



Collecting mulberry-leaves for silk-growing. Engraved in stone and printed on white silk. From a Chinese book on silk-growing published in 1696 by command of the Emperor of China from the original of 1234.

## The Early History of Silk



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## *The Early History of Silk*

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# The Origins and Rise of Silk

By A. Varron

To the Ancients there was something mysterious about silk, at that time a greatly coveted but prohibitively expensive textile. Nothing was known of the manufacture of this strange material with its brilliant lustre, and its at the same time strong and delicate texture. Bold travellers reported that silk had its origins in a distant country, the inhabitants of which called it "ser". Therefore the Romans gave the name "seres", the silk people, to the inhabitants of this mysterious country, and the city where the silk was bought, was called Sera Metropolis. This land of silk was China, and the city was perhaps Singanfoo in the northern province of Shensi, or Canchow in the neighbouring province of Kansu, situated on the ancient Chinese trade route to the West.

A charming Chinese legend has it that Princess Si-ling-shi, the wife or daughter of the Emperor Hoang-to invented silk in the 27th century B.C. One day the princess was walking in the gardens of her palace. While watching a silk-worm spinning its thread she was struck by the happy idea that what the little animal could wind might be unwound again

*Princess Si-ling-shi. From an illustration by Hokusai Katsushika (1760-1849).*



*Serica, the country of the silk people, from a map of Asia by Ptolemy of Alexandria, about A.D. 150. From a copy dated 1400. National Library, Paris. Bottom right, Sera Metropolis, the silk town.*

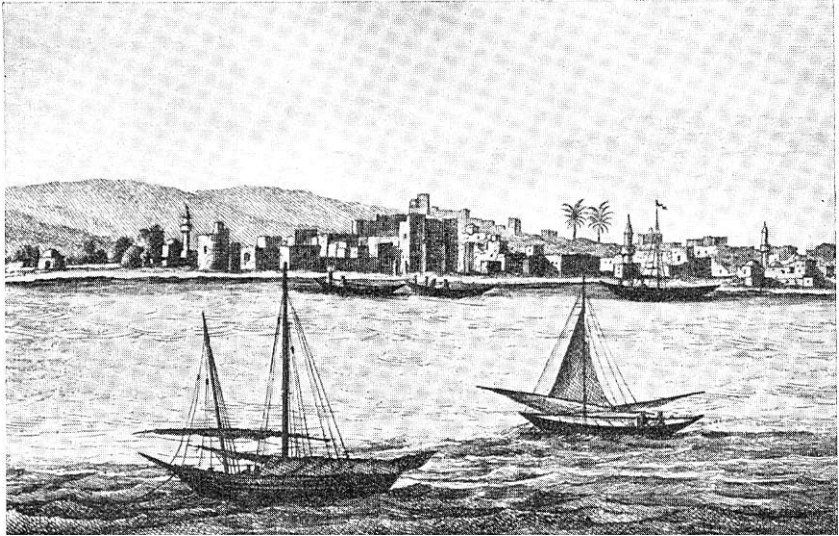
by man. That was the origin of silk-worm breeding. As a reward the princess was admitted to the company of the gods, and to this day she bears the name "Little House of Silk".

However that may be there is no doubt that there must have been silk-weavers and dyers in China at a very early date, perhaps 50 centuries ago, who wove robes, banners, and sunshades for the emperors in a gorgeous selection of patterns and colours. The first report on Chinese silk appears in the book of Chooking in the second half of the third millennium B.C. The province of Shantung is described as the cradle of silk-weaving.

At first the production and use of silk were imperial privileges. At a later period, when China was divided into a number of important principalities these privileges were extended to the nobility in general. The demand increased, and silk-worm growing, which was part of the serf-labour imposed upon the peasantry, spread throughout China. However, the misgovernment of many of these principalities led to impoverishment of the nobility, and the supply of silk began to exceed the demand. With the reform of the Chinese State, which began about the 6th century B.C., silk began to become popular as



*Sidon, the city of  
Phoenician dyers.  
From a travel-  
book, 1700.*



a dress material among all classes of the people. The renaissance of China under the Tsin dynasty (3rd century B.C.) and especially under the Han dynasty (206 B.C. till A.D. 221) which succeeded it, led for the first time to Chinese enterprise beyond the borders of China itself. Both for near and distant neighbours the shimmering silks became coveted articles of trade.

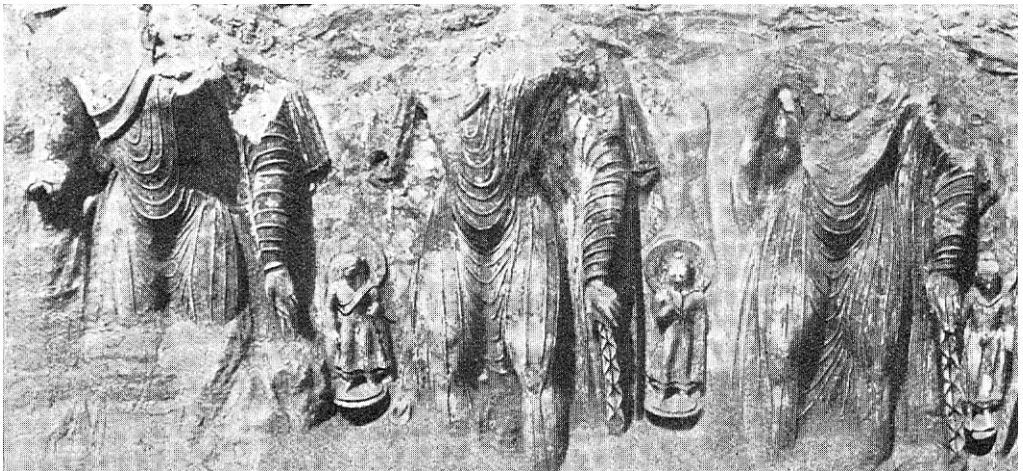
Shortly before the Han period silk-growing had been introduced into Korea by fugitive peasants, but it did not reach Japan—via Korea—until the 3rd or 4th century A.D.

In India a caterpillar had been known of old which produced a yellow thread as compared

with the white silk of its Chinese counterpart. The Indian were, however, neither able to breed the mulberry trees to feed the insects, nor could they—for religious reasons—be persuaded to kill the silk-worms, so that the butterflies broke the threads of the cocoons on emerging. The Indians had therefore to be content with piecing the broken threads of the cocoons together and spinning them into silk.

About the second century B.C., silk probably became known in the West Mongol principality of Khotan in Turkestan. But a story which tells of a princess who was about to marry a prince of Khotan, and smuggled a few silk-worm eggs to the country of her

*Statues of Buddha of about A. D. 200, found by Sir Aurel Stein in Khotan, the great transit country of silk between East and West. The fine texture and folds of the garments point to silk.*





*Mural painting from the royal graves of Korea, 5th century A.D. Korea was the most important transit country for silk between China and Japan. It may be assumed that the coat with its coloured trimmings and the pleated skirt of this Korean lady were of silk.*

adoption, though the disclosure of the secret of silk-production was punishable by death, dates only from the 4th century A.D. It may well be that this story is not without a basis of truth, as the Chinese princesses were frequently owners of silk-worm cultures; and the lady was probably well aware of the value of the dowry which she was taking to her future husband. Silk first became known in Europe as a finished article. It was unknown to the Greeks and to Republican Rome; the view held by some scholars that the bombycina (cf. bombazine) were silk garments has little probability. They are first mentioned by

writers of the early imperial period (1st century A.D.), who report unanimously that they were imported from the Far East. Silk thread was rarely imported, and it was often necessary to unravel finished silks in order to weave smaller pieces of a different pattern. It is unlikely that there were silk-weavers in Rome. The place-name "Tuscus Sericus" probably refers to silk-merchants. The inscription on the tomb-stone of a certain Marcus Flavius Aurelius dating from the 3rd century A.D., describes him expressly as a silk-merchant. It is, however, probable that silk was dyed in the purple dye-works of Puteoli, north of Naples.

The real centres of the ancient silk-industry which began to flourish about the end of the first century A.D., were situated in the cities of the Eastern Mediterranean which about this time began to outstrip the West both in cultural and economic respects. Centres of weaving were in particular Alexandria, Antiochia, and Jerusalem, and dyeing was principally carried on in the Phoenician towns of Sidon and Tyre. After the victory of Christianity, and when Constantinople became capital of the Empire a silk-industry began to develop there in the 4th century, which, like that of ancient China, at first worked for the emperors only.

The monopoly of the imperial workshops did great harm to those of Egypt and Syria, especially as the latter had difficulty enough in competing with the silk-industry of Persia, which had begun to flourish about the middle of the 4th century. In the year 360 King Sapor II of Persia, of the Sassanid dynasty conducted a victorious campaign against the Roman empire of Byzantium, in the course of which he carried off the best silk-weavers of Syria to Susa, thus laying the foundation of that Persian silk-industry, which by a happy combination of technique, style, and efficiency became the basis of the entire silk culture of Europe and Asia.

Again and again the Byzantines attempted to overcome this Persian competition, but to no purpose. Finally the emperor Justinian (483-565), the great reorganizer of the Roman Empire, succeeded, with the help of his Christian missionaries, in gaining possession of a fresh stock of silk-worms. These shrewd monks of the order of St. Basil probably did not procure the eggs which they concealed in their pilgrims' staves in China, but in the less distant country of Khotan. The chance thus

gained of becoming independent of a foreign market for raw materials was not at first fully exploited by the Byzantines. The imperial monopolies were a hindrance to free development, and when in the 7th century the Mohammedan Arabs conquered Syria, and put an end to the rule of the Sassanids in the East, they found a flourishing silk-industry only in Persia, to which they succeeded without serious competition on the part of the feeble Byzantine and Syrian industries.

Bagdad and Mossul, which gave its name to muslin, and at a later period Damascus, became the principal centres of silk-weaving. Through all the countries of its rule Islam carried the silk-industry, to Merw and Nireba in Turkestan, and to Spain in the extreme West of Europe.

In the 11th century there were 6000 looms in Sevilla alone, and in the small town of Almeria no fewer than 800. To provide the necessary raw material for these districts 3000 villages are said to have been engaged in silk-worm breeding, but it is probable that for a long time the greater part of the raw material was imported from the Far East.

In the 10th century the Byzantine silk-industry, now no longer carried on in Constantinople alone, but in other parts of Greece, again revived, and flourished for a period of

3 centuries. When in the 13th century the Spanish rabbi Benjamin of Tudela visited Thebes, he found 2000 Jews there engaged in the silk-industry. The imperial workshops of the capital acquired such renown that for centuries, their products, known as "imperialis" enjoyed universal preference.

From his victorious campaign in Greece in 1147 the Norman King Roger II brought silk-weavers back to Sicily, where the industry rapidly developed, and was later transplanted to Italy by the Emperor Frederick II (1194-1250) of the Hohenstaufen line. That event marked the beginning of a new and brilliant chapter of the silk-industry lasting to the present day.

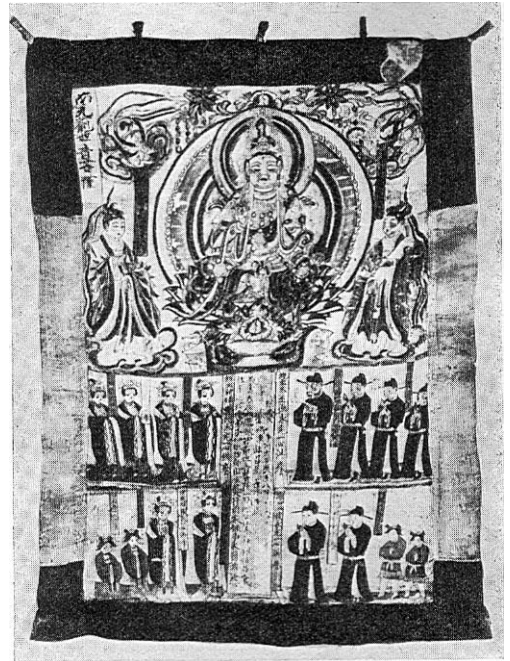
In the East the silks and brocades of Cyprus acquired great fame after the conquest of the island by the French in the 13th century. The rise of the European silk-industry by no means robbed that of the Mohammedans of its importance. Under the influence of the Far East, of India, and at a later date of Europe, the countries of Islam developed a new style in silks, which excited the admiration of travellers as late as the 17th and 18th centuries. To this day these silk textiles with their style composed of Asiatic and late classical elements are rightly regarded as treasures of the first rank.

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If we may believe the ancient Chinese legend, it was the strength and elasticity of silk which led men to make use of the fine white thread spun by the caterpillar of the silk-moth. The chronicle of "Chuking" relates that at the beginning of the 3rd thousand years B.C., the emperor Fo-hi had strings for his musical instruments made from threads gained "from the bowels" of the silk-worm. His son is said to have used such threads as fishing lines, no remote possibility in a country so rich in rivers. There may be a grain of truth in this legend, but if so, this use of silk can only have been temporary. When the threads were woven into cloth it became evident that the peculiarity of silk was its shimmer rather than its strength. Silk was deemed worthy of



*Painting on silk, A.D. 983, from the "Cave of the Thousand Buddhas". After Sir Aurel Stein. Representing a Buddhist deity and, below, the donor, a high Chinese official with sons, daughters, sons and daughters-in-law, and grandchildren, distinguished from each other by different sizes and colours.*



*Chinese silk banner of the Tang period with Buddhist figure, from the "Cave of the Thousand Buddhas" near Tunhuang. After Sir Aurel Stein. It is characteristic how the style of dress of the Tang period was determined by the fluttering quality of silk.*

use in the most exalted places in China; it was used to make sunshades for the protection of the emperors, and banners for the temples of the gods. To this day such banners adorn the holy places; all the religions and cults of the East have adopted this custom, and have adorned these standards with scenes taken from their religious traditions, either painted, embroidered, or woven. This development reached its height in the Tang period between the 8th and the 10th century A.D., when the altar-pieces painted on silk—like the late medieval altars of European churches—formed both a supplement and a contrast to the fresco paintings on the walls. From the temples these paintings on silk penetrated—as in 15th century Europe—to the houses of private individuals, and those paintings on long rolls of silk developed which became known by the Japanese word "kakemono". On these landscapes and still-life studies the quiet brilliance of the Chinese paints blends with the

natural shimmer of the multi-coloured silk to form works of inimitable beauty.

