminated and there was a well-regulated research institute already in the 9th century, and in the next century a library was built. In light of these facts, it is not exaggeration to say that paper had been produced since long ago.”

In the days of the feudal Joseon dynasty the demand for paper increased quickly, encouraging mass-production

of paper. State measures were taken for cultivating paper mulberry to meet the growing demand for paper; a government department specializing in paper making was set up in the capital city to mass-produce various kinds of paper.

3. CULTURE AND DAILY LIFE

The Korean nation, from the first days of human origin, created the Taedonggang Culture, an old civilization originated in the basin of the Taedong centring on Pyongyang, and other cultural assets essential to their daily life.

This chapter deals with the Taedonggang Culture, Koguryo tomb mural, Korean celadon and silk, kimchi and other Korea's traditional foods, Korean wrestling, *janggi*, chronicles of the feudal Joseon dynasty, *kayagum* and other relics.

Taedonggang Culture

The culture formed in the basin of the Taedong River centring on Pyongyang is called Taedonggang Culture, as this basin is the home of an ancient culture of mankind where many relics and remains from primitive culture and the Old Stone Age created

by the humans who originated in this place a million years ago and started conquering nature since 5 000 years ago had been uncovered.

Thus the basin of the Taedong became a birthplace of human civilization together with the Nile in Egypt, the Tigris and Euphrates in Southwest Asia, the Indus in India and the Huanghe in China.

The Taedonggang Culture can be counted as one of the world's five civilizations because it originated in a place where the political, social and economic conditions for a transition to a civilized society were fully created in the latter half of the 4000s BC.

In those days the Korean people who lived in the basin of the Taedong produced bronzeware in the latter half of the 4000s BC, reached a high level of *pipha*-shaped dagger culture, and produced precious metal articles and earthen pots; they cultivated five cereals including rice, conducted ridge farming and crop rotation and introduced irrigation in farming.

The Taedonggang Culture contributed to establishing an ancient state in the earliest period in the East.

Tangun's Joseon is the first ancient state of the Korean nation, which was established in the early 30th century BC.

Numerous castles, fortresses of the state, were set up with an interval of a certain distance (some 40km) along the earthen walls with Pyongyang as the centre, and the sites of large-scale villages including the Namgyong remains in Samsok District, Pyongyang, were those of satellite cities and villages of Pyongyang around the years of the 3000s BC.

There was an altar where successive kings of the Tangun's Joseon performed religious rituals together with the people, worshipping Tangun as the son of heaven.

A written law is a touchstone which determines the level of an ancient civilization and its crystallization.

The Eight-point Bans was the criminal code of Later Joseon, but it also gives a glimpse of the development of the slave system of Tangun's Joseon.

In those days there was a standing army equipped with developed bronze weapons.

In its heyday the territory of Tangun's Joseon covered most of the Korean peninsula with northwest Korea as the centre; and it expanded its territory to the upper reaches of the Songhua in the north and lower reaches of the Liaohe in the west.

The Taedonggang Culture constitutes one of the world's five civilizations as it has the ancient culture of a high standard as the core.

Bronzeware culture of the Korean nation was on a high standard in quality and manufacturing techniques; pure gold and gold-and-bronze earrings from those days can be hardly believed to have been made in the mid-3000s BC.

The invention and usage of *Sinji* characters helped development of art and literature, and made it possible to institute and enforce a written law.

Other fields including astronomy also attained a high level of development.

Koguryo Tomb Mural

The people of Koguryo, famed in the East for 1 000 years of history, a vast territory, a powerful

national strength and brilliant culture, were brave and courageous and lived optimistically with noble emotional feelings.

Their excellent national temperament, personalities and emotions are reflected in the works of fine art of those days.

Typical of them is the tomb mural, which numbers 100 known so far.

Painted in the murals are portraits of people, landscapes, animals, flowers, birds and decorative and symbolic patterns.

Common in these murals are the enterprising, courageous and militant spirit of the people.

This is reflected in a concentrated way in the battle mural in Tonggou Tomb No. 12 in Jian, Jilin Province, China.

The mural portrays two warriors on horseback and armed with armoured coats, helmets, spears and swords defeating the enemy after chasing and capturing him.

By making a skilful contrast of the appearance of the Koguryo warriors with long moustache holding swords to the cowardly appearance of the enemy

soldier asking to spare his life, it depicts truthfully the high-spirited temper, patriotic mettle, high-level of martial arts and uncompromising fighting spirit of the Koguryo people.

