The relation of the Chinese to crickets presents a most curious chapter of cultural-historical development. It seems that generations of experience with crickets have enabled them to accomplish what might be called natural selection.

But the little insect _Gryllus domesticus_, dear to us as a cheery hearthside companion, found in the crevices about old-fashioned fireplaces, where its merry chirping has woven itself into the romance and poetry of all Western nations as a sound suggestive of domestic cheer, is not the cricket referred to, but a species of _Gryllus neglectus_, which only occasionally comes into houses. The Chinese field crickets (Ch'ü-ch'ü), are most abundant in isolated fields or where old layers of straw and other rubbish give them warmth and hiding. They dig holes in the ground and sit there during the day, chirping as if with contented enjoyment, and going abroad at night; but any disturbance near them will produce instant quiet.

The Chinese house cricket called _Tsao-wang-ma-erh_ (馬家馬兒) "Steads of the King of the Stove," are popularly believed to be ridden by the God of the Kitchen when he ascends to Heaven on the 23rd day of the 12th moon. They are of a light green colour, with white legs striped with yellow. They fairly swarm in Chinese cook-houses, especially in the cracks of the earthen stoves, making night hideous with their eternal chirping, which sounds something like _tsa-tsaa-tsaa_, and not _t'urh-t'urh-t'urh_, as with the field cricket. Hence, they are utterly detested by the Chinese; who, however, take no means of destroying them for fear of offending the God of the Kitchen, who would be certain to make an unfavourable report to the Pearly Emperor, no matter how much sugar was given him. And, then, who knows, whether he would be able to reach Heaven, if his steeds were gone! "But," someone may say, "why not destroy his chargers so that he cannot ride to Heaven at all?" The answer is, that the Chinese have too much respect for their gods to do anything so foolish. Worse things might happen!
The true (fighting and singing) cricket is called by various names such as Ch'ü-ch'ü (蟋蟀), Hsi-chu (蟋蟀), Ch'iung (蛐) (bug), Ts'ü-chih (促织) "to stimulate spinning"—referring to the click of a shuttle, the sound of which it is supposed to resemble, Ch'ing-tés (蟋蟀), Wang Sun (王子) "Prince's descendants," and Ching-tien (景天) "Worldly Pleasures." The mole cricket—which of more anon—is called Lou-ku (蝼蛄). The tree cricket, which in China is produced from larvae that inhabit the Ailanthus glandulosus is called Ch'üan-p'ing (蟬蛉), or "Ailanthus Hopper." They are the eternal prey of Chinese children who delight in squeezing them to make them jump. The female wingless cricket (Centophilus maculatus) is called Lü-chü (蝼蛄), "Donkey's colt." The male, which has a pair of short stubby wings, is called Kuo-kuo (蝽). There are three species of Kuo-kuo, one, called the Tou (豆) or "bean" Kuo-kuo, because it frequents the bean patches. The Chinese have not much use for the latter, since they are weak and do not produce a loud chirp. The Shan (苫) or "hull" Kuo-kuo which are found in the mountain regions. These latter are almost the size of a cicada, and of a greenish blue-yellow colour. The male has a loud prolonged chirp. The third of the species are called Ch'ü-chhu-tz'eh (秋子兒) "Autumn Births," because they are born late in autumn. This last is a strong, healthy insect, with good singing powers, and can be kept alive till the beginning of spring, when its colour, which is of a greenish hue, changes to that of a greenish-blue shade, when the insect expires. The Kuo-kuo, like the field cricket makes a buzzing sound produced by the friction of the bases of its wing-cases against each other. The female, Lü-chü, is absolutely mute. Still another species of non-fighting (but good chirping) cricket is the Yü-hu (蟋蟀) or "Greasy Gourd," so-called because they are much larger and fatter than the field cricket or Kuo-kuo. Its entire body is of a shiny black. A common nickname for a stout person is Yü-hu. Although both sexes have wings, only the male, like the Kuo-kuo and Ch'ü-chhu-tz'eh makes a noise by grinding them together. The field and Yü-hu crickets are kept in small pottery jars during the summer months, and the Kuo-kuo in small wicker cages. In autumn the field, Yü-hu and Ch'ü-chhu-tz'eh crickets (the "shan" and "tou" Kuo-kuo die as soon as the cold weather sets in) are transferred to finely decorated and carved gourds over which are fitted cotton cases to keep them warm. The making of these gourds is an art in itself, and merits a brief description. While the calabash is still green, a flat mould of wood is carved out in various designs and clamped onto the calabash till it is dry, flattening it, and leaving a deep impression of the carved design on it. Others again, after being flattened without any carved design on the mould, have the desired design either carved by hand or burnt in. These are fitted with perforated covers carved in various designs to match the drawings on the gourd itself. The reason for having the gourds flattened is for convenience in carrying them on the person. Especially this is the case with women, who strap them under the breasts: many of them carry not one, but several gourds, each with its single occupant thus producing a discordant insect concert pitched in the various turk-turk-turk—kuo-kuo kuo—yu-yu-yu keys.

