can be cut in this way at a time. Independent designs were usually cut with a knife through as many as sixty or seventy sheets of paper at once. Lines could be cut out to make a positive impression, or left between cuts to make a negative impression, simple lines being cut with an ordinary blade, but delicate ones with a specially sharp, small, round knife. The inside lines were cut first and then the outside ones. After cutting was completed, the paper could be dyed with colours mixed with white wine or arsenic, with as many as forty sheets being coloured at a time. Multiple colours were applied separately, a fresh colour being added when the previous one had dried. For decoration of houses, red and multiple colours were usually used for auspicious occasions and blue for mourning. A flat piece of paper can be folded into various shapes and forms such as figurines, animals, flowers, garments, furniture, buildings, and numerous other objects (Fig. 1094). Paper folding (Che-chih, origami) is probably one of the most interesting folk arts. It helps train nimble fingers, cultivates a sense of balance and symmetry, and can be used to provide visual illustrations to explain modern physics and geometry. Indeed, many mathematicians have demonstrated their scientific interest in paper-folding, especially in dealing with three-dimensional problems and to show the geometric construction of regular polygons and spheres.

Although paper-folding probably flourished in China for many centuries before it spread worldwide, there is no clear indication of how early it began. From all available evidence, its origin probably was not later than early in the Tang dynasty, for several artificial flowers of folded and cut paper have been found in T'ung-huang (Fig. 1095), and they show highly sophisticated techniques in paper-craft. Today, paper-folding is one of the most popular crafts and pastimes for teaching children in classrooms, and among adults throughout the world; it is especially popular in Japan, Europe, and America, with extensive literature in different languages.

Flying paper kites (Che-pi) is a somewhat athletic pastime enjoyed by children in spring and autumn. It was said that when their kites flew in the sky, children lifted their heads, opened their mouths, and breathed deeply, which was good for their health, and the ninth day of the ninth month of each year, or the 'double ninth' festival, was especially devoted to this amusement. The paper kite, consisting of a light bamboo frame covered with sturdy paper, and with a string attached, was made in the forms of butterflies, men, birds, or other animals, often in colour. Kites were, perhaps, originally made of light wood or silk before paper became common, and how early paper was used for making them is unknown. However, a story about sending a message to a rescue mission by flying a paper kite, in c. +549, indicates that it must have been earlier than this date.

Other Chinese literary sources frequently tell of the use of kites for measuring distances, testing the wind, lifting men, signalling, and communicating for military purposes. The earliest known reference to their use for amusement or pleasure tells of someone in a palace in the +10th century fastening a bamboo whistle to a kite,
so that it made a musical sound in the wind. From this the term for the aeolian harp (feng cheng) was derived. Kite-flying diffused very early to all other nations of East and Southeast Asia, especially Korea, Japan, Indo-China, and Malaysia, and was sometimes associated with religious practices. It was introduced to Europe as a Chinese contrivance at the end of the 14th century.¹

Lanterns in China generally consisted of wooden or bamboo frames covered with a variety of such translucent materials as horn, silk, or skin, but those of paper are said to have been especially elegant and skillfully made. They were lighted with candles, and were hung indoors or outdoors as decorations, or carried as aids for walking at night. Especially interesting was the massive display of lanterns at the annual lantern festival around the fifteenth of the first moon each year (Fig. 109b), a festival which was not instituted until the T'ang dynasty, although poems about lanterns were written in China as early as the 4th century.²

How early paper was employed for lanterns is not clear, but it was certainly used in the T'ang, for an account book of the time from a monastery and found at Khotan records that ‘two sheets of white paper were bought, each sheet fifty cash, for mounting lanterns.’³ Chou Mi (†935–988) said that in the Hsiao-Tung period (†916–960) there was great variety of lanterns at the lantern festival in Hangchow, and that the best came from Soochow and Fuchow, while the latest fashions from Hsin-an were extremely extravagant. There were such varieties as ‘boneless’ lanterns without skeletons, lanterns of fish-egg and pearl designs, lanterns of deerskin and of silk fabrics, and lanterns of coloured waxed paper with revolving figures on horseback, spun swiftly by the heat of a candle; some of the figures cut from paper by skilful ladies were especially graceful.⁴ In his memoirs, Meng Yüan-Lao⁵ (fl. †1264–1271) recalls annual customs in the Northern Sung capital, K'ai-feng, saying that several tens of thousands of lanterns in a great variety of forms were displayed along the main street. Long poles, installed in an area enclosed with a thorny fence, were wrapped with colourful silk. Numerous paper figures of dramatic personages were hung on the poles, moving in the wind like flying fairies.⁶

A similar custom existed in the Ming dynasty, when the festival extended from two days before to five days after the fifteenth of the first moon. Starting on the thirteenth night, bamboo awnings erected from house to house were decorated with numerous lanterns hanging over the streets; those made of paper are said to have been especially attractive and well made.⁷

Fans were frequently used in daily life as a shield against dust and the sun; they were first made of feathers but, later, silk, bamboo, ivory, bone, sandalwood, and

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¹ Hsin Chih Lu (TSHC), p. 3.
² Cf. Leder (ibid.), p. 96.
⁴ See Ch'ao Yen (T'ai chin), nos. 896, 977.
⁵ Yang Chao Ming Hua Lu (TSHC), pp. 110–11.
⁶ Chin Hua Sai Shih Chi (SP), ch. 69, pp. 99–103.

