An Archaeological and Historical Account of Cannabis in China

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Although Cannabis is generally believed to be of Asiatic origin, within this vast geographical area, there is no general agreement as to where the domestication really came about. Alphonse de Candolle (1884), the first authority on the origin of cultivated plants, ascribed a very extensive range to the plant. He asserted that "the species has been found wild, beyond a doubt, to the south of the Caspian Sea, near the Irtysch, in the desert of Kirghiz, beyond Lake Baikal in Dahuria (government of Irkutsch). Authors mention it throughout southern and central Russia and to the south of the Caucasus, but its wild nature is here less certain, seeing that these are populous countries, and that the seeds of the hemp are easily diffused from gardens. The antiquity of the cultivation of hemp in China leads me to believe that its area extends further to the east, although this has not yet been proved by botanists."

Later workers, mostly working on field collections, either have accepted this very general and extensive area, or favor specific regions, such as the Himalayas, central Asia, India, Pakistan or China (Vavilov, 1926; Zhukovskii, 1962). It is a difficult problem to differentiate truly wild plants from spontaneous, escaped or semi-cultivated plants. There still remains much to be done to clarify the systematics of Cannabis. Moreover, in the case of Cannabis, which has been associated with man for so long, botanical studies alone are inadequate to ascertain the origin of cultivation. As one author states (Schultes, 1972), "It would seem that historical and ethnobotanical evidence must have greater weight perhaps — at least at the present state of our understanding — than the study of collections of wild, cultivated or spontaneous specimens."

From a historical vantage, Cannabis has been found in China since Neolithic times, about 6,000 years ago, with a continuous record of cultivation down to the present. This record stands unique in comparison to those of other regions in Asia, and it strongly indicates the plant to be indigenous. New archeological finds in recent years considerably substantiate and extend its early history. The very scattered references in historical literature are in need of organization and analysis. These records are assembled here, followed by some notes on the possible routes of early diffusion of the plant in relation to its usage.

Cannabis, as a cultivated plant, had many uses in ancient times in China. It was primarily an important fiber plant, and the dominant textile plant in northern China until more recent times when other textile plants from warmer southern habitats became known and cotton was introduced from abroad. It was used extensively in making ropes and cordage, fish nets, fabrics of all kinds, and as raw material for making paper. As a food crop, the seed was one of the major grains of ancient China, the use of which gradually decreased until it was finally forgotten as a grain for human consumption. Oil extracted from the seed was used for frying food but had even more industrial applications. The fruits, leaves and roots were used in medicine in ancient times. The medicinal uses of the plant diminished in later ages. The plant was also used as a hallucinogenic drug.

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Submitted for publication October 11, 1973.