During their confinement the insects are fed on masticated water-chestnuts, green or yellow beans, carrots, and sheep's liver pounded into a pulp. It is quite a common sight at Peking and Tientsin to see the cricket fans congregated in the teahouses with dozens of these insects laid out on the tables: their masters washing out the fancy gourds with hot tea, chowing beans, and feeding and listening to the chirping of the insects and boasting of the fighting powers. They are exposed for sale in the bazaars at from a few coppers to ten cents each. In autumn, when they are plentiful and nice and fat, the Yü-hu-kuo are bought by the handfull and fed to captive birds, especially when the latter are moulting, as the Yü-hu-kuo are said to make their new feathers grow much quickly and stronger. Thus the Yü-p'icheh or cockchafer is said to be an excellent remedy for cementing broken bones of birds, animals and humans. In certain parts of Canton, cockroaches are believed to reduce the weight of pigs if eaten alive. This might also be a good remedy for those who object to being called a Yü-hu-kuo!

During the winter months—when they are not numerous—the Yü-hu-kuo, as well as the Ch'ü-chhu and Ch'ü-chhu-kuo, are sold singly, each wrapped in a paper funnel. Many Chinese buy these insects only to let them go. This is called fangcheng "Releasing Life," for which they naturally expect a reward in the world to come. Some fancy gourds are sold in the bazaars from 20-cents to $1.50 each. The pottery jars may be bought for a few coppers. There is one special kind, however, made by a famous potter named Chao Tsu-yü (超玉) who lived during the reign of the Emperor Tao Kuang (A.D. 1821-1850) that sell for as high as $1.50. Some cricket fans rear hundreds of Ch'ü-chhu and Yü-hu-kuo, more particularly the latter, in their houses: seldom the Kuo-kuo, as they are more difficult to rear. The Yü-hu-kuo is more difficult to bring up than the field cricket, but is preferred to the latter owing to its loud buzzing noise. The racket made by these insects is such that only a Chinese could stand without going crazy. Some even employ experts, called Ch'ü-chhu-kuo-putshih to look after their crickets.
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DISTRIBUTION.—As the crickets are caught, the ordinary sized ones are put into the wicker baskets and covered with a cloth; the larger and finer ones are placed in the bamboo tube and the ends plugged up with a bunch of grass or straw. When the hunters have caught a sufficient number they return to their homes.

SELECTION.—The crickets thus caught, are first sorted according to colour, of which there are four. The green soldier first on the list, then come the red, followed by the black and the white. I have never seen a cricket catcher discard a green or red specimen, no matter how small or weak looking: sometimes they will throw away a black one if it is not up to the mark, but unless a white one shows superior qualities it is at once thrown out.

After being sorted out into the various colours, their special “points” are carefully scrutinized. The neck and shoulders must be thick and wide, also the top of the head, and there must be a good width across the back, with rather long legs. (How like choosing a prize fighter.) Those with a long neck, pointed head, too narrow feet, and thin legs are considered useless for fighting, although they may have good singing qualities. They have also their four weaknesses or faults: keeping the head too high, curled (instead of straight) antennae, keeping the teeth too close together, and crouching or squatting. Crickets with such faults are absolutely useless for fighting.

