FAMINE FOODS

Listed in the

CHIU HUANG PEN TS'AO

救　荒　本　草

By

Bernard E. Read

Henry Lester Institute of Medical Research

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Giving their Identity, Nutritional Values and Notes on their Preparation

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Published by the

Aid of a grant from the BRITISH COUNCIL

One of the great disasters that arise out of all big wars is a shortage of food. Men who go to war are drawn in many cases from the farming classes and there is a shortage of man power in the cultivation of crops and in the care of flocks of animals providing man with food. Then in the warring areas there is destruction of crops, the commandeering and killing of farm animals and the eating up of all food resources. During war all available means of transport are usually devoted to promoting war and even where there is an abundance of food, the means of transporting it to needy areas are not available. This state of affairs continues as one of the dreadful aftermaths of war, so that today in many parts of the world there are starving millions. In China we have reports of such from Honan, Hunan, N. Kiangsu and Kwangtung.

In a relatively small well administered country like the United Kingdom of Great Britain, besides purchasing food from other parts of the world, everyone is encouraged to develop vegetable gardens, from which a considerable amount of food is obtained to supplement that provided through the usual channels and Britain fortunately has escaped the ravages of war on her territory. In China with its great trek to the West of millions of its inhabitants there is now a return of these people to their original homes which in many cases have been so devastated there is not a vestige of food, of farming implements or stock, their houses are gone and their menfolk may be dead, wounded or still involved in civil war.

Such utter destitution in a land which has so persistently been scourged by famines, flood, epidemics and war is so extreme it beggars the imagination and people with comfortable incomes in good homes with ample food do not realize the awful suffering endured by a large part of their fellow human beings.

What is the remedy? There are two aspects of the subject, namely future prevention and the immediate need. In India with its many famines it was a byword that transportation cures famine. In normal times when the world produces an abundance of food, this has meaning, but now

when ships have been sunk, railroads torn up, roads bombed and all types of vehicles are scarce, even the fine efforts of UNRRA to distribute food are in many cases at a standstill or so thwarted by circumstance that distribution is ineffective. The International Famine Relief Association of China has done excellent work for decades to remove the causes of famine, especially in North China where many roads have been made, land irrigated, crops improved, wells dug, orchards developed and by many other means. We still have famines and their immediate need of relief. In the reports from the famine areas we read of the wild plants eaten by the sufferers. The people have naturally turned to such natural resources as were available, even turning to a meal of China clay which will relieve the pangs of hunger.

It is commonly said that China has vast undeveloped natural resources. This is true. It not only applies to her mineral wealth it applies to everything. Of the 2 million chestnut trees reported to exist in Chekiang and Kiangsu only a minute fraction of the nuts reaches the Shanghai markets at absurdly high prices. They should care for the nutritional needs of quite a number of the population, they were the basic food of the old Roman armies, standing storage well, and providing a high calorie diet. Another natural resource which could be developed far more is the wealth of fish in our seas and rivers. Pheasants, partridge and wildgame, deer and hare should be collected and offered more extensively for sale. Even these things are beyond the reach of the empty handed starving peasant and their only resources are the wild plants and trees about them to which they naturally turn to sustain life. The investigating teams who have gone into China's famine areas have brought back samples of the barks, leaves, roots and seeds eaten by these famine sufferers, for appraisal of their food value. In many countries this might have presented an impossible task, however China with its centuries of famines has produced a Famine Herbal dealing with its edible wild plants.

THE FAMINE HERBAL. In the beginning of the 15th century Chou Ting-wang 周 定 王 compiled the Chiu-Huang Pen-ts'ao, a treatise upon plants fit for food in times of famine. Chou lived at Kaifengfu, Honan from 1382 to about 1400 and then moved to Yunnan, where he died in 1425. The

original edition was in 2 volumes, a later edition of 4 volumes compiled by his son Chou Hsien-wang appeared in 1559, this is the edition now current.

This work for the most part is an original compilation based on the author's own experience in Kaifeng of the flora in the districts south of the Yellow River and the Mi Hsien and Hui Hsien areas north of that river.

