

Di-yuan [Ti-yuan]—Varieties of Lands

HARA, Motoko

Introductory Comment

The following is a complete translation of *Di-yuan* 地員 [Varieties of Lands], the *Guan-zi* [Kuan-tzu] 管子 XIX, 58. *Di-yuan* chapter offers not only a valuable historical material concerning early Chinese knowledge levels on pedology, botany, and agriculture but also involves a suggestion in understanding the entire editorial policy of the *Guan-zi*. On several chapters of the *Guan-zi*, excellent English translations have already appeared by Professor Lewis Maverick,¹⁾ and by Professor W. Allyn Rickett,²⁾ but unfortunately, *Di-yuan* is not found in either of these works.

Moreover, in China and in Japan, most scholars studying the *Guan-zi*, often assert to emend the knotty character with the ordinary in the *Guan-zi* text. Then, they show their own views, based on the recognition that the *Guan-zi* is an editorialized book in disorder. However, is it really a fair assessment of the *Guan-zi*?

Recently, in my writings, I have explained my opinion³⁾ on the content and the meanings of *Di-yuan*, including the reason why we must not emend the character of *Guan-zi* text. Therefore, in the following translation, based on *SPTK*, I have kept away from emendation,⁴⁾ as much as possible, and on the basis of the interpretation of each word, as shown in the chapter and the paragraph, the meaning of the divisions and the marks I used are as follows, and discussed in my writings.

Translation

○ When Guan Chung arranged the earth (under the heaven),⁵⁾ the unit of calculation⁶⁾ to appreciate the soils was seven feet (depth of ground water).

A Irrigated lands (*Du-dian* 瀆田) [northern paddy soil irrigated by wells],⁷⁾ after drawn whole of irrigation water, are well adapted to the growing of the five grains [wheat or barley, beans, paddy, german millet, and millet]. There, a managing officer⁸⁾ is demanded, and the yields are investigated⁹⁾ in the field.

Adaptable trees¹⁰⁾ of this land are the beech,¹¹⁾ the camphor,¹²⁾ some species of pears,¹³⁾ and pines.

Adaptable grasses are the wait-a-bits.¹⁴⁾

Arranging this soil, “Five units” is called. [“Dig the well to five units depth to

get the pure water of confined aquifer system.”] Five times seven, thirty-five feet depth, [we] get to the ground water. The symbolic sound of this water level is “*Jiao* 角”.¹⁵⁾ The water is blue.

The people in this [soil's] land are strong.

B Cultivated burozem (*Chi-lu* 赤壩) land, after manured enough, are well adapted to the growing of the five grains. The hemp, produced in this land, is white, and the hemp cloth is dyed yellow.¹⁶⁾

Adaptable grasses of this land are the woolly grasses and a type of pampas grass.¹⁷⁾

Adaptable trees are some species of pears.¹⁸⁾

Arranging this soil, “Four units!” is called. [“Dig the well to four units depth to get the pure water of confined aquifer system.”] Four times seven, twenty-eight feet depth, [we] get to the ground water. The symbolic sound of this water level is “*Shang* 商”. The water is white and sweet.

The people in this [soil's] land have longevity.

C Cultivated drab soil (*Huang-tang* 黃唐), is less adapted to the growing of most of grains, besides german millet and millet might grow, besides water irrigation by hands with a fence [to avoid the waterdrops infiltrate and injure the young spikes of german millet] is necessary.¹⁹⁾ Since the water regime often varies, it is hard to make suburban walls and to establish a [new colonial] village.²⁰⁾

Adaptable grasses of this land are a kind of panic grass, the wild cats,²¹⁾ and a kind of couch grass.²²⁾

Adaptable trees are Chinese mahogany and mulberry.²³⁾

Arranging this soil, “Three units!” is called. [“Dig the well to three units depth to get water.”]

Three times seven, twenty-one feet depth, [we] get to the ground water. The symbolic sound of this water level is “*Gong* 宮”. The water is yellow and smells, and it makes definite underground streams.²⁴⁾ [Therefore, the water level often varies.]

D Yellow fulvo-aquic soil (*Chi-zhi* 斥埴) is well adapted to the growing of beans and wheat or barley.

Adaptable grasses are the snake gourd and the motherwort.²⁵⁾

Adaptable trees of this land are the black willows.²⁶⁾

Arranging this soil, “Double units!” is called. [As] two times seven, fourteen feet depth, [we] get to the ground water. [drainage work should be done.] The symbolic sound of this water level is “*Yu* 羽”. The water contains salt [lixivated from the soil], and it makes definite underground streams. [Therefore, the water level often varies.]

E Lime concretion black soil (*Hei-zhi* 黑埴) is well adapted to the growing of the paddy and wheat or barley.

Adaptable grasses are the duckweeds and the docks.²⁷⁾

Adaptable trees of this land are the sweet crab apples.²⁸⁾

Arranging this soil, “One unit!” is called. Seven feet depth, [we] get to the ground water. The symbolic sound of this water level is “*Zhi* 徽”. The water is

black [for the solution of soluble humus, which was parent material of the soil], and bitter [because calcium bicarbonate and magnesium bicarbonate are contained.

X Generally to say,²⁹⁾ when we hear a note “*Zhi* 徵”, it is just like a [sleeping] mother sow grunting, surprised by the baby swine bearing on[to be fed]. [It is a friendly and carefree tone, sounds bright and funny.] Generally to say, when we hear a note “*Yu* 羽”, it is just like a horse neighing in a green field. [It is a leisurely tone compared with a horse cantering in the street or resting in a stable]. Generally to say, when we hear a note “*Gong* 宮”, it is just like an ox lowing in a cattleshed [put in a cave in the side of the cliff. It is a low-pitched tone, sounds wild and dissatisfied, distant from dwelling area.] Generally to say, when we hear a note “*Shang* 商”, it is just like a sheep bleating, leaving the flock. [It is rather a high-pitched lonely tone, but sounds a little independent, from the pasture.] Generally to say, when we hear a note “*Jiao* 角”, it is just like a pheasant screaming on a treetop, it is a high-pitched clear tone, [sounds from the depth heart of the mountains.]

Y Normally,³⁰⁾ to make a standard scale of the five notes, first, we take one note, and treble it. Then we make the fourth power of it (the treble), nine by nine [81]. Thus the key note of “*Huang-zhong* 黃鐘”/“*Shao-su* 小素” scale, the “*Gong* 宮” note is decided. Then we divide it [81] into three, one third of it [27] adds to the principal [81] makes 108, and “*Zhi* 徵” note is decided. Then we divide it [108] into three, take one third of it [36] from the principal [108] make 72, and “*Shang* 商” note is decided. Then we divide it [72] into three, one third of it [24] adds to the principal [72] makes 96, and “*Yu* 羽” note is decided. Then we divide it [96] into three, take one third of it [32] from the principal [96] make 64, and “*Jiao* 角” note is decided.

R① Terrace “*fēn yān* 墳延³¹⁾” is called “six units”. Six times seven, forty-two feet depth, [we] get to the ground water.

② Terrace edge “*xie zhi fang* 陝之芳³²⁾” is called “seven units”. Seven times seven, forty-nine feet depth, [we] get to the ground water.

③ Center of alluvial fan “*si xie* 祀陝³³⁾” is called “eight units”. Eight times seven, fifty-six feet depth, [we] get to the ground water.

④ The foot of hill “*du ling* 杜陵³⁴⁾” is called “nine units”. Nine times seven, sixty-three feet depth, [we] get to the ground water.

⑤ Flat surface stretching ridge “*yan ling* 延陵³⁵⁾” is called “ten units”. Ten times seven, seventy feet depth, [we] get to the ground water.