Neither banners nor paintings could, however, have made silk the important commodity it was, had it not from a very early date been used as a dress material. At first, it is true, silk robes were worn only by members of the imperial house in China, as the production and use of silk was regarded as a privilege of the emperor until the middle of the 2nd thousand years B.C. To him alone the brilliance of this costly material was reserved. The rules of etiquette decreed that in his palace the emperor should wear robes of white silk; for processions and State functions outside the palace certain coloured robes were prescribed. The colour reserved to the emperor, his first wife, and the heir to the throne appears to have been yellow, the colour of the sun. His other wives wore violet-coloured dress, as did the officers of supreme rank, those of second and third rank wore red, the remainder black.

When in the 12th century B.C., the imperial power began to decline, and China became, as it were, a federation of numerous powerful principalities, the imperial silk-monopoly was extended to the potentates of the provinces. Each princeling sought to vie with the splendour of the imperial court, thereby hastening the material and cultural decay of the empire. Instead of being a mark of rank, silk became the symbol of a senseless and unchecked extravagance. Good taste declined, and instead of the simple colours at one time the rule, a veritable riot of colour began to rage.

In view of this stimulus the silk-production increased to such an extent that most of the court workshops had to seek new customers. Silk came into the public market, and began to be generally worn. As a remark of the philosopher Meng-tse (3rd century B.C.) shows, silk clothing was popular because of the warmth it afforded in winter.

This feature of silk was considered in China only. According to the moralists of imperial Rome it was the transparency of silk which made it seem so desirable to the ladies of Greece and Rome. The moralists entirely overlooked the fact that it was the sheen of silk more than anything else which excited the admiration of the Europeans. But even in the 1st century A.D., garments made entirely of silk were probably not worn. The first reasonably reliable evidence on this head is that of Suetonius, who towards the end of the century

reports that the emperor Caligula sometimes was clad in silk. Tacitus' statement, according to which the emperor Augustus in the year 14 A.D., forbade the wearing of silk for men, was very much in accordance with that historian's educational aims, as he elsewhere stated that "silk degrades a man".

In reality silk was generally only used for the manufacture of braid or trimmings, the so-called "clavi". The round or oval clavus, generally purple in colour, was regarded as a badge of rank. It varied in size and shape with the different ranks, and was later adopted by the Church for the same purpose. What was

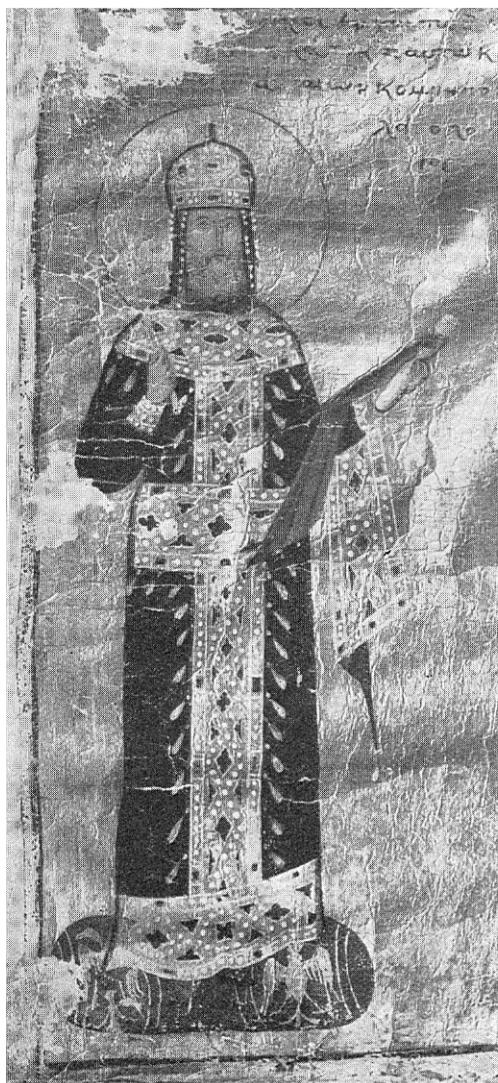
*Ivory diptych of a Roman consul, A.D. 428. The dress shows the consular robe with broad silk shoulder-pieces, covered with a characteristic woven pattern of rosettes in circles and squares.*





more natural than to manufacture these badges from the new and costly material. In addition to the clavi there were the coloured trimmings with which a rich man would adorn his toga or cloak. Only a very few people, even of the wealthiest women of the Roman aristocracy are likely to have worn dresses made entirely of silk as early as the 2nd century; though there is no reason to doubt the report that the emperor Heliogabalus (218–222) himself a native of the East, was

*The Byzantine emperor Andronicus Palaeologus on a 14th century miniature. Byzantine Museum, Athens. The broad silk facings adorned with gold and jewels are a derivative of the Roman clavus, and were retained in liturgical vestments.*



*The Sassanid King Chosroes II, hunting. Silver bowl. National Library, Paris. Collection of antiques. The silk dress of the King is richly adorned with pictorial designs.*

in the habit of wearing garments made wholly of silk. However that may be, the amount of silk used by the Romans was probably not so large as is generally supposed. The import prices of silk were excessively high, and were a real threat to the balance of trade. Hence the numerous decrees against the import of silk. There can be no doubt that the millions of sestertii spent on importing purple-dyed silk thread, “metaxablatta”, as the Greeks called it, or the finished textile, most of which money found its way to Persia, did not a little towards ruining the economic system.

Silk was not to be kept out of Europe, in spite of all decrees and edicts. On the contrary the elevation of Byzantium to the capital of the Empire in place of Rome, and of the Church to a State institution marked the beginning of a period in which silk was predominant as a dress material. It is characteristic of that turbulent age that Christian asceticism existed side by side with a riot of fantastic luxury. Two hundred years before, Tertullian, the spirited champion of Christianity, who frequently expressed his contempt for silk garments, was chiefly concerned at their excessive colourfulness, arguing—not very convincingly—that such things were sinful because God had not originally made them coloured. Asterius, bishop of Amasia, who lived about the beginning of the fifth century, denounces in one of his sermons people who



go about like painted walls. Landscapes, animals, and scenes from the arena had no place on garments, but if the people could not do without such things they should at least choose Christian subjects. Though the best thing of all would be to sell such garments, and devote the proceeds to works of charity. Such stories give an idea of the importance of silk at that time; though even then the use of silk as a trimming was still its most important feature. Ausonius of Bordeaux, a poet and teacher of rhetoric, expresses his thanks to the emperor Gratianus for the present of a consular robe, the silken border of which bore the emperor's woven portrait. These garments with imperial portraits as a sign of imperial favour became customary in the following centuries, the practice being continued by the emperor Justinian as late as the 6th century.

A certain limit was imposed on the use of silk by the jealousy with which the Byzantine emperors preserved the law forbidding ordinary mortals to wear purple. This restriction was the more significant as purple was a very comprehensive term. The frequent reaffirmations of this law seem to show that it was not very widely respected, and a friend of the

emperor Julian the Apostate (332-363) stated that even the common people wore silk dress.

Soon, however, silk found new patrons, more important even than the Byzantine nobility: the princes and chiefs of the Germanic tribes of the migration of nations. Many of them adopted the more superficial forms of Graeco-Roman culture, covering themselves with precious stones and gorgeous silk robes. The childlike delight in such forms of refinement was often almost boundless. When Alaric laid siege to Rome, the price which he demanded for sparing the city included no fewer than 4500 silk robes.

The extravagance in the use of silk during this period was, however, but a shadow of that which developed in Persia, and which in the 7th century accompanied Islam on its triumphal progress across two continents.

Whether silk formed the dress material of the ordinary people in Persia, we are unable to say; but there is no doubt that silk was worn not only by the nobility, but also by the wealthy and cultured merchant class. And at the Court in particular silk reigned supreme. The huge relief sculpture which the Sassanid King Chosroes II (561-628) had hewn into the rock of a mighty cave in Takibostan,



*Persian horsemen with silk flags and script banners. Miniature from a 14th century Persian manuscript. National Library, Paris.*

shows plainly that not only the King but every one of his followers down to the last servant dressed completely and unmistakably in silk. Under his armour the King is wearing garments of patterned silk, and the trousers worn by the Persians in contrast to the Romans are of the same material. Officers, elephant-drivers, and boatmen are all clad in gaily patterned silk.

The use of silk, which was produced by the Persians themselves, and therefore to be had in abundance, was not confined to clothing. We hear of silk bed-coverings, carpets, and hangings. In all the countries where the influence of the Sassanids was felt, to those which were under the influence of the far East, to Turkestan and India, there was an increasing demand for silk-textiles.

The Sassanids had no tendency to expansion, and it was only in the 8th century under the Mohammedan caliphs and in the name of the world-wide claim of Islam that the treasures of the Sassanids became accessible to the world in general. It has been said that silk helped to tame the wild Arabs. At the court of the Abassids, whose greatest ruler, Haroun

*Silk mantle of state, belonging to a 13th century Chinese statesman, one of the very few examples of Chinese silk dress preserved from that early period. Dragons and other symbols adorn the silk. Vuilleumier Collection, Lausanne.*



al Rashid, was a contemporary of Charlemagne (768–814), the use of silk had assumed those fantastic proportions so vividly and probably accurately described in the Arabian Nights. Ebn Shunah records that in 920 ambassadors from Constantinople came to the court of the Caliph Muktader Billah. Hundreds of thousands of soldiers, attendants and eunuchs lined the streets in their honour, a large proportion of whom were dressed entirely in silk. 38000 awnings were stretched over the streets, 12000 of these being of pure silk and 500 of gold brocade. It is probable that these figures have their foundation in the Oriental imagination rather than in reality. Nevertheless, other records also point to an unheard-of extravagance in the use of silk. Ibn Abd el Azis, a writer of the 11th century, describes the wealth of an Egyptian Caliph, whose treasury contained 50000 lengths of silk damask, as well as other textiles of Persia and China. One of these cloths is said to have shone like the tiles of a prayer-niche in all shades of gold and purple light.

Once more the princes of Europe became the imitators of the Orient, so much admired for its wealth and luxury. At every court, in every palace and castle of Europe the ladies and gentlemen of the nobility wore garments of silk; at the very least their clothes were trimmed with silk. The dignitaries of the Church yielded nothing to their secular peers in this respect.

It was this perpetual demand which gave to the Spanish and later to the Sicilian silk industry such a remarkable stimulus. The Norman princes were customers of particular importance; their palaces were adorned with silk tapestries and hangings; and their silk coronation robes were the finest that could be procured. The rise of the middle-classes from the 14th century onward brought about a popularization of silk; in spite of the resistance of the feudal powers, men and women of the wealthy merchant-class wore silk, and in the 15th century it was even within reach of tradesmen and artisans.

From the beginning silk was used as clothing for the dead. The belief common to all ancient people, that man's life after death should be like that on earth, led to the custom of burying the dead in their best clothes. The oldest specimens of Chinese silk which have been preserved are from a city of the dead in the west of China on one of the caravan routes

near a fortress known as Lou-lan. The silks, the colours of which are remarkably fresh, probably belong to the 1st century B.C.

The same applies to Egypt. There, too, the oldest silks are shrouds. Some are composed partly of silk, and partly of linen or cotton, and have preserved their beautiful colours. It is probable that these garments, like those of Lou-lan, were not the usual clothing of the dead, but were destined solely to adorn the dead body. The world of the late Roman Empire was intensely preoccupied with death, both in fear and longing, silk shrouds might often seem more important than silk gowns for the living, and this custom was adopted by the Christians. A very considerable proportion of the silk used in Rome and Alexandria at that time may have been used for the adornment of the dead. From there the use of silk penetrated to the cult of the sacred relic. Not only the body of the martyr, but the casket containing it, was wrapped in silk.

Princes and nobles gave materials and garments from their private treasuries. Of Louis the Pious (814-840) we are told that he gave to the Church silks which he had received from the Emperor of Constantinople. Silks were at that time considered suitable offerings to the Church, bishops were not only buried in shrouds of silk, but silk cloths were placed in their graves. When in the 9th century, Heribald, bishop of Auxerre, had the grave of St. Germain opened at Ravenna, he found that it contained robes which had belonged to the empress Galla Placida, who had died centuries previously. The historian Gregory of Tours (540-594) stated that the large amount of brocade and silk, with which the graves were filled, made it possible to distinguish the tomb of a saint from others. On another occasion he relates that when Siegbert, King of the Normans, stormed Paris, the soldiers made their way to the churches, to plunder the graves of their silks, which they prized beyond their material value as possessing magic powers. Of many such silks it was said that they had been the garments of Christ and his apostles.



*A very rare example of medieval civil dress. A 14th century coat of brocaded silk with a pattern of eagles and lions wrought in gold. Probably made in a Sicilian workshop. Textile Museum, Lyons.*

“Recently”, Gregory continues, “a man came and offered a very ancient silk robe, which he claimed had been wrapped round the cross of Christ.” At the funeral of bishops the people would often fight for the cloths with which the body had been covered, in the belief that they held some healing power. Pope Gregory the Great (540-604) forbade this practice, but to no purpose. The clergy itself was too much influenced by the passion for silk spreading through a Europe just recovering from the throes of the great migration of nations to be able to resist this popular cult. Bishop Theodulf, a contemporary of Charlemagne, used silk to protect the miniatures of a book preserved in the museum of Sens. Silks were used for altar-screens and altar-cloths, and in the cult of relics silk cloths figured as handkerchiefs of the martyrs. It is due to such reasons only that so many ancient silk textiles have come down to us.

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There is a style peculiar to silk, a pattern which is not adapted from the style of other textiles or from that of painting, but which is suited to the exigencies of the material. This style was evolved in Persia under the Sassanids in the 6th century, and was finally developed and perfected by the Mohammedans. It is characterized by patterns whose subjects do not absorb the attention, but which bring out to the full the peculiar character of silk, its lustre. The silk style belongs to that group of styles, which because of their regular forms are described as geometrical.