This Herbal describes in all 414 plants, 138 of which were recorded in earlier works on Materia Medica, 276 being new. There an five classes, herbs 245 kinds, trees 80, cereals 20, fruits 23 and vegetables 46. These are 15 groups according to the part used; leaves 237 kinds, fruits 61, leaves and fruits 43, roots 28, roots and leaves 16, roots and fruits 5, roots and shoots 3, roots and flowers 2, leaves barks and fruits 2, stems 3, shoots and fruit 1; total 414.

In 1881 the great botanist Dr. Bretschneider made a study of this book and identified 176. With the help of all the more recent botanical studies we now have identifications for 358, all except 56; for there is given not only the name and a brief description but each plant has a full page original woodcut, superior to those given in the Herbals. Bretschneider remarks on the excellency of these drawings made when engravings on wood were unknown in Europe. The earliest woodcuts of plants in Europe are said to be those of Cunrat von Megenburg in his Buch der Natur published in Augsburg in 1475.

To appraise the relative food value of the various things described one may first take those indigenous or naturalized to China, wild forms of which are said by the author to grow in his district, Honan, cultivated forms of which are well known in modern Chinese diet. There are at least 73 of such which include:—*Roots and tubers:* the yam 2 kinds, arrowhead, taro, lily root, water-chestnut, water calthrop, lotus seed and root, foxnut root and seed, 6 kinds of onions and garlic; and bamboo shoots. *Grains, seeds and nuts:* buckwheat with the leaves and shoots, Indian rice with the shoots, sesame with pod leaf and stems, knife-bean whole plant, kidney bean whole plant, cowpea whole plant. *Fruits;* wild cherries 2 kinds, mulberry, jujube 2 kinds, rose hips and leaves, red haw, fig, raspberry, winter cherry, wild pears 3 kinds, walnut,

persimmon, date-plum, grapes 2 kinds, plum, prune, Japanese apricot, apricot, peach, quince, pomegrante. *Flowers:* yellow lily with leaf and shoot, wisteria, chrysanthemum with leaf. *Leaf and other vegetables:* colza, fennel, amaranth 2 kinds, lettuce 2 kinds, chard, alfalfa, mint, celery, aster, garland chryanthemum, water celery, tea, cedar shoots, kuku vine, loofah, bitter gourd, leek, ciboule, shepherds purse. The nutritional values of these are given in Shanghai Foods and other standard publications upon nutrition, though little is known in most cases about the nutritional value of the stems and leaves of the grains and legumes. Indian rice *(Zizania)* is cultivated for its succulent stem as a vegetable and in Chinese cultivation is seldom allowed to seed. The wild plants yield a grain, now becoming quite popular in the diet in the United States, which has greater food value than ordinary rice, the proteins being of better quality and the content of vitamin B_1 is greater.

There are 16 others well known in the dietary of Europe or Japan, watercress, salsify, wasabi, garden cress, udo root, honewort, sawa millet, burdock, cornel cherry, poppy seed, hemp seed, sow thistle, purslane, dandelion, shallot and lamb's quarters, for which the nutritional values are known. Then there are a number of plants which were once used and their names in English indicate appreciation of their nutritional qualities, such as the star-wort, the suffix wort being applied in old English to edible herbs. The detailed nutritional values of the majority of the leaf vegetables recommended is not known, confirmation of their value as foods has been made in many cases by reference to the food habits of other, particularly adjacent, countries where in some cases they appear as market vegetables.

Watt in the Dictionary of the Economic Products of India gives a list of 280 plants used as famine foods. Some of these are identical with those listed here. With no analyses given it is impossible to know their exact nutritional value. However ones doubts regarding the possible deleterious effects of some are removed when it is known that they are commonly used elsewhere. Domestic medicine in the various Asiatic countries credit them with such remarkable therapeutic properties and some are known to be closely allied to toxic species it is

important that assurance of their unharmful nutritional status be established. For instance the seeds of the calthrop *(Tribulus terrestris)* are accredited in Chinese Medicine with abortifacient action and are recommended for many kinds of serious diseases including leprosy. Actually they are quite inert and formed the chief food supply during the great Madras famine. The sea-blites *(Suaeda sp.)* are bland plants and according to Watt constitute the most valued famine food of India, yet one species *S. fructicosa* is listed as an emetic in Ayurvedic medicine. These ideas in old domestic medicine are very unreliable and cannot be taken as an index of a plant's real value. In many other cases we have evidence of the use of a plant as a common cattle fodder, which is good evidence of the absence of deleterious principles and of probable nutritious value in the human dietary.

