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SOCIAL STRUCTURE AND SHIFTING AGRICULTURE OF THE WHITE MEO

Second Technical Report
November, 1965-March, 1967

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by

George A. Binney

This research was conducted under Contract #N00014-66-C0143
with the Group Psychology Branch, Office of Naval Research

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TECHNICAL REPORT NO. 2
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(Research Contract No. N00014-66-C0143, Dated 11/15/65, Fixed Amount $23,900)
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Synopsis

The main objectives of this research project are the study of the social structure and organization of a small swidden, or shifting cultivation, community and a descriptive analysis of the structure and content of a particular system of shifting cultivation practiced by a White Meo community in Thailand. Illustration will be made of the general type of agriculture involved and of the specific contexts within which alternative social solutions to major problems faced by the shifting cultivator may be investigated.

This report constitutes a preliminary review of environmental conditions prevailing in two White Meo communities in Changwat Chiengmai, Thailand. The period of research covered by this report is approximately sixteen months, from November, 1965 to March, 1967. Further illustration will be made of the general type of agriculture involved, within the White Meo agricultural cycle. The timing, sequence and factors involved in swidden site selection, cutting, clearing, burning, cropping, harvesting and fallowing are described. Although no definitive conclusions are drawn within this report, it is hoped that it may add to an understanding of shifting cultivation as it is practiced by the White Meo in north Thailand.

There are a number of considerations it might be well to keep in mind. Swidden farming follows a locally-determined, well-defined pattern. The swidden and the crops require continuous attention throughout the annual agricultural cycle. Hard physical labor is required, especially during the clearing of primary forest. Although secondary forests are less difficult to clear and burn, many White Meo prefer primary forest because of the superior soil and the requirements of rice cultivation. The burning of swiddens, though often preceded by precautionary measures such as clearing firebreaks, has nevertheless not been controlled. Weeding is perhaps the most time-consuming labor undertaken in the White Meo agricultural cycle. It is also the main drawback to efficient opium production. Many details of swidden technique differ from area to area and often within a village. Swiddens are often planted with a number of crops. Inter-cropping is primarily in the corn/opium swiddens. There is an overlapping of plantings and harvests in many swiddens, which lasts until the swidden is fallowed. Thus inter-cropping and the succession of crops, especially the alternation of wet season cereals with dry season opium and

leguminous crops, amounts to a type of crop rotation on a limited scale. It is, therefore, impossible to give a meaningful assessment of swidden rotation by merely determining the number of years a swidden has been fallowed. Many variables must be considered when attempting to set a minimum period of fallowing necessary for the continued productive use of a swidden. Ideal estimates given by the White Meo vary sharply with actual practice. A reasonable limit to fallowing periods can only be determined through an understanding of the total ecology in a particular area. Finally, productivity of a swidden can be only partially determined by an estimate of the harvest yield of any one crop. A study of the efficiency of swidden farming must take into account the total yield per unit of labor not per unit of area. However, it is evident that swidden farming requires more intensive labor than permanent wet rice cultivation, particularly in the clearing of forests.

This report comprises eight sections. The first section concerns itself with some introductory remarks by previous writers concerning shifting cultivation as practiced by the Meo. This is followed by a review of yields per household in the White Meo communities of the Mae Nai and Ban Khae in northern Thailand. Certain information has been omitted from the tables relating to crop yields in order to protect individual sources. Section II describes some of the ecological considerations of shifting cultivation in the Mae Nai and Ban Khae areas. Environmental distinctions are noted relating to such factors as the climatic, edaphic and biotic. In the third section site selection as practiced by the White Meo in northern Thailand is discussed, followed by sections on cutting, burning, cropping (harvesting), and fallowing.

Cultivation Practices

In Laos, many Meo living on the Xieng Khouang Plain cultivate rice,[1] while those in more remote regions appear to rely on corn. Two observers reporting on the Meo, but writing three decades apart, both see the Meo in a stage transitional to irrigated rice cultivation.[2]

Abadie (1924: 159-60) writes of the Meo of Tonkin, "Maize is the basic food of the Meo. It is boiled, steamed, dried, or reduced to meal in order to be eaten in the form of cakes. The Meo also cultivate mountain rice, but like the Man (Yao) they are coming more and more to cultivate permanent irrigated rice fields, the working of which is easier and more remunerative. To this end they have taken over as much as possible of the favorable terrain, valley bottoms or sides of hillocks on which water may be brought by a simple canalization and have laid out these areas into terraced rice fields where they often successfully cultivate rice and opium."

A monograph by Boutin (1937) on Sam Neua claims the Meo of this area are obliged to concentrate on corn because they inhabit an altitude of between 1,500 to 2,000 meters where rice does poorly.[3]

Bernatzik notes that among the Meo he studied in northern Thailand corn ranked in eighth place as a cultivated crop, after rice, opium, sugar cane, yams, cucumbers, radishes and beans.[4] He also found the Meo abandoning the use of the plow in favor of swidden agriculture, due to cultivating steep slopes without terracing. He found a few old Meo still familiar with the use of a plow. When asked why the Meo no longer used the plow, an elderly Meo replied, "The land on which we live, and the regions we had to cross before we came here, were mountainous and

stony and did not permit the use of the plow."

Bernatzik feels this tradition of the Thailand Meo indicates that they did not imitate the use of the plow after they had seen it used by the Chinese or Annamese on their migrations, but that they had used it before this time.

The present writer's experience in three White Meo villages may add to this controversy. The village of Mae Nai (including Jak Kyn) consisted of seventeen households and one-hundred thirty-five persons. The village was located at approximately 1,500 meters above sea level. Each household in the village, except for one particular case, had its own rice swidden.[5] The following rice and corn production figures illustrated in Diagram #1 for Mae Nai seem to indicate that the size of the household correlates with the quantity of rice crop. However, the extreme variation in a number of cases (#10 and #13) indicate that other factors must be at play. An obvious reason for these two exceptions, and perhaps for #15 also, is that the heads of these three households are habitual smokers of opium. Lao Paw Sae Lee and his elder brother Lao Sae Lu hardly ever leave their houses. Lao Paw during the one year agricultural cycle of 1966 left the house to join his wife in the field on three occasions; during the 1966 clearing of a new rice swidden, the harvesting of the same rice field, and the cropping of the 1966 opium crop. Lao Sae Lu left his house twice in 1966; once to oversee the opium cropping and once to visit Muang Chiengmai to buy household goods and exchange three "hang" of silver for Thai currency. It is noteworthy that Lao Ju Jee Sae Lee, the headman of the very recently segmented Jak Kyn village, has the largest household and the greatest agricultural yield. Yield in this case refers to the amount produced by a family of specified numbers. Lao Ju Jee also has the highest rice yield per rai. The Lao Neng household, while only fifth in the number of members, clearly outproduces any other household on a per capita basis. The Lao Neng household is organized and run by his mother, Na Ying Sae Lee, a woman of sixty. She has a forceful character and will not abide laziness.[6]

The data summarized in Table I covers the 1966 agricultural cycle. Certain missing data, such as opium and peach production for 1966, were omitted for specific reasons. Due to the fact that Mae Nai is located near Muang Chiengmai and that the Meo in this area officially do not grow opium poppy, I was asked not to publish opium production figures dealing with specific households. However, the average opium production per household for the village is 2 "joy" or 3.2 kgs. No household exceeded 5 "joy," and many had less than 1 "joy" per household.

