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Traditional Devices for Threshing Rice Seeds in Yun-Gui Highland, China

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Abstract

The dadou constructed with wooden boards is predominantly used as a traditional skill for threshing rice seeds in Miao tribe in Guizhou province, China, although the daguji, a modern device, has been introduced and developed into the area. The dadou device is well adapted and has several advantages in the traditional paddies under wet and rainy weather conditions of the area. The dazhen and occasionally the stone and broken-chair devices are utilized in the southwestern China with the cultivation of the rice cultivars with easy shattering habit. Historical and cultural significance of the dadou for the Miao tribe is discussed.

Key words: Threshing device, Rice cultivation, Traditional culture, Miao tribe.

Introduction

The mode of crop cultivation in an area is determined by and composed of the elements of practices and skills for cultivation. The practices or skills themselves vary with developmental change of the human civilization including crop improvement, or sometimes are very stable as well as food custom and traditional cultures. One skill or one practice present in one place is therefore a reflection of human culture and civilization. Knowing the mode of an element of agricultural practice will give a good insight into the relationship between human culture and crop cultivation.

Rice, *Oryza sativa* L., is one of the major staple food crops of the world, especially in Asian countries. People depending on rice as a principal food have the life-style firmly connected with rice cultivation. The rice has many cultivars with various degree of grain-shattering. In general, wild rice, *O. rufipogon* Griff., or weedy rice, *O. sativa* var. *spontanea*, produces easy shattering grains, and indica rice of *O. sativa* shows relatively easy shattering habit while many cultivars of *O. sativa* in Japan show non-shattering habit of grains.¹⁾ In the Southeast Asia, however, high- or intermediate-shattering cultivars are utilized at present. In almost cases, a particular harvesting practice is associated with such particular cultivar traits. Depending on this association, various devices, tools and machinery are hence developed in concordance with a given crop and other cultural elements.

Several minor human tribes or ethnicals maintain such rice varieties, in particular, in

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south-western China in the area covered by secondary vegetation of climax broad-leaved forest. Several traditional practices for threshing the seeds of paddy rice are found in the area. Very few opportunities watching such practices were able to be taken during four tours. In this paper our preliminary observations on the practices including our previous results²⁾ are described, and some considerations are presented.

Methods

Investigations were carried out in September to October in 1994, 1995, 1996, and 1997. The total days surveyed are 55 days. Information on threshing devices or threshing machine was mainly gathered by interviews to farmers and by *in-situ* observation in the paddy fields. Interviews were conducted through Han's interpreters dwelling in the same provincial cities as the survey sites, who translated into Japanese. The practices of threshing and the vernacular names of the parts of threshing devices were recorded. In some cases, the structure of devices was recorded, and they were measured.

Study Sites

Three areas of Guizhou province, and two areas of Yunnan and Sichuan provinces for comparison were studied including 50 sites. These areas are highlands and mountainous areas at the altitudes from 700 m to 1800 m. In the areas of Guizhou province, Miao (苗), Buyi (布衣) and Tong (侗) tribes dwell as well as Han (漢) tribe. In the areas of Yunnan province, Han, Bai (白) and Yi (彝) tribes inhabit. Annual precipitation ranges from 500mm to 1500mm, and average month-temperature ranges from 5°C to 25°C. Paddy rice is cultivated as a summer crop.

Results and Discussion

Three major and two minor types of devices for threshing rice seeds were observed in three provinces of south-west China. The dadou (撻斗: Plates 1, 2) whose name was formulated in 1987³⁾ is the most common device predominant to Guizhou province, especially in the areas where the minorities, Miao and Buyi tribes, dwell (Table 1). This device was called for short "dou (斗)" in most areas, and has several derivative names; "gudou (谷斗)" and "gutong (谷桶)" in Miao tribe in Kaili (凱里); "dadou (大斗)" in Buyi and Han tribes, "nutau" and "tohoa" in Miao tribe in Guiyang (貴陽); "kandou (鑲斗)" in Miao, Buyi and Han tribes in Guiyang. The dadou was called "dagutong (打谷桶)" or "bantong (拌桶)" in Sichuan province. The dadou is a wooden trapezoid box (Plates 1, 2) whose body is consisted of several wooden boards. The board is made of several species of trees ("sha-mu (杉木)": *Cunninghamia lanceolata* Hook., "dong-mu (桐木)": *Paulownia fortunei* Hemsl., or "wudong-mu (梧桐木)": *Firmiana simplex* W.F. Wight., probably including some species of *Quercus* and *Lithocarpus* as a part of dadou).