Many other murals including the one in the Three-Chamber Tomb depicting a battle by heavily-armed warriors on the back of armoured horses show these natures of the Koguryo people.

Their courageous and undaunted spirit can also be seen in the murals in the Yaksu-ri Tomb and Changchuan Mural Tomb No. 1 that depict hunting; the wild animals, stupefied by a hot chase by warriors, take a flight heels over head; in particular, the self-confident appearance of a hunter who unstrings a bow on a running horse demonstrates the fearless attacking spirit, agile manoeuvrability and skilled marksmanship on horseback of the Koguryo people.

Solgo and Painting of Pine Tree in Hwangryong Temple

The Hwangryong Temple, a large wooden structure, was situated in Kyongju, North Kyongsang

Province. Its construction began in 553 and finished in 566.

The man who painted the mural on a wall of the temple was Solgo.

Solgo had been born into a family of humble origin, and been exceptionally fond of painting from his childhood; when he had climbed a mountain to gather firewood, he had painted drawings on a rock, and when he had been weeding in the crop field, he had painted drawings on the ground with a hoe. Thus, he had grown up as a famous painter.

When asked to paint a drawing on a wall of the Hwangryong Temple, he thought much before deciding to draw an old pine tree. It seemed he was moving his hand carelessly, but the brush was depicting a pine tree true to life—strong roots, trunks and limbs that look coarse grained as it has overcome all sorts of rough storms and the ever-green twigs and needles.

Later, birds like black kite, swallow, sparrow and crow would fly to the tree to perch on its branches, only to collide with the wall.

With the passage of time, the painting began to

be discoloured. Too regretful for this, monks of the temple restored the painting, devoting all their sincerity and skills, but the birds did not fly there again. The monks had not known nor could imitate the unique and mysterious drawing method of Solgo.

Celadon

The Korean people began making pottery in 7 000-6 000 BC, the Neolithic age.

In particular, the celadon ware of Koryo, which inherited and developed the Koguryo kingdom's pottery, occupies a unique place in the world history of pottery for the variety in contents, rareness in shapes, colours and patterns and high artistic quality.

Typical of them were greenish blue ware, inlaid blue ware, white ware, dark ware and slip-decorated ware.

Koryo's pottery continued to develop and greeted its heyday between the late 16th century and mid-19th century, the days of the feudal Joson dynasty.

The white porcelain, which was made between the late 17th century and the mid-19th century and constituted the acme of the pottery of the feudal Joseon dynasty, was in no way inferior to Koryo celadon in terms of beauty and solidness.

The porcelain wares of those days, as compared to those of previous ages, are characterized by a wide range of kinds and shapes, naïve and refreshing colours and varied natural patterns.

The porcelain wares of Korea became so famous in the days of Koryo that potters of China tried hard to learn the pottery of their counterparts in Koryo, and the monarchs and noblemen of Europe vied with one another to collect the porcelain wares of Koryo.

China exported imitations of Korea's porcelain wares through the Dutch East India Company, amassing a "large fortune."

From that time the word *china* began to be known widely.

The Japanese also learned from the Koreans, and succeeded in presenting its famous Imari ware.

The masterpieces of the Korean nation's porcelain

ware, especially those of the days of Koryo, had been stolen from the early days.

The Japanese and Americans randomly unearthed tombs, temples and kiln sites in Kaesong and other parts of Korea, taking away large numbers of Koryo porcelain wares and other valuable relics.

In the museums, art galleries, libraries, universities and private collections across Japan there are tens of thousands of valuable Koryo porcelain wares; for example, many Koryo porcelain wares including 100 most valuable ones, which the first Japanese Resident-General in Korea, Hirobumi Ito, presented to the Japanese emperor, can be found in the Tokyo National Museum.

For this reason, Koryo porcelain wares, treasures of the Korean nation, can be seen in larger numbers in Japan, the US, Britain and France than in Korea.

Silk

The Korean people made silk already in the ancient times.

While living in animal skins, they waged uninterrupted

creative activities for making new cloth, and at last they discovered that threads can be spun from the silkworm cocoons.

They began to raise silkworms and spin threads from their cocoons to make silk cloth.

Quality silk fabric, called *kum*, was produced already in the days of the Three Kingdoms, and its kind increased to more than ten in number by pattern and colour.