Long before the time of the Sassanids geometrically patterned silk was common in China. The oldest silks known to us, found

*One of the oldest examples of Chinese art. A bronze vessel in the shape of an owl, Cheou dynasty (1122-240 B.C.). The ornamentation conveys some idea of textile patterns of the period: spirals, undulating lines (symbolizing the rolling thunder), stylized dragons, and snakes. Eumorfopoulos Collection, London.*



in the great cemetery of Lou-lan in western Mongolia on the great southern silk route, are for the most part of geometrical pattern. These silks are, however, of comparatively late date (about the beginning of the Christian era), when the vigorous and powerful Han dynasty ruled in China. Our only knowledge of older silks is gleaned from written records and the study of early bronzes. At first the materials were probably plain, but dyed in bright colours; not later than the second thousand years B.C. patterns—either painted or embroidered—were introduced. Woven patterns were probably not known till about 1000 B.C. Dragons composed of the limbs of various sacred animals, and regarded as divinities, alternated with reproductions of real animals. Wave-like bands served as borders for these patterns; they probably were derived from the ancient art of braiding, and are believed to have represented thunder rolling across the heavens. The animal pictures were not what we should call true to life, but were very characteristic in their limbs and movements, not unlike the forms familiar to us in modern expressionist art.

Geometrical regularity in the forms of art is frequently a sign that the nations are striving towards a new order—such regularity mirrors the attempt to find more clearly defined forms of communal life. Natural forms on the other hand, indicate as a rule the inner stability and optimism of a social order; criticism and contentment appear in harmonious blending. The silks from the graves of Lou-lan are evidently at the end of such a “geometrical”, and at the beginning of a “naturalistic” period. Dragons, coiled to form a parabola, belong, as is frequently the case with religious symbols expressing strong feeling, to the old geometrical style; other animals, however, leopards, tigers, chamois, birds, show an entirely different form, vigorous and natural; for the Han dynasty had strengthened and finally realized the century-old desire for reform of the State.

Another element is contained in some of these Lou-lan textiles: as well as the forms native to China we find a so-called meander pattern running in zig-zag lines, also stylized palm-leaves, and shell-like figures which remind us of the capitals of Ionic pillars. And indeed—the all-pervading, all-enchanting spi-

rit of Greece had, in its later manifestations found its way from Baktria to that distant Mongol wilderness. It must, however, be said that this Hellenistic influence, by very nature of it being imported, was not inherent to the

*Chinese pottery of the Han period. The coloured dress appears to be of silk with a regular pattern and trimmings adorned with geometrical figures. Eumorfopoulos Collection.*



material. Textiles in general, and silk especially, demand the geometrical style. When Chinese silk first penetrated to Europe, it encountered there a purely naturalistic conception of art, where regular ornamental figures were subject to the scenes represented, both being imposed on the material independent and regardless of its inherent qualities. Until the beginning of the imperial period of Rome figural designs on textiles were comparatively rare.

Naturalistic art, the aim of which is as faithful as possible a reproduction of certain objects, requires a neutral material. Cloth has not only the function to cover and to protect, but possesses as material its own aesthetic effect. Thus the oldest silks showing pictorial patterns, which were found in Egyptian graves, present, in spite of their brilliant colours, a hybrid appearance, and can neither be fully appreciated as paintings nor as creations of the weaver's art. Most of these purely naturalistic designs which are found on the clavi, or trimmings, of robes, are embroidered, a technique which comes closest to that of the painter.

Already towards the end of the 2nd century A. D. the people of the decaying empire were seized with a despairing contempt for the human body and nature in general. Artists no longer sought to uphold the glories of the world of the senses, but confined themselves to the reproduction of its bare essentials and their spiritual order, which they could only depict by neglecting the natural details, by emphasizing the essential features, and by the meticulous subordination of every stroke of the brush and patch of colour to the general composition.

This mood was eminently suited to the treatment of silk. If the beauty of natural form is no longer an essential, embroidery, at best an inadequate substitute, was no longer necessary. The craftsmen began to weave patterns into the silk itself; the effect of this technique is less delicate, but heightens the severity of the geometrical composition. The rectangular linen binding hitherto customary was replaced by the closer diagonal twill binding, which produces a smooth surface, the sheen of which is in itself an element of artistic creation.

The melancholy feeling of impending doom increased the willingness to adopt mysterious Oriental motifs. Nothing indicates the trend of the hopes of that age better than the fact that on silks of that period the figure of a hero





*Fragment of clavus from a tunic of the Coptic period with Biblical scenes embroidered in silk. Louvre, Paris.*

slaying a lion frequently appears. The Romans identified him with Hercules, but descent from the Babylonian Gilgamesh, and other redeemers of the Near East is unmistakable on grounds of style alone. The contours of the pattern on the so-called Hercules silk found at Achmim are as yet naturalistic in their effect. The garlands of rose-buds which border and fill the pattern are also of the old style, but men and beasts are represented in the design as unreal yellow shades on a blue ground. In the following period the lion slayer merges with the figure of a Greek horseman, with the

radiant Persian god Ormuzd, the conqueror of darkness, and finally—though this is never plainly expressed—becomes the figure of the Redeemer, struggling against the monsters of darkness and evil.

One of the oldest figured silks is the so-called Joseph silk, one of the treasures of the cathedral of Sens in France (see ill. p. 364), a product of the later Graeco-Roman period, characterized by the lack of symmetrical grouping, which harmonizes so ill with the texture of silk.

Even after the conversion of the Roman Empire in the 4th century, purely Christian subjects remain rare at first. Fragments of silks and written evidence tend to show that subjects from ancient mythology, from animal life, landscapes and even scenes from the circus were preferred. It must, however, be said that fragments of a silk tapestry preserved at Aix-la-Chapelle and Paris, showing a charioteer standing erect in a chariot drawn by four horses reveal in their rigid forms that the figure is intended to convey some religious or symbolic meaning.

In the 5th and 6th centuries Christian subjects become frequent, and are treated in a more naturalistic manner. A flaming red silk in the Christian Museum of the Vatican, which may possibly be of Alexandrian origin depicts in surprisingly life-like manner the scene of the Annunciation (see ill. p. 364). A remarkable feature is the absence of the red and violet

*Silk tapestry showing twin figures of riders, presumably Amazons. Alexandria, about A.D. 500. Cluny Museum, Paris.*



shades of purple which are found in nearly all Byzantine silks; the scenes and the garlands framing them are blue, white, yellow, and brown on a bright red background.

In the cathedral treasuries, particularly of France, there are many such silks dating from the following centuries, and treating nearly every Biblical and ecclesiastical subject. But the naturalistic forms of Classical Antiquity are no more; human and animal figures are treated in the same manner as borders and geometrical devices, the colours are no longer in accordance with Nature, but are subject to the requirements of the composition, the ruling principles of which are symmetry and harmony. The higher spiritual and moral order which Christianity was to give to the world had found its artistic counterpart.

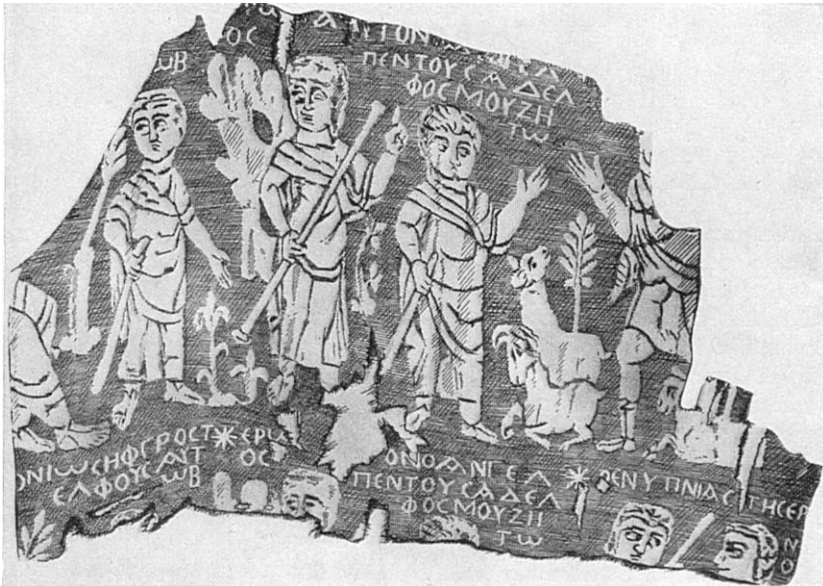
This Christian style in silk attained to its highest perfection in the remoteness of the Egyptian monasteries of the 7th to 9th centuries, in the so-called Coptic style. The dragon-slayer is identified with St. George, colour and line developed on the glossy silk background absolute autonomy, which makes these silks works of art of the highest order.

The Coptic style remained isolated. It was the silk style of the Sassanid era in Persia which achieved world-wide renown. In Persia a wealthy merchant-class, based on the country's monopoly of trade between East and West, had developed a high state of culture, made up of Eastern and Western elements.



*Tapestry showing the Annunciation. First half of 6th century. Christian Museum, Vatican.*

This composite civilization was governed by the reinvigorated religion of Zarathustra. The spiritual power of this religion and the superb organization of the State produced a style in which great vital strength is bounded by equal severity of form. The Sassanid weavers evolved the style dominated by twin motifs placed opposite to each other, a style which though geometrical in its severity, is nevertheless full of life. Ancient Babylonian designs with their twin griffins fecundating a palm-tree placed between them served as a model. In Persia this palm became identified with the

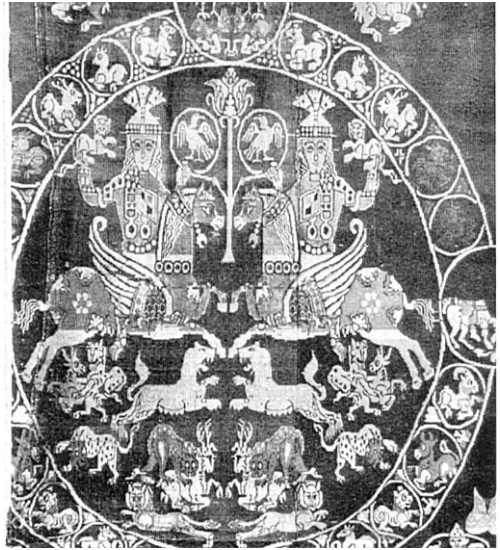
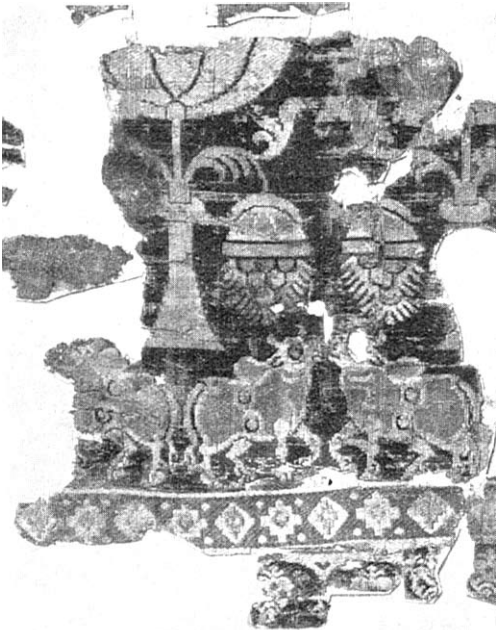


*"Joseph tapestry", 4th or 5th century, in the cathedral of Sens. Left: the mission of Joseph to his brothers; right: his meeting with his brothers, who are guarding their flocks, and in the centre the angel instructing him.*

Indian tree of life, the “homa”, and there resulted as a schema for the weavers a central axis—either figurally reproduced or merely imaginary—on both sides of which identical figures were woven into the material (see ill.). Three centuries of Sassanid rule passed, before, about the middle of the 6th century, this peculiar silk style was developed. Even on the rock reliefs of King Chosroes II (6th century) in Takibostan the patterns of the dresses—which are plainly recognizable as silk—are geometrical and symmetrical, but not yet actually twin reflections of each other. Stars and rosettes alternate with animal subjects, especially ducks, which, as frequently in such designs, are framed in two circles. From the Hellenistic world the Sassanids adopted the sea-monsters, griffins, and lions, which the Greeks themselves had originally taken from the Orient.

Shortly before the end of the Sassanid rule in the 7th century the twin motif style is fully developed. From this period dated the magnificent silk of the last king Jesdegerd, who was driven from his throne by the Arabs in 640. Riding a griffin-like beast the hero swoops down upon a lion which has attacked an ass, and with one thrust of his spear slays them both—the strength and the stupidity of Evil.

*Tapestry showing Persian “Tree of Life” and twin bullocks. Byzantine-Sassanid style. Textile Museum, Lyons.*

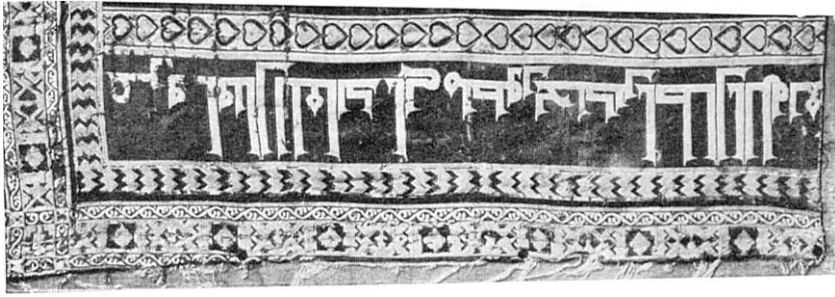


*Sassanid “horsemen-tapestry”, 7th century. (Section.) Palace Museum, Berlin.*

The composition, which has been traced back to the ancient Persian legend of Prince Bahram Gor, is wrought on a darkly brilliant background, the figures traced on severely geometrical lines with complete absence of light and shade. Imitation of Nature has been replaced by narrative of form and colour. Lions and ibexes which are grouped around the scene are not intended to create a naturalistic effect, but to give to the whole a more perfect balance. The style is perfectly adapted to the material, the brilliance of which achieves its full effect.