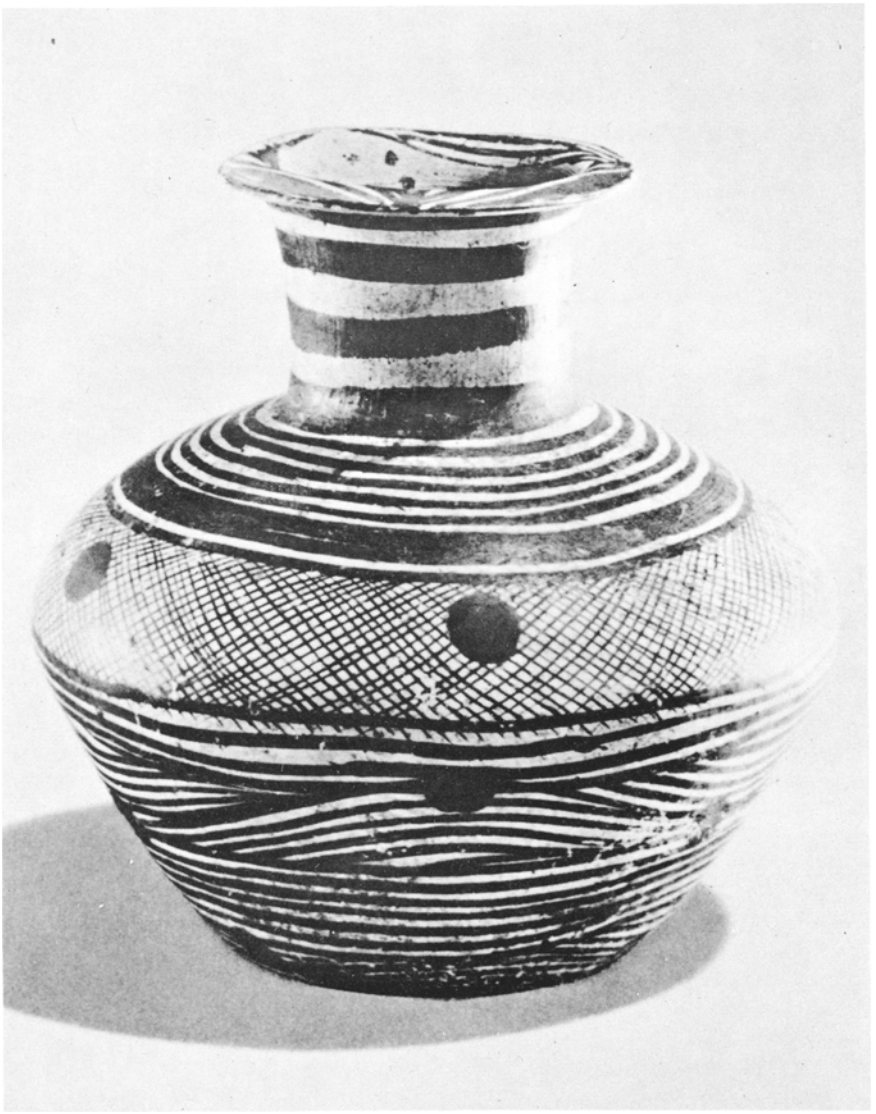

Fig. 1. Neolithic pottery jar from Pan-p'o, Si-an, decorated with weaving design.

ARCHEOLOGICAL RECORDS

In 1921, Andersson (1922) discovered the Neolithic culture remains at Yang-shao, Honan province. Among the pottery finds, some were decorated with clear impressions of cloth. Andersson believed that the material of this cloth was hemp. Fine bone needles were also found, indicating the existence of sewing at that time.

The Yang-shao culture, characterized by painted pottery, is the oldest known Neolithic culture in China. It was subsequently discovered at many sites and most of these excavations reveal directly or indirectly the existence of plant fibers and textiles which are attributable to hemp. Paintings of rope and woven cloth designs were found on many pots, and impressions of ropes were found on others. At the Yang-shao site at Hua-hsien, Shensi province (Shensi Museum, 1959), were unearthed many pottery spinning-whorls

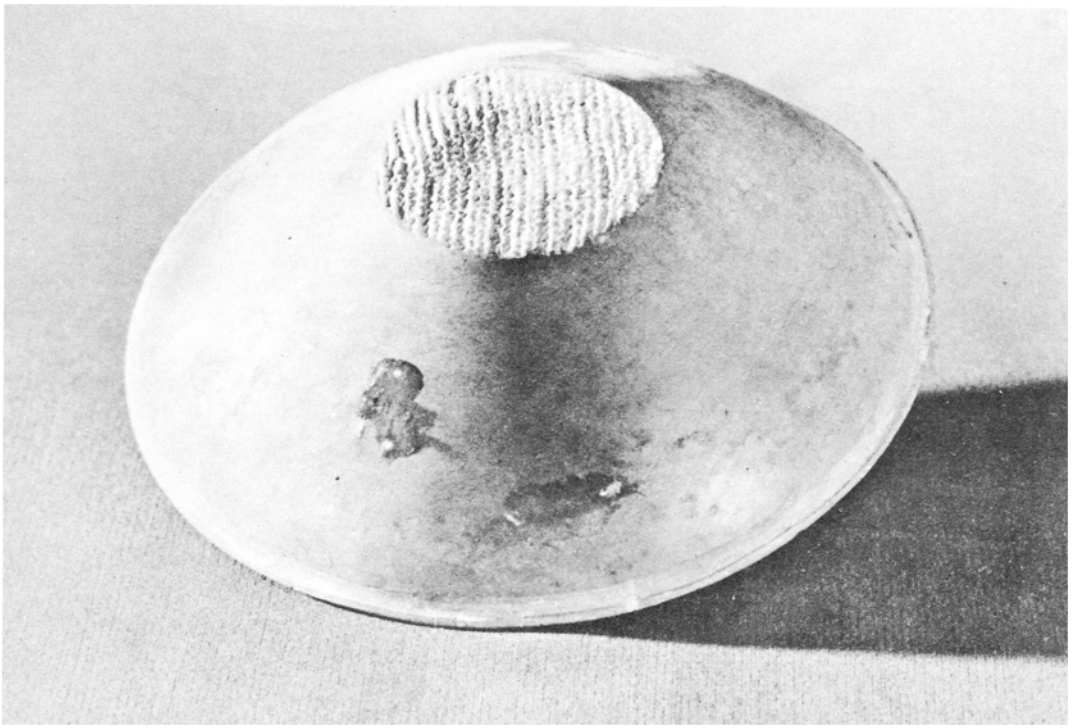

Fig. 2. Neolithic pottery bowl from Pan-p'o, Si-an, with imprints of hemp cloth.

of different types with different decorations, and numerous finely made bone needles with well-shaped holes. Distinct fragmentary impressions in the dirt in one grave, according to the discoverers, most probably were made by hemp cloth.