Table II provides production data for the village of Ban Khae during the 1965-66 and 1966-67 agricultural cycles. The most obvious disparity between Table I and II is that in I the figures cover rice and corn production for 1966-67, whereas II covers corn and opium production for 1965-66 and 1966-67. Some explanation should be given. The White Meo village of Ban Khae is 5,200 feet above sea level. Rice has not been grown by any of the households in the village in the past eight years. Rice is either purchased or traded outright with the Karen in the nearby villages of Ban Yang Om Tieng and Ban Yang Khum Pae. Occasionally the Meo villagers will go as far as the Thai village of Ban Pae nine hours distant. Unhusked rice is purchased outright at Tcs. 10 per "tang." However, the most common method of buying is a system of rice "futures" known as "cha ble." The system varies from village to village as to particulars, but the method is consistent. The Meo will pay for a specific amount of unplanted "padi" before the planting season in June. In this transaction the Meo will give the Karen farmer Tcs. 5 per "tang." The

theory is that the Karen will then have sufficient funds to purchase extra rice seed if it is needed or to hire additional labor. It also allows the Meo to purchase rice at a cheaper price. However, in practice the system is not very successful. Instead of paying in Thai currency or silver coins, the Meo usually make the advance in the form of opium. The current exchange in 1966-67 is four "mu" of opium for fourteen kilos of unhusked rice. The obvious happens; the Karen in their efforts to get more opium, outbid themselves, and when the time comes for repayment in the form of "padi," they usually do not have enough. At first, according to the five informants[7] the investigator discussed this with, very bad feeling was created between the Meo and Karen villagers. The Meo were very angry and threatened to withold opium as a form of payment. Then at the suggestion of Lao Ying Sae Ya they arrived at a solution. The Meo heads of household would discuss their "future" purchases in advance of payment with all other heads of household. Thereby each villager would know just who had contracted with which Karen for his rice crop. In Ban Khae this method has proved partially successful.

In Ban Khun Klang the trading system between rice and opium differs from that in Ban Khae in that the Karen headman, Pa Bu, serves as a broker between his villagers and the Meo. The Meo will leave the opium which they want to trade for rice with Pa Bu. The Karen villager who wants opium will then go to Pa Bu, and Pa Bu will supply opium only to those Karen whom he feels can repay him in rice. When the rice payment has been delivered, Pa Bu will notify the Meo whose opium he has traded. Pa Bu charges 10% for these services and takes the percentage from the rice assigned to a particular Meo. If the Karen obliged to supply rice becomes ill or overextends himself, Pa Bu will repay the Meo from his own resources of rice. The advantages to this system are obvious; the Meo do not have individual contacts with the Karen; there are no language or communication difficulties since Pa Bu speaks Meo; the Meo advance is secured by the word of the Karen headman; Pa Bu as the Karen headman is in a better position to know which Karen are reliable and can supply a certain quantity of rice; if there is a recalcitrant Karen who refuses or cannot make repayment Pa Bu can punish him (in almost all cases by fine) without creating friction between the Meo and Karen.

The second disparity between Mae Nai and Ban Khae is that in Ban Khae none of the villagers is concerned about the cultivation of opium poppy. Thai Government authority is not in evidence in Ban Khae. The nearest Thai Amphur office is eight hours distant and can be reached by arduous mountain trails only. There is no Border Police school nor any other Government office in the area. There are periodical visits from the Thai Provincial Police and occasionally a Royal Thai Forestry official passes through the village. The Tables indicate that opium production per household decreased in Ban Khae between 1965-66 and 1966-67. Inquiries and reference to Table III indicate that this was in part caused by the more favorable climatic conditions in 1965-66. It is essential that no rain fall during the opium cropping period. In 1966-67 the cool months of November-January were drier than usual (note rainfall in Table III) and there were light rains at the end of January and February, the period in which the opium cropping commences.

Although the data given in Table I is insufficient to make any detailed comparisons between opium production in two White Meo villages, it is nevertheless, possible to make some fairly broad comments about yields per household and relate this to the amount of land cultivated per family. In the village of Mae Nai the average production figure during the 1966-67 period was 3.2 kgs. per household, and with the exception of two households, the average is within 1 kg. of the household unit figure. Table I indicates the number of "rai" under corn cultivation for

1966-67. In Mae Nai the corn fields are succession-cropped with poppy.[8] The average corn/opium swidden per household in Mae Nai is 8.5 rai, or approximately 1 hectare. This varies favorably with the estimate made by the Thai Ministry of Agriculture (1958:133) of the average farm sizes in northern Thailand of 9.58 rai, when the rice swidden in Mae Nai are also considered. Averages for the northeast, central plains and southern areas, and Thailand as a whole, range between 4 and 5 hectares. The figures in Table I indicate that the number of rai in the swidden does not always correlate favorably with the size of the crop. Edaphic and climatic factors, especially the quality of the soil, relate directly to crop production. Since the villagers do not use fertilizer in any form, soil nutrients are rarely replenished, except by burning. The average swidden slope in Mae Nai of 35° and the complete lack of terracing creates a considerable topsoil loss. (Refer to Table III on environmental data) Rice swidden are only used for two years in succession, while in most cases only the first year's yield is good. The data in Table IV supplies some of the information needed to draw tentative comparisons about relative productivity of wet rice and swidden-cultivated rice in Laos and Thailand.[9] Hectare for hectare in any given season during the first year, swidden cultivation can be and usually is more productive. Although the present writer's investigations were limited to two White Meo communities, it would appear from Table IV that there is a greater return of labor from a swidden. However, in the second year of rice production this comparative advantage decreases appreciably as the yield declines as much as 50%, while in the third year it may drop as much as 80-85%.[10] In Mae Nai the average rice swidden per household in 1965 was 8.5 rai, making a total of 142 rai under rice cultivation for a village of sixteen households. If all of these swidden had been first-year fields (newly cleared from climax forest), we could expect a yield exceeding 1,249 "pur" or 27,478 liters. In fact only five households had used newly cleared primary forest for the 1966 crop, while nine used secondary forest area with a fallow of between 8 to 12 years. Two households had cleared primary forest but had been forced to resort to their third year fields because of Government pressure.[11] One household received no yield at all because of late planting and lack of leadership.

It is clear from the above discussion that a paradoxical situation exists in that in the first year a hai or swidden may produce a higher yield per rai, or hectare, than intensive irrigated cultivation, but it can only support a relatively sparse population because of its declining fertility. Certain general correlations appear to exist after examination of the data in Table I. The size of the rice crop usually varies proportionately with the number of adults in the household. The polar examples of this are Lao Ju Jee's household with a rice yield of 224 "pur" and that of Lao Paw Sae Lee. All of Ju Jee's children, except for three, are old enough for field work, while Lao Paw has only two small sons under four living in his household, besides his wife and himself. Lao Paw is further handicapped by his addiction to opium, thereby leaving his wife to carry the full burden of planting and harvesting. Corn production also appears to vary proportionately with household size, but again hidden factors, primarily social in nature, may be affecting the production figures. Lao Lu Sae Ya has a household of six members, yet it produced only 35 "pur" of corn in 1966. Both Lao Lu and his wife are opium smokers, and their eldest daughter Na Pi is mute. There is often sickness in Lao Lu's household, and consequently sacrifices are frequently made to "Ua Neng," the ancestor spirit. The result is that Lao Lu has only one pig and two chickens. Little corn is needed to support these animals. Lao Lu has never considered growing corn as a cash crop. Even if he had, the family organization is such that any increase in crop production would indeed be surprising.

Approximate figures for the number of rai in corn/opium production in Ban Khae are included in Table II. These figures were obtained by approximate measurement of the fields by meters and bounds. Also included in Table II are corn and opium production figures for the 1965 and 1966 cropping seasons. The reliability of the production figures cannot be ascertained by the investigator. The figures were given by household heads. During the months of residence in Ban Khae, the investigator repeatedly checked answers from one household with estimates from others. The investigator's main informant in Ban Khae discussed the figures in Table II and generally agreed with the estimates given for each household, except in two cases which he felt were underestimated by the household heads. The writer is inclined to believe that all opium production estimates are well under the actual yield by as much as 20%. This opinion is based on cropping figures for a designated 100 square meter area opium swidden in Ban Khae measured by the investigator during the 1966 cropping period, which yielded 18.5 "joy." It is not surprising that the White Meo villagers would hesitate to give accurate figures on opium production. Each household is aware of the "taxes" which must be paid on opium estimates. They also know that opium is an illegal crop and that it is to their advantage to underestimate production figures. Even among villagers it is considered very bad taste to ask, "How much opium did you gather this year?" If such information is proffered between the Meo, it is almost always assumed that the individual is minimizing the figure in order to express his dissatisfaction with the current situation.