⑥ Basin plain “*huan ling* 環陵³⁶⁾” is called “eleven units”. Eleven times seven, seventy-seven feet depth [we] get to the ground water.

⑦ [The foot of] gently sloping mountain “*man shan* 蔓山³⁷⁾” is called “twelve units”. Twelve times seven, eighty-four feet depth, [we] get to the ground water.

⑧ [The foot of] fluffy mountain like dome “*fu shan* 付山³⁸⁾” is called “thirteen units”. Thirteen times seven, ninety-one feet depth, [we] get to the ground water.

⑨ [The foot of] fluffy mountain like dome, partly with white cliff of Rhyolite “*fu shan bai tu* 付山白徒³⁹⁾” is called “fourteen units”. Fourteen times seven,

ninety-eight feet depth, [we] get to the ground water.

⑩ [The foot of] central peak of a chain of hills “zhong ling 中陵” is called “fifteen units”. Fifteen times seven, one-hundred five feet depth, [we] get to the ground water.

⑪ [The foot of] blue limy mountain “qing shan 青山”⁴⁰⁾ is called “sixteen units”. Sixteen times seven, one-hundred twelve feet depth, [we] get to the ground water. Here, there are often blue dragons [the fossil of dinosaurs], and a muddy argillaceous bottom. Therefore, we cannot take the ground water.

⑫ [The foot of] sheer mountain made of ferruginous “chi rang hao shan 赤壤勢山”⁴¹⁾ is called “seventeen units”. Seven-teen times seven, one-hundred nineteen feet depth, [we] get to the ground water. Here, there is an ore deposit of azurite,⁴²⁾ [so, the water is poisonous]. Therefore, we cannot take the ground water.

⑬ [The foot of] mountain with the collapse of a precipice made of granite sand “zuo shan bai rang 陸山白壤”⁴³⁾ is called “eighteen units”. Eighteen times seven, one-hundred twenty-six feet depth, [we] get to the ground water. Here, there is a rock bed of granite.⁴⁴⁾ Therefore, we cannot take the ground water.

⑭ [The foot of] mountain with cliff “tu shan 徒山”⁴⁵⁾ is called “nineteen units”. Nineteen times seven, one-hundred thirty-three feet depth, [we] get to the ground water. Here, there is an ore deposit of graphite. Therefore, we cannot take the ground water.

⑮ [The foot of] high and gently sloping mountain made of Kolin “gao ling tu shan 高陵土山”⁴⁶⁾ is called “twenty units”. Twenty times seven, one-hundred forty feet depth, [we] get to the ground water.

F [The land] on the top of mountains, is named “hunging fountain, *xuan quan* 縣泉”, the soil is not dry, here, as to grasses, cotton-grass/Hare’s-tail and the material grass for sandal “*zou* 走”⁴⁷⁾ grow, as to trees, a kind of larch fir⁴⁸⁾ grows. If we drill there, in two feet depth, we get to the ground water.

G [The land] on the top of mountains, is named “double ingot, *fu lü* 復呂”,⁴⁹⁾ here, as to grasses, “the fish bowel *yu chang* 魚腸”⁵⁰⁾ and a kind of herb just like valerian⁵¹⁾ grow, as to trees, willows grow. If we drill there, in three feet depth, we get to the ground water.

H [The land] on the top of mountains, is named “fountain blossom, *quan ying* 泉英”, here, as to grasses, a dropwort⁵²⁾ and a rock sweet-flag⁵³⁾ grow, as to trees, poplars grow. If we drill there, in five feet depth, we get to the ground water.

I [The land] at the sheer bluff [*cai* 材] of mountains,⁵⁴⁾ as to grasses, a yellow flower simmilar to the perennial sow-thistle⁵⁵⁾ and a water pepper⁵⁶⁾ grows, as to trees, Chinese arbor-vitae⁵⁷⁾ grows. If we drill there, in two by seven, four-teen feet depth, we get to the ground water.

J [The land] at the gentle slopes [*ce* 側] of mountains,⁵⁸⁾ as to grasses, the bindweed⁵⁹⁾ and the mugworts grow, as to trees, elms⁶⁰⁾ grow. If we drill there, in three by seven, twenty-one feet depth, we get to the ground water.

Z Generally to say, the relationships between grasses and soils,⁶¹⁾ involve each adaptations⁶²⁾ At the high land, at the low land, grasses and soils are respectively

in existence.

A kind of Bur reed⁶³⁾ grows lower than wild Indian rice,⁶⁴⁾ wild Indian rice grows lower than bistorts/Easter-ledges,⁶⁵⁾ bistorts grow lower than cat's-tails,⁶⁶⁾ cat's-tails grow lower than reeds,⁶⁷⁾ reeds grow lower than motherwort,⁶⁸⁾ motherwort grows lower than mugwort,⁶⁹⁾ mugwort grows lower than summer cypress,⁷⁰⁾ summer cypress grows lower than a kind of lemon-grass,⁷¹⁾ a kind of lemon-grass grows lower than wild angelica,⁷²⁾ wild angelica grows lower than a type of pampas grass,⁷³⁾ a type of pampas grass grows lower than a kind of couch grass.⁷⁴⁾

Generally to say, these grasses show twelve steps, which are founded in certain ground.

O₁ The land of the nine regions [various regions]⁷⁵⁾ make their appearance as ninety kinds of [a great variety of] soils. The soils involve zonality by each region, and yet, their appearance can be classified in detail.

K(a) The most excellent of the number of the soils, are the very five variations of *su* [粟 cultivated brown forest soil].⁷⁶⁾ The appearance of the *su* is red, blue, white, black, or yellow. The *su* soils have five patterns of color.⁷⁷⁾

(b) The conditions of the *su* soils are dewy but not stickily, firm but not rigid. They don't either cling to the wheels, nor make the hands and legs dirty. What are sown there, are barley,⁷⁸⁾ both large and small, with white stalks, white ears, which can be sown in other soils.

(c) If the variety of *su* soils are on hills and mountains, or on the bank or plains, both in the shade and the sun, a paulownia⁷⁹⁾ and a tree like chinquapin⁸⁰⁾ are adapted to bring up.

(d) The elm, the willow, the paper mulberry, the red mulberry, the white mulberry,⁸¹⁾ the pedunculate oak, the black locust and the populas, all these trees grow up well, spread their branches out straight.

(e) [In the area of *su* soils,] every swamp is rich in fish, every pasture is good [to raise] cattle and sheep.

(c)₃ [In the area of *su* soils,] for the hedge in hamlet or meadow,⁸²⁾ the big and small bamboos, the common jujube, the catalpa,⁸³⁾ the Japanese oak,⁸⁴⁾ and the spindle-tree⁸⁵⁾ are adapted.

(f) Where the herb and the aromatic trees grow, the dropwort, the field garlic, a kind of angelica,⁸⁶⁾ a kind of hogweed,⁸⁷⁾ the prickly ash,⁸⁸⁾ and the weeping golden bell.⁸⁹⁾

(g) As the various kinds of aroma are mingled, illnesses are rare, the aging is slow, the ladies and gentlemen are all good-looking,⁹⁰⁾ the people are skillful. The ground water is yellowish white, and everyone is good-humored.

(h) The five variations of *su* soils, when it is dry, it doesn't solidify, when the water is supplied, it doesn't become quaggy. Such a kind of soil, is named the *su* soils.

L(a) Then next to the *su* soils are the five variations of *wo* [沃 brown forest soil].⁹¹⁾ The appearance of the *wo*, is red, blue, yellow, white, or black. The five

appearances of the *su* soils give a sign of the different properties of the *wo* soils.