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Fig. 109b. Paper articles were sold by peddlars on the street. (a) Rubbing of calligraphic model to a young scholar. (b) Paper lanterns at the lantern festival on the 15th day of the first moon. (c) Paper umbrellas on the back of a pillar. (d) Folded paper figures in the basket. Drawings by Chao Te-Yü, Hau Ping Hau Le Pfu (Pictures of Happy Occasions in a Peaceful World), printed by lithography in Shanghai, 1888.
palm leaves were all used. It is believed that paper fans first appeared in the Western Chin. Later, when for economic reasons silk was banned for such purposes by Emperor Hsiao-Wu (r. + 373–97) and again by Emperor An (+ 397–418) of the Eastern Chin period, this use of paper increased, and two scrolls of calligraphy on fans by Wang Hsi-Chih (+321–79) and his son were among their writings in the imperial collections. Fans were usually bestowed upon officials following lectures at the imperial court, and Emperor Che-Tsung (r. +1086–1100) is said to have been praised by his officials for his thrift because he used a fan made of paper.

Circular fans of paper were popular in the Sung dynasty. The folding fan made of durable paper with various kinds of frames and designs was introduced to China from Japan via Korea in the 11th century. Su Shih (+1036–1101) said that a kind of white pine fan from Korea could be opened to over a foot and yet folded into a space of only two fingers. Many poems were written on these folding fans by Sung authors, and calligraphy and painting also adorned them. Emperor Chih-Tsung (r. +1190–1200) of the Chin dynasty is known to have composed verses on folding fans, but the practice was probably not popular until the 15th century when Emperor Hsien-Tsung (r. +1465–90) wrote maxims on folding fans to bestow on his subordinates. The practice was most common among the literati, and fans decorated with calligraphy and painting became a form of art during the Ming and Ching dynasties (Fig. 1097). Small sheets of a special kind of strong, hard-sized bark paper were used in the Ming dynasty for the manufacture of oil-paper fans, such fans usually bear no artistic decoration but were used by the common people in summer (Fig. 1096d).

The same kind of oil-paper was also used for the manufacture of umbrellas (Fig. 1096c) in the Ming dynasty. The origin of umbrellas derived from the use in very ancient times of a chariot cover called kar. For protection against rain, a piece of silk called sam was spread above, but the use of paper umbrellas is believed to have been introduced in the late 2nd or early 3rd century, when the T’o-hand tribe established its Wei dynasty (+308–534) in north China. Red and yellow ones were used by the emperor, and blue by commoners. It was decreed in +1368 that silk umbrellas were reserved for the imperial family, while oil-paper ones for rain were allowed to the common people, and they were not only used for protection from rain or sun, but were also taken on ceremonial occasions. Umbrellas called le sam or ch’i yang were carried in official processions and ‘umbrellas of ten thousand names’ (tao ming sam) were presented to specially honoured officials, inscribed with the donors’ names.

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Paper flags must have been used early. Several were found in Thang tombs in Sinkiang, one of several thicknesses of paper manuscripts pasted together, and painted with horizontal stripes of black and white; it was pasted on one side to a stick (Fig. 1088a).

Playing cards made of paper, written or printed with designs, probably existed no later than the +9th century, when the relatives of a princess are said to have
played the ‘leaf-game’ (zhé zú jiǎo). A similar date of origin is suggested by several other sources, including the noted scholar Chuyang Hsü (1607–72), who said that the card-game had been popular since the middle of the Tang dynasty, and related its origin to the change of book format from paper rolls to sheets or pages. A book on the game, titled Yeh Tzu Kō Hsiü, was supposed to have been written by a woman toward the end of the Tang dynasty, while it was mentioned by authors of successive dynasties, and numerous works on it have been written in later times.

The form of playing cards was described in a Ming work, titled Tin Chang Ching, as about one inch wide, two inches high, and several tenths of a finger thick (Figs. 1303, 2034). It enumerated the numerous advantages of playing cards: they were convenient to carry, could stimulate thinking, could be played by a group of four without annoying conversation, and without the difficulties which accompanied playing chess or meditation. The game could be played in almost any circumstances without restriction of time, place, weather, or qualification of partners. The fictional persons in the Chinese novel Water Margin were represented on the cards and were extremely popular toward the end of the Ming dynasty, and such characters, painted by the famous artist Chen Hung Shou (1538–1602) are still available on playing cards today. Apparently because of the popularity of gambling, punishment was specified in penal codes of the Ching dynasty for the manufacture or sale of more than 1000 paper cards, and for engaging in gambling by officials.