The quality is showcased by the piece of silk cloth unearthed in Mt Taesong in Pyongyang in 1959 and the embroidery in the Horyu Temple in Japan depicting a flower pattern with over 15 kinds of coloured threads on a piece of silk cloth; the person who drew the original pattern on the cloth and decorated the pattern with thread was a Korean.

The Koryo dynasty inherited and developed the preceding silk fabric to a higher degree.

The remains of silk fabric in the Korean Central History Museum are of high quality.

An analysis of the relics revealed that the threads are very fine and even and the structure is plain.

Known as Koryo silk, it was exported not only to

neighbouring countries but also as far as the Arabian peninsula.

Traditional Dishes

The traditional dishes of the Korean nation are unique in their tastes, flavours and colours and delicate in their shapes; as they disliked strong spices, their dishes look tasty, light and clear.

Varied in kind, the dishes are scientific in preparing them and are high in the pharmacological value.

There are many kinds; boiled rice, *ogokpap* (made with five cereals), *yakpap* (glutinous rice mixed with sugar, jujube, chestnut, pine-nut and sesame oil), *pibimpap* (boiled rice mixed with side dishes), adzuki porridge, pine-nut porridge, glutinous rice cake, half-moon-shaped rice cake, buckwheat noodles, starch noodles, fermented glutinous rice pancake, mung bean pancake, grey mullet soup, pollack soup, carp sashimi, full bok choy kimchi, *tongchimi* (pickled whole radish), pickled chopped radish, bracken salad, roast eel, roast gizzard, *sinsollo*, loach stew, *samgyethang* (chicken

boiled with insam), chicken casserole, beef casserole, taffy, *sujonggwa*, *sikhye* (sweet rice drink), *kamju*, liquor etc.

Noodles with outstanding taste, high nutritional value and ennobling national feelings are a food enjoyed by all the Koreans. They are prepared and served differently according to the regions.

Most popular of them are the Pyongyang cold noodles. Prepared with buckwheat, the strips are tough and the broth (mainly the juice of *tongchimi*, a kind of kimchi) tastes refreshing, sweet and sour, leaving a savoury aftertaste.

A historical book reads in part, “The buckwheat noodles put into radish and bok choy kimchi juice and garnished with pork are called cold noodles, and the cold noodles from the area of Phyongan province are the best.”

This tells that the cold noodles from Phyongan province, especially those from Pyongyang, were most famous.

The real taste of the Pyongyang cold noodles can be sustained only when the buckwheat is not unhusked too much, the meat broth is cool, and the strips are

dressed with vinegar before pouring the meat broth over them.

Grey mullet soup is known not only among the Korean people but also many peoples of the world. The Korean people learned that when a live grey mullet is dressed, put in water boiling in a stone vessel and boiled until its oil floats on the water surface, the soup sustains its unique savoury taste.

Sinsollo is also a characteristic traditional food of Korea, famous among the world people.

The word *sinsollo* denotes the vessel of a unique structure, in which a kind of broth is boiled, and it now means the broth boiled in it.

They say between the end of the 15th century and the early 16th century, a man, while living in mountain, boiled foods in a unique vessel, and the vessel carried on air of a mountain wizard (*sinson* in Korean); hence the name of the vessel.

The dish is made by processing over 20 kinds of materials, like meat, trepang, shrimps and other seafood, vegetables, edible herbs, chestnuts, jujubes, gingkoes and pine nuts, all separately, and boiling them in chicken broth.

The materials are so aromatic and tasty that they are perfect even though they are eaten separately, and the way they are arranged in the vessel looks very beautiful; the dish that gives the real tastes of the traditional Korean dishes won a special prize at an international cooking contest long ago.

Bean Paste, a Health Food

The people of Korea, a place of origin of beans, began to make paste with the cereal from their early days.

In the days of the feudal Joseon dynasty there were several kinds of bean paste including Tamsu bean paste and Tambuk bean paste; as chilli began to be cultivated after the Imjin Patriotic War (1592-1598), the people mixed chilli powder with bean paste to make a unique and characteristic condiment.

As they thought the taste of bean paste decided the taste of all foods, they devoted all their sincerity to making it: They not only ensured hygiene but also forbade people other than those, who had prepared it, to access to the large earthen jar where it was in the process of fermentation after it was prepared, saying it

may be contaminated by harmful germs; they looked after it with utmost care lest its taste should be spoiled.