(b) The conditions of the *wo* soils are minute but moist, there are holes where insects are easy to live. Why they are moist and minute, and never become whitish, is that the bottom slice holds the water. What are sown there, are wheat,⁹²⁾ both large and small, with reddish stalks, blackish ears, and long beards.

(c)₁ If the variety of *wo* soils are on hummocks and mountains, or on hills and hillocks, or if on the southern peak of a chain hills,⁹³⁾ both in the east and west side, a paulownia a chinquapin, a tree named *Fu* [扶],⁹⁴⁾ and the Chinese mahogany, are adapted to bring up.

(c)₂ In addition to that, the white catalpa, the Japanese apricot, the apricot, the peach, and the plum, bear a lot of fruit, some of them are tree-seedlings.⁹⁵⁾

(d)₁ The common jujube,⁹⁶⁾ the sweet crab apples, the pagoda tree,⁹⁷⁾ the poplar, the elm, the mulberry, the willows, the red oaks, all the trees grow up well, spread their branches out straight.

(d)₂ The raisin tree⁹⁸⁾ grow up in the shade of the *wo* soils.

(c)₄ And if they are in sunny side, it is easy to crop the various kind of hemp plants, either in high point or in lower point.⁹⁹⁾ The thick ones are just like small bamboos or reeds, the thin ones are similar to the head of miscanthus or twigs. The thick ones are not for spinning, but the thin ones are used, the yarn spun and treasured up, reminds us of the heap of the glossed silk.

(f) In the irrigated field for hemp plants, the various kinds of herbs can be planted, the mishmi bitter, some kinds of angelica, the fenel, and a kind of hogweed.¹⁰⁰⁾

(e) [In the area of *su* soils,] every swamp is rich in fish, every pasture is good [to raise] cattle and sheep.

(g) The ground water is bluish white, and everyone in that land enjoys robust health, rarely has a skin disease, and his back never is bent.

(h) The five variations of *wo* soils, when it is dry, it does not crack, when the water is supplied, it does not become quaggy. Such a kind of soil, is named the *wo* soils.

M(a) Then next to the soils are the five variations of *wei* [位 mull layer on the brown forest dark soil].¹⁰¹⁾ The appearance of the soils, which is the mixture of five colors, varies between one another.

(b) The conditions of the *wei* soils are neither tough, nor flight. They look like a green moss-grown field.¹⁰²⁾ What are sown here are oats,¹⁰³⁾ both large and small, with reddish stalks, white ears.

(c)₁ If the variety of *wei* soils are on hummocks and hillocks, on the bank or plains, or on hills and mountains, the big and small bamboos, the common jujube, the catalpa,¹⁰⁴⁾ the Japanese oak, and the wahoo are adapted.

(d)₃ [In the area of *wei* soils,] at the out-of-the-way places in the mountains, the gentian¹⁰⁵⁾ and a kind of hedge parsley¹⁰⁶⁾ bloom. All the trees are given to grow up, spread their branches out straight, the mulberry, the pine, the black willows, and a kind of fir, named *rong* 茸.¹⁰⁷⁾

(c)₅ [If men] forested there, the elm, the peach, the weeping willows, and the chinaberry are adapted to bring up.

(f)₁ There are so many kinds of herbs, the ginger, the balloonflower, the asarabacca, and the herb paris¹⁰⁸⁾ are easy to grow.

(f)₂ At the headland of the mountains, the snake gourd¹⁰⁹⁾ is hanging, the bittersweet¹¹⁰⁾ and the garden burnet¹¹¹⁾ are trembling.

(f)₃ At the dale, a kind of lady's slipper and the tartarian aster¹¹²⁾ bloom.

(f)₄ At the foot of the mountains, the snake's head,¹¹³⁾ a kind of calamus,¹¹⁴⁾ a kind of white hell-bore¹¹⁵⁾ a kind of lily,¹¹⁶⁾ and other herbs are easy to gather, so the illness of the people are avoidable.

(d)₄ In the wooded regions and the forested mountains [of the area of soils], the black locust, the chinaberry, the Japanese oaks, and the paper mulberry are grown, so a lot of birds and animals live in, so long as the reindeer dwell, a number of deer dwell, of course.

(g) The ground water is bluish black, and everyone in that land is nimble and irrepid, lives in simple way, rarely takes grains.

(h) Wherever, high or low, they keep the moisture. Such a kind of soil, is named the *wei* soils.

N① Then next to the *wei* soils are the five variations of *yin* [陰 moder layer on the brown forest dark soil].¹¹⁷⁾ The appearance of the *yin* soils is soft and rich just like the blackish moss, covering on the black soils, or a green gluey foxtail millet,¹¹⁸⁾ and they are slightly, similar to ash. What are sown there, are the yam,¹¹⁹⁾ both large and small, with reddish stalks, yellowish ears, and ripened into a big bean just as an eye opening wide, and the leaf just like the aster's one.

The total products, the foods, trees, and others in [the *yin* soils] area, can be estimated to be a 20% reduction off in the total products of the best three soils. Such a kind of soil, is named the *yin* soils.

② Then next to the *yin* soils are the five variations of *rang* [壤 alluvial brown soils].¹²⁰⁾

The appearance of the *rang* soils, is spongy, like the mire by the marsh, or the heap of compost.

What are sown there, are the Japanese barnyard millet,¹²¹⁾ both large and small, with reddish stalks, yellowish dangling ears, that are proof against the floods and the drought, so adapted to bring up in other kind of soils. The total products, the foods, trees, and others, in [the *yin* soils] area, can be estimated to be a 20% reduction off in the total products of the best three soils. Such a kind of soil, is named the *rang* soils.

③ Then next to the *yin* soils are the five variations of *fu* [浮 alluvial sandy loam soils].¹²²⁾ The appearance of the *rang* soils, is rustling, like the pile of threshed grain, but they keep the moisture, never scatterd, nor crack. What are sown there, are the *Coix*,¹²³⁾ both large and small, with long and soft leaves like fox's ears, simmilar to miscanthas's leaves, one kind of them has yellowish stalks, another kind of them has blackish stalks, with blackish ears, and big grains.

The total products, the foods, trees, and others, in [the *fu* soils] area, can be estimated to be a 20% reduction off in the total products of the best three soils. Such a kind of soil, is named the *fu* soils.

O₂ The above mentioned thirty varieties are recognized as the first class of the soils. The sown foods are twelve.

P① The middle of the number of the soils are the five variations of *zhu* [恐 calcic cinnamon soil].¹²⁴⁾

The appearance of the *zhu* soils, is bunched up, like the grains in sacks in granary, but as if they were a lump of salt, they keep wettish [and easy to scatter]. What are sown there, are the foxtail millet,¹²⁵⁾ both large and small, with reddish stalks, yellowish dangling ears, that are proof against the floods and the drought, so they are adapted to bring up in other kind of soils.

The total products, the foods, trees, and others, in [the *zhu* soils] area, can be estimated to be a 30% reduction off in the total products of the best three soils. Such a kind of soil, is named the *zhu* soils.

② Then next to the *zhu* soils are the five variations of *lu* [纒 albic dark brown forest soil].¹²⁶⁾

The appearance of the *lu* soils, is firm and solid. What are sown there, are the buckwheat,¹²⁷⁾ both large and small, those stalks and leaves are simmlar to the Chinese mahogany's, and the grains are big.

The total products, the foods, trees, and others, in [the *lu* soils] area, can be estimated to be a 30% reduction off in the total products of the best three soils. Such a kind of soil, is named the *lu* soils.

③ Then next to the *lu* soils are the five variations of *yan* [墘 cultivated meadow cinnamon soil].¹²⁸⁾

The appearance of the *yan* soils, is firm and solid. What are sown there are the *li* [荔],¹²⁹⁾ both large and small, with blue stalks and yellow ears. The total products, the foods, trees, and others, in [the *yan* soils] area, can be estimated to be a 30% reduction off in the total products of the best three soils. Such a kind of soil, is named the *yan* soils.