Many other items made of paper for household, recreation and enjoyment are occasionally recorded in art and literature (Fig. 1096). Such articles as paper chessmen (shih chi¹), were substituted for those of Yunnan stone; paper flutes, played transversely (chih h¹) and vertically (chih hiao⁹), the sound of which was said to be better than that of those made of bamboo; shadow puppets; fireworks and firecrackers; and numerous kinds of toys like the paper tiger (shih hao h¹) (Fig. 1099) were some of the notable objects made of paper.

(e) ORIGIN AND DEVELOPMENT OF PRINTING IN CHINA

(1) Pre-history of Printing

Printing is a process of reproduction with ink on paper or other surfaces from a reverse or negative image. It contains at least three essential elements: a flat surface, originally cut in relief, containing a mirror image of whatever is to be printed; the preparation of the mirror image; and the transfer of the impression of this image on to the surface to be printed. In brief, the invention of printing required the development of necessary techniques for creating a proper vehicle to transfer an image on to an acceptable medium, in addition to meeting the large-scale demand for multiple copies. Before printing was used in China, many techniques for making reproductions existed. At first, of course, texts were copied by hand, but later mechanical devices were devised. These included seals for stamping on clay and, in due course, on silk and paper; the casting and engraving of inscriptions on metal and stone, the taking of inked impressions from stone inscriptions and, finally, using stencils to duplicate designs on textiles and paper. All these processes paved the way for the use of woodblock printing and later printing from movable type.
stroke character 二氧化 was used as a ditto sign in the inscriptions on the stone drums dated variously from the 8th to 11th century. Treaties among feudal states in the Chou dynasty were usually made in triplicate, with one copy for each of the parties and another to be filed with the spirits. Then, during the Former Han dynasty, the original copy of meritorious records of marquises appointed by Empress Kao in -186 was held in the imperial ancestral hall, with a duplicate kept in the government office.

Even before copies were made by hand, duplicate images were formed by impression from finger tips or from the palm in very early times in China. These prints have been found on pottery and clay articles as well as on documents, and are recorded in early literature. The use of fingerprints for identification and authentication by the illiterate was probably a substitute for the seals of the literati, since both were intended to be unique and private, duplicates could be made only with specific authorisation.

Before printing was adopted popularly, and even after its extensive use for book production, manuscripts made by hand-copying were still common. This was because it was not only cheaper but also more convenient than printing for making single copies or a limited number of reproductions. Classics are said to have been copied by the father of Thao Hung-ching (451-536), the famous alchemist and physician, for sale at forty cash per leaf in the 5th century, and the famous woman Thang Tai-hai-bun of the early 9th century is said in many tales to have made hand-copies of rhymed books in fine calligraphy for serving service candidates, for 3000 cash per copy. Many Buddhist manuscripts from Tun-huang were also copied by professional scribes with a good standard style of calligraphy, for sale to those who wished to fulfill their vows to spread the Dharma (Fig. 1100). Official scribes were to be found at court to copy books into the imperial collections. As early as the 3rd century, the Chin Imperial Library had official scribes able to write the standard 19th century style of calligraphy for copying books on silk and paper. In the Sui dynasty, it is recorded that during the reign of Emperor Yang (560-617), a choice collection of 37,000 chans was selected for the Imperial Library and fifty manuscript copies were made of each book to be kept in...
two new buildings at the court. Because so much could be done by hand, printing was not necessary unless a very large number of copies was in demand.

(ii) Impression of seal inscriptions

The carving and impressing of seals is considered one of the technical precursors of the invention of printing in China. The technique of carving a mirror image of characters in relief on stone, wood, or other materials in making a seal is almost the same as that of engraving characters on wooden blocks or making individual types for printing. The only difference is probably the size and purpose of the carvings, and the method of casting metal seals is little different from that of casting metal types from a matrix. The stamping of seal inscriptions on clay and later on silk and paper

was probably the earliest attempt to reduplicate writings by a mechanical process.

Seals were made of almost any kind of hard-surfaced material. They were cast of bronze, gold, silver, and iron; or carved of stone, jade, clay, ivory, horn, and wood. They were usually square, though some were rectangular or round, about one or two inches in diameter. Inscriptions were carved or cast on one or more sides of the block, which was sometimes decorated with a knob on top, and with a string attached. They usually bore an inscription of a few characters to give a personal name, official title, and name of studio, or other indication of ownership, authentication, or authority.