This technique permitted the weavers to repeat the same motif as often as the width of the piece might require. In this way the “endless pattern” developed, which appealed so strongly to the Oriental mind, in particular to the world of Islam. Life has its origins in the Unknown, and returns to the Unknown; anything may be begun or ended anywhere, there is no complete entity. Therefore, the Persian weavers saw nothing amiss in cutting a figure in two; the rigid belief in the work of art as an entity with finite boundaries, is a product of the European urge to create things complete and final in themselves.

The colours of these Sassanid silks were exceedingly rich; deep blue, dark green, many shades of red and purple, pale yellow figures, often making use of the colour of the raw silk, rarely white, and very frequently black.



*Mohammedan silk with Cufic lettering. 10th century. Probably brought from first crusade by Godfrey of Bouillon (Section). Louvre, Paris.*

Sassanid silks were counted among the most coveted possessions of the European courts and cathedrals. The Syrian and Byzantine weavers adopted the technique and the comparatively limited range of subjects of the Sassanids. The details given in the 9th century by Anastasius, a Roman librarian, in the “*liber pontificalis*” concerning the treasures in the churches of Rome contain, apart from the deep purple silks with their typically Byzantine scenes from the life of Christ, nothing but pieces patterned with griffins, birds, peacocks, lions, leopards, and elephants interspersed with rosettes and palmettes, surrounded by rings, garlands, and meander patterns.

The conquest of Persia by the Arabs merely served to increase the tendency of the Persian weavers towards geometrization and abstraction. The Mohammedan distaste for naturalistic

reproduction is—like that of the ancient Hebrews—a legacy of their nomad days; when they settled, these tendencies grew weaker, but retained nevertheless for a long time a certain antinaturalistic influence on art. The motifs of Persian silk-weaving remained the same under Arab rule; the Persian civilization was much too vigorous to be immediately transformed by the conquerors, who in this respect were inferior to them. Under the impetus of Islam the Persian silk style spread far to the East and North, where the technique of Persia became blended with that of India and China; Persian technique was superior, and formed the style of pictorial silks even in China itself. The Turkish tribes in particular from the interior of Asia carried on the Persian style of silk-weaving. The inventories of St. Paul’s in London mention, as



*Miniature from a late medieval Arab manuscript. The dress of the two figures on the right and of the recumbent figure bears patterns formed from elaborations of Cufic script. National Library, Paris.*



*Fragment of a chasuble, the outer liturgical vestment worn at Mass. Seljukian silk-brocade with twin lions in circles. 13th century. Textile Museum, Lyons.*

late as 1295, the acquisition of two Seljukian (Turkish) pieces of purple silk ornamented with horses in circles of gold to be made into chasubles. The preference for gold thread is typical of these Turkestan tribes which, though at that time settled in the Near East were still in a semi-barbarian state. Whilst the period from the 9th to the 12th century was in Europe filled with the struggles of the cities to develop their trades, in the East, from Bagdad to Merw and Samarkand the great silk workshops flourished, the brilliant products of which—in perfect harmony of style and material—became the finest object-lessons for the development of European artistic conceptions. To what extent this was the case may be seen by the fact that the mosaic in the floor of the Church of St. Gereon in Cologne was modelled on the style of these silks.

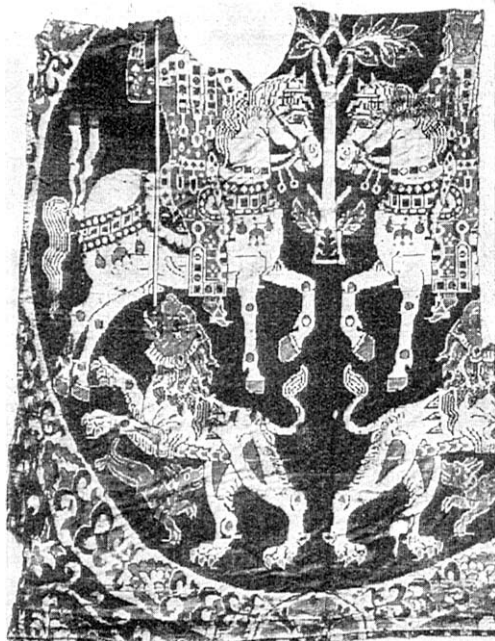
In the west of its sphere of influence, in the Mediterranean area, Islam had met with the crumbling civilization of Rome and with the barely consolidated Germanic States. Here the tendency of abstraction in art encountered less resistance than in the East, and the representation of the human figure becomes less frequent.

A new element finds its place in the technique, much better suited to silk than human or animal figures, which never entirely har-

monize with the material. This element was Cufic script. As a rule the writing consisted of good wishes, or was of a religious character intended for the recipient of the silk. These Cufic characters, which were treated entirely as ornamental figures of the pattern, were most perfectly embodied in the design in the private workshops which the Mohammedan grandees maintained to supply their own needs, and to have presents worthy of their dignity. In these Tiraz workshops, as they are called, superb silks were made between the 11th and 13th centuries. With their geometrical and floral patterns framed with lines of script they represent the purest form ever attained by the silk style.

One of the finest Tiraz textiles, made for the Seljuk prince Keikibad (1214–1239), and later made into a chasuble, is in the Textile Museum at Lyons (see ill.). No less magnificent are the products of the silk industry of Mohammedan Spain, where fresh motifs are added, and where, especially in the Tiraz workshops, the purely ornamental style is cultivated. Under the influence of Persia the style of the twin motif repeatedly made itself felt. Lions, gazelles, and birds enliven the ornamental patterns, and it is highly probable that this in-

*Byzantine silk of 9th century, from the Abbey of Mozac, France, where it was used as a wrapping for relics. Textile Museum, Lyons.*





fluence was instrumental to the development of the charming Gothic style of borderings.

From the 9th century on Byzantine silk-weaving began to develop independently. The chief artistic value of these silks, made in Byzantium, Morea, and Thebes, lies in their rich and brilliant colours, well attuned to the character of the Byzantine Empire. Unlike that of western Islam, the Byzantine style did not exclude the portrayal of the human figure. Scenes from Christian legends continue to appear, and the figure of the horseman, who had always figured in Eastern tapestries, through the Crusades received an entirely new significance. The outstanding example of a renaissance of the Persian Sassanid lion-slayer, and at the same time one of the last figural silks in Byzantine style, is the Mozac tapestry shown on p. 367 with its pale yellow horsemen in Byzantine Court array on a dark blue background.

From the Seljukian East the Byzantine silk-weavers adopted the motif of the eagle. An 11th century chasuble at Brixen (Tyrol) shows on a purple background an eagle with yellow eyes and claws, bearing a yellow jewel in its beak. His body is covered with feathers so stylized that they appear like scales; severely traced rosettes and meander-ornaments complete the design. In this hitherto unsurpassed severity of geometrical form, the hierarchic rigidity of the late Byzantine Empire is perfectly mirrored. It is not impossible that such eagles on Byzantine tapestries provided the inspiration for the creation of the eagle which was for centuries the emblem of the German Emperors.

Byzantine severity of style and the Spanish-Islamic taste for ornament went to make up

the style of the workshops founded in Sicily in the middle of the 12th century by the Norman king Roger II. The ancient coronation mantle of the German emperors was made in a Sicilian workshop (cf. Ciba Review No. 4). For the house of Hohenstaufen it was an expression of the highest state of culture that this mantle was embroidered with the Oriental symbol of the tree of life, and with two lions pulling down their enemies in the shape of camels.

In the Tiraz workshops of the Normanno-Sicilian kings silks with ornamental inscriptions in Latin are made for the first time. For a long time, however, Arab script was principally used, as on a gold brocade with gazelle pattern believed to be the coronation mantle of the Emperor Henry IV, or on a chasuble of King Robert, today in the church of St. Serinin, Toulouse.

Europe was, however, seeking its way back from abstraction to life, and even the Mohammedan East, in particular Iran and India, was affected by this movement. In the 15th century a technique developed in the ancient weaving cities of Persia, a technique influenced by the spirit of the Renaissance in Europe, which adapts naturalistic style to the exigencies of the material in a particularly charming manner. And in the 17th century the East saw a renaissance of its own past; motifs of the Sassanid age reappear, and are developed in the fantastic manner natural to that baroque period. Once again the twin lions and other animals are woven into the silks by the weavers of Bagdad and Ispahan, but the rigid severity of geometrical form has made way for a graceful lightness, pervading at that time all the world from Europe.

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For dischargeable blacks on natural silk *Neolan Black 2 R*

as a self shade or in combination with Neolan Yellow G and Neolan Dark Green B

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# The Growing, Weaving, and Dyeing of Silk in the Ancient Orient and in Classical Antiquity

By A. Varron

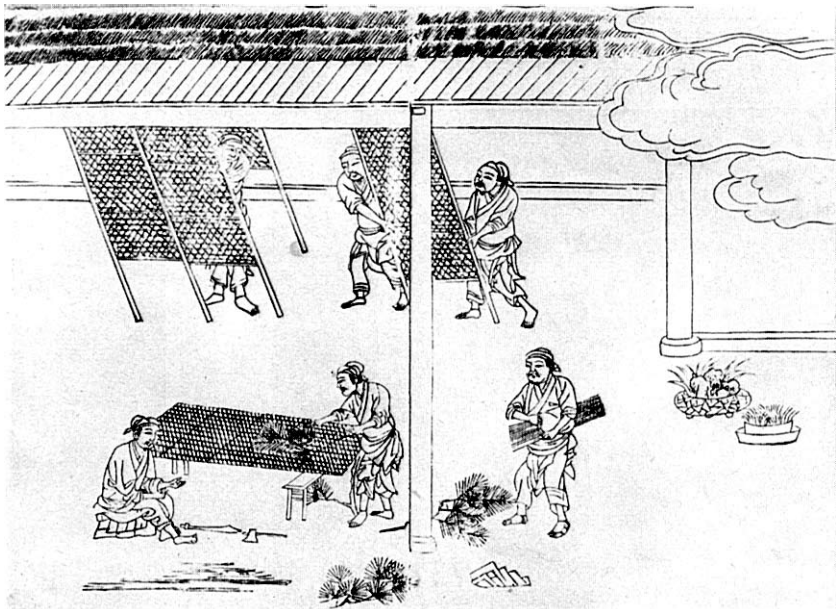
Three conditions were necessary to the rise of silk-production; the prevalence of the white variety of mulberry-tree and of the white-spinning silk-worm, *bombyx mori*, and finally a high standard of craftsmanship.

In China all these conditions were fulfilled. For a period as remote as 3000 B. C. ancient chronicles record, albeit vaguely, the production of silk. From a comparatively recent period, the 13th century of our era, a work has been preserved which contains fairly explicit information on the breeding of silk-worms and the production of silk. It is entitled *Keng-chi-chou*, and is by the poet Lou-Shou. The conservative character of Chinese crafts makes it highly probable that the methods here described do not in principle differ from those of the very earliest period.

The people of the early stages of civilization placed neither in their own skill nor in their rough and undeveloped tools complete confidence. In their belief all human effort is in vain if the gods are not invoked and the demons exorcised. In addition to the priests it is particularly the sons of gods, the emperors and princes, who are endowed with the powers of calling down the blessing of the gods on the work of man. For that reason the work on

silk-production in China was inaugurated every spring by a member of the ruling house, by the empress herself, for spinning and weaving were, in China as elsewhere, the affair of the women. During that period the ladies of the Court made the sacrifice of wearing neither fine clothes nor ornaments, thus symbolizing the concentration of all their powers on the production of the silk. It is probable that in the course of time this ceremony lost its original significance, and assumed that didactic character which similar customs possessed during the early Middle Ages. The devotion of the princes and the Court were to be an example for the people. Not until such magic ceremonies were fulfilled could the actual technical work begin. From its earliest stages the work of the silk-grower demands his undivided devotion. The slightest deviation of the temperature of the salt-bath into which the eggs are first dipped, may destroy the brood of a whole year. After the caterpillars emerge from the eggs, the various stages of their sleep must be carefully supervised. For the short period of feeding by which the sleep of the animal is interrupted, fresh food must always be ready, until finally the great awakening comes. Three days later the caterpillars

*Spinning-trays being prepared for the reception of the cocoons. From a reprint of 1696 of the work, the original of which is based on the songs of the Chinese poet Lou-Shou, 1234. National Library, Paris.*



begin to feed vigorously, and from that time on the breeder must have fresh mulberry-leaves for them every half-hour, for only by means of such feeding can a high quality of silk be produced. It is produced in the two tubular glands which run parallel to the intestinal tract, one is the collector-gland, whilst the other, the spinning-gland, effects the secretion of the viscid silk-material, which flows through fine channels to the spinning-wart or arachnidial mamilla situated in the head of the animal. From there the silk is discharged through two tiny orifices and united to a thread which the silk-worm emits from its jaws. In order to regulate and promote this process the spinners are separated from the others and placed on trays made of rice straw, which are slightly heated, as heat furthers the process of spinning, and the silk is easier to boil. Soon the animals begin crawling to and fro on the frame, secreting the threads and enveloping themselves in them. Care must be taken that the caterpillars placed on the trays are of the proper red colour; that they are ripe. Silk-worms which have fed too rapidly should not be placed on the trays, that might result in tangled cocoons. As it is, there are always plenty of cocoons, the threads of which are so involved that they can only be used for wadding. From long experience silk-growers have calculated that in a normal year one pound of silk-worms which have survived the "awakening" should yield about 12 pounds of silk.