The dadou varies in size and shape by local area. The predominant dadou shows 130-140 cm in upper edge, 110-130 cm in bottom edge, and 45-60 cm in height (Figs. 1, 2). The dadou tends to be larger in the flat areas than in mountainous ones. A ventral side is usually constructed

Table 1. Threshing practice observed in Guizhou, Yunnan and Sichuan Provinces

Site (Locality)	Date observed	Tribe	Threshing type	Vernacular name	Source
<i>Guizhou</i>					
Guiding, Taijiang	1995 Sept.	Miao	A		O
Guangtun, Taijiang	1995 Sept.	Miao	A	gudou(谷斗)	I
Guangtun, Taijiang	1995 Sept.	Miao	A		O
Taijiang, Taijiang	1995 Sept.	Miao	A	dagudou(打谷斗)/打斗(dadou)	I
Qingman, Kaili	1994 Oct.	Miao	A		O
Shaozhai, Kaili	1995 Sept.	Miao	A		O
Panghai, Kaili	1995 Sept.	Miao	A		O
Panghai, Kaili	1995 Sept.	Miao	A	dou(斗)	I
Panghai, Kaili	1995 Sept.	Miao	A		I
Houshaozhai, Kaili	1995 Sept.	Miao	A	gutong(谷桶)	I
Mandong, Kaili	1995 Sept.	Miao	A	gutong(谷桶)	I
Matan, Kaili	1994 Oct.	Miao	A		O
Lushan, Kaili	1995 Sept.	?	A		O
Tafengtong, Kaili	1995 Sept.	Miao	A	dou(斗)	I
Tafengtong, Kaili	1995 Sept.	?	A	dou(斗)	I
Xiaofengtong, Kaili	1995 Sept.	Miao	A	dou(斗)	I
Leishan, Leishan	1995 Sept.	Miao	A		O
Leishan, Leishan	1995 Sept.	Miao	A	gutong(谷桶)	I
Daliangtian, Majiang	1995 Sept.	?	A		O
Baiyangping, Majiang	1995 Sept.	?	B		O
Shuishangpo, Fuquan	1995 Sept.	?	A		O
Fuquan, Fuquan	1995 Sept.	?	A/B		O
Longli, Longli	1995 Sept.	?	B	daguji(打谷机)/tuoliji(脱粒机)	I
Heping, Huishui	1996 Sept.	Buyi	A	dadou(大斗)	I
Huaxi, Guiyang	1994 Oct.	Miao	A		O
Huaxi, Guiyang	1995 Sept.	Miao	A	tohoa/dou(斗)	I
Huaxi, Guiyang	1996 Sept.	Buyi	A	dadou(大斗)	I
Huaxi, Guiyang	1996 Sept.	Miao	A	dou(斗)	I
Huaxi, Guiyang	1996 Sept.	Miao	A	nutau/dou(斗)	I
Huaxi, Guiyang	1996 Sept.	Miao	A	kandou(鑽斗)	I
Qingyan, Guiyang	1996 Sept.	Buyi	A	dadou(大斗)	I
Maiping, Guiyang	1996 Sept.	Buyi	A	dou(斗)	I
Maiping, Guiyang	1996 Sept.	Miao	A	nutau	I
Shawun, Guiyang	1996 Sept.	Buyi	A	kandou(鑽斗)	I
Shawun, Guiyang	1996 Sept.	Han	A	kandou(鑽斗)	I
Zhazuo, Guiyang	1996 Sept.	Buyi	B	daguji(打谷机)	I
Dula, Guiyang	1996 Sept.	Buyi	A	dou(斗)	I
Xiayun, Pingba	1996 Sept.	Han	A	kandou(鑽斗)	I
Chengguan, Pingba	1996 Sept.	Han	A	kandou(鑽斗)	I
Weiqli, Puding	1996 Sept.	Han	A/A'	kandou(鑽斗)	I
Weiqli, Puding	1996 Sept.	Han	A/A'	kandou(鑽斗)	I
Anshun, Anshun	1994 Oct.	Miao	A'		O
Anshun, Anshun	1994 Oct.	Miao	A'		O
Chengguan, Zhenning	1996 Sept.	Buyi	A	kandou(鑽斗)	I
Duanqiao, Guanling	1996 Sept.	Han	A	dadou(大斗)	I
<i>Yunnan</i>					
Sishang, Dali	1995 Sept.	Bai	C/B	dazhen(打穀)/daguji(打谷机)	I
Chuxiong, Chuxiong	1995 Sept.	?	B/C		O
Annin, Kunmin	1995 Sept.	?	B		O
<i>Sichuan</i>					
Dujiangyan, Chengde	1997 Sept.	Han	A	dagutong(打谷桶)/bantong(拌桶)	I
Lushan, Ya'an	1997 Sept.	Han	A	dagutong(打谷桶)	I