The use of seals in China can be traced back to the Shang dynasty. Three old square seals, cast in relief on a flat surface of bronze, are said to have been found at Anyang, while later seals made of bronze, gold, jade, turquoise, and soapstone in various shapes and sizes, dating from the Chou, Ch'in, and Han dynasties, have been discovered at various sites in China. Most of the Chou seals made of bronze were cast in moulds with inscriptions mostly in relief, and only a small number of surviving specimens have intaglio inscriptions. The seals of Ch'in are similar to those of Chou except for the creation in —213 of a large imperial seal with eight characters carved on jade, to display the authority of the First Emperor. This piece was used by the successive Han emperors as the seal of inheritance of the empire, though Han seals were mostly made of metal with inscriptions cast in intaglio. After the Han, however, all official seals were made with inscriptions in relief, and their size was gradually increased more or less in proportion to the rank of the officers using them.

Seal inscriptions were at first stamped on clay and later impressed on silk and paper. For secrecy and authentication, documents of bamboo and wood, when ready for transmission, were covered with a board and bound with string on which a small piece of clay was affixed and impressed with a seal. After bamboo and wood ceased to be used as writing materials, seal impressions were made on soft materials, and the earliest known example with black ink is found on a piece of silk from Tunhuang dating from the +1st century (Fig. 1102). Since the +5th century, seals were generally applied to paper with vermilion ink, one early reference to such impressions dating from +517, when they were stamped in red on lists of officials addressed to the court. Since paper written with black ink had been commonly used for documents and books since the +2nd or +3rd century, the use of red ink for stamps in order to distinguish the seal impression from the black text may, perhaps, be earlier than the +6th century.

—The character 'stamps' which was used for 'seals' in the Han, was adapted to seal printing when that began in China, cf. p. 3, f. 13b.
—C. T. Tien (6), pp. 54-6; Li Shu-Hsü (4), pp. 60-73.
—See Yu Hsiung Wu (1), p. 18.
—See section and illustration in Tien (2), pl. 13-15; pl. VIII, fig. 1.
—(2)
Seals were also carved on wood, and these had a much larger surface than those of metal and other materials. As Ko Hung (1834–367) mentioned, in ancient times a seal of the Yellow God, four inches in breadth and bearing 120 characters, was used to make impressions on clay along the routes taken by travellers to keep away fierce animals and evil spirits. Another source says that Taoist priests cut seals of jujube heartwood, four inches square, apparently to duplicate charms on clay and then, later, on paper in vermilion ink. It is also recorded that at the court of Northern Chhi (1136–1279), a large wooden seal one foot two inches long and two and a half inches wide, bearing four characters, was used to stamp the joining sheets of documents. All this evidence indicates that seal-cutting on wood with mirror-image characters in relief and bearing a text of as many as over a hundred characters, can truly be considered as a forerunner of woodblock printing.

(iii) Bronze casting and stone carving

Other techniques which contributed directly or indirectly to the invention of printing include bronze casting and engraving on stone. Two methods are known to have been used in casting bronze vessels and their inscriptions in ancient times, namely: clay moulds and the lost-wax process. The latter, which involved the construction of a mould with characters originally traced in wax which was later to be melted and replaced with metal, may have suggested the carving of writing in reverse to obtain a positive position on the object to be cast, as was later to be done in printing.

Some of the techniques of early casting may even have suggested the use of movable type to compose a long text, for it was not uncommon to use separate moulds, each with a single character or a group of characters, to make one vessel or one inscription. One of the most interesting examples still in existence is the inscription on a kuei vessel of Chhin (Chhin kung kuei), probably of the 3rd century, each character of which can be seen to have been cast from a separate unit, because the edges of the individual units are visible between the characters (Fig. 1105). Another example is the inscription on a bronze bell of the late Chou period, with ornamental archaic characters (Chhin kung chung), each separately cast from an individual mould. There are also examples of individual moulds bearing a group of characters instead of a single one, and a pottery container of the Chhin dynasty (Chhin san hsiung) had an inscription of forty characters made from ten separate moulds, each with four characters. It would seem that this technique of using

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Fig. 1100. Seals, seal impressions, and sealing clay of various periods. (a) Impressions of bronze seals of the Shang dynasty. (b) Sealing clay of the Han period. (c) A carved seal of the pre-Chhin period with its mark and impression. (d) Impressions from two Han seals, top one with a ring handle. (e) Seal of the Northern Sung Imperial Library carved in relief. (f) A poem in 20 characters carved on a stone seal, c. 1850.

Fig. 1101. Earliest known seal impression on positive image on silk fabric from Jen-Chihung, Shantung, c. 4100, enlarged twelve times. From Ten (1), pl. XVII.
separate units in the composition of one text may be considered as the forerunner of typography.¹

Carving inscriptions on stone is another technique which is considered as a prerequisite for engraving on wood for printing, for not only the technique of cutting, but also the change of material from stone to wood is significant for the development of printing. Cutting inscriptions on stone for commemorative and monumental purposes developed early in China. The oldest inscriptions on stone still surviving are those on ten drum-shaped boulders known as the Stone Drums of the Ch’in State. They were carved with ten verses, originally with some 700 characters, although less than half of them are still extant.² After the unification of the empire, the First Emperor of Ch’in erected seven stone inscriptions throughout the country between —219 and —211; these were in praise of the achievements of his administration, especially his role in the standardisation of measures and of the style of writing.³

From the 2nd or 3rd century, stone was extensively used not only for commemorative purposes but also as a permanent material for preserving canonical

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¹ Lo Ch’eng-yü, p. 135.
² For description and dating of the Stone Drums, see T’ien (3), pp. 64–7; also S. W. Bushell (5), pp. 133 ff.