The most notable site of the early Neolithic Yang-shao culture is the recent discovery at Pan-p'o, near Sian, Shensi province (Si-an pan-p'o Museum, 1963). Among the artifacts from this village site are many tools for weaving and sewing, such as stone and pottery spinning-whorls and bone needles. Ropes and cloth are the commonest decorative designs on the potteries discovered there. The most distinct evidence of hemp are imprints of textiles found on some of the pottery pieces. (Figs. 1, 2, 3).

An analysis of the pollen deposits at Pan-p'o (Chou, 1963) reveals the presence, among many other plants, of a considerable amount of pollen attributed to *Humulus* sp., now a weed in northern China. This pollen may have actually represented Cannabis, since the pollens of these two plants are almost indistinguishable in their structure. Many cultivated plants, including cereals and other crops, are represented in these pollen deposits.

Carbon-14 dating of carbonized remains from Pan-p'o (An, 1972) has now established the dates of Yang-shao remains as 4115 ± 110 B.C. to 3535 ± 105 B.C. The core of the Yang-shao culture was found (Chang, 1969) to extend from modern Shensi, Shansi, Honan to northern Hopei, thence extending northeastward to the southern part of Liaoning in northeast China.

The Lung-shan culture, post-dating Yang-shao, was characterized by black pottery. Its early stage extended from the eastern coast westward along the Yellow and the Yangtze rivers to Honan and Hupeh provinces (Chang, 1969). Carbon-14 dating from various localities range from 2310 ± 95 B.C. to 1170 ± 90 B.C. (An, 1972). Among the relics of the later Neolithic stage, at a recently discovered site at Hsi-chou, Honan province (Honan Museum, 1972), there are pottery

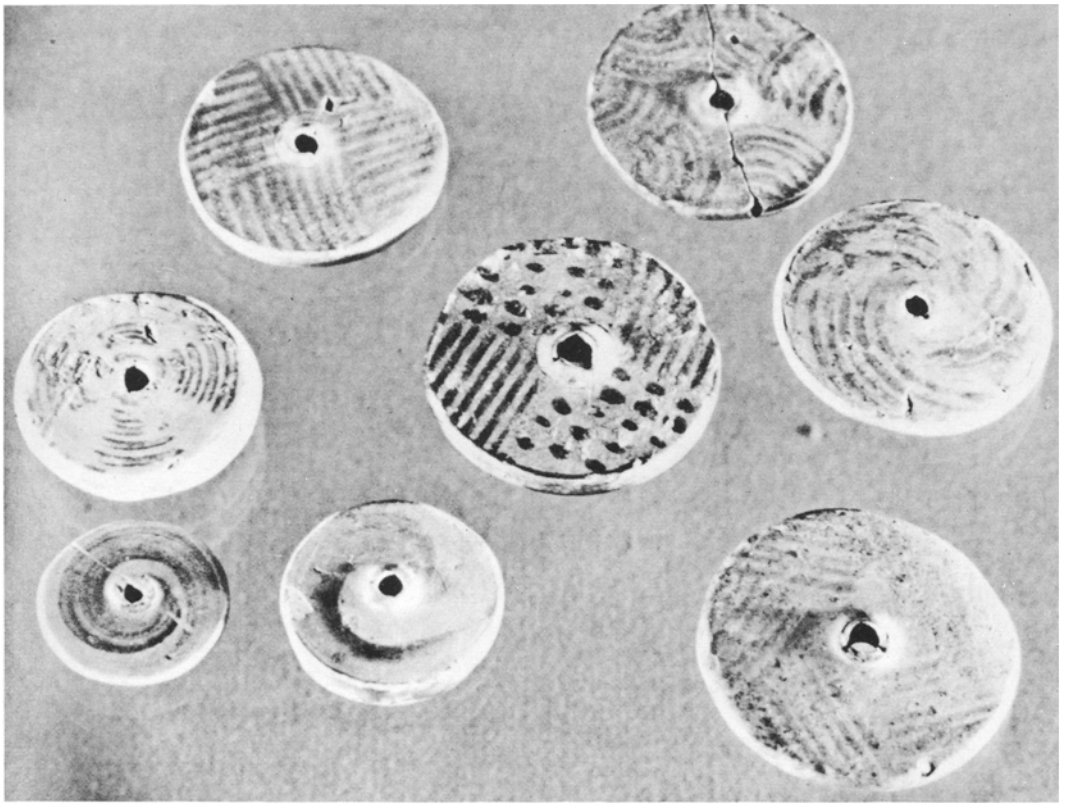

Fig. 3. Neolithic pottery spinning-whorls with different designs, from Pan-p'o, Si-an.

spinning-whorls and potteries with rope patterns; and from a subsequent stage, there are pottery spinning-whorls and bone needles.