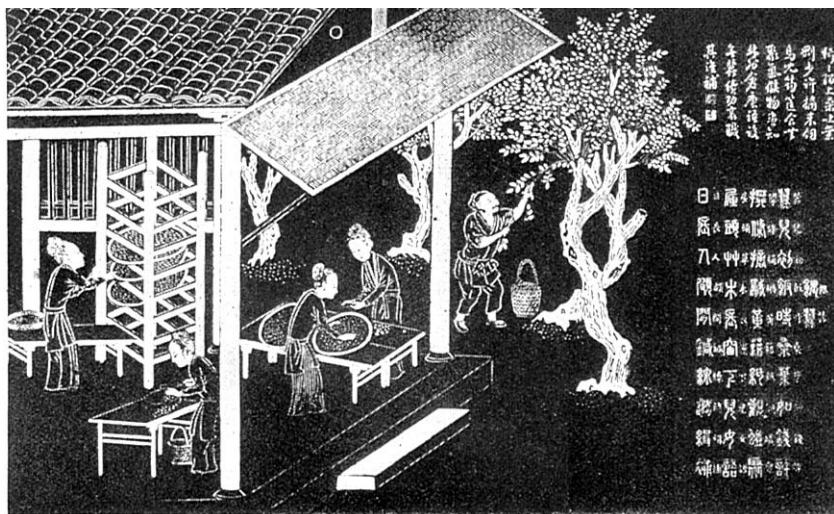
The excitement of the peasants increases as days pass; in a fortnight the moth may

emerge, bursting the white shroud, and thus rendering the threads useless. During these critical weeks, sleep is brief for the Chinese peasant. Parents and children take turns in watching the cocoons, until the harvest is safe. Great is the joy and relief when the finished cocoons lie like the white blossoms of a fruit-tree on the trays of the breeding-huts.

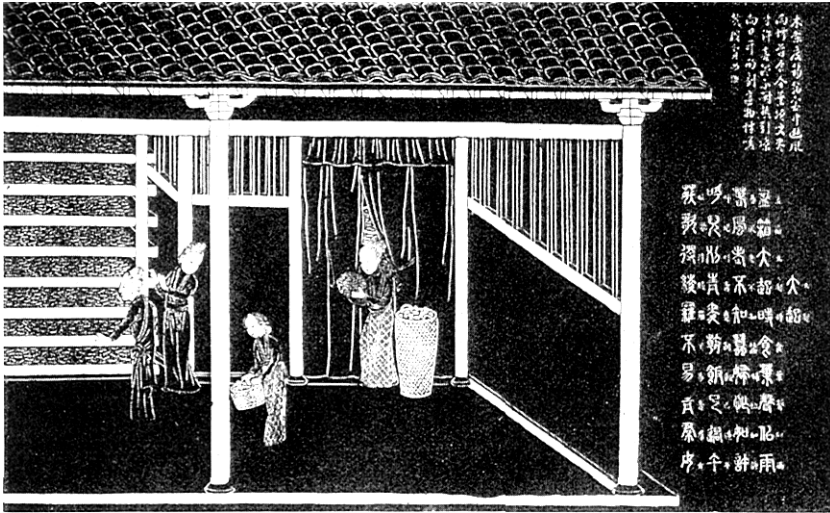
Next, the cocoons are placed in boiling water, the gummy substance which holds them together is dissolved, and the water beaten with rods, to the ends of which the threads adhere. These are then wound on to reels. That is the end of the first stage of silk-production. The thread can now be dyed and spun. The finest of the moths which were suffered to develop are then brought together for breeding; the foundation for the next harvest is laid. With thanksgiving for the kindness of the gods the work is brought to an end.

Technical knowledge was not readily divulged in former times. Even when in the 6th century A. D. Europeans finally learnt the secret of silk-growing from the East, a long time passed before it was possible to produce a serviceable raw silk. Until the 12th century the Far East remained the principal source of the raw materials of the silk-industry. So much the greater, however, was the knowledge of weaving and dyeing among the ancient inhabitants of the Eastern Mediterranean.

The Chinese had also a highly developed technique of silk-weaving, and the few rem-



*Sorting the cocoons. From a Chinese reprint of 1769 of the plates of the 13th century Chinese poet Lou-Shou, engraved on stone and printed in black on white silk. National Library, Paris. Copies of this rare work are also in London, New York, Berlin, and Leningrad.*



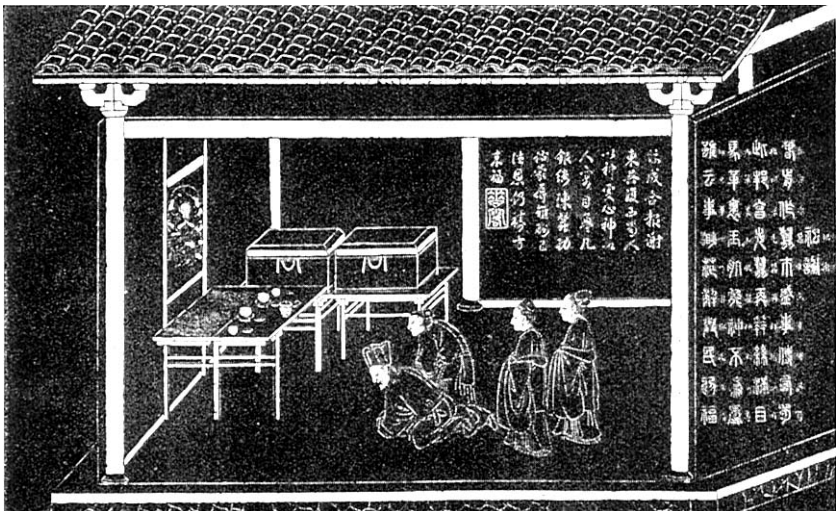
The "great awakening".  
After Lou-Shou.

nants that have come down to us from the earlier periods, point to a high standard of excellence. Most of the textiles made of Chinese silk which have been preserved, are, however, from European, Egyptian, or Persian workshops, so that our knowledge of the technique of these countries is of necessity much greater than that of China.

Masters of the weaver's craft in the Ancient World were the Egyptians. Three thousand years before Christ some of their linens were as thin as the finest of gauze. The Greeks made woollen cloth, the rich softness of which produced those inimitable folds, which in their sculpture still excites our whole-hearted admiration. Thus there were ideal technical conditions for its reception,

when in the first century of the Christian era, silk found its way to Europe.

Silk was at that time a rare and infinitely costly article; out of one Chinese piece several new ones were made by unravelling the threads, and weaving them anew with linen or wool. If the warp of a piece of cloth was silk and the woof of another material, it was known as "subsericon", and if the components were reversed it was called "tramosericon". The rare pieces composed wholly of silk were distinguished by the name "holosericon". In the graves of Achmim (Egypt) a large number of wrappings of this kind were found, from which no fewer than seventeen different forms of technique have been deduced. The ruling principle in all these



Thanksgiving to the gods. From the book of Lou-Shou.

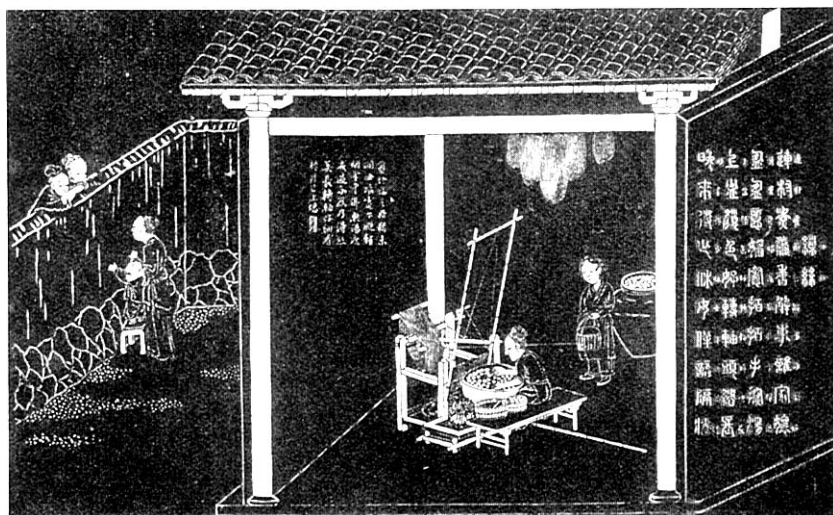
methods consisted in the difference in thickness between the threads of warp and filling. A peculiarity of the half-silk fabrics was to work woof-threads into the warp, either by omitting some of the warp-threads or putting them close together. Occasionally linen or woollen threads were simply overspun with silk. A description from the pen of bishop Theodore of Cyrz, dating from the 5th century makes it plain that for the weaving of silk as of any other material there were only three essential instruments, the loom, the comb for seizing the threads of the warp, and the shuttle to introduce the threads of the woof. It is not certain whether the horizontal or vertical form of loom was preferred for silk-weaving.

It is probable that considerable time elapsed before a technique of weaving developed which was in every way suited to the peculiarities of the material. For linen, which in its finer forms is somewhat akin to silk, the rectangular linking of warp and woof, known as linen-binding, had hitherto been customary. This technique with its equal spaces between the threads fulfilled the requirement that the cloth should be as transparent as possible. In addition to this style there was also twill-binding, where the connection-points of warp and woof lay on a regular zig-zag line. This technique imparts to the fabric a somewhat greater smoothness and closeness of texture, and breaks the uniformity of the surface. The threads of the warp cannot be traced so easily, the eye being distracted in an upward and side-ward direction. Picturesque movement takes

the place of clarity, the rapid change in the position of the threads brings out the lustre of the material.

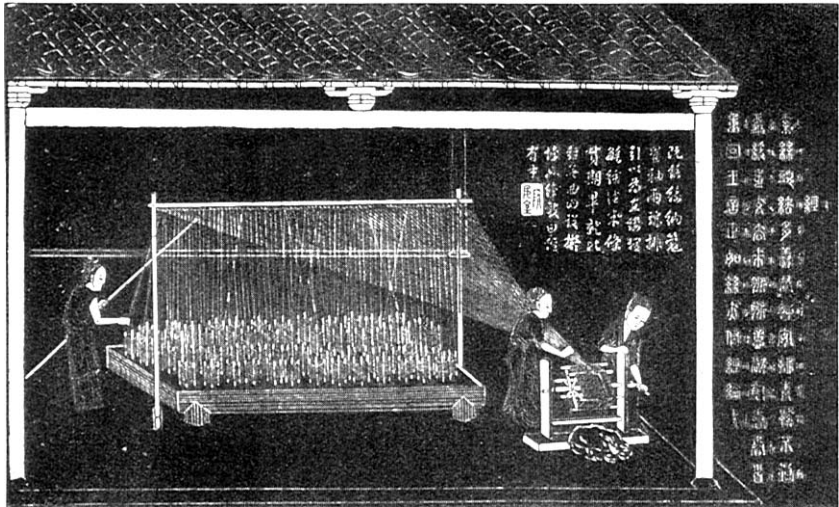
It was perhaps the recognition of the fact that the peculiar qualities of silk demanded special treatment which led to the development of that technique which was named after one of the greatest centres of silk-weaving, Damascus, and became known as damask-weaving. In this style the effect of the involved and unexpected is increased. The points where warp and weft are linked appear to move diagonally away from each other, as though impelled from some centre of force.

Neither the Greeks nor the Romans of the Republic developed a style of pictorial tapestry. Patterns composed of purely geometrical figures or of animal or floral details were more in accordance with the taste of the period. It was only towards the end of the classical period that textiles with pictorial designs were produced under the influence of the East. During the first two centuries of the Christian era a technique was employed in Egypt, which, like the painter's brush, permits of the tracing of every individual line: embroidery, which remained in vogue as long as the naturalistic style demanded the reproduction of every detail of the pattern. With the rise of the geometrical style, however, the craftsmen of Egypt began to weave their patterns into the material. The decidedly mechanical character of weaving was very well suited to this style, which was dominant during the closing age of the Ancient World. It reached its height in the Sassanid period in



*Unwinding the cocoons. After Lou-Sbou.*

*Preparing the weft. After Lou-Sbou.*



Persia, and dominated the silk-weaving of two continents until the close of the Middle Ages. Characteristic of all these patterns is that each detail is repeated, facing the original in a reversed position, as though reflected in a mirror. It was the Sassanids, too, who hit upon the idea of counting off the same number of threads on either side of the central thread of the warp, and there simultaneously pulling down corresponding threads of the weft, so that with one movement of the loom, identical weft-threads were woven in on either side. This procedure could be repeated as often as the width of the material allowed. Of course when the end was reached the pattern was simply cut short. In this manner the "endless" pattern developed, which is so typical of the Oriental mind, and which is familiar to us from the style of carpets known as Persian. For centuries these patterns were so much in accordance with the taste of Europe and Asia, that there was no need for the Persian craftsmen to modify their technique. Thus silk-weaving remained at the same stage until the end of the Middle Ages.

Ancient silks which have been preserved still show colours of great brilliance, but that peculiar lustre which one always associates with silk is lacking in them. Did they ever possess it? Have the centuries changed the qualities of the colours? Silk is naturally lustrous, but must be woven in such a manner as to allow as large as possible a number of threads close together to form a smooth surface, before the light can be adequately reflected in it.

The astonishment caused in the 10th century by a new technique developed in Byzantine workshops, which increased very much the lustre of silk, justifies the view that the Ancients did not bring out this quality in their silks.

But little later, in the 12th century, a silk-brocade industry grew up in Cyprus, the success of which was based on the fact that instead of real gold threads as hitherto, linen or silk threads covered with gold leaf were used. The brilliance of this somewhat deceptive material was never of very long duration, and many of these brocades now show only faint traces of their former beauty.

Dyeing is imitation of Nature. The more brilliant the colours natural to a country, the more colourful are the everyday utensils and textiles. The most primitive peoples in the world have their technique of dyeing, and in the highly civilized countries of the Ancient World dyeing was raised to the level of a fine art. The religious and social significance which in time became attached to the various colours, made the dyer's craft a very important one. The Chinese chronicle of Choo-king refers to dye workshops of 3000 years B.C. which even then were said to look back on a long history. At any rate, there was always coloured as well as white silk, at first in plain colours, and later in every imaginable shade. In the excerpts from Choo-king, prepared by the philosopher Confucius (551-478 B.C.) the red and black silks are described which were presented as tribute to the emperor Yu about 3000 B.C.

In the Cheuli, 12th century B.C. there are

special regulations for silk-dyeing. The threads were soaked in water for seven days, dried, and dipped in water to which ashes from the wood of the lan tree (the blossoms of which were used as a yellow dye) had been added, and strewn with powdered shells of shell-fish. After being soaked once more for seven days and nights, the threads were ready for dyeing.

The importance attached to the lengthy procedure of preparing and dyeing the threads may be gauged from the fact that there were specially appointed officials to supervise it, who continued to function until the 17th century.