④ Then next to the *yan* soils are the five variations of *piao* [剽 orthic yellow-brown earth].¹³⁰⁾

The appearance of the *piao* soils, is colorful and flowerly, [when a clod of them falls to pieces] they spread slowly, as germs of young grasses spread in the field. What are sown there, are the millet,¹³¹⁾ both large and small, with blackish stalks and blue ears.

The total products, the foods, trees, and others, in [the *piao* soils] area, can be estimated to be a 40% reduction off in the total products of the best three soils. Such a kind of soil, is named the *piao* soils.

⑤ Then next to the *piao* soils are the five variations of *sha* [沙 fluviatile sandy soil].¹³²⁾

The appearance of the *sha* soils, as the unhulled grains are crunching, is gritty like a whetstone. What are sown there, are the calabash gourd,¹³³⁾ both large and

small, with white stalks blue fruits and the vines extending.

The total products, the foods, trees, and others, in [the *sha* soils] area, can be estimated to be a 40% reduction off in the total products of the best three soils. Such a kind of soil, is named the *sha* soils.

⑥ Then next to the *sha* soils are the five variations of *ge* [壩 luvic cinnamon soil].¹³⁴⁾

The appearance of the *ge* soils, is pebbly like the snail's shell, they cannot be used after the floods and the drought. What are sown there, are the grain sorghum,¹³⁵⁾ both large and small, with blackish stalks and blackish ears.

The total products, the foods, trees, and others, in [the *ge* soils] area, can be estimated to be a 40% reduction off in the total products of the best three soils. Such a kind of soil, is named the *ge* soils.

O₃ The above mentioned thirty varieties are recognized as the second class of the soils. The sown foods are twelve.

Q① The inferior of the number of the soils are the five variations of *you* [猶 humic bog soil].¹³⁶⁾

The appearance of the *you* soils, is pulpy, like the excrement. What are sown there, are the perilla,¹³⁷⁾ both large and small, with whity stalks, blackish ears.

The total products, the foods, trees, and others, in [the *you* soils] area, can be estimated to be a 50% reduction off in the total products of the best three soils. Such a kind of soil, is named the *you* soils.

② Then next to the *you* soils are the five variations of *zhuang* [壯 red clay].¹³⁸⁾ The appearance of the soils, is red and stickly, just like the liver of a rat. What are sown there, are the spict millet,¹³⁹⁾ both large and small, with blackish stalks, blackish ears.

The total products, the foods, trees, and others, in [the *zhuang* soils] area, can be estimated to be a 50% reduction off in the total products of the best three soils. Such a kind of soil, is named the *zhuang* soils.

③ Then next to the *zhuang* soils are the five variations of *shi* [殖 pseudogley soil].¹⁴⁰⁾ The appearance of the *shi* soils, is so barren, that after an excessive surplry of the water, they first become muddy, and then, they congeal with cracking. What are sown there, are the love-lies-bleeding,¹⁴¹⁾ both large and small, some of them grow black seeds, others grow yellow seeds, with cinnabar red calyxes.

The total products, the foods, trees, and others, in [the *shi* soils] area, can be estimated to be a 60% reduction off in the total products of the best three soils. Such a kind of soil, is named the *shi* soils.

④ Then next to the *shi* soils are the five variations of *hu* [殼 pseudozolic].¹⁴²⁾ The appearance of the soils, is so crumbly, that after the floods and the drought, they cannot be cultivable. What are sown there, are the beans, most of which grow white seeds. The total products, the foods, trees, and others, in [the *hu* soils] area, can be estimated to be a 60% reduction off in the total products of the best three soils. Such a kind of soil, is named the *hu* soils.

⑤ Then next to the *hu* soils are the five variations of *fu* [鳧 consolidated

soil].¹⁴³⁾ The appearance of the *fu* soils, turning into a solid mass, is too hard to crack. What are sown there, are a lot of kinds of upland rice, named *hei-e* 黑鷲, *ma-fu* 馬夫.¹⁴⁴⁾

The total products, the foods, trees, and others, in [the *fu* soils] area, can be estimated to be a 70% reduction off in the total products of the best three soils. Such a kind of soil, is named the *fu* soils.

⑥ Then next to the *fu* soils are the five variations of *jie* [桀 solonchak].¹⁴⁵⁾ The appearance of the *jie* soils, is extremely salty and bitter. This soil is the worst. What are sown there, are the thin paddy rice,¹⁴⁶⁾ the grain is long and thin.

The total products, the foods, trees, and others, in [the *jie* soils] area, can be estimated to be a 70% reduction off in the total products of the best three soils. Such a kind of soil, is named the *jie* soils.

O₄ The above mentioned thirty varieties are recognized as the third class of the soils. The sown foods are twelve.

O₅ Finally, the varieties of the soils are ninety, the sown foods are thirty-six.

Notes

- 1) Maverick, Lewis: *Economic Dialogues in Ancient China: Selections from the Kuan-tzu*. Far Eastern Publications, Yale University, New Haven, Conn, 1954.
- 2) Rickett, W. Allyn: *Kuan-tzu: A Repository of Early Chinese Thought*. Hong Kong: Hong Kong University Press, 1963.
- 3) *Kodai Chūgoku no Kaihatsu to Kankyō: Kanshi Chi-in hen Kenkyū* 古代中國の開發と環境—『管子』地員篇研究—[Development and Environment in Ancient China: A Study of the *Di-yuan* Chapter, *Kuan-tzu*, XIX, 58], Tokyo: Kenbun Shuppan 研文出版, 1994. In the following, an abbreviation KCKK is used.
- 4) *Ssu-pu ts'ung-k'an* 四部叢刊 [*Si-bu cong-kan*, Collected Reprints of Works in Four Categories]. 3 Ser. Shanghai: Commercial Press, 1929–35.
- 5) Lit., 天下 *Tien xia*, "under the heaven", i.e. "ground". Usually, the word *Tien xia* means "the world" or "the state" and sometimes "political power". But, here, the original meaning is more available as the object of the word *kuang* 匡, "to set it order".
- 6) Lit., 施 *Shi*. This word is not seen as the name of the unit in other classics. Here, it might be a standard for the engineering in Qi country.
- 7) Lit., 瀆田 *Du-dian*. The word 瀆 *Du* means a type of the waterway. The word *dian* means the cultivated lands. So, *Du-dian* ought to be irrigated lands. On the word 悉徙 *xi-xi*, Xia Wei-ying 夏緯瑛: *Guan-zi Di-yuan pian jiao shi* 管子地員篇校釋 [中華書局 Zhonghua Shuju, 1958.], and You Yu 友于: *Guan-zi Di-yuan pian yan jiu* 管子地員篇研究 [in 農史研究集刊 *Neng shi yan jiu ji kan* 1, 1959] argue to emend to 息土 *xi-tu*, and it means a type of the land irrigated by the rivers. But in *Di-yuan pian* the order of the under-ground water-level is the topic to explain each soil, and the description from A to E is ordered from lower level of the under-ground water-level to higher level, in opposite to this the description from R ① to R ⑮, is ordered from higher level to lower level. So, the description A to E has the special meaning to admire the effort, which is taken under the name of Guan Zhong, to develop the un-productive soil to the well-productive soil by irrigation and fertilization. The water of the rivers in the lower basin of the 黃河 Huang-he [Yellow River], often contains alkaline saline, which has done much harm to the paddy rice. Adaptable grains for *Du-dian*, is written "five", it might involve paddy rice, as the other Chinese classics' idiom.