REARING OF CRICKETS.—Early every morning when the dew begins to fall, cricket fans go out in the grass with a piece of new cotton and soak up the dew which is squeezed out into pottery jars and kept ready for use. A pottery jar some two feet high, and with a diameter of one foot at the top, after being thoroughly washed out and the bottom laid with coal clinkers to a depth of about six inches, is covered with three inches of finely strained earth and sprinkled with clean water. A few shallow furrows are scratched into the earth thus laid and sown with wheat seeds (A miniature wheat field, as it were) and covered with earth. A hollow bamboo is then stuck through the earth thus prepared to a depth of about one foot, through which water is poured as required. A mat shed is erected over the jar to keep off the sun’s glare. The wheat field is sprinkled once a week. When the sprouts shoot above the earth about forty pairs of selected crickets are put in the jar.* They are fed on mastigated beans mixed with sheep’s liver pounded into a pulp, which is smeared on the ribs or leaf of a cabbage. Within twenty-one or two days the crickets, having finished laying their eggs, are cast out and allowed to roam at will.

In another fourteen or fifteen days the eggs are hatched, and the young fed on mastigated water-chestnuts, carrots, beans and sheep’s liver. The grain is never allowed to grow to a height of more than six inches, when it is cut down to about four or five inches to prevent the insects from escaping. The female is distinguished by having three cylindrical spear-shaped ovipositors. The Chinese call them san-i-pa and

* The jars just mentioned are of the regulation size to hold about 80 insects and to allow for their young, which run into thousands.

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ern-i-pa “Three and two tails,” the male having only two. Furthermore, the chirping of these insects is produced by rubbing the file-like ridge of one wing over the scraping surface of the other. Only the males have these organs, and it is generally agreed that the sounds serve either to call or excite the mute female. The young batch of crickets are still kept in the jar they were born in; water is poured down the bamboo tube three times a week, and the wheat sprouts sprinkled daily with the dew previously collected in the manner described above, and this is sipped by the insects. When they are half-grown, the females are thrown out, and only the males retained. These latter then begin to shed their skins; this process lasts for seven weeks, one layer being shed each week till they have cast the seventh skin, when they are full grown. They are then taken out of the jar they were born in, and put singly in small jars, into which is placed a little damp earth, and kept in a warm place for a few days, when they are put in the bazaar for sale.

Each jar contains a tiny bowser in which the insect conceals itself when there are any noises about. It is also provided with tiny food and water utensils made of pottery: the bowser and food utensils are nicely carved and decorated with designs of mountain scenery, rocks, bridges, grass, and the like.

CARE OF THE CRICKETS.—The Chinese cricket fans take more interest in their crickets than they do in their children, at least as far as hygiene is concerned. The small jars in which the insects are kept are washed out daily at sunrise, and the insects fed thrice daily on the mastigated beans, carrots and sheep’s liver. Once a week, at sunrise, the jars are slightly opened at the top to admit the sun’s rays (crickets soon die if they are exposed to the heat of the sun), and once a week they are exposed in an open place at night to admit the dew.

TESTING OF FIGHTING QUALITIES.—A male is first selected and a female put in the jar with him for two or three days, till they get to know each other well. The female is then thrown out and at once replaced by another male, which is attacked at once by the first male, because, as the Chinese fans say, he is jealous of losing his mate, which makes him furious. Ordinarily when two opponents are put together to fight, they are taken out of their own jars and put into another jar. No cricket fan would ever allow his cricket to enter his adversary’s “stamping ground,” as his insect would be sure to get defeated: so, they are both put into a strange jar altogether. Their chances are then more or less equalized. Sometimes one or both will make an attempt to escape, or at least dodge the issue, since the walls of the jar are an unsurmountable barrier. But such is not the case when, as stated, the male has been substituted for the female. The loss of his mate combined with the fact that he is fighting in his own domain, spur him to combat with every muscle erect.