The earliest historical period, the Yin or Shang dynasty (approximately 1766-1122 B.C.) is the age of bronze and pottery. Written script was found on oracle bones and shells excavated in modern times from Honan province. The character "hemp" has not been found among the deciphered ideograms of the oracle bones but those which have been identified represent only about one-third of all such characters on the oracle bones so far discovered. Culturally this period was especially famous for the many elaborate and exquisite bronzes. Stone implements, however, were still being used.

There is one archeological find of this period related to hemp. In 1931, Li (C. Li, 1931), reporting on excavations at Anyang, Honan province, mentioned that on some of the *ku*-type bronze weapons buried in graves appeared very conspicuous cloth patterns. Although no statement was made as to the actual material of the cloth, hemp was the most likely source.

From the Chou dynasty, lasting from 1122-249 B.C., including the period of the "Spring and Autumn Annals" 722-481 B.C. and the Period of the Warring States 481-221 B.C., there are abundant literary records pertaining to the extensive use of Cannabis, both as textile and as grain. These accounts will be treated in the following section.

A rare archeological find is the recent discovery of a fragment of hemp cloth of the late Chou dynasty in Shansi province (Ko, 1972). The discovery was made in a grave containing bronze vessels and weapons, jade and potteries. The inscriptions on the bronze vessels prove the grave to be of the Western Chou dynasty. The weave

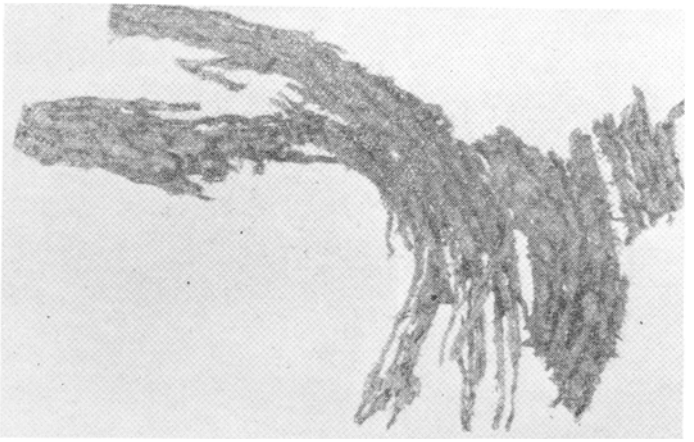

Fig. 4. Fragment of hemp cloth from late Chou dynasty found in Shansi province.

of the cloth was relatively tight, indicating that weaving techniques had by then reached a relatively high standard.

Another interesting find was made at the site containing several hundred pieces of "oath document," which are jade and stone slabs with red inscriptions, discovered recently in Shansi province (T'ao and Wang, 1972). These date from the Eastern Chou dynasty. In these texts, the archaic character *ma* (hemp) appears with the connotation of "negative," which was a secondary meaning attributable to the stupefying effect of the plant. This provides the indirect proof of the fact that this physiological effect of the plant was known since very early times.

From the brief Ch'in (221-206 B.C.) and the long Han (206 B.C. — 220 A.D.) dynasties, while historic records of Cannabis are varied and numerous, there are also some significant archeological findings pertaining to the presence and varied uses of Cannabis.

Concerning the use of hemp as a textile fiber, actual complete specimens of hemp cloth were found used as covers for corpses in two of the three large graves of the late Western Han dynasty, about 1st cent. B.C. — 1st cent. A.D. in Kansu province (Kansu Museum, 1972). These coverings were wrapped around silk dresses and tied with ropes also made of hemp. Hemp fibers were also used in reinforcing plasters on the inside of the brick walls of the crypts of the graves.

In regard to the use of hemp as a raw material for paper making, the earliest known specimens of paper were recently discovered in a grave in Shensi province. These fragments of paper were made of hemp fibers. The graves were of the period preceding the reign of Emperor Wu (104-87 B.C.) of the Han dynasty (Pan, 1964), thus antedating the supposed date of the invention of paper by Marquis Ts'ai Lun in the year 105 A.D. (Fig. 4).