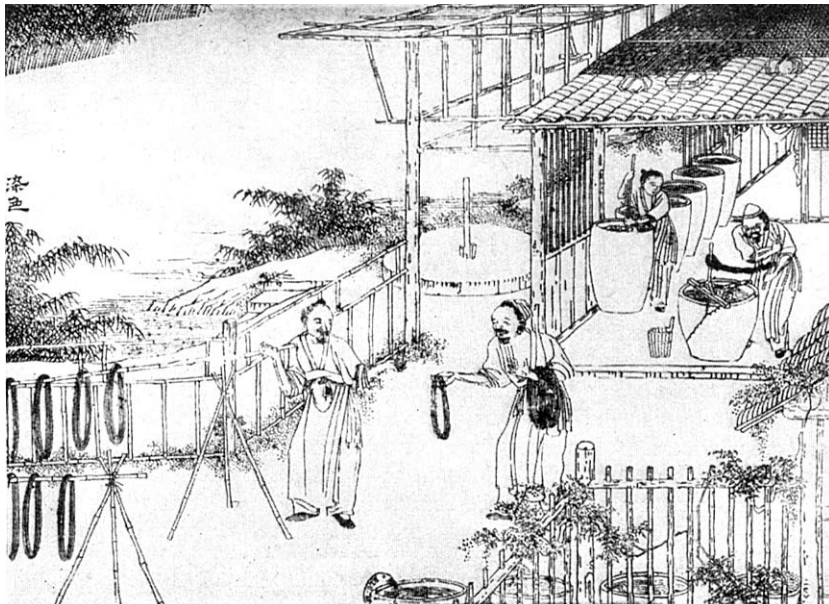
The dyes, too, were well protected and preserved in the imperial store-houses. Ancient writings contain some reference to the manufacture of these dyes. Red was extracted from the flowers of the dye-thistle or from safflor. The dye was pressed into small cakes, and before use was pounded and dissolved in water. Mixed with an infusion of dried plums, caustic soda, and the ashes of coarse-ground rice, it produced a deep red, the shade of which was varied by adding sumac blossoms. The safflor plant, so important for the production of red dye, was introduced into China by an officer at the time of the Han dynasty. Yellow was achieved by means of an infusion of the bark of the phollodendron mixed with indigo, blue was a product of *indigofera tinctoria*, known to the Chinese as lan-tien. Green was extracted from the bark of the rhamnus,

but the process was so involved and expensive that the dye was used exclusively for silks. The highly individual shades of the earliest Chinese silks are not to be found in those of later date; from the 7th century on the Chinese obtained their dyes from India and Persia; and the colours of their silks became similar to those of Europe.

The dyers of the Mediterranean countries were by no means dependent on imports. Their dyeing was of such quality that until the end of the Middle Ages no material modification of the technique was necessary. The dyers par excellence of the Ancient World were the Phoenicians; later the Byzantine emperors declared dyeing to be an imperial monopoly, and at the end of the Middle Ages the dyes produced in the Spanish workshops were the most sought after.

Anastasius, a Roman librarian of the 9th century, recorded a large number of names of Byzantine dyes, the most important of which was "blatta", a word probably of Oriental origin, and signifying purple. We are unable to identify the majority of these dyes, but we know from fragments of silks which have been preserved that the term purple comprised nearly all shades from deep red to violet, and even certain shades of green.

In the East the Indians and Arabs were the masters of silk-dyeing. The Mohammedans developed their sense of colour and their dyes in the manufacture of fine faience, from whence



*Dyeing the threads. After Lou-Shou.*



they transferred them to textiles. The iridescent lustre of the materials, which was adapted from the faience technique, was achieved by linking threads of similar shades in the damask style of weaving, or by following the Indian methods of dyeing.

The decisive technical inventions in the field of silk-dyeing and weaving were made in modern Europe. Nevertheless the fabrics manufactured by the late Graeco-Roman and Oriental craftsmen have maintained their fame and reputation unimpaired to this day.

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# *Cibacet Red B*

Very good fastness to light  
on bright or matt acetate rayon  
Excellent tinctorial power  
dischargeable to white

## Silk and the Development of Trade

By A. Varron

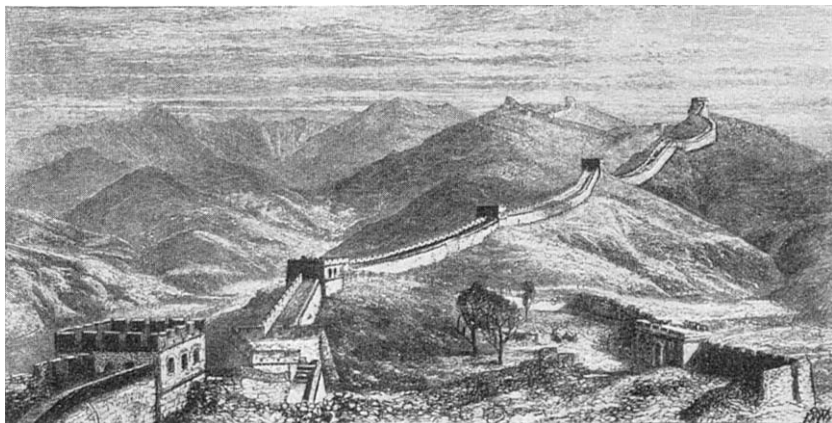
It was silk which paved the way from China to Europe. The political and economic rise of China under the Han dynasty (206 B.C.–A.D. 221) was accompanied by an urge for expansion. In the 4th century B.C. there already existed a silk trade with India. The emperor Shi-ho-ang (about 250 B.C.), who belonged to the Tsin dynasty, had already attempted trade communications with the West, but the nomad Huns who inhabited the deserts west of China were a source of constant danger. As a protection against them the Great Wall was built. Military expeditions followed, and in 126 B.C. a Chinese army is said to have penetrated to the eastern shores of the Caspian Sea, twelve years later a caravan proceeded by order of the emperor to Bactria (Balch) on the Amu Darja in Afghanistan. Among the goods which it carried, there is said to have been silk. In Bactria, which was ruled by a Greek oligarchy, there were great trading stations of Persian merchants. Thus silk first found its way to Persia, which was at that time under Parthian rule, and was the communicating link in the entire trade between the Graeco-Roman world and India and the Far East.

In 70 B.C., Chinese envoys attempted to establish direct trade connections with Rome, but the jealous Persians told them such terrible tales of the dangers which threatened them at sea that they deemed it more prudent to return.

At about the time of the birth of Christ tribes of Huns occupied Western Mongolia and destroyed time and again the laboriously constructed "silk roads" (cf. Ciba Review

No. 10, p. 316) which, starting from one of the western provinces of China, led along the south and north borders of the terrible desert of the Tarim basin, which has only recently been entirely explored, finally ending at Bactria. Ruined forts and towers still bear witness to the high military and administrative qualities of the Chinese, who made that barren wilderness, covered with salt-water swamps and entirely without fresh water, passable for the caravans. The most important stages had pipe-lines carrying drinking-water for the garrisons and travellers. Nevertheless, the toll of human life taken by these roads must have been very great. Along the road crossing the terrible Lobnor swamp the English explorer Sir Aurel Stein discovered a burial-place which yielded the oldest silks as yet known.

The northern route was probably the easier of the two, being protected by a range of mountains against the winds of northern Siberia; on the other hand, it was in these mountains that the wild tribes lived, who lay in wait for the caravans and their treasures. The southern route had the more inclement weather, but it led through the principality of Khotan, the rulers of which had been the first to penetrate the secret of silk-manufacture, and had since then maintained close commercial relations with China. In Bactria, where the two roads ended, the goods were prepared for the transport to Europe. One of the two routes led through Afghanistan, which, though at that time partly peopled by Greeks, was still sufficiently forbidding, and from there to the great Indian ports. In these



*The Great Wall of China. From a 19th century drawing.*

ports there were Greek and Egyptian trading-agencies, which arranged for further transport by sea to one of the Red Sea ports, and from there to Alexandria, where the goods were redistributed for the European ports. The second route from Bactria led through North Persia to the great cities of Mesopotamia and from there via Damascus to Beirut or Sidon, or via Jerusalem to Gaza.

During the subsequent centuries these silk routes were never entirely forgotten, but the great dangers and equally great expenses rendered the trade comparatively unprofitable, the more so as the goods passed through so many hands between the Chinese producer and the European consumer that the price finally realised was almost absorbed by commission to the many intermediaries.

Already under Parthian rule, in the first three centuries of our era, the Persians had succeeded in gaining control of most of the commerce between East and West. Under the powerful Sassanid dynasty (until the 7th century) this virtually became a monopoly. Merchants from China or Khotan were not allowed to come into direct contact with those engaged in the European trade, at that time for the most part Syrians, Greeks, and Jews. On the western frontiers of their state the Persians took the goods of the European merchants in exchange for those of the East. In Bactria Persians and Mongols met.

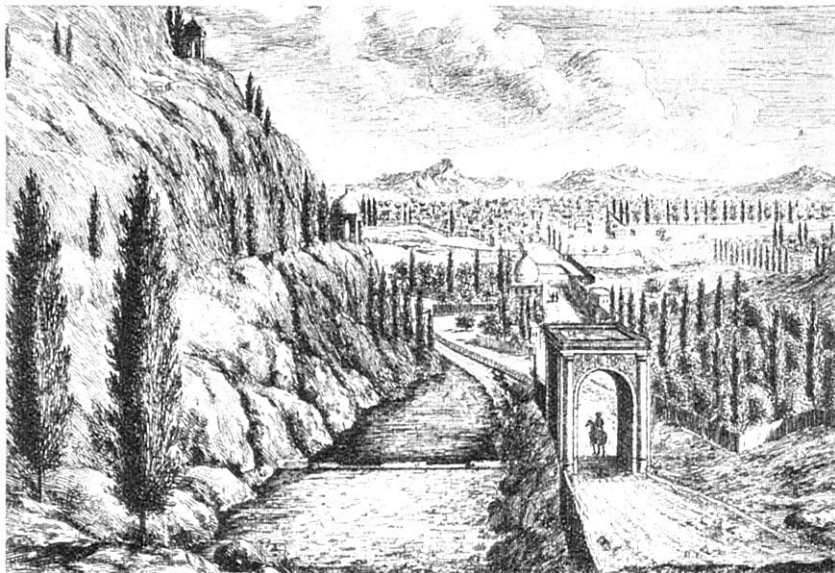
Mute and motionless as the watch-towers along their roads these Chinese silk-mer-



*Ruins of an ancient Chinese watch-tower, on the southernmost of the great silk routes.*

chants, Sericans as they were called by the Europeans, stood facing the Persian traders. The bales of silk were placed between the two parties, hands buried in voluminous robes, so that only the fingers showed, and then bargaining began by signs. The Sericans had good reason not to speak; one incautious word might have revealed the precious secret of silk-growing upon which they lived.

It was economic necessity which drove the Europeans to seek a sea route to the Far East. Science joined in the attempt. At the end of the 1st century the geographer Marinus of Tyre attempted to establish the overland route through Central Asia to the mysterious silk city, Sera Metropolis, basing his calculations on data furnished by a merchant named Maes Titanios. The great successor of Marinus, Ptolemy of Alexandria (2nd century),



*A view of Thiraz, the ancient Persian city of the shores of the Persian gulf. From Thiraz the Romans imported silk almost without any intermediary from the 2nd to the 4th century. From a travel-book of 1673.*

elaborated these calculations, and provided a basis for navigation.

Meanwhile, the Indians had formed trade connections to the East and the West from their favourable situated seaports. Large ships sailed from the mouth of the Indus and the Ganges to the Persian Gulf, the Red Sea, and in the other direction to the Malayan Archipelago, and probably also to the southern ports of China. A European writer, probably a merchant captain, wrote a brief but fairly clear account of the country of the Sericans, called "Periplus maris Erythraeae" (Voyages in the Erythraean Sea): "Beyond the peninsula (Malacca) the sea ends somewhere in the country of Thin, and in the interior of this country, high up in the North, lies a very large town called Thina. From this town raw silk, spun silk, and silk cloth is taken by land through Bactria to Barygaza (a port on the coast of India)... But it is not easy to reach Thina."

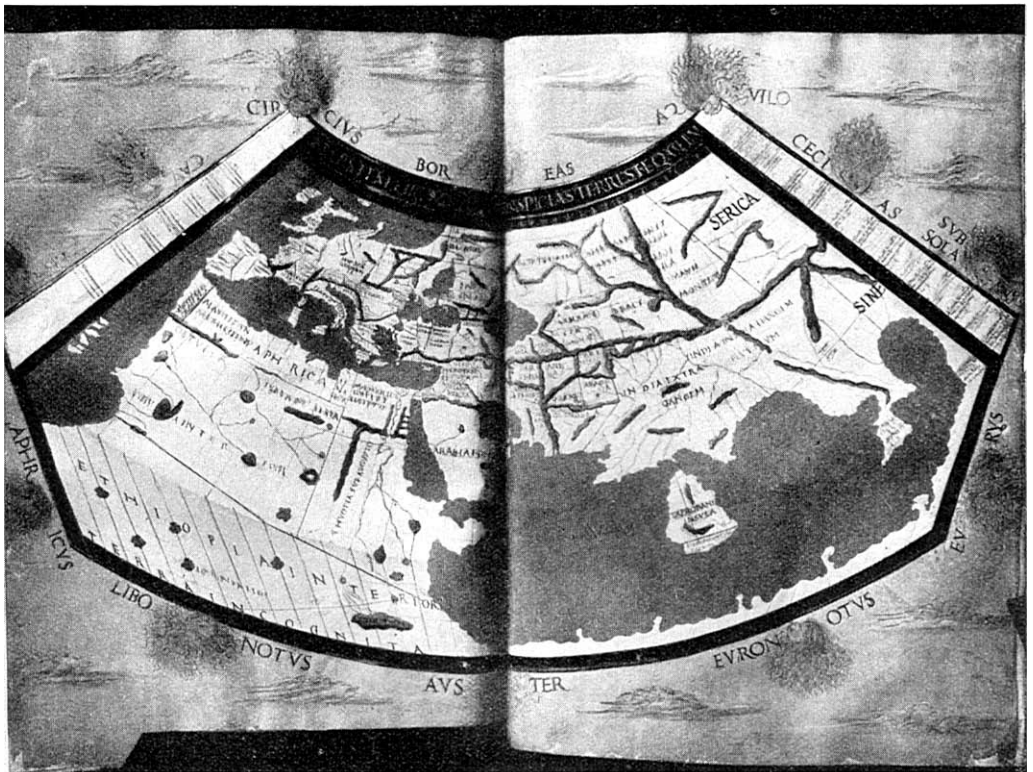
Contrary winds impeded the passage of sailing-ships from the Red Sea to India, and for that reason the overland route for silk was

preferred in the time of the author of the "Periplus". But Roman energy and thoroughness brought the problem of navigation nearer to its solution. The times of the monsoon storms were carefully noted, and soon the ships sailed eastward in July with the west monsoons, returning to Egypt in January with the east monsoons.