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literature by Confucians, Buddhists, and Taoists.⁴ A complete collection of seven Confucian classics, amounting to over 200,000 characters, was engraved on some forty-six stone tablets between +173 and 183. Since then there have been no less than six additional major engravings of standard texts of Confucian classics on stone; the last one was made at the end of the 18th century. And a complete set of the Thang engravings, made between +835 and 837, still survives in the Forest of Stone Tablets (Pei Lin) in Sian.

The Buddhists also selected stone as a permanent material for preservation of their sutras, with the aim of avoiding destruction during periods of suppression of that religion. The most gigantic of all their stone inscriptions is probably that of 7000 stone tablets preserved in a groto library in a mountain near Fang-shan, Hopei; all the tablets having been cut successively over many generations from the +6th to the 11th century (Fig. 1104). Though the engraving of Taoist literature on stone came later, at least eight engravings of the Tao Te Ching⁶ are known to have been made during the Thang dynasty; in both scope and quantity, however, they are much inferior to both Buddhist and Confucian inscriptions.

Stone inscriptions were occasionally cut in relief or in a mirror image, like wood blocks for printing. They were also sometimes cut in mirror image in intaglio,

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⁴ For detailed discussion of the Confucian, Buddhist, and Taoist canons on stone, see T’ien (2), pp. 73–83.
⁵ 碑林
⁶ 道德經
contrary to the general practice of cutting stele inscriptions in the normally direct or positive way. A few examples of this are known or are still extant, one being on the back of a sculpture at Lung-men, dating between +477 and 499, and another dating between +370 and 375; both are positive images cut in relief (Fig. 1105). A stone stela with negative or mirror image inscriptions cut in relief is located near Nanking. There is also a pair of stone pillars, one cut in positive characters, reading from right to left, and the other in reverse, reading from left to right, apparently to balance the pair (Fig. 1106). It is especially significant that this text was cut in relief with mirror images in the same manner as wood blocks for printing, because it was made at about the same period as wood-block printing began.

* See Su Ying-Hui 18, p. 82.

* See Liu Chiao Hung Ma Tzu Chieh Po Ku (Nanking, 1935), Plate 11, fig. 20 c, d; also Liu Chiao I Shu (Peking, 1938), Plate 244-5.

(iv) Inked squeeze and stencil duplication

Rubbing is a process of making inked squeezes on paper from inscriptions on stone, metal, bone, or other hard-surfaced materials. The process of stone rubbing is very similar to that of block printing; the difference lies only in the methods of engraving and of duplicating. Except for very few cases, inscriptions on stone are always cut into the surface in intaglio with characters in the normal positive form. When a rubbing is made, the paper is laid on the stone and squeezed against the surface. Ink is applied to the surface of the paper, thus producing a white text on black background. The wood block, on the other hand, is always cut in relief with characters as a mirror image. When a print is made, ink is applied to the block, the paper is placed on it, and the back of the paper is brushed to obtain a black text on white background. Although the basic materials for engraving and the end products are different, the purpose of making duplications and the use of ink and paper as media are the same.

The technique of rubbing involves the processes of laying the paper on stone, tamping the paper into the intaglio, applying ink to the paper, and removing the paper from the surface after completion. The whole process is much more complicated and slower than that of printing. Usually the soft paper was first folded...
and then moistened, plain water or rice water sometimes being used, though the most common liquid was made by steeping slices of the dried root of pai ch'i (Bletilla brazziiiana), a tropical orchid, in water. A solution of glue and alum was also adopted on occasions, but since alum injures the stone and makes the paper fragile, it was not recommended by those experienced in making rubbings.

After the paper was properly placed, it was pressed lightly into every depression by a brush of natural fibre, usually that of the coir palm. When the paper was tight against the surface and about to dry, ink was applied with a pad, the inked pad being first struck lightly over the paper before the final application of dark ink. If the surface was plain and smooth, a light ink was sufficient and produced an inked copy considered as light as the cicada's wings; it was called "tim sai thu" (cicada wing rubbing). If a dark ink was added and brushed on after the application of the light ink, the brushing action gave a dark and shining rubbing called "se chin thu" (black-golden rubbing). When the desired intensity of ink had been achieved, the rubbing was peeled off the hard surface and pressed flat, but this had to be done carefully, because distortions of the inscription resulted if the paper was stretched during peeling. The quality and thickness of the paper determined the ease or difficulty of the peeling procedure.