Ecological Considerations

The ecological considerations of swidden cultivation in a White Meo community in Changwat Chiengmai are of importance in any specific discussion of shifting agricultural practices. Table III[13] is constructed from information gathered at Doi Pui (5,528 feet, or 1,685 m.), Amphur Hong Dong, Changwat Chiengmai. A brief examination of Table III will provide a valuable insight into environmental conditions existing in the area over a nineteen month period commencing in June 1965. The annual temperature and rainfall figures generally divide themselves into three groups which correspond to the seasons in north Thailand: the hot season from February until June, the rainy season from June through October, and the cool season from October until the end of January. There is, of course, seasonal variability as noted in the precipitation figures for May and June, 1966, but on the whole these seasonal changes are stable. In both 1965 and 1966 the month of maximum rainfall was August, with 403.2 mm and 435.7 mm respectively. In 1966, August was also the month of highest humidity. Both February and March had no rainfall in 1966, while March and April were the months of highest evaporation. The totals and averages for 1965 are deceptive since the Table is incomplete from January through May. In 1966 the average temperature was 70.0° F., and there is very little variation between maximum and minimum temperatures and average maximum and minimum temperatures.

For the purpose of this paper it can be concluded that the White Meo village of Mae Nai is within the Doi Pui climatic area. There is a difference in elevation, 1,685 meters at Pui, as compared with 950 meters at Mae Nai, however, in this writer's experience this difference in elevation had very little effect on the climatic conditions. As will be noted shortly the critical periods for the Meo swidden farmer include the rice planting in June and the rice harvest in December, the corn planting in May after the first rain and the corn harvest in August, the broadcasting of poppy seed in late August and September and the cropping of the

poppy in January and February. (Note the agricultural calendar in Table V).

Edaphic factors in the village of Mae Nai varied considerably. The Mae Nai valley area (note attached map of area) had little slope, the terrain being essentially a slightly graded plateau between two mountain ridges. Slope varied from 5° to 20°, while in a few cases fields were cleared on the sides of the mountain ridges with 80° slope. Most of the other swidden cultivated by the villagers were on steep slopes, usually culminating in a bowl formed by ridges. Soil samples taken in the Mae Nai valley area, where swiddens were three to five years old, were predominately of two types. The corn/opium field cultivated by Lao Neng Sae Lee (the household with the highest corn/opium yield in Mae Nai) had SM(USCS), very dark grey-brown to dark grey-brown sandy loam (USDA). It contained about 60-70% very coarse to very fine sand and some stone fragment of granite with mica flakes and humus. It was of very slight plasticity and had a slight stickiness when wet. The pH factor was 6.0. In contrast to this sample was that taken from a two years fallowed field of Lao Tua Sae Lee (one of the poorest agricultural households in Mae Nai). This fallow swidden had SM(USCS) light brown to pink (97.5 YR 6.5/4 dry) sandy loam (USDA) with some brown to dark brown (10 YR 4/3 dry) humus mixture. Its coarse-grained soil was mainly quartz and feldspar in sub-angular shape and 3 mm in maximum size. The soil had no plasticity and no stickiness when wet. The pH factor was 7.8 - 8.0. Lao Tua said that he had fallowed the field because he could no longer grow opium in it. It is noteworthy that Lao Neng's field with a pH factor of 6.0 grows good to fair poppies with a good opium yield, while Lao Tua's fallowed land has an extremely high pH factor, but was fallowed because the opium yield was poor.

Other samples taken in Ban Khae indicated a close correlation between a high pH factor and a good opium crop. In Swidden I, a field which was universally considered by the White Meo villagers to be the best opium swidden in the area, the pH factor was 7.0 - 7.2. The soil was sandy loam and contained about 60% medium to very fine sand with some coarse sand and granite fragments. It was dark brown to dark yellowish brown (10 YR 3/3.5 dry) with brown (10 YR 5/3 dry) mottles. When wet, the soil had little plasticity and stickiness. Humus was present in the soil. This swidden had a 30° slope and had been under cultivation for 4 years.

This contrasted with another field (Swidden II) only 100 meters distant which produced dwarfed opium plants with very small buds. This field had a pH factor of 6.2 - 6.3. The soil was sandy loam and contained about 70 - 80% gravel and sand with mica flakes. Its color varied from brown to pinkish grey. Plasticity and stickiness were slight (7.5 YR 5/2/-6/2-6/4-7/4 dry). The slope of this swidden was 38°, and erosion was quite evident to the eye. This field had been worked for ten years, followed by a five-year fallow, and at the time of the sample testing in 1966 had been under cultivation for four years.

However, another field directly adjacent to Swidden II above, produced fine poppy plants and a medium yield of opium in the 1966-67 harvest, with a pH factor of only 6.3. Swidden III had sandy loam with some gravel, about 5 mm in maximum size. It had medium plasticity and stickiness when wet. Color varied from dark brown to brown (7.5 YR 3/2-4/2-4/4-5/4 dry). The slope was 14° and there was little evidence of erosion.

In all of the above samples, the White Meo swidden farmer had made no attempt to contour his fields or to form drainage areas. (The investigator never saw contoured fields in the White Meo villages he visited.) The elevation of the

Ban Khae area under discussion is 1,350 meters. Swiddens I, II and III above were located about three-quarters of a mile north of Ban Khae on a shallow plateau facing Doi Inthanon to the north.

A brief description of biotic factors in the Mae Nai and Ban Khae area will illustrate the local plant associations and successions. There are three main types of vegetation which are within the scope of this paper: climax (primary) vegetation, secondary vegetation and swidden vegetation.

The climax vegetation in the Mae Nai area is what Credner (1936) described as lower montana coniferous forest. This classification continues to be used by the Royal Thai Forestry Department. On the ridges and slopes surrounding Mae Nai and extending from an elevation of 800 meters to 1,685 meters one recognizes a two-layered lower montana forest. Descending to the plains near Mae Rim one follows the ridgeline of a spur from coniferous and hill evergreen forest at 1,500 meters to 800 meters into lowland dipterocarp deciduous forest. Mae Nai itself, at approximately 950 meters, is located in a transitional zone where the evergreen terrace forest and the deciduous forest of the slopes above merge into a semi-evergreen transition belt dominated by dipterocarpus. At about 1,000 meters (3,300 feet) the first zone of the lower montana becomes very distinct. This zone includes oaks, such as C. tribulaides, Castanopsis acuminatissima and Lithocarpus leucostachys. The dominant pine along the ridges above 800 meters is Pinus insularis which forms small groves and stands about 25 meters (80 feet) tall. Under these pines there is little undergrowth since the forest floor is covered with needles.

The secondary forest areas constituted by swiddens fallowed for more than five years have 8 - 10 meter high thickets of small trees, scrubs and climbers. The grassland which invariably precedes this secondary reforestation is composed of tall grasses such as Imperata cylindrica, Imperata arundinacea, Sporobolus indicus and Themeda arundinacea. In areas where forest regeneration is apparent, Castanopsis is seen among the grasses. Ferns and sedges are also common in these grassland slopes.

The swiddens themselves consist of corn, rice, poppies and a variety of vegetables ranging from the squash to the bean family. Often the less cultivated swiddens show signs of being invaded by grasses, especially Imperata cylindrica. Herbs and bushes, such as Sladenia celastrifolia, Cycas pectinata and Aporosa wallichii also appear to invade swiddens left temporarily unattended.