A book on forestry and the economy, written in the late 18th century, reads in part, “Bean paste ranks first in taste. If bean paste does not taste good, vegetables and meat, however fresh and tasty they are, cannot become excellent dishes. Even though they cannot obtain meat easily, the rural people do not worry about side dishes if they have various kinds of tasty bean paste.”

Bean paste was one of specialties of Palhae, successor to Koguryo.

From olden times, the Korean people have not only used soy sauce, bean paste and chilly bean paste as major condiments for side dishes including soup and stew but also eaten them as a separate side dish.

Korean Taffy

The Korean people have since long made their own type of taffy and enjoyed eating it irrespective of whether they are men or women, young or old.

There are several historical records that biscuits were made with honey or taffy in the days of Koryo. In the

light of this, it is believed that taffy began to be made from the earlier days. They made taffy by fermenting boiled cereals with malt and condensing them.

The liquid taffy was used as a medicine or an invigorator and in preparing dishes, and the hardened taffy was eaten between meals.

The hardened taffy made with cinnamon, dried ginger, Japanese pepper and Japanese apricot was regarded as effective in improving health and loosening phlegm.

Taffy was made with various cereals and fruits like glutinous rice, sorghum, rice, jujube, chestnut, walnut, beans, pine nuts and sesame.

On folklore holidays they made various candies with taffy.

Every region made taffy with its own specialties.

In the Phyongan region the mixture of taffy and parched glutinous rice powder was so famous that women, who made a trip to their maiden homes, would come back with the candy and share it among their family members and relatives.

The Kangwon region was famous for taffy made with corn.

In the Chungchong region they put finely-sliced radish into rice-fermented water and condensed it, and called it liquid radish taffy.

The hardened taffy made in the Hamgyong region with potato starch was clear, hard and sweet; families in this region ate this taffy as a snack and served it to guests.

The Jolla region's sweet potato taffy and rice taffy were famous.

In the Jeju region, they first fermented glutinous millet and then put pheasant meat or chicken in the liquid, before condensing it until it turned dark brown; the pheasant taffy and chicken taffy were popular among the locals.

With the increase in the production of taffy in various regions, the number of taffy vendors also increased; they would carry large scissors with the clanking sounds; the scissors not only were used for cutting taffy but also played the role of informing their arrival at particular places.

Korea's taffy spread in Japan in the late 16th century, selling like hot cakes.

Kimchi

It is said that the Korean people had cultivated vegetables and pickled them since before the days of Koguryo.

The methods of making kimchi developed and its kinds became diversified from the mid-17th century, the days of the feudal Joseon dynasty.

In the documents from the 17th century are recorded 34 methods of making kimchi and in the 18th century, the number increased to over 60.

Kimchi has become one of the most favourite foods of the Korean nation.

Especially in winter, it has become such an important food that it is called a source of sustenance for half a year.

The Korean specialty, refreshing with unique aroma and flavour, has now spread to several countries, becoming an international food.

During the 26th Olympic Games held in July 1996 at Atlanta, kimchi became one of the main foods to be served to sportspeople and tourists from different countries.

Today, kimchi is popular as a food for longevity, and is highly praised throughout the world.

Ssirum

What is peculiar in *ssirum*, Korean style of wrestling, is that the players wear thigh bands.

If they wear them on their right thighs, it is called right *ssirum*, and if they wear them on their left thighs, it is called left *ssirum*.

So far, left *ssirum* has been encouraged.

Sometimes they play it without wearing the thigh bands.

It is played by men irrespective of age.

Ssirum, which can be called the ancestor of Eastern wrestling, has a long history.

In the mural paintings in the tombs from the Koguryo period such as the Changchuan Tomb No. 1 and Ssirum Tomb can be found the scenes of *ssirum* playing; on each scene two bulky men, with their jaws placed on each other's shoulder, are competing while wearing thigh bands.

It is very similar to today's way of playing.

A painting *Ssium* drawn by Kim Hong Do, a famous fine artist in the 18th century, depicts realistically the exciting scene of a game played with other people watching it.

According to an old record, one who was good at *ssirum* was called *yongsa* (warrior) in the days of Koryo and *ryoksa* (man of Herculean strength) in the days of the feudal Joseon dynasty. It was a tradition to arrange a nationwide *ssirum* contest every year to select strong men.