There is in some cases a definite question of the reliability as a food of the plant mentioned. For instance poke root (6.5) is extremely poisonous, in spite of drastic boiling of the sliced root and soaking in changes of water, it is liable to be toxic. On the other hand the toxic properties of raw taro is well recognised and it is ordered to be well cooked, by which method the toxic effects are definitely removed.

As a famine dietary the articles listed in Chou's Famine Herbal require considerable study. The larger half are leaves, of which one would have to eat an impossible amount to provide even a subsistence diet. One requires about 20 lbs of cabbage to yield 1500 calories for a survival diet. Hence whilst the leaves provide an excellent source of the protective elements, the vitamins and salts, the more important items are the roots, grains, seeds and legumes. Of the roots the following calorific values are known, for 100 grams (3½ ozs) lily roots 140, black leek 340, ground pear 159, yam 89, taro 78, shallot 89, ciboule 28, cattail 98, Kudzu 121, water chestnut 89, lotus 48, gobo 124.

Of the grains listed the best are:—Indian rice 439, adlay 375, sawa millet 375, buckwheat 325, jute 326 and short millet 270. Two types of acorns, washed free of the bitter principle which is apt to cause diarrhoea, are highly nutritious yielding over 350 calories per 100 grams of the shelled kernels. The oily seeds of plants have high value:—walnut 720, sesame

690, poppy 579, elm 472, perilla 525, cocklebur 507, hemp 380; and the starchy seeds of others are good, such as water calthrop 318, dried lotus 340, dried foxnut 352. There are a number of others of which analyses have not been made. The figures quoted for the standard quantity of 100 grams indicate that with the average value of 300 calories, about 1 lb. of any one of these foods will provide about 1500 calories enough for a survival diet. Other sources of starch rich foods are seen in the flag root, bindweed root, calthrop seed, cowherb seed, gourd root, lambs quarters seed, etc. There is a species of so called "ground pear" *(Apios)* used in Central Europe as a substitute for potatoes which yields 117 calories per 100 grams. Among the legumes there are the wild forms of the broad bean calorie value 97, soya bean 440, mung bean 345, sword bean 360, hyacinth bean, 333, and cowpea 338, standard articles of diet yielding many calories and essential proteins. Beside these are listed the beans of *Dumasia, Desmodium, Indigo* and *Cassia* of unknown value. Two types of wild pea, *Lathyrus* species, can only be taken in small amount with other foods, eaten to excess they cause paralysis of the legs, a disease called lathyrism..

The fruits as a class only yield about 50 calories per 100 grams but they are rich sources of the protective elements, vitamins and salts. Beside the commoner well known fruits; the fig, jujube, red pruit, pears, mulberry, cherries, persimmon, grape, plum, quince, apricot, peach, pomegranate etc. there is the date-plum, a small sugary persimmon yielding 163 calories, the cornel cherry, viburnum fruit, scissor berry, brambleberry, raisin tree (Hovenia), hackberry, paper mulberry, Ichang gooseberry and others. Of these about the most widespread and plentiful is the jujube or Chinese date which can be dried and used through the winter.

The very limited season during which fruits are available makes it essential for the chief source of the protective elements to be dependent on the numerous leafy vegetables. Among these a certain number stand out as of particular value for their nutritional qualities and for widespread occurrence all over the country as common weeds, available in quantity for the picking and lasting through the larger part of the year.

Dandelion leaves have been used all over the world since ancient times, cultivated in many places they develop large leaves. They have good quality protein and mineral salts, the lime and phosphorus being superior to spinach, lettuce or marigold and the magnesium better than lettuce and cabbage. They contain the essential heavy metals, iron, copper, manganese and zinc. They are rich in vitamin C.
Shepherd's purse sold in the regular market as a good substitute for spinach is similar to the dandelion in nutritional qualities but is even richer in iron and vitamin C and contains similar amounts of vitamin A and B. Rich in lime.
Plantain leaves when young are another palatable substitute for spinach. The spikes of seeds when ripe are as rich in vitamin B_1 as rice polishings.

The amaranths are far superior to spinach being exceedingly rich in vitamins A and C and are a good source of B_1. The iron and lime are unusually good.