One of the most extraordinary archeological discoveries in recent times is the unearthing of a well preserved woman's body from an early Han tomb 2,100 years old at Changsha, Hunan province. Along with the body over a thousand sacrificial items were preserved intact in this well sealed and insulated grave. These items include silk fabrics, lacquer ware, pottery, bamboo and wooden wares, and food stuffs. Besides fruits such as pears, peaches and jujubes, there were grains such as rice, wheat, millet, hemp seed, and mustard seed. Hemp seed was clearly used in early Han times as a common grain along with the other cereals. (*K'ao-ku* 1972).

During the Han and later the T'ang dynasty (618-906 A.D.) China was at its peak of expansion, and both commercially and politically busy contacts with central Asia and western Asia were operating through the deserts of its north-

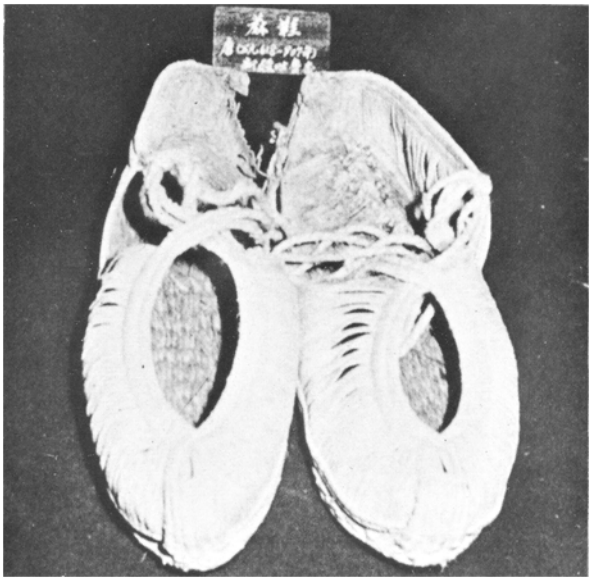

Fig. 5. Shoes made of hemp fibers from a grave at Turfan, in Sinkiang, 721 A.D.

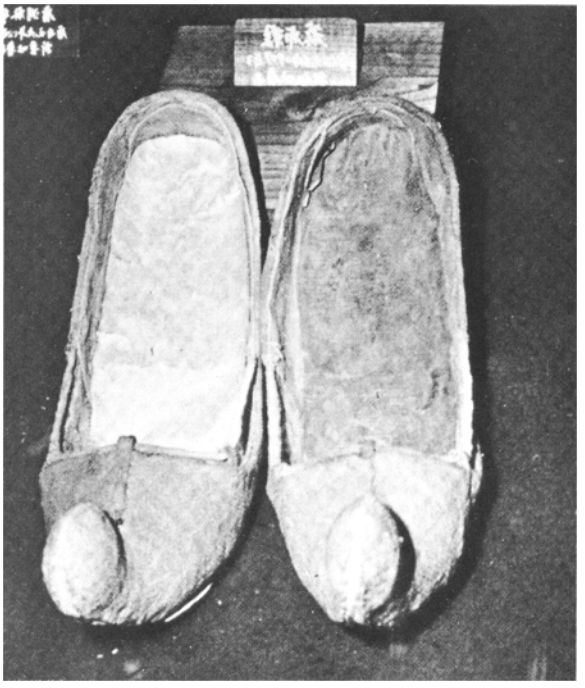

Fig. 6. Shoes made of fine yellow hemp cloth from a grave at Turfan, in Sinkiang, 721 A.D.

western borderlands. The famous "silk road" carried silk, porcelain and other products to the western world. Many relics along this route have been discovered, as the dessication was especially suitable for preserving artifacts. From graves and deserted habitations, silk and silk fabrics have been found in especially large quantities and some hemp products were found along with them. These were apparently products of Chinese origin, carried west by traders.

Several recent finds among the eight-century-old cemeteries of Astana and Karokhoja at Turfan in Sinkiang province are of special cultural importance (Sinkiang Museum, 1972a, b). In one grave was found a rare fragmentary script of the *Lun Yü* (Analects of Confucius) written in 716 A.D. on white hemp paper. Also found were paper shoes made of pasted layers of white hemp paper sewn together with white hemp threads. In the same grave was a complete cloth sheet of hemp fabric.

In another grave dated 721 A.D. there was hemp cloth as well as hemp shoes. The latter were of two kinds, one woven of hemp fibers and the other sewn in a fine yellow cloth. The latter is an actual specimen of a famous cloth produced in Szechuan province and well known in earlier times, especially in the Han dynasty (Figs. 5, 6).

HISTORICAL RECORDS

In the early classics of the Chou dynasty, written over 3,000 years ago, mention is often made of a prehistoric culture based on fishing and hunting, a culture without written language but which kept records by tying knots in ropes. Nets were used for fishing and hunting and the weaving of nets eventually developed into cloth-making. These earliest written traditions seem to corroborate modern archeological discoveries of the Neolithic culture in northern China, and support the idea that hemp was used from the earliest times and is unquestionally indigenous.