A: the dadou; A': the stone or broken-chair device; B: the daguji; C: the dazhen; I: interview; O: observed.

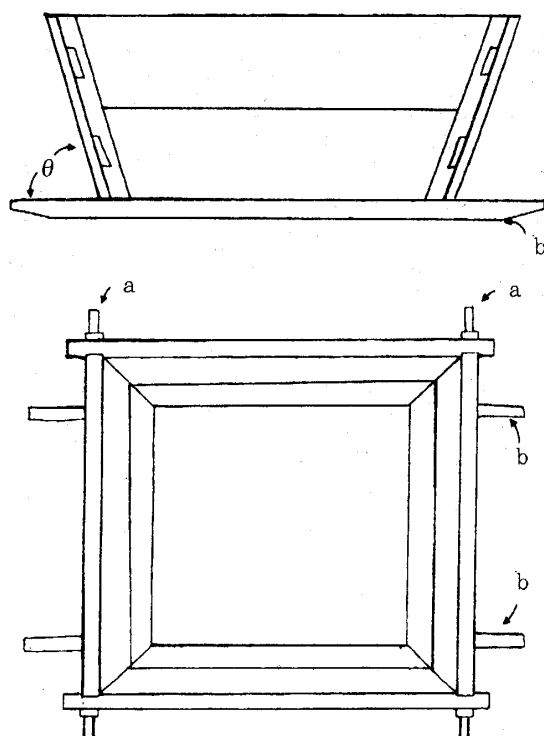


Fig. 1. Structure and name of parts in a standard dadou (partly modified from Masanaga *et al.*²⁾).

- a: a handle of the dadou
b: a leg of the dadou

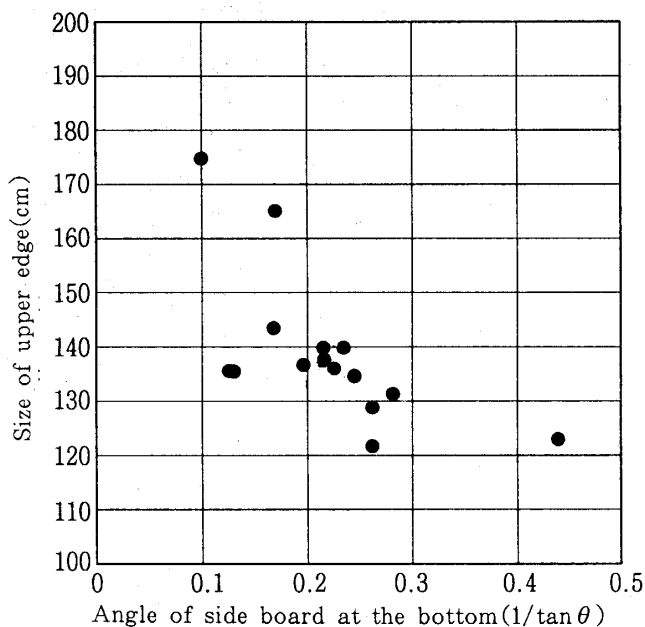


Fig. 2. Variation in size and shape of the dadou.