Lambs quarter's, which is widespread, characterised by its erect stem over a foot high, bearing pale bluish green smooth leaves with a white mealy dust on the undersurface. Of the same botanical family as spinach and chard its protective elements are superior, 2 ounces contain more vitamin C than the average orange.

Sow Thistle, a tall hollow stemmed thistle with toothed leaves, is rich in vitamin C and is used in salads all over the world.

Alfalfa has more good protein than any other leaf vegetable, and it is rich in vitamins A, C and E and has a medium amount of B_1. The young plant is a regular Shanghai market article and the mature plant one of the best cattle foods, brought to China B.C. 96 by General Chang Ch'ien with the Arabian horses he presented to the Emperor. Other good greens plentiful as weeds are the purslane, sorrel, chickweed, boxthorn, dayflower, peppergrass and pennycress and many others.

When people are faced with death from starvation they naturally turn to whatever can be eaten to sustain life, taking the barks of trees, wild roots and weeds to meet their needs. It is astonishing what can be obtained just from the common

trees and plants of the countryside. The Elm common all over the country has a most nutritious inner bark, the seeds yield 531 calories per 100 grams and the leaves can be eaten. The chief problem is the preparation of these unusual foods in palatable form, digestible and acceptable to the consumer. One could sustain life with about ¾ lb. of any of the oily seeds such as poppy or perilla but so much oil would produce an indigestible meal. The starchy seeds are digestible but in general not so widespread, and the same is true of the wild cereal grains. The oaks provide an abundance of acorns but the tendency if eaten regularly to produce diarrhoea offsets their value.

Actual famine cuts across the established food habits of a community. Partial famine and a general shortage of food in the world also compels people to turn to unusual foods. Experience has shown that people can adapt for their use many of the wild plants growing in profusion at their doors. Circumstances during the war years have compelled communities all over the world, internees, migrant groups, military outposts and people in derelict areas to adapt themselves to whatever food was available. Critical studies of some of these groups has brought out a hitherto neglected factor in nutritional studies, name the degree of acceptability of the food as prepared under prevailing circumstances. Many of the cases of malnutrition appearing in internment camps resulted not from lack of food but a refusal on the part of the individual to eat all of the foods provided. So besides the excellent work done by such men as Chou Ting-wang in showing what big resources are available in the wilds, we very greatly need elaboration of his work to show how these foods can be put together to make attractive meals, meals adequate in calorie intake for a subsistence diet and meals adequate in vitamins and salt to protect people from the diseases of malnutrition resulting from an unbalanced diet.

1.1 野生薑 （劉寄奴） YEH SHENG CHIANG.

Senecio palmatus, Pall. (M. Ch. SD) RAGWORT.

Some of the ragworts contain toxic alkaloids. This species is apparently as harmless as the edible golden ragwort. As with all this group of leafy vegetables it is ordered that they be thoroughly boiled, the bitter taste removed with repeated washing and then eaten with oil and salt. *Leaf.*

1.2 刺薊菜 （青刺薊，千針草，小薊） T'ZU CHI TS'AI.

Cnicus japonicus, Maxim. (M. P.) CAT-THISTLE. Porter 214.

Su Sung (11th cent.) says, in the spring the young leaves with the roots are used for food and considered very palatable. Bret. 160, used all over China. *Shoot, leaf.*

1.3 大薊 TA CHI.

Cnicus Spicatus, Maxim (M. SD. BR.) TIGER-THISTLE.

The root is considered deleterious, but the leafy shoots have a natural sweet taste and are said to be excellent eating. *Shoot, leaf.*

1.4 山莧菜 SHAN HSIEN TS'AI.

Achryanthes bidentata, BL. (M. P.)
and *A. Aspera*, L. （百倍，脚斯燈，對節菜，牛膝）
CHAFF-FLOWER. Porter 62.

Cultivated in North China and Szechuan for food, Li Shih-chen. In the Moluccas the young leaves are served as a spinach, Burkill 33. The Herbal says the root is poisonous but the leafy shoots are edible. *Shoot, leaf.*

1.5 款冬花 K'UAN TUNG HUA.

（橐吾，顆凍虎鬚蒐奚，代冬蜂斗菜，水平菜，鑽凍）

Tussilago Farfara, L. (M. H. Ch.) COLTSFOOT. Bailey 749.