Royal guardsmen were chosen from among excellent *ssirum* players.

The word *ssirum* originated from the old Korean verbs meaning compete and fight.

Ssirum is one of the most popular traditional games which involves a variety of skills and can be played anytime and anywhere.

The game does not demand a specific playground, and its beginning and end is clear. It can be played at any place that is not likely to cause injury, like edge of the field, the grassland and the sand by the river; the game starts when the contestants are settled spiritually and physically, and once any part of the body of a player

touches the ground, he is declared to be the loser and the game ends at that moment, so the watchers do not feel bored. The playing tactics are varied, and the movements performed by the players with the hand, the leg and the body look wide open and quick.

The Koreans have loved and enjoyed playing the game as it helps build up the mental and physical strength. On traditional holidays *ssirum* contests take place in a grandiose way with a bull decorated with flower necklace as the prize.

Today the Grand Bull Prize National *Ssirum* Contest takes place on the picturesque Rungna Island on Chusok (a traditional holiday that falls on the 15th day of the eighth month by the lunar calendar), adding to the festive mood of the day.

Janggi

Janggi, a Korean type of chess, is one of the popular traditional pastime in Korea.

It is spectacular to see the senior citizens shouting at the top of their voices, “Checkmate!” under the cool shade of trees in hot summer days.

There is an interesting Korean saying, “You still keep giving unasked advice to the chess players even after you have got slaps on the cheek.”

The Korean chess reflects the characters, modes of action, manners and military tactics unique to the Koreans and their subconscious and cultural psychology.

The way and rules of its playing is presumed to have originated long ago.

It is played with 32 chessmen (16 on each side), and the board has ten lines crosswise and nine lines lengthwise.

The colour of the chessmen is red on one side and black or blue on the other side, which reflects the philosophy of Yin and Yang, a philosophy unique to the Korean nation, the red meaning Yang and the black Yin, and it is a custom to offer the red chessmen to the senior person.

The *Kung* (king) is given prominence, and the possibility of the change of position of the *Sang* (elephant) and *Mal* (horse) reflects the adroitness in the promotion of officials and in the military tactics.

And the chessmen like the *Pho* (cannon), *Cha*

(chariot) and *Jol* (pawn) are made to be able to directly attack any opponents or defend themselves, which means the game gives precedence to the practicality and are ingenious and mobile in combining defence and attack.

When seen from the moves of the chessmen, the Korean type of chess is stronger in the concept of openness and freedom and the concept of the rank is less discriminate than the Western chess. For example, all the chessmen including the *Kung* and *Sa* (knight) can move freely both directly and slantly inside the royal area.

Most peculiar in the move of the pieces is that of the *Sang*; it plays the role of a powerful attacker on both right and left sides.

The *Pho* can jump over only one chessman but not over the *Pho* of either the friend or foe, and cannot destroy its counterpart.

The *Jol* can move not only forward but also to both right and left inside and outside its own territory, demonstrating its resourcefulness, practicality and combat strength.

This Korean chess reflects the demands of the

military strategy to defeat the enemy by enlisting all resources effectively.

The Record of Travel to India

The Record of Travel to India was written by Hyecho, a Buddhist scholar and monk in the early eighth century.

In order to make an in-depth study on Buddhism, Hyecho made up his mind to personally go to India, the birthplace of Buddhism, and embarked on a long and arduous journey.

In those days the region of today's Nepal and India was divided into five small states.

Hyecho, after leaving today's Xian, the capital of the Tang dynasty, travelled across Southeast Asia including Sri Lanka by sea, looked around the five small states one by one, and then Kashmir, Persia, Asia Minor (today's Syrian region) and Tibet, before returning to Xian in 727. This means he covered 40 000km.

He observed and recorded in detail almost everything of human life, ranging from socio-political

system, natural and geographical features, economic life, cultural life, morality, customs, religions and superstitions.

The part of the economic and physical geography details on a high level of those days the political structure and names of the states and towns he visited, their geographical environments, natural resources and specialties and the ways of life and customs of their peoples.

He also wrote in the book poems depicting his beautiful motherland, reflecting the noble love of the country and homeland of the Koreans who never forget their homeland and national flavour.