Rubbings were sometimes made from three-dimensional objects such as round or square bronze vessels, which were copied in perspective with a photographic effect known as "chi tien hsi" or whole-shape rubbing (Fig. 1107). Before making such a rubbing, careful observation and study of the object was normally required, and the shape of the vessel, the curve of its surface, the distance between its front and rear, and other details being sketched. This sketch was then transferred to the paper to be moistened with the orchid liquid and placed on the vessel's surface. When the paper was almost dry, dark ink was applied to the relief portions and light ink to the intaglio parts of the design. Sometimes separate pieces of paper were used on different parts of a vessel and then pieced together to make a composite rubbing, although a single piece covering the entire vessel was sometimes used. The key technique in making whole-shape rubbings was primarily the application of the ink in the correct gradations of light and dark in accordance to the perspective sketch.*

The technique of rubbing is believed to have been first used in China before the 6th century, and it became well established in the following centuries.* Technicians in charge of rubbing, known as "chiu shuo," were employed in the Thang dynasty, in academic institutions and imperial libraries, along with such skilled workers as scribes, paper-dyers, and brush-makers. A few specimens of inked rubbings from the Thang period were found in Tung-huang, including the earliest known piece extant of the inscription of the pagoda of the Hu-tu

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* See YKST, 1976, nos. 17, pp. 50-60.

Fig. 1107. A composite rubbing in three dimensions of a round bronze vessel. Field Museum of Natural History.
technique can be traced back to the 2nd century. Animal skin or thin silk fabric treated with varnish or some other tree sap may have been used at this time, and certainly such a use of skin and paper was common in the Thang and Sung. Several paper stencils with perforated designs of Buddhist figures have been found in Tunhuang, together with finished stencilled pictures on paper, silk and on plastered walls (Fig. 1106); other paper stencils of later dates already in museums were used for the reproduction of designs on textiles.

(2) Beginnings of Woodblock Printing

Numerous dates have been suggested for the earliest use of woodblock printing in China, varying from the middle of the 6th to the end of the 9th century. No

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* A buff paper stencil coated with oil, collected by the late Berthold Laufer, is in the Field Museum of Natural History in Chicago.
* Some two dozen theories are summarised and discussed in Shimizu Kin (3), Sun Yu-Hsin (4), Pellet (41), Carter (4), Li Shu-Hua (4), and Chang Hsin-Min (4).
fact that the dating of the book has an element of controversy. Another text, this time by the pilgrim I-Ching († 634–715) reported in +628 that Indian Buddhists printed (yan) Buddhist images on silk and paper; however, there is a suspicion that the word yan may have meant impression with image blocks rather than real printing. On the other hand, a more recent opinion suggests that monk Hui-Ching († 665–701), who arrived at Changan in 600, and defended Buddhism by saying that sutas were written and engraved (shao kuo) to insure their existence, was clearly implying that printing was used at the end of the Sui dynasty. Since Buddhist texts preserved on stone had been a common practice, this word shao could refer to engraving on stone instead of on wood, and thus this statement may not in fact be taken as definitive evidence for printing at this time.

Finally, yet another document mentions that a woman's code compiled by Empress Chang-san was ordered to be carved on wood blocks for distribution (luo kuo) at her death in +666, which may imply printing in that year. This story is due to the Ming historian Shao Ching-Pang (+1491–1565), but the passage containing the term luo kuo does not appear in the two Tang standard histories or in other documents which include the same story. Thus certain evidence is lacking in support of this statement from a secondary source.

As for +8th-century printing, several specimens are extant. The earliest of these is a diary sutra scroll (Fig. 1110) which was discovered in +1666 in a stone stupa in the Buddhist temple Pulguk-sa, Kyongju, in southeast Korea. The scroll bears no date, but it includes certain special forms of characters created and used when Empress Wu († 700–704) was ruling in China. It is believed that this charm must have been printed no earlier than +704, when the translation of the sutra was finished, and no later than +751, when the building of the temple and stupa was completed. Another piece of old printing, chapter 17 of the Lotus sutra, is said to have been found in Turfan and to be preserved in Japan. It is printed on yellowish hemp paper with nineteen characters per line in the text, which contains also some of the peculiar characters commanded by Empress Wu. If this is evidence of

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5 For other theories about printing in the +7th century, the evidence is more convincing, though some points are controversial. One statement in a Thang work says the famous monk Hsian-Chuang (+685–698), who travelled to India in 624–45, printed (yan) pictures of Samanta Bhadra on paper, perhaps after his return to China and before his death. This statement may be reliable in spite of the
printing during her reign, it could be another specimen contemporary with the one found in Korea.