Besides being important as a textile fiber plant, Cannabis was also an important food plant from the very beginning. In the *Shih Ching*, (Book of Odes), which extended through the Chou period, the hemp plant was mentioned no less than seven times in the three hundred odes, mostly as a fiber but also as a grain. The cultivation of hemp was briefly mentioned as well as the preparation of the fibers and use of the textile in making a robe.

In the *Li Chi* (Records of Rites) and *Chou Li* (Rites of Chou), the use of hemp cloth was mentioned in some detail. Hemp and silk were the two sources of textile fibers, the first for the use of the masses and the latter for the wealthy and the aged. In all subsequent literature, hemp and silk or the hemp plant and mulberry plant are mentioned together as metaphors for either women's work or cultivated lands.

Noteworthy is the passage in the *Li Chi* which states that in ancient times people clothed themselves with feathers and skins and that later some sages invented fabrics of hemp and silk. The *Li Chi* also gives specific instructions about using hemp cloth for mourning rites at the deaths of ones parents. This tradition has been carried on through the centuries down to recent times.

In the *Li Chi*, hemp seed was mentioned as an important grain and specifically as being used by kings during certain months. In the *Chou Li*, the term "nine grains" was employed and in the *Li Chi*, the term "five grains" was mentioned. The word *k'u* or "grain" of the ancients indicated important cereals as well as non-cereal grains. Some later commentators include *ma* (hemp) along with several kinds of millet, barley, rice, soybean and others as early grains.

In the early literature, besides the character *ma*, referring to the hemp plant in general, there appear several other characters: *i* or *si*, for the male plant, *chu* or *tsu* for the female plant, *fên* or *bên* for the fruit clusters, and *ma-tzu* or *ma-jên* for the seeds. This extensive differentiation clearly indicates the close association of the ancients with this plant.

In the oldest history, *Shu Ching* (Classic of History), the chapter "Tribute of Yu" mentions the male hemp plant, *i*.

This male hemp plant, which was the source of excellent fibers, was indicated as a product of the provinces Yu-chou and Ts'ing-chou (modern Honan and Anhwei provinces) in central China.

Ma was mentioned in other classical writings such as the *Lun Yü* (Analects of Confucius) and *Mo-tzŭ*. The most important account about Cannabis extant is found in the two chapters on agriculture in the work *Lü-shih ch'un-ch'iu* (249-235 B.C.), based on an earlier agricultural work of the Chou period. In this *ma* was mentioned as one of the "six grains," along with two millets, rice, soybean, and barley. It was mentioned together with silk as the fiber for textiles, and as one of women's assigned responsibilities. Brief mention was made of the timing of plantings to obtain fibers of high grade.

The hemp plant was frequently mentioned in Han historical works and other writings since it was one of the most important crop plants in ancient China. An important early agricultural treatise which has survived through quotation in other works, *Fan shêng-chih shu* (Book of Fan Shêng-chih), was composed by an official about 32-7 B.C. One chapter was devoted to the planting of *i*, the male hemp plant used as fiber. Another was devoted to *ma*, the female hemp plant from which seeds were collected. These chapters treated the proper time of planting, preparation of the land, fertilization, watering, tending, and collection. Even more detailed instructions were given in the *Ch'i-min yao-shih* (Essential Arts for the People) of the 6th century, the earliest existing complete agricultural treatise. The need of fertilizing fields for planting with hemp was especially emphasized.

A very important contribution of hemp fiber to the Chinese culture, as indeed to the culture of mankind as a whole, is the role it played in the invention of paper. According to the dynastic history *Hou-Han shu*, paper was invented by the Marquis Ts'ai Lun. He used "old fish nets, ragged cloth, hemp fibers, and tree bark" to make paper and presented his new invention to the throne in 105 A.D. Fish nets and cloth at that time were also made of hemp fibers.

Ts'ai Lun was probably responsible for perfecting a technique that had been in use for some time. As mentioned earlier, the oldest existing paper was recently discovered in a grave in Shensi province dating before the reign of Emperor Wu (104-87 B.C.) of the Early or Western Han dynasty. This paper proved to be made of hemp.

In surveying the ancient literature, Ho (1969) found only one reference to wild Cannabis. In the work *Tung-kuan Han chi* (28 A.D.) it is stated that after a year of great famine caused by war and natural disasters, wild grains were found growing everywhere, Cannabis and soybeans especially appearing in great abundance. Ho points out that this statement concerning wild plants is not definite since it is more likely that these plants were only escapes from abandoned crops of the previous year. However, this reference does indicate that during the Han period hemp seed was used as a common grain.