The book had been known only by its title, only to be discovered in the area of Dunhuang in Gansu Province, China, in 1910. It then was widely known to the world. Hyecho wrote the travelogue in three volumes, but the original versions disappeared and only the summarized version of the three volumes without the front and back parts was discovered at that time; what remain still are the contents of the second and third volumes.

Since it is a travelogue written by a Buddhist monk

for the purpose of studying Buddhism, its main contents are about Buddhism. But the detailed and vivid description of the things he saw and heard through the long and arduous trip opened up the era of writing travelogue in Korea.

While giving an account of the history, geography, culture and folklore of the then India, Asia Minor and their western region, it gives a great help in understanding the external relations of the author's country and the spirit of adventure of the Koreans.

Chronicles of the Feudal Joseon Dynasty

The cultural treasure house of the Korean nation with a 5 000-year-long history contains the chronicles of the feudal Joseon dynasty.

A characteristic of the chronicles is that the number of their volumes is large.

The chronicles, which can be called the records of the dynasty's governments, consists of 1 763 volumes for the period of the dynasty (1392-1910) reigned by 27 monarchs.

The diary-style historical books record by monarch and by date events, big or small, that happened throughout the country.

The number of the volumes is so large for a dynasty that such a kind is not easy to be found in the world.

Recorded in these volumes are detailed historical facts that happened in about 180 000 days of the 519 years of the feudal Joseon dynasty.

They are rich, diversified and valuable in their contents.

They cover the political, economic and military fields and the internal and external policies related to these fields, foreign activities like diplomacy, trade and cultural exchanges, art fields like music, dance, fine art and handcraft and even natural phenomena like astronomy, meteorology, earthquake and tidal waves. In other words, they record almost everything from the policy issues of the governments to the minor events that happened among the common people, and from the social issues to natural phenomena.

They also record the materials about the people's struggle against feudal oppression and foreign

aggression–large-scale struggles like the peasant war of 1467 in Hamgil Province and the peasant war (1811-1812) in Phyongan Province, both well known in the history of Korea, as well as the limited struggles not known widely.

For example, more than hundred facts about big and small struggles of the people fought in the 30 years of the reign of Sejong (1419-1450) are recorded.

The chronicles of the dynasty record valuable materials about the Korean people who developed science and culture through creative labour and resourceful wisdom.

The musical notation in *Chronicles of Sejong* compiled in the 15th century is one of the earliest in the history of publishing musical notations in the world, demonstrating the outstanding artistic skills of the Korean people.

Many successes in the field of science and technology are recorded; in case of materials about hydro-meteorology, 10 000 pieces tracing even the times of the days are recorded, and the records of black spot in the sun, tidal waves and abnormal weathers are of great value even today.

The chronicles also reflect the materials about the neighboring and Western states and even about the neighbouring tribes that failed to leave their records.

These chronicles are valuable cultural relics of the Korean people well known to the world for the large number of volumes, original descriptive system and rich materials.

In the days of Japanese military occupation of Korea, these historical books were objects of their pillage.

During the Korean war (1950-1953) a set of the books were kept in a library in Seoul, and they were in danger of being burned any moment. Kim Il Sung gave an order to a unit of the Korean People's Army to rescue the books, and had them kept at the Supreme Headquarters. After the war he initiated the work of translating the chronicles into Korean, organized a capable translators' team, and illuminated the principles to be observed in translation.

The enormous project of translating the books was completed by 1981, and the translated version of 400 books was published by December 1991.

The chronicles had first been kept in a pavilion in the Chunchu Office (a government department in charge of recording historical events) in Hansong and the archives in Chungju, Songju and Jonju.

During the Imjin Patriotic War, the books, except those in Jonju, were plundered or burnt by the Japanese aggressors.

Later the set in Jonju was moved to a mountain by the scholars in the region, and then shipped to Mt Myohyang and then to Kanghwa Island via Haeju.

Several copies of those in Kanghwa Island were published, and kept in the Chunchu Office, Mt Jongjok on Kanghwa Island, Mt Joksang in North Jolla Province and Mts Thaebaek and Odae in Kangwon Province in south Korea.

The set in the Chunchu Office was burnt, and another set in Mt Odae plundered by the Japanese imperialists and burnt during the Great Kanto Earthquake.

The set which had been kept in Mt Joksang in North Jolla Province is now kept in the Pohyon Temple in Mt Myohyang.