The specimen found in Korea predates the dharami charm from Japan printed c. +764-70, and which until recently was considered to be the world’s oldest extant example of printing.4 That there were a million copies of the charm in Japan is recorded in several contemporary documents, which also relate that in +764 a copy of one of the four versions of the dharami was placed in every one of a million tiny wooden pagodas (Fig. 1215) ordered by the Empress Shōtoku to be distributed and stored among ten different temples. Although the records do not say that the charm was printed,5 not only do many printed specimens of it survive, but it seems certain that such a multitude of copies could not have been made without the aid of printing. The text is from the same sutra as the one recently discovered in Korea, but the latter consists only of the prayers in Chinese characters transcribed from the Sanskrit, while the scroll from Korea is much longer, including the story as well as the prayers of the sutra.

Since both of these examples were found outside China, it may, of course, be questioned whether they are, in fact, Chinese printing. While the dharami found in Japan is believed to have been produced there, as it is documented in Japanese records, the single piece of dharami found in Korea is very likely to have been printed in China. The fact that there were frequent pilgrimages of Korean monks and students to the Thang capital, that the Silla Kingdom in Korea was zealous in adopting Chinese culture and practices, together with both the presence of special writing forms of Empress Wu, and also the lack of any collateral evidence of early printing in Korea, suggests that this printed sutra originated in China and was perhaps brought to Korea for ceremonial use when the temple was built. In any case, the use of printing in China must have begun some time before the date of the examples found in Japan and Korea.6

The two charms just mentioned are both miniature examples of printing, unlike the usual size of a Chinese book. The first complete printed book is probably the famous Diamond Sutra of +868, discovered in Tunhuang by Stein during his second expedition in 1907.7 This book, in roll form, is made of seven sheets of white paper pasted together to form a scroll with a total length of 175 feet. Each sheet is 23 feet long and 10 3/4 inches wide. The text is the complete work of Chin Kung Pan, Ji Po Lo Mi Ching, translated into Chinese from the Sanskrit Vajrachakrid Pradjad Paramiti by Kumārīva (b. +344) in the +4th century. Both the picture on the frontispiece (Fig. 1169) and the calligraphy in the text show a highly advanced technique in cutting and printing, more refined than those found in Japan and Korea, or in Europe of pre-Gutenberg date. At the end of the roll a colophon says: ‘On the fifteenth day of the fourth month of the ninth year of Hsiian-thung (+868). Wang Chieh reverently made this for blessings to his parents, for universal distribution’ (Fig. 1171). This is the earliest clearly dated printing in complete book format extant today.

Among printed materials of the Thang dynasty, several other examples may be mentioned. These include the printed versions of the dharami (Fig. 1112), of Buddhist verses, and the two oldest printed calendars, both discovered at Tunhuang.8 One calendar, for the year +872 (Fig. 1113), is a fragment printed with minute drawings and diagrams, solar terms, and pictures of the animals corresponding to the twelve branches, very similar to those used on calendars even in modern times. The other, for +884, is printed with a line of very heavy characters as the heading, which reads: ‘Family calendar of Fan Shang’ of Chhengfu-su in Hui-chhuan, province of Chhien-nan’. Apparently the private printing of family calendars was very popular in Szechuan and all along the Yangtze valley; indeed, a memorial of +893, submitted by Feng Shu (+767-916), a regional commandant of Szechuan, requested that the private woodblock printing of calendars be forbidden, because large numbers of unauthorised calendars were being printed and sold in markets before the Board of Astronomers had submitted the approved calendar for the new year to the emperor.9

Besides Buddhist sutras and calendars, many books on various subjects were also printed and sold in bookstores. A Thang official, Liu Phien, who was in Szechuan with the refugee emperor in +883, said in his family instructions that during his

4 For a fuller description of this charm, see Carter (1), ch. 1; Hunter (90), ch. 3; Nagasawa Kikuyas (3), pp. 6-8; cf. below, pp. 397 ff.
5 Chang Hsin Min (3), p. 134, questions this because of the absence of mention of printing in all the documents and the fact that no other printing earlier than +713 in Japan is mentioned or has survived.
6 Despite the findings of earliest printing specimens outside China, there is little doubt that these printings followed the exact model and method of Chinese printing. As Gossenich (317), p. 378, says: ‘everything that I think, in my opinion, to the beginnings of the invention in China and its spread outward from there’.
7 Preservation in perfect condition at the British Museum; cf. Giles (17), pp. 1191-7; Carter (1), ch. 8.
8 Giles (17), pp. 1193-4, 1197-7.
stay in Szechuan he saw a number of books on astrology, the divination of dreams, and geomancy, as well as dictionaries and other lexicographical works, being printed on paper from engraved wood blocks; but he commented that the ink was smeared and could not be read clearly.* Another Thang official, Ho-k'ang Chi (d. +847–50), a regional supervisory commandant in Chiangsi, is said to have spent much time in the study of Taoist alchemy and to have composed a biography of Liu Hung, several thousand copies of which were printed between +847 and +851 and distributed to interested alchemists.†

Among the books brought back by the Japanese monk Shou-yei* on his return from China in +865 were two rhymed dictionaries, "Thang Tin" and "Tu Phen".