θ : see Fig. 1.

with two boards which are at nearly right angles or steep to the bottom (Fig. 2). A dadou has two legs like sled at its bottom (Fig. 1; Plate 3). These legs with the same length of upper edge of the device make it possible to move smoothly on the surface of the paddy fields even under water-logged conditions. On the flooded paddies, the dadou can be used for threshing as like as a floating boat. The legs are called "tuo-ni (拖泥)" or "tuo-to (拖斗)". When moving the dadou in a paddy field, usually, two farmers hold the handles on its both upper sides in their hands. This handle is called "xia-er (挾耳)," "dou-er (斗耳)," "tuo-er (拖耳)" or "dong-er (桶耳)," meaning of the ear of the device, and often "pa (把)" or "lasu (裸手)," meaning a handle.

The surface of the dadou is sometimes spread with the oil extracted from fruits of the tongmu (桐木: *Aleurites fordii* Hemsl., probably including *A. montana* Wils.) (Plate 4), which is called "tong-you (桐油)." The trees of this species are grown around the rural villages and in the mountains in Guizhou throughout. Tong-you is used for the woody walls of the farmer's house as well as for the dadou. Covering of woods with tong-you acts as a lowering of the deterioration, so it has utilized for the protection of waterproofing since old time. The dadou is usually made by a carpenter (木匠) in the village (Plate 5) or by a grow-up male in the family. In Guizhou province, a dadou costs from 200 to 300 yuen which is inexpensive to a large farmer but expensive to a small farmer.

Mainly male farmers conduct the threshing of rice (Plate 1). Reaping the rice must be done immediately at maturing time since predominant rice cultivars are easily shattering type. Just

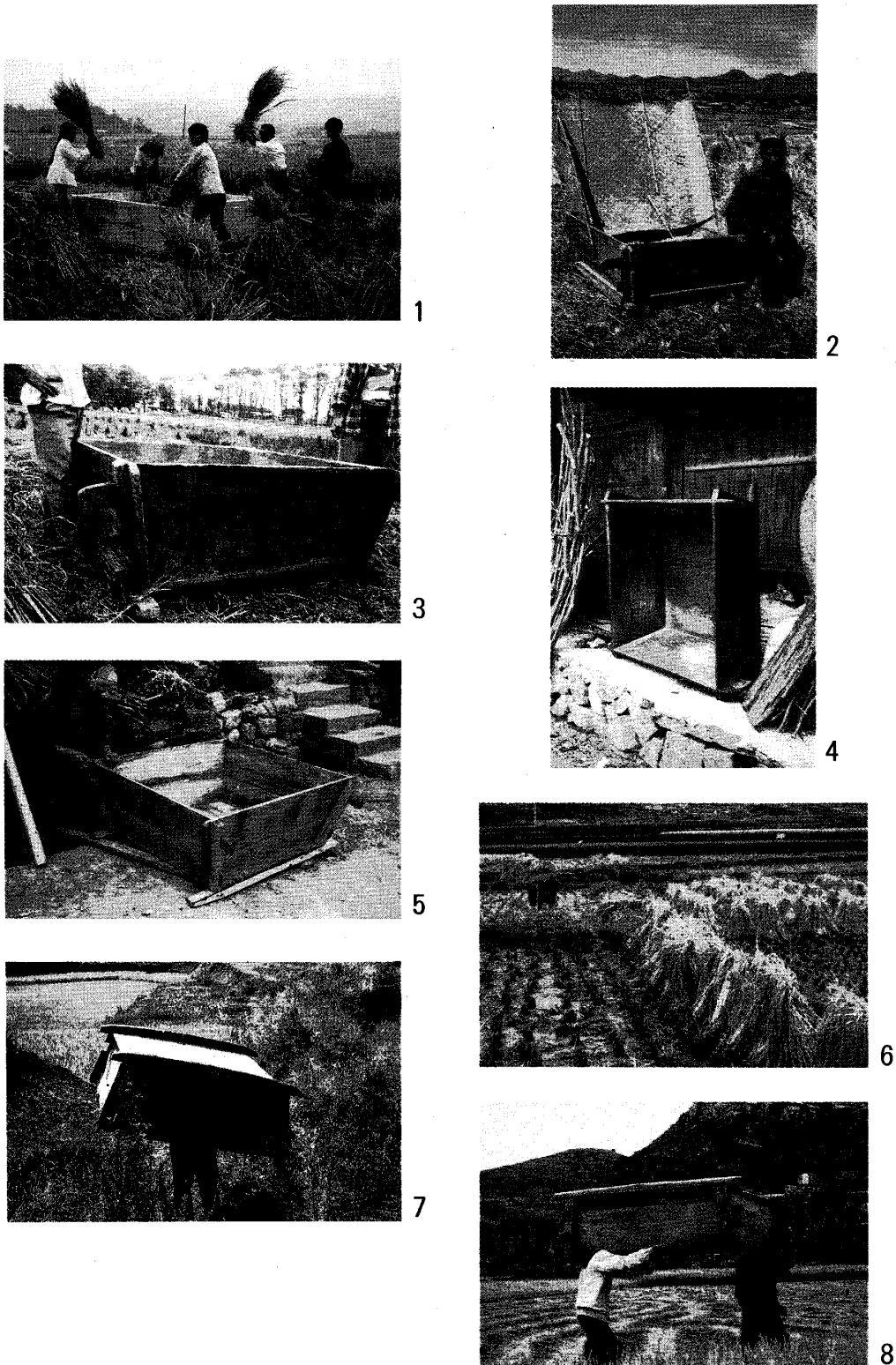
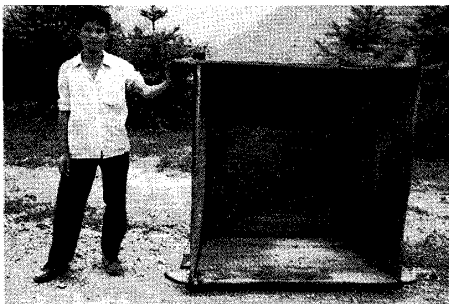