The use of hemp seed as a grain gradually diminished as it was apparently replaced by superior cereal grains. This use, however, must have persisted at least until the 10th century. In both the dynastic history of Southern Ch'i (470-502 A.D.), *Nan-Ch'i shu*, and in one verse of the T'ang poet P'o Chu-i (772-846 A.D.), a porridge made of hemp seed was mentioned. In later ages it was completely forgotten as a human food.

The use of oil from hemp seeds was apparently a later development since it involved the process of extraction. Hemp seed oil was used for frying food but had even more industrial applications. The ancient Chinese preferred mucilagenous vegetables and oily grains. Later, when technological development enabled the extraction of oil from seeds, mucilagenous vegetables and some oily grains, such as hemp seed, became less desirable and were gradually replaced by other, more edible, foods (Li, 1969).

The use of Cannabis in medicine was probably a very early development. Since ancient men used hemp seed as food, it was quite natural for them to also discover the medicinal properties of the plant. Cannabis was mentioned in the famous

Fig. 7. Illustration of hemp plant with text describing its functions from the *Chêng-lei pên-ts'ao*, edition of 1234 A.D.

herbal *Pên-ts'ao Ching*, attributed to the legendary Emperor Shên-nung of about 2,000 B.C. but actually compiled in the first or second century A.D. in the late Han dynasty. This work was apparently based on early traditions passed down from ancient, even prehistoric times.

A statement in the *Pên-ts'ao Ching* of some significance is that Cannabis "grows along rivers and valleys at T'ai-shan, but it is now common everywhere." Mount T'ai is in Shangtung province, where the cultivation of the hemp plant is still intensive to this day. Whether or not this early attribution indicates the actual geographical origin of the cultivation of the

Cannabis plant remains to be seen.

Concerning the medicinal properties of Cannabis, the *Pên-ts'ao Ching* states that "ma-fên (fruits of hemp) . . . if taken in excess will produce hallucinations (literally "seeing devils"). If taken over a long term, it makes one communicate with spirits and lightens one's body."

It was about this time that a famous physician Hua T'o (117-207 A.D.), according to the dynastic history *Hou-Han shu*, was using a concoction of Cannabis called *ma-fei-san* (hemp-boiling-compound) taken with wine, to anesthetize his patients in order to perform operations on abdominal organs. His disciple, Wu P'u, wrote an herbal in 200 A.D. in which he clearly made the distinction between the toxic hemp fruits (ma-fên) and the non-poisonous seeds or kernels.

The *Pên-ts'ao Ching* was subsequently revised by the famous physician and Taoist priest T'ao Hung-ching of the 5th century. He supplemented this work with his *Ming-i pieh-lu*, which was finished around 500 A.D. In this work, he noted not only the difference between the non-poisonous seeds and the poisonous fruits (ma-fên), but also that the latter was used "by necromancers (or magicians), in combination with ginseng to set forward time in order to reveal future events."

The effect of temporal distortion or hallucinations caused by Cannabis was noted by later authors such as T'ang Shen-wei in his *Chêng-lei pên-ts'ao* of the 10th century (Li, 1964) (Fig. 7). In these herbals, Cannabis was used in the cures of many diseases. Many prescriptions were made employing its analgesic effect, especially for severe pain due to broken bones. Plant parts used for these purposes include root, leaves and fruit-clusters. This information was collated in full in Li Shih-chên's famous Ming dynasty materia medica, *Pên-ts'ao Kang-mu*, 1590.

The use of Cannabis as an hallucinogenic drug by necromancers or magicians is especially notable. It should be pointed out that in ancient China, as in most early cultures, medicine has its origin in magic. Medicine men were practicing magicians. In northeastern Asia, shamanism was widespread from Neolithic down to recent times. In ancient China shamans were known as *wu* (Needham, 1962). This vocation was very common down to the Han dynasty. After that it gradually diminished in importance, but the practice persisted in scattered localities and among certain peoples. In the far north, among the nomadic tribes of Mongolia and Siberia, shamanism was widespread and common until rather recent times.

From the middle ages to the present, Cannabis has remained an important fiber plant in northern China. When other fiber plants from the southern warmer regions of the country became known, the word *ma* became a generic name for plant fibers. Thus *chi-ma* is *Boehmeria nivea*, *ching-ma* is *Urtica thunbergii*, *chung-ma* is *Abutilon nivea*. Hemp, in order to distinguish it from other fiber plants, was named *Han-ma* (Chinese *ma*) or *hou-ma* (fire *ma*). Cotton was not introduced into China until the Sung dynasty, around the 10th to 11th centuries.