Difficulties of language made the transport very expensive. The Graeco-Roman merchants, who for safety sailed in a body, were obliged to secure the service of some Indian in Ceylon who could speak Greek; at Annam, the next stage, a second interpreter was taken on board, whose duty it was to negotiate with the Singhalese, and finally in the Chinese port a third man was necessary, with whom the Chinese merchant could confer. It is not difficult to imagine what prices resulted from this negotiation through several languages.

In the 4th century the Chinese finally reached Ceylon by the sea route, and the following century saw Chinese merchants in the ports of the Persian Gulf. Farther than that

*Map of the world by Ptolemy of Alexandria, A.D. 150. 14th century copy in the National Library, Paris. In the extreme East, Sinae, known to the Arabs as Thsin, i. e., China. In the north, Serica, the country of the silk people. Ptolemy apparently put the same country in two places.*



*Catalonian merchants—probably silk-merchants—travelling home from the East. From the “Atlas Catalan” of 1375. National Library, Paris.*



they could not get, as the Persians used every means in their power to preserve their monopoly as intermediaries.

With the victory of Islam trade in Asia was completely transformed. Islam released forces which had been held in check by the successor-states of Classical Antiquity, Byzantium, and Sassanid Persia. The place of state coercion was taken by private initiative with all its advantages and drawbacks. The sea route to the East was now alone of importance. The caravan routes with their dangers and hardships fell into disuse, and soon became a prey to fresh tribes emerging from the unknown wastes of Asia. Persian and Arabian merchant-ships passed the fleets of Chinese and Japanese traders in the Indian Ocean and the Yellow Sea, which in the late Roman period was already known as “Oceanus sericus”. The principal article of trade was raw silk, which was woven into silk cloth in the workshops of Persia, Asia Minor, and Byzantium. The trade was not without its set-backs. Jealousy of the foreign merchants soon arose, and in the 8th century thousands were murdered in a Chinese port. Nevertheless, the trade grew, and at the turn of the 11th century commerce between the distant silk country and the industrial West was firmly established.

The introduction of silk-growing into Europe by no means produced a fall in the exorbitant price of silk. Only very gradually did the development of European silk-growing bring about a reduction in price. Until then fantastic sums continued to be paid for

silk. In a decree issued in 301 under the emperor Diocletian the maximum for one pound of Chinese raw silk was fixed at a sum equalling about £13.14s., and for “metaxablatta”, best purple silk, the figure was £161.5s.

These maximum figures were never adhered to. It is impossible to dictate prices to an economic system in decline, and all the evidence shows that prices did not sink, and in this respect even the hopes placed in the introduction of silk-growing into Europe by Justinian were not realised. On the contrary: from £6 per pound, the rate first fixed by Justinian, prices soon soared to £56.15s. and for purple silk to £228 per pound. According to some calculations these prices were even exceeded. This fantastic rise in prices was due to the disastrous policy of monopolies pursued by the Byzantine state, which thought only of its own revenues, and sought by every possible means to destroy private silk-growing, which was springing up everywhere from Syria to the Alps. The private industry was placed under the control of the tax-collectors. A contemporary of Justinian, the historian Procop of Gaza, describes how one of the corrupt officials bought up the entire private silk-crop of Syria at a low price fixed by himself, and resold it for a sum many times as large. In this way silk prices remained so high that only the richest princes in Europe were able to pay them.

The Arabs were the silk specialists of the Middle Ages; they were weavers, dyers, merchants, and buyers. Under the Spanish Omay-

yads of the 10th century great trading-centres grew up in Granada, Sevilla, Malaga, Saragossa, and Lisbon. From these centres and from the workshops and trading-posts in the north-west of Africa, in Persia, and in Turkestan, the Arabs controlled the entire trade of the Mediterranean area. The Arabian Nights do not lie when they tell of the amazing voyages made by the Arabs from the Persian port of Bassorah to the East and the West; of a merchant of Syraf, at the southern end of the Persian Gulf, named Kamesht, we are told that his agent brought back goods valued at £950000 from one journey to China. Kamesht was so rich that in 1137 he had the Kaaba at Mecca covered with gold and Chinese silk, the value of which was so great that, as the Arabian chronicle states, it could not be put into figures.

The first blow to the all-powerful Arab trade came from the heart of Asia. Gingham Khan and his Mongol nomads had destroyed

Chinese, Arab, and Indian trading-stations. The Europeans took advantage of this, and entered into negotiations with the Mongols, natural enemies of the Arabs, in order to re-organize the import of silk by way of the ancient caravan routes. The attempt was, however, foiled by the technical and climatic difficulties of the route.

More dangerous for Arab trade were the results of the crusades. Europeans began to realize the wealth and power that lay in commerce, and endeavoured to extend their trade connections. The Germanic Normans were the pioneers of this movement. King Roger II of Sicily not only introduced silk-growing into his country, he also encouraged trade in finished silks. The Italians profited by this example, and in the 13th century the silk-trade began to flourish in the cities of Italy, and helped in no small measure to lay the foundations of the brilliant period of the Renaissance in the 15th century.

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fastness of substantive shades to water  
improved at the same time  
by using*

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### *Formation of cracks in printed fabrics*

The observation was made at an early date that fabrics which were printed with alkaline printing pastes were liable to show cracks. Vat colors were printed with pastes containing caustic alkalies prior to the use of the potash method. It often happened that when printing heavy designs, the material sometimes became creased in the Mather Platt ager with the result that the printed material cracked where it was creased.

#### Oxycellulose not formed

It was thought that the cracking of the fabric was due to the formation of oxycellulose, but this was found not to be the case as the printed portions of the fabric no longer showed any weakness after the goods had been washed off.

The aforementioned defect was seldom encountered after the introduction of the potash printing method. It was only after large amounts of rayon fabrics were printed, that decrease in the tensile strength of fabrics was observed due to the employment of alkaline printing pastes.

#### Frozen materials

Frozen fabrics show a similar defect to the foregoing. Housewives are aware of the fact that if garments, etc., are hung out in the open in winter during a hard frost, they may crack if folded whilst in a frozen condition. It has long since been disproved that the water which penetrates into the linen breaks same when leaving the fibre and so reduces the tensile strength of the fibre.

The growth of plants gives some indication of the cause of cracking of textile materials. Certain plants remain elastic, pliable and to a certain extent plastic as long as they are growing. As soon as growth ceases, noncellu-

losic substances are deposited in the cells, the cell walls become rigid with the result that they lose their elasticity and power to bend. The stalk becomes woody and breaks when bent. An analogous effect is the hardening of the cell walls in the flesh of human beings and animals with age.

Cause of cracks in textile fabrics

The formation of cracks in textile materials is no doubt due to similar causes to the foregoing. The printing pastes contain a relatively high concentration of caustic alkalies and salts, which is further increased on drying.

The fibres become incrustated with salts, the cell walls become rigid and break when bent like a thin layer of wood. The application of dry heat for drying the printed goods accentuates this defect. It is, therefore, dangerous to dry goods printed with a potash printing paste on a plate drier. These types of prints should be dried in hot air driers which always leave a somewhat moister condition than a plate drier.

The type of thickening used in the printing paste plays a very important part.

Starch to be avoided

Starch should be avoided if at all possible, as on treatment with alkalies it forms aparatine which dries very hard and therefore the printed portions of the material become very brittle and is liable to crack. British gum thickening behaves more satisfactorily, but if the drying is very intense, the material is liable to crack.

Experience has shown that a British Gum-Dextrine thickening gives the best results as dextrine is very hygroscopic. The hygroscopicity of printing pastes cannot be maintained by the addition of a large amount of glycerine as the prints are then liable to run.

All the aforementioned defects are due to purely physical or mechanical agencies and are in no way connected with damage due to the effect of chemicals on the fibre. R. H.

## Historical Gleanings

### The Beginnings of the Silk Industry in England and America

Though raw silk was introduced into England under Henry VI (1422-1461) there was no English silk industry until after 1585, when a large number of Flemish weavers sought refuge from Spanish oppression in the Netherlands by emigrating to England. Exactly a century later, in 1685, the young industry received a fresh impetus by a second influx of craftsmen, this time from France, where the repeal of the edict of Nantes caused a number of the best French silk-weavers to leave their homes. The refugees settled for the most part in Spitalfields, East London. It is worthy of note that in 1630 efforts were made to cultivate mulberry trees and to breed silk-worms in England, and experiments were carried out in the grounds of St. James's Palace.

Silk was introduced into America by Cortez, who in 1522 brought mulberry trees and silk-worms' eggs to Mexico. By the end of the century, however, all traces of the experiment had disappeared. In 1609 James I made an attempt to introduce silk-growing into North America; but the ship bearing the materials was wrecked. A second attempt, in 1619, was more success-

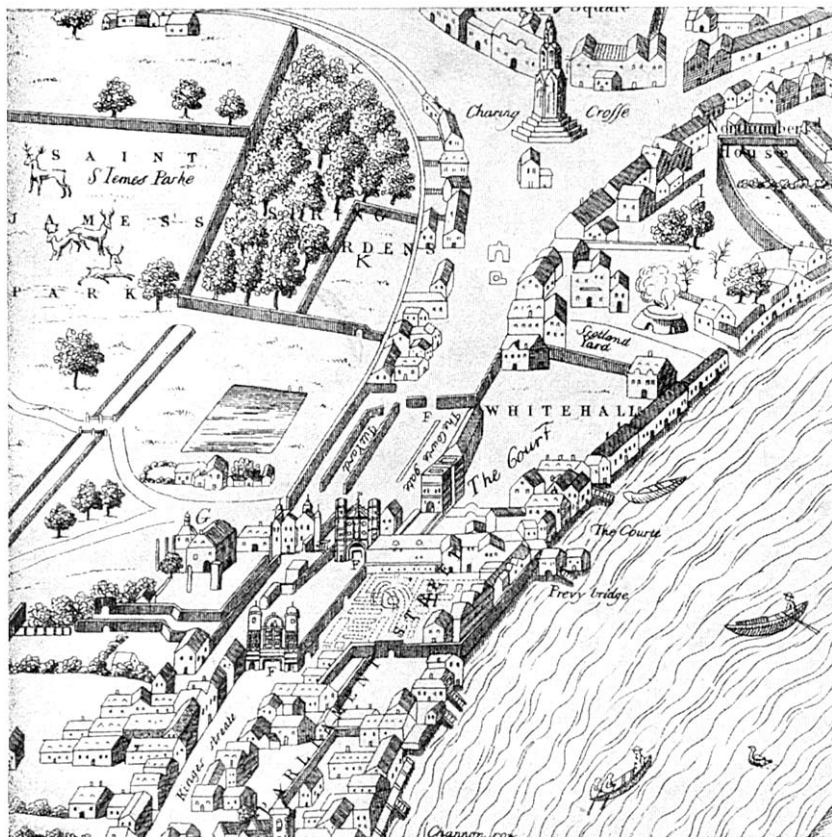
ful; every effort was made to induce the settlers of Virginia to take up silk-growing; premiums and other remunerations, congresses, lectures, learned treatises, and didactic verse, all were enlisted to promote production. One of the verses ran as follows:—

Where worms and foods do naturally abound,  
A gallant silken trade must there be found,  
Virginia excels the world in both—  
Envie nor malice can gainsay this troth!

W. N.

### A Silk-Merchant and the Discovery of America

The discovery of America was based on a scientific error of the Greek geographer Marinus, who lived in the ancient dyeing city of Tyre in the first century. According to his calculations the distance from the Euphrates to Sera Metropolis was 62 280 stadia, about 6130 miles. Marinus had made this calculation on the basis of figures supplied to him by a silk-merchant, and as neither he nor Ptolemy, who carried on his work, were in a position to check them, the error persisted throughout the Middle Ages. Relying on these figures led Columbus to believe the eastern half of the globe to be so large that he must very soon strike its East



*St. James Park in London. By Ralph Aggas. 1560. In the grounds of this park experiments in breeding silk-worms were carried out probably in 1630.*

coast by sailing from western Europe. And, indeed, when he landed on the island of Guanahani he thought he was in India. In this way the exaggerations of an ancient silk-merchant helped to bring about the discovery of America.

A. V.

### English Silk-Weavers demand Tariffs

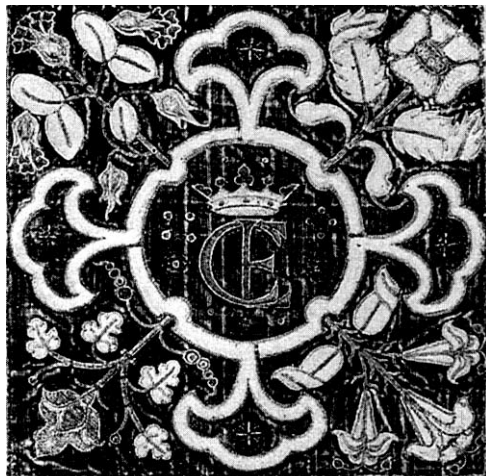
In 1700 the English silk-weavers laid a petition before both Houses of Parliament, in which they showed in detail that the duty imposed hitherto on imported silk was inadequate, and was to blame for the fact that French silk was to be had in England at a price lower than that asked for English silk. The English weavers were at pains to stress the importance of their industry, and stated that the production of silk was twenty times as large as in 1664. Every kind of silk was made in England in exactly the same quality as elsewhere, not excluding France. As an instance the petition quoted the manufacture of black silk for caps and shawls, which had been unknown in England 25 years previously and now yielded £ 300 000 yearly. The silk-weavers also stated that the exports of serge and other woollen materials to Italy and Turkey had materially increased, and that in exchange for these goods raw silk and semi-finished silks were imported, thus ensuring increase of work for the English manufacturers.