***Sokbinggo*: First-ever Ice Storage**

Sokbinggo, an ice storage, demonstrates the high level of stone architecture and the history of freezing facilities of the Korean nation.

According to the historical records, people of Puyo, an ancient slave state, used ice in summer.

Chronicles of the Three Kingdoms published in 1145 records that King Jijung of Silla gave an order to a government office in November 504 to store ice.

Sokbinggo in Okkye-dong, Haeju, South Hwanghae Province, is a semi-underground arch-shaped structure stretching from north to south and built with delicately dressed granite slabs around the 10th century; first an arch-shaped tunnel was built with granite slabs of certain sizes and a mixture of mud and limestone was piled over the tunnel, and the top was covered with turf.

Another of its kind in Kyongju, North Kyongsang Province, is also a semi-underground structure, round and long like a railway tunnel; the outer gate of its double

entrance is large and the inner one is a little smaller than that.

The floor of the interior is slanted, and there is a long outlet from south to north for the drainage of melted ice. On the ceiling there are three holes for ventilation.

The tunnel is covered with 2m-thick earth, which is then covered with turf.

The number of stones used in building the ice storages in Haeju and Kyongju is several hundreds, but all of them are tightly geared to one another, and they still remain in their places after more than one thousand years.

Kudul

Kudul is a heating system unique to the Korean nation; it was made to fit the topography and weather conditions of Korea.

Kudul originated from imitating bonfire; it first had one flue and then developed into one with several flues to heat the entire room.

Later the Koreans installed a structure, called *punomi*, between the fireplace and flues to increase the

efficiency of the heat and another structure, called *kaejari*, between the flues and chimney to prevent smoke and cold air from blowing in.

Korea has four distinctive seasons, and the structure of the houses was developed for the regulation of cold and heat as suited to the weather conditions of each season.

Although simple in structure and principle, it can keep warm heat for a long time.

Its scientific features have been recognized from the old days by the world people.

The Westerners have got interested in it and their demand for it is increasing as they aspire after putting off shoes in the houses so that larger part of their bodies can contact the floor.

Kayagum

The *kayagum* is a national musical instrument of Korea.

It is capable of portraying the feelings and emotions of the Korean people well for its most peculiar and unique character.

This traditional musical instrument was made 1 500 years ago by Uruk of the state of Kaya.

At the time of its invention it was a plucked instrument. It had a sound box made with paulownia, and mobile bridges with 12 strings over them.

The sound is produced by both the strings and the sound box.

The sound is elastic, yet soft and elegant, and the performer's rendering posture is beautiful and rhythmic.

For its simple structure, easy way of tuning and different but easy rendering methods, it was loved by the Korean people, and has continuously developed.