Plate 1. The dadou manipulation in a paddy near Guiyang, Guizhou; **Plate 2.** The dadou with an additional bamboo-net; **Plate 3.** Side view of the dadou in a paddy; **Plate 4.** The dadou spread with tong-you oil; **Plate 5.** The dadou under construction; **Plate 6.** Rice banches under desiccation; **Plate 7.** Transport of the dadou by man; **Plate 8.** Transport of the dadou by two men.



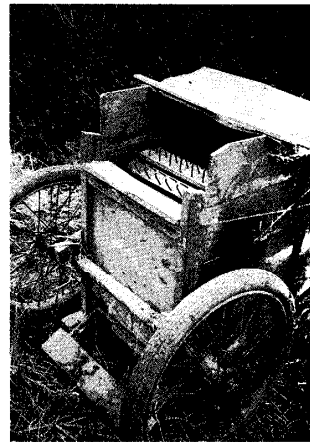
9



10



11



12



13



15



14

Plate 9. A transporting bar, gang, in the dadou; **Plate 10.** General transporting skill, the gang and the balancing cages; **Plate 11.** The daguji manipulation in a paddy near Guiyang; **Plate 12.** The daguji with car; **Plate 13.** The dazhen manipulation in a paddy in Dali county in Yunnan province; **Plate 14.** The stone device for threshing; **Plate 15.** The broken-chair device for threshing.

after stubbing by iron sickle, they grasped two or three rice-bunches in their hands, and they strike the head of sheaves down against the inner sides of the dadou three times or more to thresh unhulled rice from straws. As a dadou has four sides, four persons can thresh rice at the same time at the maximum. While bunches of some cultivars were often found under desiccation in the paddies for transporting to dwelling site (Plate 6). These varieties tend to show the round grains and a hard-shattering habit, although we could not confirm the threshing practice for these varieties.

The dadou is transporting from a dwelling site to a paddy field by one male farmer, usually, or two persons in the case of large dadou (Plates 7, 8). Only one wooden rod is enough to transport the dadou in mountainous areas (Plate 9). The rod is often called "gang (杠)" as well as a bar of balancing cage for transporting (Plate 10). Based on our observations transport of the dadou by a domestic animal or a modern device such as a cart or a mobile car is unusual case.