Unfortunately, the imposing table of figures with which the silk-weavers hoped to prove their case, put the import-duty on French silk lower than it really was, a blemish which probably did not add weight to the petition.

H. G.-N.

### A Controversy on Silk in the „Times”

Following an article in the “Times” in November 1877, a controversial correspondence was carried on through the medium of that journal, whether or not the silk-manufacturers derived undue profits by increasing the weight of silk in the process of dyeing. “A Consumer” wrote: “Silk of good quality, honestly dyed, loses 25% of its weight... But there are dyers who make a pound of silk weigh two pounds, when dyed black... Nor is this all. After the precious tissue is woven, the fabric is heavily dressed with gelatinous matter... the dress silks of the present day will not bear rolling.” And the president of the South Kensington Exhibition of Silk and Silk Material, which had taken place a short time previously, even maintained that the manufacturers demanded a six-fold increase of the weight of silk in the process of dyeing. A Spitalfields manufacturer wrote with regard to the materials which had aroused objection: The miserable counterfeit... is made of “schappe” (spun silk waste) in Germany. Soon more manufacturers entered the lists, and accused earlier correspondents of lack of knowledge. The weighting of silk did not bring undue profits, and was the result of the prevailing fashion. Furthermore only the weft was subjected to a chemical process, whereas the warp was of pure Italian silk. A manufacturer of Lyons declared that the reduction in price brought about by this weighting of silk was in accord-



Square Panel of red velvet with gold and coloured-silk raised embroidery. English. Late 16th century. The Duke of Devonshire.

ance with the needs of the public: formerly 12-14 yards of silk went into a dress, now 25-40 yards were required. At the close of the controversy the “Times” published a letter stating that silk of good quality was still to be had in plenty, and that it cost 25% less than formerly. As regards “schappe”, it used to be regarded with contempt, but is now widely used, yielding “a most elegant article at a price within the reach of the million”. In December 1877 the controversy was published separately. In the preface of this publication the hope was expressed, “that the fullest discussion of this question will have the effect of warning the public against spurious makes, and increasing the demand for good and pure silks, which can be obtained today as readily as in former years”.

H. G.-N.

### The Origin of Silk-Growing in Japan

is described in the Japanese legend of the “Girl with the Golden Banner”. There once was a king whose queen died after the birth of her child. The second wife hated her little stepdaughter because of her beautiful golden hair and had her buried alive. But the good spirits delivered the child from its prison, and it became fairer than ever. Then the wicked queen planned two other prisons worse than the first, but it was of no avail, the spirits were on the side of the girl with the golden banner. After the final attempt of the queen, they delivered the child from her power, and carried her away to the coast of Japan. The princess had scarcely set foot on the sacred soil when she was transformed into a silk-worm. In this legend the different stages of the metamorphosis of the silk-worm are plainly recognizable. The golden hair makes it probable that the legend was of Indian origin; for the cocoons are yellow in colour, whereas those of China are white. The short yellow threads which hang from the empty cocoons may well have given rise to the legend of the golden-haired princess.

A. V.

## **The Mystery of the so-called Coan Silk**

has remained unsolved. In his *Natural History* Aristotle (384–322 B.C.) describes a caterpillar supposed to occur on the island of Cos, on the west coast of Asia Minor, the threads of which were woven into cloth. From “bombyx”, the name given to this species of caterpillar, the word “bombyciniae” was coined for those especially thin dress materials which later aroused the indignation of the moralists of the Roman Empire.

At the time of the Roman naturalist Pliny (A.D. 23–79), who quotes Aristotle, nothing was known of silk-production on the island of Cos. Some scholars, not wishing to relinquish the idea that the Mediterranean peoples had discovered silk independently of the Chinese, have suggested that the silk was brought to Cos from neighbouring Assyria, and woven on the island. It is true that there is a species of wild silk-worm in Assyria, but there is no more proof for the existence of a silk industry in Assyria than in Cos. A. V.

## **Silk Banners which turned the Fortunes of a Battle**

The legions of Crassus, who in 60 B.C. had been a member of Caesar's first Triumvirate, had in 53, during the campaign against Persia, been enticed by the enemy far into the Mesopotamian desert. Made desperate by heat and lack of supplies, and believing the Persian force to be small, the Romans tried to force the issue. No sooner were they drawn up in battle array than a large Persian army appeared as if by magic and began to attack them to the thunderous accompaniment of their kettle-drums. The Roman ranks stood fast until midday. Then, just as the sun was at its height, the Persians suddenly began to wave enormous flags of Chinese silk which, according to the historian Florus, produced such a wild and unfamiliar gleam that the Romans lost heart and fled in disorder. According to this story the career of silk in Europe began with a victory. A. V.

## **The Guild Organization of the Byzantine Silk-Weavers**

The Byzantine empire had adopted from Rome a system of compulsory guilds. Of particular importance were the workshops of the weavers' guilds in Byzantium. As the majority of those employed there were women, the workshops were called *Gynaecia*, “Women's houses”. With the introduction of silk-growing by the emperor Justinian in the 6th century the guild grew in importance, the number of men whose hereditary employment was silk-weaving increased, and the silk-weavers enjoyed the many privileges of the guild, especially with regard to the payment of taxes. A. V.

## **The Silk Cap of Confucius**

The great teacher of the Chinese people, Kung-futse, Confucius, who lived in the 6th century B.C., was a member of a noble family of the North. The wearing of silk being a privilege of the nobility, custom demanded that he should be clad in silk. Now at the

time, the price of silk had fallen so low, as a result of over-production and the reduced purchasing-power of the nobility that it was possible for Confucius to say in the book named “*Longo*” that he preferred to wear a silk cap though silk was cheaper (and therefore more vulgar) than any other textile. A. V.

## **A Caliph's Tent of Silk**

The story that the awning with which the emperors caused the enormous area of the Colosseum to be covered was of silk is doubtless legendary. There is more probability in the report which states that the curtain in the church of St. Sophia, Constantinople, which separated the altar from the rest of the church was in Justinian's day of silk.

The report of an Arab writer of the 11th century describing the tent of an Egyptian Caliph appears to be substantially true. To make this tent 150 men are said to have worked for 9 years, and the expenses to have reached £ 30 000, while 100 camels were required to bear the 64 pieces of cloth, most of them silk, which made up the tent. A. V.

## **The Silk-Worm in a Parable**

It was one of the Church Fathers who explained to Europe the secret of silk-growing, about which even the best of ancient naturalists had written mere nonsense. John Chrysostomos, patriarch of Constantinople, who lived in the 4th century, described in one of his sermons with great detail the development of the silk-worm. This he did not out of zoological or economic interest, but because the transformations of the animal seemed to him a perfect analogy to the eternal transformations of the human soul. A. V.

## **The Silk Monopoly of the Byzantine Emperors**

About the middle of the 4th century the so-called “*Gynaecia*” (women's houses) were founded in Byzantium; these were textile workshops administered by the imperial household; where silk-weaving and dyeing was carried on. From that time onward the Byzantine emperors repeatedly sought to restrict the private textile industry. The reason for this lay not only in the frequent shortage of raw materials, but in the financial profit which accrued, not so much for the emperor himself as for the “comes largitionum” appointed by him. The latter, whose office was that of a treasurer, fixed the maximum price for silk at a ridiculously low rate, bought up the entire stock of the private workshops, and resold it to the consumers at a huge profit. Procop (6th century) the most notable historian of that period, writes: “Justinian united the entire silk-trade in the hands of the imperial treasurer, Petrus Barsumas, a Syrian. The weavers and dyers work for him alone, and from him alone can silk be bought. On his appointment Barsumas immediately raised the price of silk; one ounce of silk cloth dyed in common colours costs six pieces of gold; stuffs dyed with imperial purple are rated at 24 gold denari and even more. The emperor draws immense profits from this monopoly; but to an even greater extent does Barsumas enrich

himself. But the merchants who were wont to live by the silk-trade, are ruined; the silk-workers of Tyre and Berytus, weavers and dyers, have been reduced to poverty; many have emigrated to Persia." W. N.

### Tapestry-Weaving as shown on a Gothic Stained-Glass Window

In the Austrian Museum for Art and Industry in Vienna there is a window from the church of Strassengel near Graz, showing the figure of a woman seated at a loom. A second window, companion to this, shows the Virgin on the way to the Temple. As the latter is one of an established series depicting incidents from the girlhood of the Virgin, it may be assumed that the first window also belongs to the series. According to the apocryphal gospels, which originated in the Christian East and which, in spite of decrees of the Church, were frequently illustrated by medieval artists, the Virgin was brought up in the Temple of Jerusalem, where she span the purple wool for the Temple curtain. The Virgin spinning is a frequent subject of Christian art. It may be assumed that in this case she has been depicted as weaving instead of spinning, which is more usual, though we can give no reason for the change. It is possible that the artist was working for a convent where, as was not uncommon, tapestry-weaving was carried on. That seems the more probable as the Virgin appears to have three young assistants or pupils—a realistic detail not furnished by Christian iconography, and probably the result of direct observation. Experts judge the window to date from between 1350 and 1375. It is similar in style to the windows in the chancel of St. Stephen's, Vienna.

The scene is set in a species of alcove which, following medieval convention stands for an entire building, in this case the temple of Solomon. The Virgin is seated at an *hautelisse* loom near the altar. She is dressed after the style of a noble lady of the 14th century. We quote from the description given by B. Kurth. "The Virgin holds in her left hand a stick with which to open the shed for the insertion of the shuttle, a needle-like implement round which the thread is wound. The taut threads of the warp run round the two horizontal bars of the frame, and the finished portion of the tapestry, showing an ornamental pattern, is carried back over the top bar of the frame... The first of the three young girls is at work on an embroidery-frame, the second holds in her hand a shuttle and the third is seated before a yarn-winder." In the opinion of the writer quoted above it is beyond doubt an illustration of tapestry-weaving and not of cloth-weaving, as the loom is too primitive in construction. Tapestry-weaving was individual, creative art, whereas cloth-weaving was a trade based on the production of large quantities, and required even at that time looms of greater technical perfection. The Strassengel window is one of those early illustrations of weaving which, in the opinion of B. Kurth, prove the almost exclusive use at that time of *hautelisse* looms for tapestry-weaving. *Basselisse* looms were in her opinion not used for tapestry-weaving until a much



*The Virgin at the loom. Stained-glass windows of Strassengel (1350-1375). Austrian Museum for Art and Industry, Vienna.*

later date. In the Middle Ages they were very rare—and perhaps the embroidery frame held by one of the figures in the foreground of the Strassengel window is such an exception, for it is to be regarded as a very primitive form of *basselisse* loom. W. B.



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*Silk of Antinoe with ibis pattern. The ibis, the herald of the rising Nile, was regarded as sacred in Egypt. Graeco-Egyptian style. After Lessing.*

### Silks of Antinoe

About the year A.D. 122 the emperor Hadrian (117–138) founded a city in the district of Hermopolis in Egypt. The city, which he called Antinoe after his friend Antinous, who had lost his life in the Nile, soon became one of the most magnificent and luxurious towns of that age. Among other things the remnants of costly silks discovered in the burial-grounds of Antinoe in 1896 by A. Gayet testify to the high standard of luxury and taste, which prevailed in the city. Gayet's excavations are doubtly important by reason of the fact that they are the only ones which were conducted systematically and scientifically; in other Egyptian burial-grounds it was frequently left to Bedouin

and Fellaheen searchers to plunder the graves and sell what they found to the highest bidder; in such cases it was scarcely possible to discover exact details of the origin of the finds. The textiles found by Gayet are for the most part preserved in the Guimet Museum in Paris, the remainder is in Lyons and Berlin.

The silks of Antinoe are of the 4th and 6th centuries; O. von Falke distinguishes between three periods of style, basing his conclusions on the patterns of the silks; these are the Greek period, the Graeco-Egyptian period (see illustr.) and the Persian-Egyptian period. W. N.

### Seneca and Silk Clothing

The Roman philosopher Seneca (4 B.C.–A.D. 64) was greatly angered by the introduction of silk dress. "I see clothes of silk", he wrote in his book "On Benefits", "if clothes they can be called, affording protection neither to the body nor the modesty of the wearer, and which are purchased for enormous sums from an unknown people..." And in one of his letters he writes: "What dost thou say? Did philosophy ever teach men to wear silk?" A. V.

### Early duties on silk

In the Ancient World duties served less to protect the native industry than to increase the income of the state. According to Tacitus, the historian (A.D. 54–117), duties fixed by earlier Roman law were 1/25 to 1/200 of the value of the goods, and later rose to about 1/8. Three kinds of silk are mentioned in the revenue regulations, raw silk (*metaxa*), dyed silk (*attincta*), and twisted silk (*nema sericum*). Only goods intended for sale, and not for personal use, were liable to duty. This was also customary in the Middle Ages; but the Italian republics soon inaugurated a consistent policy of protective duties. In France and Italy duties were chiefly imposed on exports; imports were as a rule only subject to municipal dues, which affected foreign and native goods in like manner. In England harbour-dues were always payable. According to a *Charta mercatoria* issued by Edward I in 1302 foreign merchants were compelled to pay 3d per pound on all silk and silk articles (*cindacis*) which were imported to or exported from English ports. This poundage was raised to sixpence in 1383, and at the end of the 14th century was fixed at 5% of the value of the goods. In the Low Countries, the Hanse had to pay 2 pfennigs per cwt. of silk thread, and 6 pfennigs for each bale of gold or silver brocade. In Germany the emperors often ceded the right of levying duty to the regional princes. Clergy and nobility were generally exempt from duty, as were some of the free cities, e.g. Worms (since 1073) and Nuremberg (from 1219 on). Later, tariffs became more and more frequent. Imports of silks were nearly always affected, as they could always be classed as luxuries. W. N.




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