Then, the source of the irrigation for *Du-dian*, must not be the rivers, but the wells from deep water-level, 35 Chinese feet, here mentioned. See KCKK, chap. 1.

- 8) Lit., 立后 *li-hou*. Reading 后 as 官.
- 9) Lit., 手實 *shou shi*. The word *shou* means a hand, and the word *shi* means actually. It is said that in Song Dynasty, a law, called *shou shi fa* 手實法, was legislated, with the object of weighing the grains as land tax at the place of production. So, Zhang Ping lin 章炳麟 said, the origin of the word *shou shi* is this, *Di-yuan pian*.. See KCKK chap. 1 and the conclusion.
- 10) Lit., 其木 *qi mu*. Xia, Wei-ying would emend this 木 to 草, and the following 草 to 木, according the styles of the following parts. Then, he would investigate the following 杭菑杜松 as the name of two grasses, and 楚棘 as trees. Yet in this part, to explain the special character of the irrigated land, the following adaptable trees should be mentioned at the first. So, these 木 and 草 must not be emended. See KCKK chap. 1 and 2.
- 11) Lit., 栢 *yan*. *Quercus*.
- 12) Lit., 蒿 *lan*. *Lauraceae*.
- 13) Lit., 杜 *du*. *Pyrus betulifolia* bgc.
- 14) Lit., 楚棘 *chu ji*. *Rosa multiflora/Rosa banksiae*. Other roses may be included. See KCKK chap 2.
- 15) Lit., 呼音中角. *hu yin zhong jiao*. According to *Shi chi* 史記 *Lü shu* 律書, the Chinese classical music scale is composed as 宮 *gong* 81, 商 *shang* 72, 角 *jiao* 64, 徵 *zhi* 54, 羽 *yu* 48. How to tune these notes are described as follows,
 $9 \times 9 = 81$ 宮 $81 \times 2/3 = 54$ 徵 $54 \times 4/3 = 72$ 商 $72 \times 2/3 = 48$ 羽 $48 \times 4/3 = 64$ 角.

But in *Di-yuan pian*, another method of computation is used to compose a music scale in following Y part. This is,

$$9 \times 9 = 81 \text{ 宮} \quad 81 \times 4/3 = 108 \text{ 徵} \quad 108 \times 2/3 = 72 \text{ 商} \quad 72 \times 4/3 = 96 \text{ 羽} \quad 96 \times 2/3 = 64 \text{ 角}.$$

By this method, 角 becomes the highest note of the five, and 商 becomes the second highest. This scale might be used for the music in *Qi* area. These variations are used as the symbol of the land development in this sentence. A man selected the way of development, irrigation or fertilization, just like Guan Zhong did. Inferior land might be turned to *Du-dian*, as a man selected the scale of *Qi* music, lower note *jiao* might be turned to the higher note. See KCKK, chap. 1.

- 16) Lit., 其布黃 *chi pu huang*. The character *fu* means linens. Linens cannot be dyed in yellow by the natural dyestuff, except the plants which hold gibberellin alkaloid, as the mishmi bitter, which is written in following K part. But the mishmi bitter cannot grow on alcalic soils, ranges in most of northern China, and acid soils in *Shan-tong* province are the rare area where the mishmi bitter can grow in northern China. So, this passage shows the regional character of *Di-yuan pian*. See KCKK, chap. 5 and the conclusion.
- 17) Lit., 白茅與藿 *bai mao yu guan*.. *Imperata cylindrica* Beauv.. and *Spodiopogon sibiricus* Trin.. Xia, Wei-ying would emend this 藿 and the following 藿 in D part to 藿 (the old style of the character 藿 *huan*) and would investigate both 藿 (藿) as a type of reed, *Phragmites communis* Trin.. The level of the underground water of 赤墟 is deeper than 斥墟 3 meters, then, two 藿 characters must not mean the same grass. So we need to emend one of 藿 to the other character. Besides, in the following Z part, there is another 藿 character and 藿 *huan* character according to the order of description of Z part, the land 藿 is growing on should be lower than the land 藿 is growing on. Today, the character 藿 has two pronunciations, *huan* and *tui*, 藿 *huan* is used as the new style of 藿 *huan*, and 藿 *tui* is used as the new style of 藿 *tui*. The character 藿 *tui* means motherwort (*Leonurus sibiricus* L.), and the argument on the meanings of 藿, has been confused through all these 1500 years. It is however, exactly that it should be some of the monocotyledonous plants, growing on the dryer land than the motherwort grows, and a popular plant in northern China. Then, it should be *Spodiopogon sibiricus* Trin., a type of pampas grasses. See KCKK, chap. 3.
- 18) Lit., 赤棠 *chi tang*. *Pyrus calleryana* Decne..
- 19) Lit. 宜縣澤行廂落. The character 廂 means a fence, and 郭沫若 Guo Mo-ruo argued, in 管子集校 *Kuan-tzu ji jiao* [科學出版社 Ke xue chu ban she, Beijing, 1956], it is a fence around the village.

But in this passage, the method of cropping german millets and millets in the dry area as 黃唐, is described. In watering them, it is necessary to avoid pouring water directly on the sprout. This knowledge was known in ancient China, as 齋民要術 *Chi min yao shu* mentioned on it. Then this 廡 should be a kind of tool, like a fence, to avoid the pouring of water on the sprout. See KCKK, chap. 1.

- 20) According to Guo Mo-ruo.
- 21) Lit., 黍稷 *shu shu*. Usually, these characters mean german millets and millets. As they are not the wild grasses, Xia, Wei-ying would recognize these characters are broken. But german millets are the plants improved on a kind of panic grass, *Panicum bisulcatum* Thunb., and the millets are improved on the wild cats, *Setaria viridis*. They often turn back to their original breed, just like as in the grains. Then, here is described their original breed as the grass. See KCKK, cha p. 4.
- 22) Lit., 茅 *mao*. *Calamagrostis* Adans. or *Elymus* L. .
- 23) Lit., 欏 *chun*. *Toona sinensis* Juss. Roem. Lit., 擾桑 *rao sang*. *Morus alba* var. *multicaulis* London.
- 24) Lit., 流徙 *liu xi*.
- 25) Lit., 黃蕒 *fu guan*. According to 爾雅 *Er Ya*, 黃 *fu* means 王瓜 *wang gua*, *Trichosanthes cucumeroides*. On 蕒 *guan*, here as *Leonurus sibiricus* l., see note (17). See KCKK, chap. 3.
- 26) Lit., 杞 *qi*. According to Xia, Wei-ying, *Salix purpurea* L. or *Salix cheilophila* Schneid.
- 27) Lit., 苳 *ping*. *Lemnaceae*. Lit., 蓍 *xiu*. *Rumex*.
- 28) Lit., 白棠 *bai tang*. *Malus sieboldii* Rehd..
- 29) The following sentences are often recognized as an interpolation, and argued to be omitted. But these are the symbolic descriptions on the situations of each lands. For example, in the most developed area, *Du-dian*, the breeding animals should be the pigs, by the loss of the forests and the plains. These sentences must not be omitted. See KCKK, chap. 2.
- 30) The following sentences must not be omitted, also. See notes (15) and KCKK, chap. 1.
- 31) Lit., 墳延 *fen yan*. According to 周禮 *Chou li*, reading 墳 as 水崖. See KCKK, chap. 7.
- 32) Lit., 陝之芳 *xie zhi fang*. 陝 *xie* means the gorge. Reading 芳 as 旁. The level of the under-ground water at the edge of the terrace is deeper than it is at the mountain side. See KCKK, chap. 7.
- 33) Lit., 祀陝 *si xie*. Reading 祀 as 無已, according to 說文 *Shuo wen*. Where the gorge can be seenlost, but really extends under the ground, is alluvial fan. See KCKK, chap. 7.
- 34) Lit., 杜陵 *du ling*. Reading 杜 as 堵, according to 白川靜 Shirakawa Shizuka, 說文新義 *Setsumon Shingi* (*The New Interpretations of Shuo-wen*) [Kobe, 白鶴美術館 Haku-tsuru Museum, 1973], 堵 *du* means a heap of soils, transfixing it with a branch, and its magical meaning is shutting. The places called *du ling* and the following eleven names, with 陵 *ling* or 山 *shan*, might not be the top of them, but the foot of them. These passages describe the places ordering the level of the under-ground water, and the name of the hill or the mountains are the characteristics of them. The style of the hills or mountains near a certain plain area shows the geological construction of the place. Also they could be the guide of the level of the under-ground water. See KCKK, chap. 7.
- 35) Lit., 延陵 *yan ling*. Reading 延 as stretching.
- 36) Lit., 環陵 *huan ling*. 環 means a circle. A place surrounded by mountains, should be a basin plain.
- 37) Lit., 蔓山 *man shan*. Reading 蔓 as 漫. The word 蔓山 *man shan* is also seen in 乘馬篇 *Shengma pian* of *Guan-zi*, and it means a gently sloped hill.
- 38) Lit., 付山 *fu shan*. Reading 付 as 浮.
- 39) Lit., 付山白徒 *fu shan bai tu*. According to 王紹蘭 *Wang Shao Lan*, reading 徒 as the meaning of 斗絕, cliff. See KCKK, chap. 7.
- 40) Lit., 青山 *qing shan*. The Following passage, "there are often blue dragons [the fossil of dinosaurs] and muddy argillaceous bottom (lit., 青龍之所居庚泥)" prove this area as the hydromorphic soils. Today, in Shan Tong province, many mountains called 青山 *qing shan* are there. They are the moutains constituted from limestone. See KCKK, chap. 7.
- 41) Lit., 赤壤勢山 *chi rang hao shan*. According to 說文 *Shuo wen*, reading 勢 as 伉. These characters mean standing straight. See KCKK, chap. 7.
- 42) Lit., 青商. According to Shirakawa Shizuka, the character 青 means a well dug for azurite, as a important pigment in ancient China. Shirakawa, also argued, 辛, the upper parts of the