The daguji (打谷机) or the tuoliji (脱粒机) is another device of threshing (Plate 11, 12). Utilization of the device was found in Fuquan (福泉), Longli (龍里), Majian Baiyangping (麻江白秧坪) in Guizhou province and in the places we visited in Yunnan and Sichuan provinces as well as in Jiangsu (江蘇), Anhui (安徽) and Zhejiang (浙江) provinces. This device consists of two parts: the upper and the lower (Plate 12). The upper part usually has a rolling wood-keg with many iron cogs or nails. The lower part is a rectangular parallel-piped wooden box. In Yunnan province, all the area studied were often observed the thresher made of iron. And a daguji with prime mover was rarely observed. This device usually requires two workers for threshing rice at manipulation (Plate 11). Two workers stand side by side with two or three sheaves of rice straws hold in their hands. They press the rice panicles on the part of the rolling keg, and pedal the daguji. This device squeeze rice straws so as to take off unhulled rice from rice straws. Since so many wastes of rice straws are yielded, a worker must be required to take the wastes off a heap of unhulled rice.

It is general that the daguji was found in a relatively flatter, wide area in which Han tribe mainly dwells. A daguji costs very high price and is heavy in weight. The device is not so useful itself in these minor tribes, because it necessarily requires several accessories (Plates 11, 12). For example, the cloth enclosure is required for fear that the unhulled rices scatter around, and a cart, a horse-cart or a prime mover car is required in order to transport to the paddy field from dwelling site, because it is too heavy for the farmer to transport. In some cases, the daguji is used at dwelling site by transport of the rice bunches in several times. Many farmers said that it took too much time to be accustomed to using daguji.

The dazhen (打穀) was found in the area of Dali (大理) and Chuxiong (楚雄) autonomous counties in Yunnan province. This device is a big round bamboo basket for threshing (Plate 13). The size is 150 to 180 cm in diameter and about 70 cm in height. This device is used as the same way as well as the dadou. Two, three or four persons stand around a dazhen with a bundle of rice sheaves grasped. They strike the head of a bundle of rice sheaves against the inner side of the dazhen three to five times. Several farmers in Sishang (四上) village, Dali Bai tribe autonomous county said that the dazhen was bought for 40 to 50 yuen 3 years ago, and they have been used it at least for 30 years. In some cases, a dazen is used instead of a daguji which is not accustomed to the farmers under a wet weather.

Other devices for grain threshing are the stone device and the broken-chair device (Plate 14, 15) and, this seems to be connected with socio-economic problems. The stone device was found in two sites, Anshun (安順) and Puding (普定) of Guizhou province (Plate 14). A natural lump-like stone and a board-like stone or a flat stone in weight of 10 to 20 kg are prepared on the surface of vinyl sheets. An area of 5 x 5 m of the surface of drained paddy-field is covered by some vinyl sheets so as to catch the scattering unhulled rices. Usually a farmer obtains two types of stones adequate in size from around the field. One is a board-like stone to strike a bundle of rice sheaves against, and the other is a heavy stone stable to support the former. These stones are not particular and do not belong to the farmer. These stones are available in a hill nearby or a drained riverbed. These are different in size according to the height of the farmer utilizing.

Utilization of broken-chair device was found in Puding (Plate 15). This device is called "bandeng (板橙)." The broken-chair device is not intentionally made as a rice threshing device. A female farmer we interviewed said that her family had less money to purchase a dadou, and she was obligated to use the bandeng. Actually she had used a dadou until several years ago.

General Threshing Practice.