The young leaves after boiling are washed to remove the bitter taste due to the presence of tannin, and are then eaten with oil and salt. They are rich in mucilage which accounts for their use in domestic medicine as a demulcent, United States Disp. p. 1375. The bitterness is also due to the presence 2.63% of a glucoside. The ash 3.4% is rich in zinc. *Leaf.*

1.6 萹蓄 （萹竹） PIEN HSÜ

Polygonum aviculare, L. (M. Br. Ch.) KNOTWEED.
GOOSEWEED.

This is known in Germany as Homeriana-Thee or Weidermannscher-Thee. Like China tea it contains tannin, but the flavour is supported by 2 to 2½% of sugar and a volatile oil with a little resin and wax. The herb yields 2.44% of ash unusually rich in zinc. The fresh plant contains 87% water, (Wehmer 278). *Shoot, leaf.*

1.7 大藍 （菘藍，馬藍，蔰） TA LAN.

Isatis tinctoria, L. (M. Br.) DYER'S WOAD. PASTEL. B313.

The character of its leaves accounts for the name *sung lan* "cabbage indigo", they contain indican from which indigo is made. They are said to be nonpoisonous. *Leaf.*

1.8. 石竹子 SHIH CHU TZU.

（瓦句麥，大菊大蘭杜母草，鷰麥蕎麥）（瞿麥）

Dianthus superbus, L. (M. Br. Ch. SD) PINK B263.

Li Shih-chen says it is commonly called *Lo yang hua* from Lo Yang in Honan, the young plant being eaten when cooked. The pinks contain saponins, which are apparently nontoxic. *Shoot, leaf.*

1.9. 紅花菜 （黃藍）（紅藍花） HUNG HUA T'SAI

Carthamus tinctorius, L. (M. Ch. BN) SAFFLOWER B792.

It says that an edible oil can be expressed from the seeds, 25%. The leaves are said to be sweet and nonpoisonous; eaten as a spinach in N. W. India. *Leaf.*

1.10. 萱草花 （川草花，鹿蒦，宜男） HSUAN T'SAO HUA.

Hemerocallis fulva, L. (M. Br. Ch.) ORANGE DAY LILY. B172.
This may also apply to *H. flava* and other species.

The flowers are rich in vitamin A and have some vitamin B_1. The dried produce sold on the market, *huany hua ts'ai*, contains 9.3% protein, 25% fat 0.9% ash and 60% carbohydrate rich in sugar. There is no data regarding the leaf and shoot. Yuan Hu says the flowers, leaves and shoots are all excellent vegetables. The root can be made into a flour for making cakes. The hill people depend on this plant greatly as a food. In the author's time the literati at the Capital ate the shoots as a delicacy. The leaves are sweet. The flowers eaten by pregnant women are said to guarantee a male child. *Flower, Leaf. shoot, root.*

1.11. 車輪菜 CH'E LUN T'SAI.

（當道，芣苢，蝦蟇衣，牛衣，勝烏菜，馬鳥，牛舌草）（車前子）

Plantago major, L. (M.P.) PLANTAIN Porter 182.
var. *asiatica*, DC. (Br. Ch. Wilson. BN).

The seeds are unusually rich in vitamin B_1, and are used by the Chinese in Malay for making cooling jellies. The leaves are well known as a vegetable, the thinner leaves of the Chinese varieties being more palatable than the tough ones of the common plantain found all over the world. The fresh plant contains 81.4% water, 2.7% protein, 0.4% fat. and 2.2% ash; in the ash is 0.46% potassium making the plant somewhat diuretic. The leaves also contain an astringent principle *aucubin* (Wehmer 1145), and a small amount of vitamin C. *Shoot, Leaf.*

1.12. **白水萅苗 PAI SHUI HUNG MIAO.**
（鴻薷，紅，龍古，蘄，遊龍）（萅草）
Polygonum orientale, L. (M. Br. Ch.) PRINCES FEATHER. B245.

Li Shih-chen says the seeds are cooked for food. The young shoots are a standard vegetable in Indo-China. They have a saline taste. Dragendorff says the leaves are smoked like tobacco. They are recommended boiled washed and eaten with oil and salt, or steamed. *Shoot, Leaf.*

1.13. **黃耆 HUANG CH'I**
戴椹，獨椹芰棗蜀脂，百本，王孫綿黃耆）
Astragulus hoantchy, Franch (M. H.) YELLOW VETCH.
(and *A. Henryi*, Oliv.)