- character 商, and 章, is a figure of tatoo needle. In *Han-Shu, Lü-li Zhi* (漢書律曆志), there is a description “商 is said in other words, 章”. Then 青商 might be an ore deposit of azurite, as a material for tatooing in blue. See KCKK, chap. 7.
- 43) Lit., 陸山白壤 *zuo shan bai rang*. The character 陸 cannot be seen in any other classics. In *Shuo wen*, the character 坐, the right parts of 陸, is regarded as the figure of soils sediment, but Shirakawa, Shizuka regards it as the figure of two men, sitting in both side of a religious soil heap, waiting for the judgement. Then the figure 坐, should have the composition that the center is high, and the right and left sides are low. In regards to natural mountains, such composition can be seen at the mountain with the collapse. See KCKK, chap. 7.
- 44) Lit., 駢石, *pien shi*. The character 駢 means connecting or linking. But, if this word means unconsolidated gravel layer, it might be aquifer itself. Otherwise if it means a rock bed with no flaw, it might be impervious layer, then the upper layer of this *bing shi* layer should be aquifer. In this case, search for other under-ground water should be unnecessary. So *bing shi* layer should be a rock bed with flaw, just like the stone wall of granite. See KCKK, chap. 7.
- 45) Lit., 徒山 *tu shan*. See notes (39).
- 46) Lit., 高陵土山 *gao ling tu shan*. Kaolin is named by F. V. Richthofen after the *gao ling tu* in Jiang-xi Province, but the clay from which porcelain can be made (kaolinton) is distributed in many other parts in China, as *Shan-tong*. The mountains maden of Kaolinton, whether they are high or not, are usually gently-sloping because of the high degree of weathering. See KCKK, chap. 7.
- 47) Lit., 如茅 *ru mao*. The meaning of these two characters is “just like *mao* 茅”. English name is unknown, but it should belong to *Calamagrostis* Adans.. Their distinctive features might be ears with the long white hairs. Then *ru mao* might be *Eriophorum vaginatum* L., cotton grasses. The plants lit. 走 *zou*, cannot be identified. See KCKK, chap. 3.
- 48) Lit., 橈 *man*. *Larix gmelinii* Gord.. See KCKK, chap. 2.
- 49) According to Shirakawa, Shizuka, the character 呂 *lü* figures the ingot. Yet the place called 復呂 *fu lü* “double ingot”, cannot be identified.
- 50) Lit., 魚腸 *yu chang*. These characters mean “the fish bowel”. The plants called *yu chang*, cannot be identified.
- 51) Lit., 蕪 *you*. This character means “a bad-smell grass”, as a Chinese herbal medicine today, it is called 敗醬 *bai jiang*, *Patrinia villosa*. It just looks like valerian, the English name is unknown. See KCKK, chap. 3.
- 52) Lit., 蕲 *qi*. *Oenanthe javanica*.
- 53) Lit., 白昌 *bai chang*. *Acorus gramineus* Soland.
- 54) Reading 材 *cai* as 垂.
- 55) Lit., 競 *jing*. *Sigesbeckia pubescens* Makino. English name is unknown.
- 56) Lit., 蓍 *qiang*. *Polygonum hydropiper* L..
- 57) Lit., 格 *ge*. *Platycladus orientalis* (L.) Franco (*Thuja o.* 1984, *Biota o.*). See KCKK, chap. 2.
- 58) Reading 側 *ce* as 旁.
- 59) Lit., 薑 *fu*. *Convolvulus arvensis* L..
- 60) Lit., 品榆 *pin yu*. *Ulmus*.
- 61) Lit., 凡草土之道 *fan cao tu zhi dao*. See KCKK, chap. 3 and the conclusion.
- 62) Lit., 穀造 *gu zao*. Reading 穀 as 善, according to Guo, Mo-ruo. See KCKK, the conclusion.
- 63) Lit., 蕪 *ye*. *Sparganium stoloniferum*. On the names, from this note to note (74), see KCKK, chap. 2.
- 64) Lit., 蘆 *yu*. *Zizania Latifolia*. (Griseb.) Turez.
- 65) Lit., 莧 *xian*. *Polygonum bistorta* L..
- 66) Lit., 蒲 *pu*. *Typha*.
- 67) Lit., 葦 *wei*. *Phragmites communis*.
- 68) Lit., 藟 *guan*. *Leonurus sibiricus* L. See note (17).
- 69) Lit., 蕪 *lou*. *Artemisia*.
- 70) Lit., 莽 *bing*. *Kochia trichosphylla* Stapf.
- 71) Lit., 蕭 *xiao*. *Cymbopogon goeringii* Honda.
- 72) Lit., 薛 *bi*. *Angelica miqueliana* Maxim..