Ban Khae, at approximately 1,500 meters (5,000 feet) has a tall mixed lower montana forest. Here the climax forest has trees over 40 meters in height, which form a dense undulating canopy. A random sample of these towering trees might include Quercus rex, C. tribuloides and Lithocarpus oxycarpus. The smaller trees under this canopy range from 10 - 25 meters and include such species as H. terminalis, S. magnifica, Polyosma elongata. There is little shrubbery under this layer. The ground is composed mostly of seedlings of the upper layers. The ground itself is covered with rotting logs surrounded by leaf litter and humus. Lianes and climbers abound in some areas as do ground ferns and epiphytes, which include numerous members of the orchid family.

The secondary forests and swiddens vegetation approximate that of Mae Nai with slight variations mainly in the herbs (Forrestia glabrata, Anotis calycina) and the seedlings which correspond to the climax forest cover.

Site Selection

The brief review of environmental factors in the ecology of White Meo shifting cultivation illustrates the milieu in which an examination of swidden site selection, cutting and clearing, burning, cropping and fallowing may be conducted.

Site selection is almost always carried out by the head of the White Meo household.[14] There are exceptions to this rule, as when a household head is so incapacitated by opium that he must delegate this task to his wife or eldest son. Usually any male children over ten will accompany their father in case immediate labor resources are needed. The household head often decides to begin clearing immediately to avoid any doubtful claim on the land.[15] There is rarely, if ever, any discussion among household members about which site will be used. For even if the household head is incapacitated, his decision is final. When the site is selected, it is customary for the household head to inform the village headman. If the field has already been claimed by another household, the headman must make this known.[16]

The criterion used for selecting a new site varies from household to household; however, in an overwhelming majority (24 out of 30 households) of households the taste and texture of the soil were considered of primary importance. The soil should have an oily texture, moderate stickiness, and when placed on the end of the tongue the taste should be either salty or sweet. A soil which tastes sour is considered very poor and the site will be abandoned, even if other indications appear to be favorable. The White Meo divide soil into four main groups: "ang blo" or sticky soil, "ang du" or black soil, "ang lia" or red soil, and "ang dur" or white soil. "Ang blo" is considered to be the best soil for wet rice cultivation because it holds water for long periods with little absorption. Since the Meo do not cultivate wet rice, this type of soil is never sought after. It is also a poor soil for other types of crops. "Ang dur" is always avoided by the Meo. Crops either will not grow or grow very poorly in this type of soil. After a rain this soil will dry almost immediately. Under "ang dur" at a depth of about 4 inches there are usually small stones which make digging and cultivation difficult. The villagers from Mae Nai claim that most of the soil around their village is of this type. "Ang lia," the red soil, is the finest soil in which to grow Meo hill rice. This soil is usually found on the slopes of mountains and is very common in Chiengmai province.[17] Many of the Meo claim that only Meo rice will grow well in this type of soil. Lao Qua Sae Lee from Mae Nai village said that he had experimented with hae (dry) rice which he had brought from a Karen village, planting it in "ang lia." The crop turned out very poorly, being poor in quantity and quality. The Meo of Mae Nai village also prefer "ang lia" for peach tree cultivation. Although black soil produces larger trees with lush green foliage, there are few peaches. Peach trees grown in "ang lia" have poor foliage, but produce a larger crop of peaches. Many Meo do not like "ang lia" because it does not hold water very well. "Ang dur," the black soil, is considered to be the best for any type of crop. This soil is made from dead leaves and grass (humus). The Meo will always chose this type of soil for corn and opium; however, in the case of dry rice many Meo prefer "ang lia" since weeds do not grow so quickly in it. The Mae Nai valley area is predominately "ang du."[18]

The second criterion used in the selection of swidden sites is the availability of water resources. It is common for the Meo to search out a site which is adjacent to a streambed. The White Meo villagers of Mae Nai felt that

this criterion ranked among the most important and a survey of their fields indicated that the majority were located near water sources. The villagers noted that if there was a long drought this ground water source would provide some relief to the crops. They were particularly concerned about an extended drought during the cool months from October through January when the opium crop was under cultivation. In 1966-67 this factor was of primary concern because of the lack of rain during these months. The villagers of Ban Khae did not seem to concern themselves so much with ground water. Most of the household heads felt that without adequate rain the ground water would dry up in any case. Here more emphasis was placed on selection of a site where the foliage was green and lush. Large trees also marked the sites where water and good soil were available. Fallowed swiddens which were abandoned for a short time (5 years or less) were recultivated if the grass was lush and green all year around.

The White Meo in both villages noted a strong preference for fields close to the village. In almost every case the primary reason given for village resettlement or segmentation was the lack of suitable agricultural land near the site of the old village.[19] Except for a number of rice swidden cleared in 1967, none of the cultivated fields in Mae Nai was more than three hours distance from the village. The writer was told that the new rice swiddens had to be located at distant points to avoid the prohibition against cutting and burning primary forest by the Royal Thai Forestry Department. The situation in Ban Khae was significantly different. Many fields were five hours from the village and some were as much as a full day's walk for the Meo. The reasons for this are complex. Briefly, the villagers had sold or abandoned large tracts of their land when they migrated to Laos in 1960. This land was presently being used by Thai, Haw and Karen. The largest tracts were being used for potato cultivation by a Thai entrepreneur who imported Thai labor from the Chom Thong plains area. Since there appeared to be no means short of force to retrieve this land from the new cultivators, the Meo had to select new sites further from the village. The second reason given was that the village was surrounded on all sides by Karen villages and hamlets. Although most of the Karen lived at lower elevations, they preferred to use the old Meo swiddens for poppy cultivation. All points north, east and west of Ban Khae were predominately cultivated swiddens or abandoned grassland. Two Karen villages could clearly be seen from the north approach to Ban Khae.

Other criteria used in the selection of new swidden sites are primarily traditional in nature and include sites surrounded by mountains but unobstructed on one side, and sites located at the base of a promontory. Most informants placed considerable emphasis on the swidden exposure to the sun. Two types of good exposure were mentioned; fields exposed from 10 am until 4 pm, and fields exposed from 6 am until 6 pm. Note was made of the importance of sun exposure in poppy swiddens, especially during the cropping period. Wind exposure, the degree of slope and drainage were considered of little importance, and the Meo said they never gave any attention to these points. The Meo informants said they did not consult spirits when selecting a new swidden. They noted that there was no way to tell if the Place Spirit was good until after the field had been cleared and cultivated. If there was a serious accident during clearing and burning, the site might be abandoned. If the villagers or animals which had eaten the crops became ill, then a diviner (Hu Blee) or shaman (See Neng) might conclude that the Place Spirit was evil, and the swidden would be abandoned or a sacrifice made. No sacrifice or other ritual was performed before or during the clearing of the swidden.

Every year the villagers will try to enlarge their existing fields. First

the area that they want to clear adjoining their field is notched to indicate the claim. A downward incision is made on the trunk of the trees delineating the four corners of the site, and a wood splint is placed in the incision. Then the new area is cleared, followed by the burning of both new and old fields. A random sample of ten households in Ban Khae indicated that an average of four rai a year might be added to existing swiddens in this manner. Most nuclear households initially start with four to five rai, and as children are born the fields expand at approximately four rai per annum.