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*See Al Jih Chı T'ung Chıa (SSETS), ch. 2, p. 58.
†See Pin Chi T'ung Hsin, ch. 10, pp. 84–86.

Fig. 1111. Colophon at end of the "Diamond Analects" printed in +808, from T'ung-huang. British Museum.

Fig. 1112. A scroll of the Victory of Tsubakabara printed in the +9th century from T'ung-huang. Bibliothèque Nationale, p. 4991.

Fig. 1113. Printed calendar of the Thang dynasty. Fragment for the year +899 or +907 from T'ung-huang. Very finely cut in horizontal strip with minute diagrams and drawings, including the 12 animals of the Chinese zodiac cycle. British Museum.
which were recorded as 'printed in Hsi-chuan (modern Szechuan),' along with other titles apparently referring to manuscript calendars, medical prescriptions, and other secular works, besides Buddhist sutras. A Tang official, Su-hung Thu (A 837–908), wrote, probably in +871–9, that the printed copy of the Sushma sutra in the Ching-ai Temple of Loyang, which had been destroyed, probably in +843, should be reprinted. Therefore, a printed copy of the sutra must have existed before the date of destruction.

Also, a dharmaprahara charm printed by the Pien family in Chihengtu is reported to have been found within a hollow bracelet in a Thang tomb in Chihengtu in 1944. This piece, about a foot square, was printed on very thin but strong paper, which was probably made of mixed fibres of silk, mulberry bark, hemp, and than wood (Phacellota tartarum, Maxim.). It bears a line of Chinese characters, from which a few are missing, indicating the place and name of the printer at the right, with Buddhist figures on the four sides and also at the centre, surrounded by the Sanskrit text forming a square in seventeen lines (Fig. 114). The Chinese text says: 'This charm is printed for sale by Pien... near... Lung-chih-fang, Chiheng-tu hsien, Chiheng-te fu.' It has no date, but the tomb has been dated as c. +870–900 in the late Thang. This adds another specimen of early printing preserved in China.

By the early part of the +10th century, under the Five Dynasties (+907–60), the application of printing seems to have been much wider both in subject-matter and in geographical distribution. Printed materials include, for the first time, the Taoist canon and Confucian classics, literary anthologies, historical criticism, and encyclopaedic works, besides the Buddhist sutras and calendars. Printing centres included Loyang and also Khi-feng in modern Honan; most of the works being prepared by the National Academy (Kuo Tzu Chien) throughout the Northern dynasties (+907–60) were printed there. In the Southern Kingdoms, a few books are known to have been printed in the Shu state in Szechuan, in Nanking under the Southern Thang, and in Hangzhou under the Wu-Yueh state.

The first work of the Taoist canon to be printed was a study by the Taoist monk Tu Kuang-thing of the commentary on the Tao Tzu by Emperor Hsien-Tsong (+1001–53), entitled Tao Te Ching Kuang Sheng K'ung. It was privately printed at the author's expense from some 460 blocks, in +913, twelve years after he had

The catalogue is included in the Taisho Zojun, vol. 35 (Makura-kai), pp. 1164–11. Another Japanese monk Kunito (+1795–1871) mentions that he bought in China in +878 a copy of the fiancee to-si-sa-geo by 437 pieces of cash and saw in +839 1000 copies of the Kowane-sa-nu-sa at Mount Wu-Thai. The cheapness of the cost and numerous copies led me to believe that they were printed editions; see Kitchener (4), p. 49; Liefeld (8b), p. 38.

The dates in connection with this statement are suggested by Hsien Fu (1), p. 879, and also Carter (1), p. 61; Li Shu-hua (17), p. 117–121.

This printing can be dated no earlier than +752, since Chiheng-tu was not called Kung until this date, or +843–5, when the whole of the then Chou emin bond in the ten happy manuscripts. See Feng Hsia-chih (1), with picture, which is also reproduced in Chang-Kuo Pien Kuo Tzu Lu, p. 1.

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Fig. 114. A dharmaprahara printed in Lung-Chih-fang, Chiheng-tu, c. late 10th century, 80 x 34 cm., discovered in Chihengtu in 1944. From Chang-Kuo Pien Kuo Tzu Lu, 1951.

completed writing it. Also printed in Shu was a collection of one thousand poems by the monk Kuang-hsi (+842–923), upon whom the King of the Shu state bestowed the honorific title Master Chhien-yueh. Publication of this book, Chhuan T'u-chi, by a disciple of the author's in +923, marked the beginning of the printing of individual literary collections which has proliferated among Chinese publications ever since. In the Northern Dynasties, the Taoist canon was printed by a Taoist priest under the auspices of Emperor Kao-Tsu of the Chin in +940. A new preface was written by the scholar Ho Ning (+898–955), who printed several hundred copies of his own poems and songs in 100 chun for distribution.