- 73) Lit., 萑 *huan*. *Spodiopogon sibiricus* Trin.. See note (17).
- 74) Lit., 茅 *mao*. *Calamagrostis* Adans. or *Elymus*L.. See note (22).
- 75) Lit., 九州之士, *Jiu zhou zhi tu*. Xia, Wei ying argued the word *Jiu zhou* (the nine regions) means “all over ancient China except Chin area. Contrary to him, You, Yu argued, it means “many places of Guan zhong in Chin area”. Their argument depends on 禹貢 *Yu gong* in 尚書 *Shang shu* or other Chinese classics, the point in dispute is whether the loess is described or not. Yet the region *Ti-yuan pian* described should be concluded from *Ti-yuan pian*'s description itself, as follows. In many Chinese classics, the character 九 usually means “the biggest number” or merely “various”. Here, the word *Jiu zhou* means merely “various regions”. On the loess, see note (121), KCKK, chap.1, 6, and the conclusion.
- 76) Lit., 粟 *su*. The character 粟 often means the millet grains. Here it might be the figure of the soil texture, well water conservation and extremely even-grained, of the *su* soils. The following passages (b) proves this soil has aggregate structure. See KCKK, chap. 6.
- 77) Lit., 五粟五章. The character 章 here, means a pattern. See KCKK, the conclusion.
- 78) Lit., 大重細重 *da zhong xi zhong*. *Hordeum vulgare* L.. The characters, 大 and 細, also repeated in following parts, might be the expression of the varieties of each plant breedings. The reason why 重 *zhong* can be barley, is inferable from the following passages, on the color of stalks and ears. See KCKK, chap. 4.
- 79) Lit., 桐 *tong* *Paulownia*.
- 80) Lit., 柞 *zuo*, *Quercus dentata* Thunb.
- 81) Lit., 槩 *yan*, *Morus australis* Poiret, 桑 *sang*, *Morus alba* L., 柘 *zhe*, *Cudrania tricuspidata* Bur. See KCKK, chap. 2.
- 82) Lit., 其地其樊 *qi di qi fan*. See KCKK, chap. 2.
- 83) Lit., 藻 *zao*, 龜 *gui*. This passage, Lit. 竹箭藻龜檣, is similar to the following passage, Lit. 竹箭求龜檣, in M part. Xia argued, 藻 and 求 are the broken figure of the same character, 藻 *zao* as *Zizyphus jujuba* Miller.. He also argued 龜 and 隄 are the broken 楸 *qiu*, *Catalpa bungei*. According to this argument, 藻 and 求 should be emended to 棗, and 龜 and 隄, to 楸. Yet, 藻 *zao* must not be *Zizyphus jujuba* Miller., but *Z. Jujuba* var. *Spinus*. In L part (d)₁, a character 棘 is seen as a fruit tree with a crab apple tree and others. This 棘 should be the common jujube, *Zizyphus jujuba* Miller.. On the contrary, 藻 (棗) described here, as a tree for hedge, and 求 (棗) described in M part, as a tree for afforesting mountains, should be the Chinese jujube, *Z. jujuba* var. *Spinus*. See KCKK, chap. 2.
- 84) Lit., 檣 *you*, *Quercus serrata* Murr..
- 85) Lit., 檀 *tan*, *Euonymus*.
- 86) Lit., 薜荔白芷 *bi li bai zhi*. The argument on the meanings of the word 薜荔, has been confused through all these 1500 years, Xia would be persuaded of that these two characters mean a name of a grass, *Iris palasii* var *chinensis* Fisch. Yet the iris cannot be a spice, on the contrary, the following 白芷 (*Umbelliferae/Angelica anomala*, English name is unknown.) and others are obviously spices. 薜 and 荔 should be two spices. According to *Er Ya*, 薜 might be a wogwort, *Umbelliferae/Angelica sinensis*, 荔 might be a field garlic, *Allium macrostemon* Bge.. See KCKK, chap. 3 and 4.
- 87) Lit., 蘼蕪 *mei wu*, *Ligusticum chuanxion* Hort. English name is unknown.
- 88) Lit., 椒 *jiao*, *Zanthoxylum*.
- 89) Lit., 連 *lian*, *Forsythia suspensa*.
- 90) Lit., 士女皆好, *shi nu jie hao*. By contrast with the following 民 *min*, these 士 and 女 mean obviously rulers. See KCKK, the conclusion.
- 91) Lit., 沃 *wo*. The character 沃 means waterfull and fertile. The following passages (b) proves this soil has enogh conditions to product humus. See KCKK, chap. 6
- 92) Lit., 苗 *miao*, *Triticum aestivum* L. The reason why 重 *zhong* can be wheat, is inferable from the following passages, on the color of stalks and ears. See KCKK, chap. 4
- 93) Lit., 若在陬陵之陽, *ruo zai zou ling zhi yang*. The character 陬 is often read as 隅 *gong*, a corner or a nook. Guo, Mo-ruo would read, 若在陬, 陵之陽, “if it is on the nook of a hill, or on the sunny side of a hill”. Yet the hills and mountains are often rangy. 陬陵 might be the corner hill of the

- range. See KCKK, chap. 6 and conclusion.
- 94) A tree named *Fu* [扶] cannot be identified.
- 95) Lit., 其秀生茎起, *qi xiu sheng jing qi*. Reading 秀 as 實 *shi*. The character 茎 means stalks or branch. This phrase, word to word, is, “the (buried) fruit comes out, and the cutting branch grows up”. See KCKK, chap. 2 and conclusion.
- 96) Lit., 棘 *ji*. See note (80).
- 97) Lit., 槐 *huai*, *Sophora japonica*.
- 98) Lit., 檜藜 *zha li*, *Hovenia dulcis*. The argument on the meanings of these two characters 檜藜, whether these are the name of a tree or the names of two trees, has been confused long years. Xia argued these two mean the hawthorn, *Crataegu pinnati-fida*, yet the hawthorn usually grows up in a sunny place. Here 檜藜 is described as a tree grown in the shade. See KCKK, chap. 2.
- 99) Lit., 疇所, *chou suo*. According to 國語 *Guo wu*, reading 疇 as 麻地.
- 100) Lit., 蓮與麩蕪藪本白芷 *lian yu mei wu hao ben bai zhi*. The character 蓮 is different from 連 in K part. 青 is a shortening of 連翹, 蓮 might be a shortening of 黃連 *Coptis sinensis*, as it is a grass. See note (6). 藪本, *Ligsticum sinensis*. See KCKK, chap. 3, and the conclusion.
- 101) Lit., 位 *wei*. The reason why the character 位 became the name of the soils, is unknown. The following passages (b) proves this soil remains the soil texture as the zonal soil. See KCKK, chap. 6.
- 102) Lit., 青苳 *qing shu*. Reading 苳 as 秫 *shi*, glutinous millet. In *Ti-yuan pian*, various characters including 苳 part are used as the meaning of glutinous. Here 苳 is a description of the soil texture. See KCKK, chap. 6.
- 103) Lit., 葦無 *wei wu*, *Avena sativa* L.. See KCKK, chap. 4.
- 104) Lit., 求隄. See note (80).
- 105) Lit., 龍 *long*, *Gentiana scabra*.
- 106) Lit., 斥 *chi*. According to Xia, emending 斥 to 斤 *jin*, reading 斤 as 芹 *qin*, *Archangelica*. See KCKK, chap. 3.
- 107) A tree named *rong* 茸 cannot be identified.
- 108) Lit., 薑姜 *jiang*, *Zingiber officinale* Rosc., 桔梗 *jie geng*, *Platycodon glaucus*, 小辛 *shao xin*, *Asaram* sp. 大蒙 *da meng*, reading 大 as 牡. The argument on the meanings of 牡蒙 is so confused, that the name of this herb cannot be decided. See KCKK, chap. 3.
- 109) Lit., 桔 *jie*. Emending 桔 to 括. 桔梗 is described before. Here, a round red fruit is described. 括 might mean 括樓, *Trichosanthes kirilowii* Maxim.. See KCKK, chap. 3.
- 110) Lit., 符 *fu*, according to *Er Ya*, reading as 鬼目草, *Solanum lyratum* Thunb.
- 111) Lit., 榆 *yu*, usually means the elm, yet here, must not be trees. 榆 might be the shortening of 地榆, *ti yu*, *Sanguisorba officinalis*. See KCKK, chap. 3.
- 112) Lit., 箭 *jian*, usually means a kind of bamboo, yet it is described before. Here, 箭 might be the shortening of 天箭 *tian jian*, *Gastrodlae rhizoma*. 苑 *yuan*, *Aster tataricus* l.f.l.. See KCKK, chap. 3.
- 113) Lit., 黃芩 *huang meng*, *Fritillaria verticillata*. a kind of calamus,
- 114) Lit., 白昌 *bai chang*, *Acorus gramineus*. a kind of lily
- 115) Lit., 山藜 *shan li*, according to *Er Ya*, 藜 might mean 藜蘆 *li lu*, *Veratrum nigrum*, L. See KCKK, chap. 3.
- 116) Lit., 葦芒 *wei mang*. *Hemerocallis fulva*.
- 117) Lit., 隄 *yin*. This character has the meaning of “behind”. This naming might show, soils are under the forest. The following passages proves this soil has the soil texture as the brown forest dark soil.
- 118) Lit., 青苳 *qing shu*. Reading 苳 as 秫. See note (99) and KCKK, chap. 6.
- 119) Lit., 穉穉 *lei ge*. According to *Er ya*, “諸慮, 山藥”, these two letters might mean the vines. The vines that could be staple food might be a kind of yam, *Dioscorea batatas* Decne.. See KCKK, chap. 4.
- 120) Lit., 壤 *rang*. Today, the character 壤 means the loam, as a type of common soil. Here, the following passage proved, it is moist. See KCKK, chap. 6.
- 121) Lit., 水腸, *shui chang*. The meaning of the two characters, word to word, is “water bowel”. In the