Cutting

Although less labor is required in clearing and cutting secondary growth, the Meo prefer to cut primary forest for new swiddens. They say that the rewards brought by a crop grown in a cleared primary forest more than compensate for the extra work involved. There are two types of Meo tools used in clearing: the "tow" is an arm's length axe very similar in appearance to the common axe used throughout the Western world; the "sua" is a machete knife similar to the type used throughout much of Southeast Asia, except that is has a grappling hook on the back of the blade. The "tow" is used in cutting down large trees. Before chopping at the trunk of a large tree, (any tree with a diameter of over three feet at the base) the Meo erect a platform or lean a notched log against the trunk of the selected tree at a height of ten feet from the ground. The axe-man then climbs the platform, or log, and chops the trunk of the tree at this elevation. Two reasons are given for this technique: the Meo believe that if they cut the tree at this height it will not die, which appears to be the case in many instances. They said that they would prefer not to kill trees because then they can fallow the swiddens for a shorter time; the second reason was that at the height of ten feet the trunk was not as thick and the wood was softer. The Meo of Mae Nai and Ban Khae do not girdle trees. Many of the elder men said that it was not the right, or "Meo," way of cutting and clearing, although they had seen it used by some Meo who imitated the Karen. The younger men felt that although girdling required less work during the initial stages of clearing, in the long run it was dangerous to both the farmer and his crops. They noted cases in which Karen farmers had been killed by the collapse of a girdled tree. Even without girdling the most common mishap was injury from falling trees and branches. Ban Khae villagers proudly noted that they had not had such an accident in three years. The Meo say that they never use such clearing devices as pollarding or trimming, although the writer has observed these techniques used on the trees in and around the villages. When asked what they were doing, the Meo responded that they wanted more space under the trees and that they would use the branches as firewood. Firewood is almost always collected by the women from an area usually not more than ten minutes from the village. The area surrounding most White Meo villages is heavily wooded, if not by primary, by secondary vegetation.

Fallow areas which are predominately scrub are first cut and then burned. The roots of the small trees and bushes are left in the ground to decay. Grassland areas are first cleared by fire, followed by the cutting of unburned areas and a second selective burning. Before planting the soil is turned with a hand hoe.

The sharpening of cutting implements is done by the household itself, when possible. Every household has its own whetstone and most of the men appear to be accomplished in the care and maintenance of their tools. If new or extra tools are needed, the village blacksmith will be called upon, and for Tcs. 4 - 10 a new knife or axe can be forged.

New trails are usually cleared by the households, or groups of households, that expect to use them. For example, a household may decide on a new swidden site. The first job will be the clearing of a trail to the site. If a number of households should select new sites in the same area a joint clearing of a trail may be undertaken by the households, but more than likely the first household to clear the new site will also clear the trail. In the case of water courses to the village and main trails leading to and from the village, it is the first households to settle at the new site who clear and construct these necessary facilities.

Forest root crops (cha) are gathered in January. The most common types are the bulbs of wild flowers and plants. Many of these are eaten as supplementary food. The usual method of preparation is boiling with pork and other vegetables. A large number of forest roots and plants are used for medicinal purposes. A random list of such medicinals might include: "jok ke a," a small plant with red and black smooth petals which is boiled with chicken and used to combat fever; "chin tok ky," a plant with dark red serrated leaves which are crushed and rubbed onto open wounds; "qua la to," a small plant with thick fibrous serrated leaves that are crushed and applied to fractures or broken bones; "te nuang," a plant with large green smooth leaves that are crushed and rubbed on an aching back; "che da," a plant with small green heart-shaped leaves which, if carried on one's person, will keep away unfriendly spirits; "ton du," a plant of the gladiola family which is boiled and taken for stomach pains; "hun dee," a plant with small green serrated leaves similar to fresh mint which is boiled with pork to combat fever; "ya lia," a plant with red and green leaves, smooth and long, which is boiled and taken for abdominal pain; "che taw neng," with a small serrated green leaf that is boiled and taken immediately following childbirth; "jot taw," an orchid-like plant with small lavender and green leaves which are boiled and taken for headaches. Most of these natural medicines are known only to the specialist, or medicine man, who is usually an elderly woman. She will ask for a small fee of about Tcs. 5 when her services are requested.

The villagers of both Mae Nai and Ban Khae find that it is very difficult to obtain permission to clear new land, especially in areas adjacent to or in forest reserve. Villagers in Ban Khae say that they have given up asking the Nai Amphur for permission to clear. In the past such requests were either denied or no reply was given. The following description of the clearing of a new rice swidden in Mae Nai will give illustration to the dilemma in which some Meo now find themselves:

On the 15th of January, during the full moon, Lao X went into the forest to select a site for a new rice swidden. The White Meo call this "tia te." They begin to search for new swidden sites at the end of the cool season (tu naw du). When Lao X had found an area he liked, he returned to the village and told his sister's husband Lao Y. Lao X and Lao Y returned to the new site, and first Lao X and then Lao Y chose and marked the sites they preferred. On or about the 1st of February, Lao X and Lao Y went to the Army Breeding Station located in Mae Rim, Amphur Mae Rim. They knew that this land belonged to the Royal Thai Army, as is the case with almost all the land in their area. The officer in charge told them that although the land was owned by the Army, the trees were the property of the Royal Thai Forestry Department. He told them that the Army had no objection to their using the land, but permission must be obtained from the Forestry Department to clear it. Both Lao X and Lao Y made no attempt to contact Forestry officials about permission, since they assumed from past experience that any such request would be turned down. On February 7th another group of villagers from Mae Nai

went to this new area selected by Lao X. Lao Z was the leader of the second group. He had heard about the new area from Lao Y. Lao Z, as leader of the second group, was allowed to chose his site first from the area that had not been selected by Lao X and Lao Y. The rest of his group chose their sites at random. Five days following the selection of sites the clearing began. First small lean-to type field huts were constructed. Since the area was near the dipterocarpus forests, the huts were roofed with the wide fibrous leaves of these trees. Then the smaller trees (luate) were cut. After ten days the lower layer had been cleared, and they began to cut the larger trees (dok dong). The area was completely cut thirty days after the clearing had commenced.

Burning began during the final weeks of March. After the first burning they collected the debris which had not burned into mounds and burned the mounds (cham ble). All of the Meo worked together in clearing and burning the selected area. Lao X and Lao Y worked as one team and Lao Z and his group worked as another. After clearing and burning was completed, the area was divided according to previous claim. Lao X's field was 80 meters wide and 200 meters long. Lao Y had a field 80 meters wide and 150 meters long, while Lao Z's field was 250 meters wide and 500 meters long. Although Lao X and Lao Y had chosen the best sites, it was generally agreed that Lao Z had fared better since with a labor force of five men his group had been able to clear more land. However, villagers from the Thai villages of Ban Pa Muang and Ban Tung Fung discovered the newly cleared Meo swiddens. A meeting was held by the household heads of the Thai villages. Many of the Thai villagers were angered because they had been prohibited from clearing the same land. Therefore, the situation was reported to the local Thai authorities.

Burning

Burning of new and old swiddens begins early in the fourth month (March 15th onward). The Meo wait until the leaves and grass have turned grey and brown. The timing of the burning is considered very critical, for if they wait too long and are caught by a rain they must postpone burning until the sun has dried out the underbrush. This will take a week in dry sunny weather, and even a light rain may create a two-week delay. Rain can be expected in the sixth month (May) and if burning is delayed until the end of the fifth month, the farmer may be without a new rice swidden for the coming year.

Various reasons were given for burning. New sites in primary and secondary forest were burned, according to informants, so that the land would be clear of logs, brush and grass. Others felt that it would not be possible to plant new swiddens without burning. However, the primary reason given was that it made better crops. Specific reference was made to the ash and the fact that the ash makes the soil taste salty and sweet. It was clear to these informants that the ash replenished the soil. When the writer mentioned that fertilizer would act in the same way on the soil, they replied that they knew this, but that fertilizer cost money and was very difficult to transport. One informant noted, "Why should we use fertilizer when burning does the same thing?"