Of course, he does not always win, since his adversary is of the same weight and size. They have their heavyweight, middleweight and lightweight champions. Before the fight comes off, each is carefully weighed on a tiny pair of scales, so that the fighters are more or less equally
matched as far as actual weight is concerned. The heaviest weighs about five grains, and the lightest about three. If the crickets refuse to attack each other, they are egged on by a bunch of tiger's or rat's whiskers attached to a reed and tickled about the antennae, ends of their tails and hind legs. They "feel" for each other with their antennae—just like prize fighters do with their fists—and as soon as there is an "opening" they charge at each other furiously with wide open mouths, tearing out legs, wings, eyes, antennae, and sometimes end in severing the head from the body. Very often the best cricket is placed at a disadvantage by an unscrupulous owner of the weaker insect, who, just previous to the battle, feeds his beetle on a little red pepper, the fumes of which puts his adversary hors de combat—dopes it as it were—before it has had a chance to show its real fighting qualities.

The fashion of cricket fighting is said to have originated during the reign of the Emperor T'ien Pao of the T'ang Dynasty (A.D. 742-755), when the ladies of the harem passed their idle time rearing crickets to sing and fight. Thus, the Chinese women may be said to have the honour of introducing the custom. By the time of the Sung's, the fashion had spread all over the empire. Chia San-tao, a high minister who served under the Sung Emperor Li Tsung, is said to have neglected his official duties, and passed his time together with his women watching cricket fights, for which he was called to account by the Emperor. Cricket fights in China developed into a veritable passion during the reign of the Ming Emperor Hsuan Te (A.D. 1426-1433) and was the principal pastime at court, levies of crickets being exacted from the people as a tax.

The mole cricket, (Gryllotalpa borealis), is known in China by various names, such as Lou-ku (蝼蛄), Hsu-ku (蟋蟀), Shih-shu (石鼠) "Stone Rat," from its habit of moving quite large stones about with its powerful front legs. T'ou-ku (土狗), "Earth Dog," and most commonly, La-la-ku (螂螂), which resembles the sound it makes with its wings. Although this insect has nothing to do with our fighting crickets, I mention it because of an interesting story connected with it and the Han Emperor Liu Hsii, reminding us of the story of Bruce and the spider. The legend runs that after Liu Hsii fled to escape the clutches of his enemy Wang Mang, he hid himself on a prairie. When on the point of falling asleep he felt something wriggling beneath him, and, fearing that it was a snake, he shifted his position elsewhere. Hardly had he got settled down when the same thing happened again, so he changed his position once more, but with the same result. Feeling about in his clothing he managed to catch the disturber of his peace, which, on examination, turned out to be a mole cricket. In his anger he tore it in half and threw it away. He had just got settled down again, when he heard the tramping and voices of men and the neighing of horses, and the loud voice of his enemy Wang Mang ordering his men carefully to search the bushes for him. The latter, however, laid perdu and escaped. He then reflected that the mole cricket must have followed him up in order to warn him of the approach of his enemy. (Note: The mole cricket is said to be furnished with a curious auditory apparatus on the front leg below the knee, concealed in a deep fold of the surface which enables it to hear quite a distance.) He therefore returned to the spot where he had cast it away: picked it up and pieced it together with a thorn, dug a hole and buried it. On the conclusion of the war Liu Hsii became the first Emperor of the Eastern Han Dynasty, A.D. 25. One day while conferring honours on his adherents in the throne hall, a large mole cricket suddenly flew in amongst the assembled nobles and settled down on the Emperor's throne. On examination it was discovered that it was the very same insect that had saved Liu Hsii's life, with the thorn still sticking in its body! Liu Hsii forthwith ennobled it, giving it the name Hui-ku, "Benevolent Bug." No sooner was this ceremony finished than the bug flew away and was never seen again. The Chinese still believe that a mole cricket has a thorn in the middle of its body, but will not dissect it, probably for fear of destroying the legend attached to it.