These shoots are sweetish in taste and are considered of tonic value, known colloquially as "mutton". The young leafy shoots were cultivated as a vegetable in the 16th. century, Li Shih-chen. *Shoot, Leaf.*

1.14. **威靈仙 （能消） WEI LING HSIEN.**
Clematis chinensis, Retz. (M. H. Ch.) CLEMATIS. B277.
and Allied Species.

Said to be incompatible with tea and wheat flour. Some species contain irritant poisons, this which is said to be nonpoisonous must be like the nontoxic species eaten in India as a famine good. The root of the above species is used as a medicine in China. *Leaf.*

1.15. **馬兜鈴 （雲南根，土青木香） MA TOU LING.**
Aristolochia debilis, S. & Z. (M. Ch.) BIRTHWORT. HORSE-BELL.

The birthworts usually have poisonous roots and stems. This is said to have nonpoisonous leaves. *Leaf.*

1.16. **旋覆花 HSUAN FU HUA.**
（戴椹，金沸草，盛椹，金錢花覆，盜庚）
Inula britannica, L. (M.P. Ch.) ELECAMPANE. Porter 200.
and *I. chinesis* Rupr.

The leaves are bitter and cooling. The flowers are said to be slightly toxic. *Leaf.*

1.17. **防風 FANG FENG.**
（銅芸，茴草百枝，屏風，簡根，百蚩，又名石防風）
Siler divaricatum, Bth. & H. (M. Br. Sd. BN. Ch.) BOFU.

The young leaves were gathered for food in the second moon in Kiangsu and Anhui in the 16th. century, Li Shih-chen. The seeds and roots are considered deleterious. Leaf:—protein 1.67, fat 0.29, cbhyd. 4.7, ash 1.25%. An article of Japanese diet. *Shoot, Leaf.*

1.18. 鬱臭苗 YU CH'OU MIAO.

（益母，益明，大札，貞蔚蓳）（荒蔚子）（蓳臭穢）

Leonurus sibiricus, L. (M. BN) MOTHERWORT. BN 807.

The leaves contain leonurin, 0.5 fatty oil, 5% ash. They have a sweetish taste and are nonpoisonous. *Shoot, Leaf.*

1.19. 澤漆 （漆莖，大戟苗） TSE CH'I

Euphorbia helioscopa, L. (M. Ch. SD.)

SUNSPURGE. WARTWEED Porter 122.

In Malaya the Chinese make a sweetmeat of the leaves of the local Euphorbias, by boiling them in sugar after removing as much of the latex as possible. The tender shoots of *E. hirta* are eaten in small quantity as famine food. The latex of many species is poisonous, used as fish poisons and arrow poisons, the herbaceous species washed free of the latex are used in several Asiatic countries. The saponin phasin in this species is harmless, though some old Chinese authorities say it is slightly toxic. Lanessan cites this as a violent purgative. *Stem, Leaf.*

1.20. 酸漿草 SUAN CHIANG TS'AO.

（酸母草，鳩酸草，小酸芋）（酢漿草）

Oxalis corniculata, L. (M. SD. Ch.)

LADY'S SORREL. Porter 120. Bailey 457.

The presence of acid potassium oxalate makes this leaf a good addition to salads, but to eat much is injurious (Burkill 1616). It is cultivated in the Moluccas as a seasoning and is used in India for its cooling, antiscorbutic and appetising qualities. Cattle eat it freely and people eat it in time of famine, Watt. *Shoot, Leaf.*

1.21. 蛇床子 SHE CH'UANG TZU.

(*Selinum M.* L.) 蛇粟，蛇米，虵床，思益，繩毒，棗棘牆蘼肝）

Cnidium Monnieri, L. (M. Ch. G. Br.) SNAKES BED. Porter 138.

Whilst the seed of this plant is freely eaten by snakes, it has considerable potency and should not be included with the leafy shoots. *Shoot, Leaf.*

1.22. 茴香 （土茴香，蘹香） HUI HSIANG.

Foeniculum vulgare, Mill. (M. H. SD.) FENNEL. Bailey 564.