The procedures for burning include a number of precautions. A Meo will first clear the border of his swidden of grass and underbrush for a width of usually five meters. If his field borders on another he will tell his neighbor of his plan to burn and perhaps suggest that they burn together so as to make the work easier. If the owner of the neighboring swidden does not want to burn at that time,

they will clear or burn a firebreak between their fields. Burning a firebreak is not as common as clearing by knife and hoe. The investigator only saw the burning of a firebreak on one occasion in Mae Nai, and this particular fire got out of hand burning a wide area of swidden, fallowed grassland and forest. Fruit trees, such as the common peach (Prunus vulgaris) and the lychees grown by the Meo are protected by clearing an area around the tree and soaking it with water. The villagers do not feel that the smoke and heat from the fire harms the trees and therefore do not try to avoid burning near fruit orchards.

It is quite common for the fires set by the Meo to get out of hand. Once the preliminary clearing is completed no further effort is made to control a fire. The writer has observed fires in the Ban Khae area which were set by young White Meo boys who wanted to clear a forested area of underbrush so that they could more easily hunt for wild animals. Many of the older men were opposed to this haphazard method of firing whole forest areas, but they say that it happens every year and there is little that they can do about it. All of the informants felt that the burning of secondary forest and fallowed swiddens was not good. Twenty of the Ban Khae household heads said that indiscriminate burning caused excessive weed growth. The others felt that it harmed the soil of fallowed swiddens and prolonged the necessary fallowing period.

Pine splints are used to fire a swidden. A man can do this easily by himself by placing the burning pine torches at chosen intervals around the field. If the swidden is dry, the fire may be set anywhere; however, if the debris and grass are slightly wet, an area must be well kindled before the fire will spread. If some parts of a field are unburned, the remaining underbrush and small debris will be piled into one area for reburning. The White Meo rarely use secondary or tertiary burnings. If grass overtakes the swidden between the time of burning and planting, it will be cleared by hoe. Stumps and logs which are only charred by the first burning are not reburnt. The planting of rice by dibbling, corn by hoeing, and poppy by broadcasting is simply done around these obstacles. The most common explanations for a poorly burned field include; fields in which the grass had grown unevenly or in clumps, fields which had dried out in one area but had remained wet in another, new swidden sites cleared from primary forest where the large trunks and branches had not been given sufficient time to dry.[20]

Cropping

A list of White Meo crops might include eight possible varieties of hybrid corn. The following types have been noted: "plauku chua da," a large, orange-yellow variety; "plauku chua dow," a large white-yellow variety; "plauku blau da," a large variety with white and yellow kernels; "plauku blau dow," a small white-yellow variety with some purple kernels; "plauku blau zi," a small purple-yellow variety with white kernels; "plauku blau n'chow dow," a small white-yellow variety with brown kernels interspersed; "plauku blau n'chow lia," a small reddish-yellow variety; "plauku pa," a type of popcorn. It should be noted that all the types with the term "blau" are for human consumption. Corn, or maize, is grown primarily for animal consumption. Pigs eat close to two-thirds of the corn produced in Mae Nai village. What is left goes to the chickens, ducks, horses and the Meo themselves. Often the Meo will grind "blau" corn into meal which they use to make small corn cakes, quite similar in consistency and shape to pancakes.

The writer has eaten two types of White Meo rice: "blau ble" a dry land

variety of glutinous rice, and "jua ble" the common White Meo hillrice. However, there are three types of "blau ble," white yellow and dark red. The dark red type is often eaten by the children in the form of small rice-meal cakes. Informants in both Ban Khae and Mae Nai said that the Meo have only these three types of glutinous rice, although they have access to and often experiment with other dry land rice, such as that cultivated by the Karen, Lahu and Yao.

The only other grain crop which the White Meo grow in Ban Khae and Mae Nai is millet, or "cun jua." This was used in a variety of ways. It is quite common to see White Meo children walking or working in the fields chewing a stalk of millet. The sap from the millet stalk is moderately sweet, and both children and adults enjoy it as a form of sweet.

Squashes were the most common type of Meo vegetable, except for a green spinach like plant called "te yong cha." Among the squashes noted are the following types: "di," a large ovoid type with yellow-green coloring; "tow," a small dark-green type shaped like a pumpkin; "di pa," a yellow-white type with irregular stripes; "di ia," a small light-green type with rough skin; "ti," a large gourd-shaped type with orange-yellow coloring. The "ti" was the most common type of squash and can be seen in every household during September. Squash was prepared alone as a soup or with pork or chicken.

White Meo root crops include: "coo yau," potatoes; "caw dow," dry land taro; "dong du," an indigenous tuber; "jaw daw," turnips; "te cha ke," garlic. All of these root crops are cultivated in the corn/opium swiddens either interspersed with the corn crop or on one side of the main swidden. Most of the root crops are planted in the seventh month (June) and harvested in the eleventh month. The principal group of crops grown in association are maize, beans, bananas, sugar cane, potatoes, squash and cucumbers. Turnips, garlic and green vegetables are grown in a second association. They are planted in the twelfth month and harvested in the fifth and sixth months. Sometimes a second crop of potatoes is grown in association with this group. Ten households in Ban Khae grew two annual crops of potatoes the first of which they sold in Chom Thong. Except for potatoes all of the crops are consumed by the village.

The most suitable conditions for both of the associations are oily, sweet soil, continuous but light rainfall until harvest, and a slightly sloped swidden.

Before planting the first association crops, the Meo wait for the first rains. Often villagers are caught with their fields uncleared, and if the rains continue, they must abandon the planting of the first association. The second association is planted in the eleventh month (October) just as the rains are coming to a halt.

Some of the White Meo of Ban Khae cultivate bananas, and a few experimental peach trees (Prunus vulgaris) are grown by two households. However, in Mae Nai peaches, "su dua," now constitute the main cash crop.[21] Opium is losing its appeal as a cash crop in Mae Nai because of the taxes imposed, the low prices prevailing in 1965-66, the restricted market, and the amount of time and labor required in planting weeding and harvesting. It takes one Meo approximately sixty work days per annum to cultivate one rai of opium poppies. An equivalent area in peaches requires less than ten days care, including harvesting.[22] Peach seedlings are kept in garden boxes next to the village house until they are four to five inches high. They are then transplanted near the corn/opium swidden in the months of June or

September. Three years following the transplanting, the tree usually bears the first fruits in June. After the first year the seedling is about one foot high. Seedlings are sold for Tcs. 2 and peaches for Tcs. 3 to 5 per one kilo. If the trees are planted in good soil, and weather conditions are favorable, the Meo can get as much as 50 to 100 kilos of peaches from one tree in the 7th year.

Opium requires a cool climate; therefore, it is planted at the end of the rainy season in late September and early October. Opium seeds are taken from the buds in March. They are segregated according to color. The white seeds produce the white-flowered poppy, while the black germinate to produce the red-flowered plant. "Ying chua," the lavender-flowered poppy used for stomach ailments, is also germinated from a black seed. Poppies with red and white or pinkish petals produce grey seeds. The Meo farmer will place the seeds into a "tai," or bag, after they have been segregated according to color. Often the seeds are hastily segregated, and for this reason some Meo fields have a mixed profusion of colors. The White Meo names for the poppies planted in Mae Nai and Ban Khae are: "Ying lia," red-flowered; "ying dur," white-flowered; "ying chua," lavender-flowered; and "ying aw cha pa,", pink-flowered.

The selection of corn seeds is accomplished by storing the best ears of corn from the previous year in the loft directly over the cooking fire. It is hoped that the smoke from the continuously burning fire will discourage insects from eating the stored corn. If corn borers should damage the seed, it must be given to the animals. Unfortunately corn borers seem to damage much of the seed in spite of the smoke. If extra seed is needed for planting, the Meo may borrow a small amount of seed from his kin or neighbors; however, if insects have destroyed a large amount of seed, he must buy new seed to replenish his stock. The Meo say that they must have 3 to 4 tang, or 80 litres, to sow a field of ten rai. Corn seeds are not soaked before planting because the Meo fear that the seeds might spoil. Corn requires a moderate cool temperature. In Khun Klang there is little corn grown because at 5,800 feet there are few seeds on the ear of corn. For a good corn crop the soil must be black and soft. Particular care must be taken to make a thorough burning so that there is no disease in the soil, and there will be enough ash to make the soil oily and sweet.