Bruce, it will be remembered, while lying perdu in the island of Rathlin one day noticed a spider try six times to fix its web on a beam in the ceiling. "Now shall this spider (said Bruce) teach me what to do, for I also have failed six times." The spider made a seventh attempt and succeeded, whereupon Bruce left the island (1307), collected three hundred followers, landed at Carrick, and at midnight surprised the English garrison in Turnberry Castle. Scott tells us in "Tales of a Grandfather" "that in remembrance of this incident it has always been deemed a foul crime in Scotland for any of the name of Bruce to injure a spider. Although the mole cricket is a very destructive insect in China, cutting all the roots away from flowers and other plants which come in the way of its burrowings, I have never heard of the Chinese destroying it, probably for the same reason that the Scotch will not harm a spider. The Chinese, however, being a practical people, make up for it in another way. Certain birds being very partial to feeding on mole crickets, they tie the latter up in small nets fitted with a contrivance that will close the mouth of the net the moment the bird enters it, making it a prisoner, but the cricket soon disappears down the captive's throat. Perhaps this is a saner, more natural, and less cruel method than killing it in other ways, which might lead the offender to be brought before the King of Fugatory for deliberately destroying life in defiance of the Buddhist Doctrine "that those who kill beasts, birds or insects are insane, and will be sent to the 16th hell of the Seventh Hall of Judgment to be tormented by birds and venomous insects."

Before concluding, it is perhaps necessary to state that cricket fights are rather tame affairs. A couple of cricket fans challenge each other's insects, and, after weighing them put them together to fight, witnessed by a few idlers, who, if they have any money, may risk a few coppers on their favourite. There are no "decorations" and "rejoinings," as has been claimed by certain writers. No "sounds of music." No "gongs clanged." No "flags snapping in the wind." No "procession winds through the streets, the tablet of victory preceding all, while the jubilant owner struts with his overjoyed compatriots, carrying
his victorious cricket home from the fight.” No “sunshine of glory falls on the entire community.” No “village will become as celebrated as an American town which produced a golf or baseball champion,” etc., as has been stated by a writer who has never seen a cricket fight or has depended upon the supple narrations of Chinese who knew no more about cricket fights than they did of horse-racing. One writer in an American newspaper even goes so far as to say that “some fanciers allow themselves to be stung by mosquitoes, and when these are full of blood, they are given to their favourite pupils!” Cricket fighting from a foreign point of view, is a mere bagatelle. But, tua cuique voluplas, and why should not the Chinese have theirs, tame as they are?

THE FORMATION OF FOUR-STRANDED CHROMOSOMES IN THE AMPHINUCLEUS OF FUNKIA SIEBOLDIANA

BY

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While working on his senior thesis, Mr. Chien-Fan Li of the Department of Biology of Yenching University found a remarkable ease of chromosome behaviour in the fertilization of the plant, Funkia sieboldiana. In the late prophase of the first embryonal mitosis there are unmistakable evidences of the formation of “tetrads” in the chromosomes of the amphinucleus.

The nuclear wall has partly broken down and the chromosomes are formed from a reticulat nucleus. The lateral view of these chromosomes presents paired elements with well marked chromonomers. These pairs when traced to their ends are seen to be made up by four distinct strands (Figs. 2 and 3).

That the nucleus in question is an amphinucleus ready for the first embryonal division is well supported by the following observations:

In the first place, this particular stage is found 169 hours after fertilization. It has been proved sufficiently in Mr. Li’s work that at the end of this period the fusion of pronuclei has already occurred. Secondly, two-cell stage embryos are found on the same slide, containing sections of other sister germs from the same plant. Lastly, the presence of a degenerating synergid and an endosperm nucleus in the very germ (Fig. 1) furnishes another link in this chain of evidences.

The Four-Stranded Chromosomes of the Amphinucleus of Funkia sieboldiana.

Fig. 1 The micropylar end of the embryo sac, showing the nucleus (a) with one degenerating synergid (s) below and a sperm nucleus (e) at the left.

Fig. 2 The amphinucleus enlarged to show the four-stranded some and the chromatin-knot.

Fig. 3 Four of the chromosomes traced out and enlarged to show chromosomes and the twisting and looping of the strands.