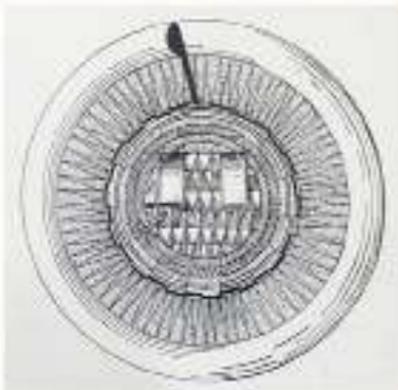
Lute-shaped dagger



Narrow brass dagger



Mirror with a fine thread pattern



Restored picture of a mirror
with a fine thread pattern



Sun-shaped gold and bronze openwork



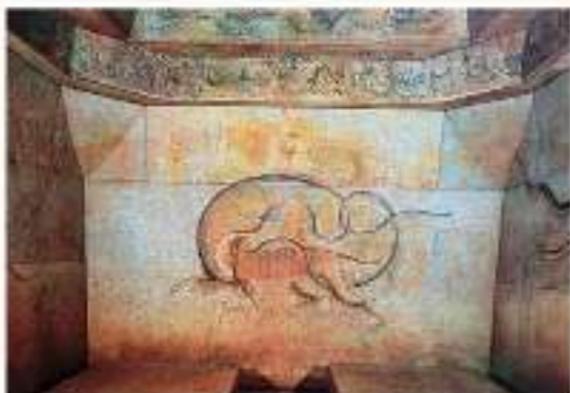
Seven-branched sword of Paekje



Bell in the Pongdok Temple



Three Tombs
in Kangso



Mural of Big Tomb
in Kangso



Big Tomb in Kangso

Chomsongdae
Observatory in
Kyongju



Sokkul Hermitage



Tabo and Sokka pagodas



Taedong Gate



Chonsangryolchabunyajido—chart of constellations



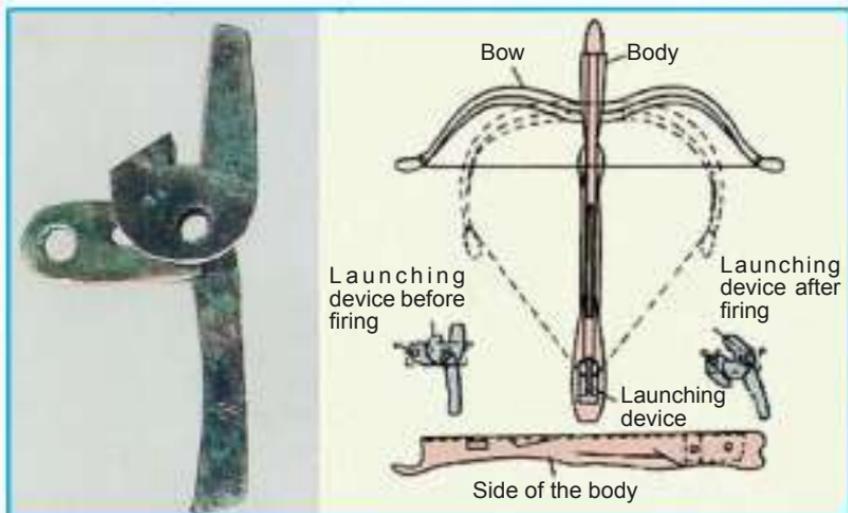
Chugugi—rain gauge



Jakyongnu in the Poru Pavilion—automatic water clock



Singijongi—origin of multiple rocket launch pad



Soenoe and the fundamentals of its operation



Pigyokjinchonroe—father
of time bomb



Hyonjachongtong



Model of a turtle ship in the Korean Central History Museum



Cross section of the turtle ship



Hyangyakjipsongbang—clinical encyclopaedia
of Koryo medicine



Tonguibogam—encyclopaedia of Koryo
medicine

醫方類聚凡例
 一諸方概世代先後分門編入不分細目如
 風門金匱方畢書後繼書諸方風門
 一門內一藥重出而治証藥材服法無加減
 則於初見處書某方同大同小異則其異
 者分附小同大異則全方附錄
 一諸方論法其重複不書某方同或文同而
 首尾稍異則略舉首語而書云云連書其
 尾語

Uibangryuchwi-encyclopaedia
 of Koryo medicine



Koryo paper



Metal type and its imprint



Wood block and printed copy of 80 000 Blocks of the Complete Collection of Buddhist Scriptures



Place which houses the 80 000 Blocks of the Complete Collection of Buddhist Scriptures



Painting of four guardian gods in Koguryo
tomb murals (Blue Dragon)



Painting of four guardian gods in Koguryo
tomb murals (White Tiger)

Painting of four guardian gods in Koguryo tomb murals (Phoenix)



Painting of four guardian gods in Koguryo tomb murals (Tortoise-serpent)



Box of chrysanthemum pattern inlaid with mother-of-pearl

Box of chrysanthemum vine pattern inlaid with mother-of-pearl



Celadon vase inlaid with lotus pattern



Round box inlaid with mother-of-pearl

Representative Korean national dishes



Ogokpap



Pyongyang cold noodles



Grey mullet soup



Kimchi



Rice cake



Mung bean pancake



Beef casserole



Sinsollo



Making bean paste

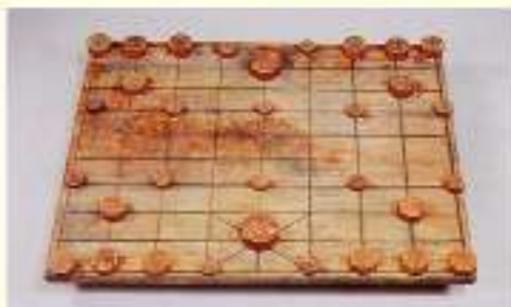


Making Kimchi



Ssirum (by Kim Hong Do)

A scene from the
11th Grand Bull
Prize National
Ssirum Contest



Janggi board and
chessmen



Chronicles of the feudal Joseon dynasty



Sokbinggo in Okkye-dong, Haeju



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