Corn is planted at the beginning of the 7th month. Four or five seeds (kernels) are placed in open holes approximately four inches deep. The men usually open the holes with a hoe, while the women and sometimes children place the seeds into the holes by hand. The holes are then filled in with soil. Usually the holes are spaced at intervals of 1½ meters.

Opium is planted in the same field as corn about ten days prior to the corn harvest. During the month preceding corn harvest, the soil between the corn stalks has been turned at a depth of five inches with hoes. This work is usually done by women and children. When all of the soil has been turned and thoroughly weeded, the poppy seeds are broadcast throughout the field. Broadcasting is done by an overhand, shoulder-high throw. Palms are cupped, while the index finger is out-stretched. The force of the throw comes from the wrist rather than the arm or body. After the seeds have been broadcast, they are covered with approximately two inches of soil.

The Meo plant both glutinous dry-land rice and non-gultinous dry-land rice. There are three types of sticky, or glutinous, rice: "ble bloo doo," which has a yellowish coloring; "ble blo cha," a reddish-grained rice; "ble blo dur," a

white-grained rice. "Ble dur" is the common variety of Meo rice, but two other varieties were noted, "ble lia," a red rice and "ble doo," a yellow rice. The Meo say that all of this rice came from Yunan, Kwangtung, Kwangsei and Honan in southern China. They say that they have tried to grow the wetland padi rice of the Thai and Karen in their swiddens. The stalk grows into a fine plant, but there is no seed. The White Meo plant rice in June at the beginning of the rainy season. The weather must be moderately cool and there must be plentiful rain. The rice seeds are placed in dibbled holes by the women and children. The holes are dibbled by the men and spaced about 8 inches apart. Most of the sticks used for dibbling are one to two inches in circumference. Ten or more seeds are placed in each hole. The holes are not filled in with soil because the Meo want the hole to fill with water so that the rice seeds will germinate quickly.

Before moving to Ban Khae the villagers had grown rice using the same techniques as those used in Mae Nai. They estimated that they reaped 100 tang per one rai, if weather and soil conditions were favorable. The Meo say that the Karen in nearby villages only receive 40 tang per rai under favorable conditions. The reasons given for the low Karen yield included the fact that the Karen did not make a deep dibbling hole and that they carelessly threw the seeds into the holes without counting the number or making sure they all went into the hole.

White Meo ritual preceding planting often varies between villages and households.[23] In Ban Khae most of the households asked permission from the Place Spirit ("Da Seng Tee Seng Cho") before planting. Households which had enough livestock would sacrifice a pig, or more usually a chicken to "Da Seng Tee Seng Cho" before the meal that preceded the first planting. Other households which had suffered illness or bad fortune would promise "Da Seng Tee Seng Cho" a chicken or perhaps a pig if he would grant them a good crop. This sacrifice was promised for a specific time, usually on the day following the end of harvest. Many households also offered food to the spirits of the field hut. "Su Ka," the house spirit, "Ua Neng," the ancestor spirit, "Da Chong," the bedroom spirit, "Sin Meng," the door spirit, "Lu Chang," the post spirit, and "Lu Peng," the cooking-fire spirit, were among those given an offering on this occasion. The White Meo of Mae Nai seldom gave offering to any but "Da Seng Tee Seng Cho" at the meal preceding planting. It is noteworthy that each clan, and within each clan, each household, had developed specific variations to the planting and other types of ritual. None of the White Meo in Ban Khae and Mae Nai had sacred plots which were dedicated to or given to spirits; however, after harvest a small platform was built at the edge of a swidden for the Place Spirit.

The three major pests from which the Meo must protect the germinating seed and the crops themselves are insects, birds, and foraging animals, in particular bears and gibbons. The most harmful insect is a small flying insect which the White Meo call "cong." Its shape and size are similar to that of a butterfly. This insect eats the young rice stalks when they are about 6 inches high. The "cong" also likes young corn stalks, but does less damage to corn than to rice. Another insect which causes damage to young plants and particularly seeds is the small red ant, known as the "n'cho." This tiny ant will carry away the rice seed before it has germinated. It is said that one of these ants can carry one hundred rice seeds from a hole in a few hours. The "kapa coo" is a type of corn borer. The White Meo like to describe it as "a small black ant with a long nose," and this is an apt description. This small borer is an avid destroyer of corn and is the cause of much sorrow in Meo households. It should be noted here that the "n'cho" also eats potatoes before they sprout, although mould is the major threat

to the potato crop. The White Meo have no way to protect their crops against these insects. In Mae Nai the villagers sometimes spray their opium crop with insecticide of Japanese and German manufacture.[24] However, they feel that the expenditure for such insecticides is too high for the benefits received, and if insects strike they will usually turn first to the Place Spirit and promise him a sacrifice if the insects are chased from their crops.

The most effective method of discouraging the birds is a scarecrow or a windshaker shaped like an umbrella. When the wind blows through the shaker it will rattle and rustle, thereby frightening the birds. These devices are always placed in the rice field after the grain has matured. Birds rarely bother the corn.

Bears and the gibbon are the major enemies of the corn crop. The Meo have devised a water-operated noise machine for scaring these animals away. A bamboo segment is placed in the path of a water flow. When the segment fills with water it will drop or tip thereby discharging the water and making a loud noise. The Meo say this noise is similar to that of a man working and that it frightens animals away.

It is quite usual for White Meo domestic animals to damage crops. The pigs are perhaps the most destructive and they often forage far from the village. When pigs are kept in the field hut they must be closely watched. Pigs will eat and damage corn, potatoes and rice, but they do not harm poppy. The roving bands of Meo cattle sometimes break into a corn swidden and damage wide areas of corn and rice. Horses will eat corn and rice if it is young. Of all of the domestic animals, the White Meo condemn the water buffalo of the Karen. The Meo say that if a water buffalo enters a swidden, it is lost. These buffalo not only eat corn, rice and potatoes, but opium poppy also.

The Meo are aware of the transplanting methods used by the Thai and Karen for wetland rice. However, except for the transplanting of peach seedlings from a germinating box after one year's growth, they do not transplant. The White Meo rice and corn crops are neither thinned nor transplanted. The poppy plants are usually thinned after the third month if they are growing closer than 6 inches apart.

The selection and storing of root crops for replanting is done with care. The White Meo household usually stores the best quality seed and plant for planting the following year. Potatoes are stored in "pur" baskets under the platforms in the main living area or in the bedroom. They must be stored in a cool shady place, otherwise they will not sprout and may mildew. The stored potatoes with their small green shoots are then taken to the swidden at planting time and placed 5 inches deep in holes about one foot apart. Turnip seed is stored either in a "pip," which is a ten-liter gasoline can, or in "pur." The "pip" was used more often in Mae Nai because they were often traded by the villagers when they went to Chiengmai. At planting time the turnip seed was taken to the swiddens and soaked in water for the night prior to planting, as was often the case with corn. The seeds were broadcast by using the same method as with poppy seed. After broadcasting 3 inches of soil was spread on top of the seed by hoe. Although the Meo often did not bother to thin out turnip gardens, the investigator noted two households in Ban Khae thinning out turnip swiddens. When questioned, the farmers said that the turnips grew better if thinned out to two feet between each plant. Onions and garlic are stored in "pur" or laid in bunches or individually on platforms or in the bedroom.