This is cultivated all over the world as a flavouring from very early times. The leaves and stems may be eaten raw or cooked. The seeds are usually dried and powdered, or added whole into cakes. The leafy shoots are a regular market article in China. Analysis:—3.8 protein, 0.6 fat, 6.4 cbhyd. 1.89% ash with a moderate amount of vitamin A, rich in vitamin C. It has a pleasant spicey flavour and is recommended for its content of iron and lime. The seeds are mixed with other foods as a flavoring and have good carminative value due to 3% volatile oil, also 9% fat and starch. *Shoot, Leaf. Seed.*

1.23. 夏枯草 HSIA KU TS'AO.

Brunella vulgaris, L. (M. BN. Ch. H. Br.)
CARPENTER WEED. HEAL ALL. Porter 156 BN 1170.
(*Prunella V.* L.) (夕句，乃東，燕面)

Of a somewhat bitter taste which is removed by washing. This is due to its high content of tannin, on account of which it was a common styptic remedy in Western domestic medicine. *Leaf.*

1.24. 藁本 (鬼卿，地新，微莖，山園姜) KAO PEN.

Nothosmyrnium japonicum, Mig. (M. SD Ch.)
STRAW WEED. BN 1462.

A somewhat acrid bitter taste. *Shoot, Leaf.*

1.25. 柴胡 (地薑，山菜，菇草葉，芸高) CH'AI HU.

Bupleurum falcatum, L. (M. H. Br. Ch.) HARE'S EAR. BN. 260.

The stem and leaf contain the glucosid rutin, not deleterious. Li Shih-chen says the young plant before it lignifies may be eaten. The old plant is used for firewood. The root is listed as a famine food in India, Watt. *Shoot, Leaf.*

1.26. 漏蘆 (野蘭，萊蒿鹿驪根鬼油麻) LOU LU.

Echinops dahuricus, Fisch. (M. Ch.) GLOBE THISTLE. BN. 1009.

A saline bitter taste, removed by washing. *Leaf.*

1.27. 龍膽草 LUNG TAN TS'AO.

Gentiana scabra, Bge. (M. Br. H. Ch.) GENTIAN BN. 1417.
var. *Buergeri*, Maxim. (BN.) (龍膽，陵游，草龍胆)

It is said to be weakening if eaten on an empty stomach. *Leaf.*

1.28. 鼠菊 (勤，陵翹，鼠尾草) SHU CHÜ

Salvia japonica, Th. (M. BN.) JAPANESE SAGE. BN. 1242.

This is like foreign sage, useful for garnishing other foods. *Leaf.*

1.29. 前胡 CH'IEN HU.

Peucedanum decursivum, Maxim. (M. SD. Ch.)
WILD PARSNIP. BN. 623.
(*Angelica d.* Miq.)

The potent root is used in Chinese Medicine. *Leaf.*

1.30. 地榆 (玉豉) TI YU

Sanguisorba officinalis, L. (M. Ch. Br. SD.) BURNET BN. 366.

An old substitute for tea, it makes a cooling beverage. The leaves when boiled and washed to remove the bitterness are eaten with oil and *Leaf.*

salt. *S. minor* in Europe is sparingly cultivated as a salad and as sheep forage, Bailey.

1.31. 川芎 **CH'UAN HSIUNG.**

（胡窮，香果，蘄藭微蕪微蕪茳蘼）（芎藭）（雀腦芎，馬衡芎）

Conioselinum univittatum, Turcz. (M. Br. Ch.)

(*Cnidium officinale*, Mak.) HEMLOCK PARSLEY. BN. 465

Besides their use as a vegetable the leaves make a refreshing drink. *Leaf.*

1.32. 葛勒子秧 （葛勒蔓，遏蘿蔓）（葎草） **KE LE TZU YANG.**

Humulus japonicus, S. & Z. (M. H.)

WILD HOP. Bailey 239. BN 1206.

This has been introduced into the West as an ornamental plant. *Leaf. Shoot,*

1.33. 猪牙菜 **CHU YA TS'AI.**

（莪蒿，蘿蒿，蒿，角蒿）

Incarvillea sinensis, Lam. (M. Ch.)