The hemp plant is no longer much used in medicine. It has been long forgotten as an edible grain. Whether or not it is still used by magicians as a drug must be a well-guarded secret; it is no longer so used by people in general except perhaps by some borderland non-Han tribesmen (Li 1974). The plant is cultivated today primarily for its fibers.

In the early days of the Ch'ing (Manchu) dynasty, about 300 years ago, Cannabis was still the only fiber plant in some parts of northern China. In the northeast (Manchuria), along the border near Siberia, for instance, when Chinese exiles first entered these hitherto forbidden regions, they found that the native Manchu tribesmen did not have the cotton plant and had only hemp. As shown by the accounts of Wu T'sêng-ch'eng on Ning-ku-t'a and Yang Pin on Liu-pien, both written around 1600, the natives were then largely hunters doing some supplementary cultivation. The people mainly used animal skins for clothings and only the wealthy had dresses of hemp cloth which were padded with hemp fibers for the winter.

In recent times Cannabis has been cultivated as a fiber plant over nearly all of

China, particularly in the northern and central regions. In Shangtung province, large quantities are produced for export (P'ei and Chou, 1951; Ts'ui, 1953; Hu, 1955). Since the introduction of cotton in the 10-11th centuries, however, the cultivation of Cannabis had gradually diminished. The fibers are presently used for making ropes and make coarser grades of cloth, largely for packing purposes.

As hemp is mainly used for fibers in China, the strains now cultivated have apparently been selected for this purpose. Compared with Cannabis growing in other Asiatic countries, the Chinese plants are among the tallest and have the lowest resin content. In eastern and southern China, plants growing to a height of 21 feet have been noted by botanical collectors in modern times (Bretschneider, 1898).

Of interest is the fact that large-seeded forms are known from such areas as Heilungkang (Liou, 1959) in the Amur region in the extreme northeast bordering Siberia. These may constitute relics of the grain usage of the past.

USES OF CANNABIS AND ITS DIFFUSION

Cannabis is generally treated as a monotypic genus. The species, *Cannabis sativa* is an extremely variable one. As noted in the beginning of this report, wild plants spread over a wide region from the lower Volga and the Caucasus in the west through central Asia to the Altai Mountains and all the way east to northern China. These plants, however, are probably not genuine wild plants but spontaneous plants escaped from early cultivation. The Cannabis plant, both wild and cultivated, needs a rich soil. It is thus a natural follower of the migrations of man, as human habitats provide a compatible environment for the plant. Furthermore, as an annual, Cannabis has found possible to extend its range, under human tutelage, beyond its original range in all directions, longitudinally and latitudinally.

From the available historical evidence, it seems more likely that the origin of cultivation of Cannabis was in the east, subsequently spreading westward, than the other way around.

Our review shows that Cannabis has been used in China since very early times as a fiber plant as well as a grain crop and a medicinal plant. There is a continuous history of cultivation from Neolithic times down to the present.

Among the various usages, its use as a textile fiber remains its prime function through the ages. Its use as a food plant, first as a grain and later also as a source for oil, gradually diminished in importance and eventually was completely forgotten. The use of the plant in medicine, especially as a hallucinogen, was apparently associated with the extensive practice of shamanism in northeastern Asia. Since the Han dynasty, shamanism in China has gradually declined. In conjunction, the use of Cannabis as a hallucinogen was greatly restricted. On the other hand, shamanism was extensively also practiced among the nomad tribes to the north of China. The great mobility of these peoples apparently assisted the movement of the plant to central and western Asia, and from there to India, where its hallucinogenic use intensified. The decline of the use of Cannabis in China as a hallucinogen is attributed to cultural factors (Li, 1974).

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Book Reviews *(continued from page 413)*

It would appear that the purpose of printing this volume is to point out those arctic species found also in Italy (marked with an asterisk) and as a medium for the reporting a few of the author's collections. The line drawings are of poor quality and leave much to be desired, and the few that are tinted are hardly true to color.

Flora Arctica is not recommended for the serious student of arctic plants; there are far better floras readily available. It may however be of some interest to Italian students of botany.

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Rubber in Malaya 1876-1922. The Genesis of the Industry. J. H. Drabble. 256 pp. illus. Oxford University Press, New York, 1973. $19.25

Why another book on the rubber industry of southeast Asia? Much has already been published on the cultivation and improvement of *Hevea brasiliensis*, one of man's most recently domesticated economic plants. Most of the available works, however, wholly or mainly are concerned with agronomical or plant-provement aspects of the industry. Drabble, lecturer in the Department of History, University of Malaya, has produced a superb history-oriented account of the rubber industry of