Among detailed description of the skills from transplanting to harvesting in rice cultivation, three practices for threshing: striking, stretching and trampling, are known in Asia.^{4,5)} The three practices were known in ancient and middle recent literatures in China.^{6,7,8)} The striking practice is assumed to be distributed, associated with disseminating the indica rice of which cultivars tend to have easy shattering habit.^{4,5,9)} According to our observation, the striking and stretching are general practice of rice threshing in Yun-Gui plateau. The dadou, the dazhen, the stone and broken-chair devices of poor people are seemingly associated with easy shattering habit of the rice cultivars in the areas observed. The later two are only temporal practices instead of the dadou device, although they are relatively common practices in rice and other cereals throughout China.^{8,10)} Tanaka (1987) further divided the striking practice into two: one is striking of rice bodies against something repeatedly, other is striking of something against rice panicles.⁹⁾ Tanaka's later practice within the striking practice was not so popular in rice in the areas observed, in spite of a threshing with a flail is usually found for beans and millets. However the dadou device is not utilized in some cultivars which may be glutinous japonica type (Plate 6). In contrast, the rice is threshed with a flail as well as in millets in the area of northern and southern extremities of Yunnan province (our observation in 1997; a communication of Dr. J. Abe). These threshing device differences suggest the firm connection between agricultural skills and cultivar or crop traits. The dadou utilization is considerably widespread other than Guizhou province, the photographs in the publication^{11,12)} or our observation (Table 1; Type slides, HY. 97-11-22-28, HY. 97-11-23-42) tell us that the dadou is present in Jiangxi and Sichuan provinces, China, and in Lao Cai province, Vietnam.

The daguji is useful despite of shattering features of rice cultivars. Unfortunately a daguji is expensive and has several problems, too heavy or costly in energy and man-power, in the traditional paddies of minor tribes.

Origin of Dadou

A threshing device closely similar to the dadou is first appeared in the agricultural literature⁹ as a hand-copy error.⁷ Original issue of T'ian-gong K'ai-wu (1637) describes the mu-tong (木桶) which is a wooden tub constructed with the several boards tied by strings. A latter issue (printed year unknown), which is assumed to be a copy of the original, describes a cubic, trapezoid threshing device, instead of the mu-tong which is columnar in shape. Since T'ian-gong K'ai-wu was written in Jiangxi province, the copy-writer was assumed to be a man from another province.⁷ If he was from southwestern China including Guizhou province, the dadou have been utilized since that time. Since the dadou is utilized in Jiangxi province¹² and other provinces of southwestern China, the dispersion of the dadou might be started at least 17 century. As will describe later if the dadou has a firm folk-connection with the life of Miao tribe, its dispersion might be accelerated with several waves of the migration of Miao tribe to the south.

The dadou is the technical skill sophisticatedly constructed with wooden boards, and wooden wedges and pegs without iron nails. In contrast, the dazhen is made with bamboo netting and in circular shape. Guizhou and Yunnan provinces can produce both wood and bamboo materials. However Miao tribe as well as Tong tribe predominantly uses wood materials in Guizhou province. The dwelling houses of Miao and Tong tribes are always build with wood in the southeastern part of Guizhou,¹⁰ whereas Buyi tribe dwells in the house built up with stone plates as well as Han and Miao tribes in western Guizhou. Hmong and Dao tribes, which are considered to be ethnically akin to Miao tribe in Vietnam,¹³ use the dadou called as "dong" or "thung" (Umemoto and Yamaguchi unpublished). Predominant use of the dadou in Miao tribe and the frequent use of stone device imply the advantage of these skills under the cultural and environmental conditions in the area. Moreover the areas observed for the dadou utilization in China, are the places of homeland of Miao tribe. In contrast, the dazhen is often utilized in Southeast Asia especially in Thailand. In the areas observed the utilization of the dazhen in Yunnan province several ethnicals belonging to Thai tribe dwell there. Several ethnic groups have the life-style firmly connected with the bamboo and its derivatives in the Southeastern Asian lowlands. We, therefore, assumes that the two skills, the dadou and the dazhen, for threshing practice are differently originated for a similar shattering habit of rice.

Replacement of the traditional tools or skills with new ones, which are introduced from the western world or developed countries, is a common syndrome in Asian countries. The turnover rate of replacement from traditional to modern system was/is particularly high in developed countries such as Japan and Korea. However the skill replacement is very slow and very hard in the developing countries and regions as well as the development of new varieties and agricultural chemicals. The new techniques or new skills tend to be hardly accepted, because the new techniques cannot have any advantages to the traditional ones without the change of major elements concerning the life-style of the dwelling people. Although the daguji utilization has been promoted in China since 1957,¹⁴ as was illustrated above the dadou has many advantages to the daguji for the traditional cultivation of rice for minorities, thus the dadou is predominantly used in the southern China.

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