I. Delavayi, B. & F. — INCARVILLA. BN. 472. Bailey 689.

Said by one authority to be slightly toxic. *Leaf. Shoot, Stem,*

1.34. 連翹 **LIEN CH'IAO**

（異翹，蘭華折根軹，三廉，連，連苕）

Forsythia suspensa, Vahl. (M. Br. Ch.)

GOLDEN BELLS. FORSYTHIA. Bailey 596. BN. 946. *Leaf.*

The leaf contains a glucoside phillyrin, potency unknown.

2.1 桔梗 （利如，房圖白藥梗草，薺苨） **CHIEH KENG.**

Platycodon grandiflorum, DC. (M. H. Br. Ch. SD)

BALLOON FLOWER. BROAD BLUEBELL. Bailey 745 BN. 785.

The radical leaves are said be slightly poisonous, so only the top leaves should be used. They are bitter in contrast to the small blue-bell (6.1) which is called "sweet chieh keng". The root is eaten in Japan, called *Kikio*. Protein 3.5, fat 0.28, cbhyd 10.9, ash 1.02%. *Leaf.*

2.2 青杞 （羊泉，羊飴，漆姑蜀羊泉） **CH'ING CHI**

Solanum septemlobum, Bge. (M. Ch.) NIGHTSHADE.

The synonym given *Shu yang ch'uan*, also applies to the toxic irritant leaf of *S. dulcamara* which contains various alkaloids. It also applies to the variety *lyratum*, Thbg. of dulcamara of which little is known, though Henry gives it the name 甜菜 *t'ien ts'ai* "sweet vegetable" Cf. 7.30. *Leaf.*

2.3 馬蘭頭 **MA LAN T'OU** (柴蘭，頭蘭，山蘭，)

Aster trinervius, L. (M. Ch.) PURPLE ASTER. BN. 852. Bailey 776.

Protein 3.9, fat 0.91, cbhyd 5.92, ash 1.81% in leafy shoots, Shanghai. Cultivated today as a vegetable of good nutritive value, with a slightly sweet taste, though the wild plant is said to be slightly acrid. *Shoot, Leaf.*

2.4 豨簽 (粘糊菜，火枚草) **HSI HSIEN**

Siegesbeckia orientalis, L. (M. Ch. SD.). HERB DE FLACQ. BN. 1300.

This contains the bitter principle darutin. Said to be slighly toxic with an acrid taste, which is washed out with water after boiling. *Shoot, Leaf.*

2.5 澤瀉 (水薺菜，水瀉及瀉，芒芋，錫瀉，) **TSE HSIEH**

Alisma plantago, L. (M. BN. Br.) WATER PLANTAIN. BN. 1368.

Of a saltish taste, composition unknown. *Leaf.*

2.6 竹節菜 **CHU CHIEH TS'AI**

(翠蝴蝶，翠蛾眉，筆竹花，倭青草，淡竹葉，)

Commelina communis, L. (M. BN.)

SPIDER-WORT. DAY-FLOWER. Porter 36. BN. 1410.

The spiderworts are mucilaginous plants well known as cattle fodder, as a vegetable and as a famine food (Burkill 645). They have a sweet taste. Eaten by the poor in India, especially in times of scarcity, Watt. *Shoot, Leaf.*

2.7 獨掃苗 (落帚) **TU SAO MIAO**

Kochia Scoparia, Schrad. (M. Br.)

BELVEDERE. BROOM PLANT. BN. 368. Bailey 250.

The leaves contain some saponin but have been used for centuries as food. The taste of the young leafy shoots is said to be delicious. *Shoot, leaf.*

2.8 歪頭菜 **WAI TOU TS'AI**

Vicia unijuga, A. Br. (M. Ch. SD. BN.)

CROOKED BROAD BEAN. BN. 663. *Leaf.*

2.9 兎兒酸 (兎兒漿) **T'U ERH SUAN**

Unidentified. *Shoot, leaf.*

2.10 鹹蓬 (鹽蓬) **CHIEN P'ENG**

Suaeda glauca, Bge. (M. Ch. SD). SEA BLITE. BN. 1549.

Cultivated as a vegetable. The maritime species is eaten in Java, Burkill. Its acid taste is removed by washing. Other species of this are used as a vegetable in Europe, Dragendorff The sea-blites are the most valued famine food in India, Watt. *Shoot, leaf.*