- following passage, lit. 絀莖黃秀以慈, the character 慈 is used as a figure of dangling ears in *Kuan-tzu*. *Shui chang* might be a plant growing on the waterfull place, with long dangling ears just like a bowel, *Echinochloa crusgalli* Beauv. See KCKK, chap. 4.
- 122) Lit., 浮 *fu*. The reason why this character is used as a name of the soil is unknown. The following passage proved, it is sandy yet moist. See KCKK, chap. 6.
- 123) Lit., 忍隱忍 *ren yin ren*. According to *Er Ya*, “莠 *bang*, 隱忍”, these three characters are two names of the plants, 忍 and 隱忍, the following passage, describing two type of stalks and grains, also proved it. According to *Shuo Wen*, 莠 means 稗, a kind of grain. Both characters, 莠 and 稗 included the meaning of “both side”, and the character 稗 means “tremendously”. The only plant, with the ears on the both side of the stalk, is the jobs tears, *Coix lacryma-jobi* L. var *ma-yuen* Stapf. It might be 隱忍, and its original breed, *C. lacryma-jobi* L. might be 忍. See KCKK, chap. 4.
- 124) Lit., 恐 *zhu*. This 恐, also might be a description of the glutinous soil texture. According to the following passage, this soil might be a type of loess, the Chinese Yellow soil, named 黃綿土 *huang mian tu*, in China today. It is not fertilized yet, that *zhu* soil ranks no more the seventh in *Di-yuan pian*. Today, Chinese Yellow soil named 壤土 *lao tu* is recognized as well-fertilized, on the contrary, the ancient Chinese Yellow soil, really, was thus. See KCKK, chap. 6 and some of my recent works.
- 125) Lit., 稷 *ji*, *Setaria italica* Beauv. var. *g*.
- 126) Lit., 糞 *lu*. According to *Shuo wen*, 糞 黑剛土也” this soil might be rich in humus, yet adhesive. The following passage proved, it is adhesive. See KCKK, chap. 6.
- 127) Lit., 邯鄲 *han dan*, *Fagopyrum esculentum* Moench. The character 邯鄲 is a name of a city to the north-west of *Qi* province. This plant might have originated north-west part of China. The following passage, on colors and figures of the leaves and stalks, proved, it is the buckwheat. See KCKK, chap. 4.
- 128) Lit., 壘 *yan*. The character means salt. This soil has granulometric composition, yet it might not be dry. Just as a lump of salt, it might be damp. See KCKK, chap. 6.
- 129) Lit., 荔 *li*. The plant named *Li* cannot be identified.
- 130) Lit., 剽 *piao*. Reading 剽 as 劫. The following passage, on colorful and pliable soil texture just like fresh meat, proved, it might be ortho yellow-brown earth. See KCKK, chap. 6.
- 131) Lit., 稭 *ju*, *Setaria italica*, Beauv. var *g*.
- 132) Lit., 沙 *sha*. The character means sand. See KCKK, chap. 6.
- 133) Lit., 黃 *fu*, *Lagenaria ocymoides* l. This plant is obviously vines, as the character 蔓 can be seen in the following passage. According to *Li chi*, it might be the calabash gourd, as vines that could be staple food, and growing on sandy soils. See KCKK, chap. 3 and 4.
- 134) Lit., 壘 *ge*. This character means making a clod. The soil texture is described in the following passage. See KCKK, chap. 6.
- 135) Lit., 糶 *ji*. The left side of these two characters are 木, a tree. This plant might be tall. The character 糶 is seen in *Shi jing*, *Qi yue* 七月, it means the early rice. The character 糶, might mean some grains growing up in the short term. It might be the grain sorghum, *Panicum miliaceum* l. See KCKK, chap. 4.
- 136) Lit., 猶 *you*. The reason why this character is used as a name of soils is unknown. See KCKK, chap. 6.
- 137) Lit., 華 *hua*. This character means flowers, as well known. Yet most of the plants for the staple food have invisibly flowers. I suppose it might be *Perilla ocymoides* l. the perilla, yet uncertainly. See KCKK, chap. 6.
- 138) Lit., 壯 *zhuang*. This character is not seen *Shuo wen* or other classics. Many scholars would emend 壯 to 壯. The character 壯 might mean a part of a bow, both characters included the meaning of strongness, emending is not necessary. The following passage proved, that this soil might be red clay. See KCKK, chap. 6.
- 139) Lit., 青梁 *qing liang*, *Setaria italica* Beauv. var. *m*.
- 140) Lit., 殖 *shi*. According to Xia, reading 殖 as 埴 *shi*, clay. The following passage proved, that this

- soil might be pseudogley soil. See KCKK, chap. 6.
- 141) Lit., 膈膳 *yan shang*. The 秀 character cannot be seen in the following passage on this plant, yet two 實 character can be seen. *Yan shang* must be neither *Oryza* nor *Cyperaceae*. Other plants can be used as a staple food, with the black or yellow seeds and red calyxes might be the Inca wheat/tumbleweed, *Amaranthus caudatus* L.. See KCKK, chap. 4.
- 142) Lit., 鞞 *hu*. According to *Shuo wen*, 鞞 is regarded as the figure of the decanter made of horn. It is hard yet not solid. The *hu* soil might have plate structure, as pseudopodzolic. See KCKK, chap. 6.
- 143) Lit., 鳧 *fu*. The character 鳧 is a name of an ominous bird, the reason why this is used as a name of soils, is unknown. The following passage described, “堅而不豁 *jian er fu ge*, too hard to make fraw like born”, this is regarded as a figure of structureless soil. See KCKK, chap. 6.
- 144) Lit., 陵稻, 黑鶩 · 馬夫 *ling dao, hei-e, ma-fu*. 陵 means a hill. These might be the breeding names' of upland rice plants, yet unknown.
- 145) Lit., 桀 *jie*. The character 桀 is a name of a famous tyrant in Xin dynasty, the reason why this is used as a name of soils, is unknown. The following passage clearly show, *jie* soil is solonchak.
- 146) Lit., 白稻 *bai dao*. *Oryza sativa* L. var *indica*.