Planting takes place in November or December. Holes are dug in the same manner as with corn. The crop is harvested six months later. The Meo grow garlic almost exclusively. They have experimented with onions but find that the bulb is small and not as strong as garlic. The White Meo of Mae Nai sold garlic for Tcs. 7. per kilo in 1966. Onions sold for Tcs. 15 per kilo. The most important White Meo vegetable is commonly called by the north Thai name "pak kanat." The seed is stored in cloth bags and sometimes left in the loft over the cooking fire. However, if left in the smoke and heat for too long a period the seeds will not germinate. This seed is usually broadcast with the poppy seed, and often the seeds are mixed together before broadcasting. The "pak kanat" grows more rapidly than poppy. Two months after planting the "pak kanat" is picked. If the "pak kanat" grows less than 4 inches apart it will be thinned. The Meo are particularly careful to prevent "pak kanat" plants from shading or crowding out the poppy. They are also conscious of the fact that the "pak kanat" has a bigger and longer root system and that they must protect the poppy plants from the "greedy" "pak kanat" roots. "Pak kanat" can be sold at Tcs. 5 per two "pur" and the Meo of Mae Nai often sell "pak kanat" to the Thai. "Pak kanat" can be kept for long periods if it is dried for two days in the sun and then placed in a jar with salt and boiling water. However, not many White Meo households preserve "pak kanat."

Bananas are planted by taking the "co chur," or shoot, from an old banana plant and placing it in a two-foot hole. The hole is then filled with leaves and weeds. Each banana plant is placed at least 3 meters apart. Planting is done in the 8th month because the young plant requires a lot of water. In Mae Nai the White Meo plant two types of bananas which they call "chur co low" and "chur teng." The first type is similar to the small yellow Thai banana, while the second is larger and has a more fragrant odor. All of the banana plant is utilized by the White Meo. The fruit is eaten. The leaves are used as baskets or containers for food. The stalk is cut up into a mash which is fed to the pigs, and the root is used as a medicine for stomach ailments. Bananas are preserved by splitting them in half and drying them in the sun for two or three days, or by steaming the split banana and letting it air dry. These dried bananas were called "chur yee tua" and are a popular snack for Meo children.

Difficulties such as seed shortage, labor shortage and delayed planting are familiar to the White Meo. If a household has a shortage of rice or corn seed, the head of the household or his wife will go to a neighbor, often but not always someone of the same clan, and either borrow or purchase. Poppy seed is always given freely by relatives and neighbors for there is usually more than is needed, and the White Meo custom has always held that there must be a free exchange of poppy seed between Meo. If there is a severe shortage of rice or corn in a village or area encompassing a number of villages, the Meo will walk to another region where he knows there are Meo villages. There, he is confident, there will be enough seeds to supply his needs. The Meo of Ban Khae often told the investigator that the White Meo are not like the Lua and Karen who sell their best seeds. The White Meo always keep the best for planting in the next year. Therefore, if one village is short of seed, they can always find good seed in a neighboring or distant Meo village.

If there is a delay in planting or a shortage of labor in the village of Ban Khae, the household head will go to the headman of Khun Pae and ask him if there are any Karen who will work in the Meo swidden. The Meo of Ban Khae will pay Tcs. 5 per day, plus food, and the Karen will sleep in the field hut. It is noteworthy that there are only two hilltribe groups which will hire themselves out to the Meo.

The Karen and the Lua appear often in White Meo swiddens. The White Meo say that the other tribes will not leave their households or villages. Within this second group are the Meo themselves.

If the delay in planting cannot be made up by the hiring of poor Meo or non-Meo labor, it is felt that it is better to save the seed for the following year. In 1966, Lao Paw Sae Lee of Mae Nai planted a late crop of corn which was almost a total loss. In Mae Nai it is not possible for the Meo to hire Lua or Karen workmen for there are no villages of these tribes in the area. Therefore they must rely on hiring workers from the poorer Meo families in the village, such as those of Lao Tua Sae Lee and Lao Lu Sae Lee. The Thai will usually not work for the Meo due to the high altitude of the Meo swiddens and other more complex cultural reasons. Often Thai who have an addiction to opium will live in a Meo village and work for their maintenance, but this work is mainly confined to the village.

Two types of fencing are used by the White Meo. A board fence usually six feet in height is used for garden plots in Ban Khae. The boards are placed side by side and reinforced with horizontal planking. This is the only type of fence which will prevent pigs and goats from entering an enclosed area. Post and rail fencing is used in areas where horses and cattle are not wanted. The post and rail fence is completely ineffective with pigs, goats, dogs and chickens.

The White Meo often use traps to catch rodents. The investigator has seen two types of rodent traps used by the Meo. One is purchased from the Haw traders or traded in a Thai shop. The other is constructed by the White Meo. It consists of a small circular trap on the end of a two-foot stick. A string or cord is attached from the door of the trap to the end of the stick. If the rodent enters the trap looking for the bait placed there, it will trip the taut string, thereby shutting the trap door. Traps are not used against monkeys, bears or other larger animals. If large animals are molesting the crops and are not frightened away by the noise devices, the White Meo will track them down or lay in wait for them. All men enjoy hunting, and this is a fine excuse for shooting an animal. White Meo usually hunt in groups of three and use their own muskets made by the village gunsmith.

Weeding is done by hand until the crop is matured. When the corn is young and tender weeds are pulled by hand. Weeding in the corn swidden occurs on the 10th, 12th and 3rd month of the Meo calendar. The second and third weeding in the 12th and 3rd months is done with a long-handled hoe. Opium poppies are weeded twice during their growing season, during the 10th and 12th months. The first weeding is done by hand, the second with a small hand hoe. Due to the fact that weeds often grow between the stalks of rice it is necessary for the Meo to separate the stalks and cut the weeds. Weeds which are growing around the outside of these rice stalk clumps are hoed. The rice swidden is weeded twice, once in the 9th month and once in the 10th month. Potato swiddens are weeded with a small hand hoe in the 9th and 10th months. The White Meo say that they weed because the crops must not be shaded by the faster-growing weeds. They also say that the roots of the weeds eat up the soil and serve as nests for the rodents which devour the crops.

The White Meo give little specific care to maturing crops, other than the weeding and thinning of the poppy crop. The peach trees are not pruned, nor do the Meo seem to know of any reason or method associated with pruning. Mulching is sometimes practiced, as with the bananas, but it is rarely done, and the Meo have doubts about the benefits of mulching. The investigator saw manuring on one occasion in Ban Khae. Lao Ying Sae Ya manured his small garden in the village. Many of the

Meo know of the benefits that come from manuring. They have seen the Haw and Thai farmers use manure. Two reasons are given for not manuring the swiddens: they are too far from the village, where most of the manure is; it requires too much work to carry the manure to the swiddens. Few Meo farmers irrigate their fields. Three of the corn fields in Mae Nai had small ditches leading to them. All of these ditches were useless in the dry season because they were fed primarily by rain.

Harvesting

Every year after the harvesting of the rice crop in November and December (the 11th and 12th months), there is a ceremony marking the White Meo New Year. Preceding the New Year ceremony which lasts for three days, are a number of sacrifices relating directly to the rice harvest. Before the winnowed grain is taken to the village sacrifices must be made to the Place and Field Spirits if they were promised during the planting or growing time. "Da Te," the Field Spirit, is responsible for the protection of the crops from animals and insects. It is usual for a White Meo farmer to offer "Da Te" a sacrifice at the end of harvest, if the farmer notices or fears that insects, animals or some other hazard may harm his crop. For "Da Te" the sacrificed animal is usually a chicken, or perhaps two chickens. The size of the sacrifice depends on the wealth of the farmer and the extent of the damage he fears. "Da Chong Da Hang" is the spirit of the fertility of a place. This spirit lives in the earth, and he is responsible for all growing crops. The Meo farmer usually offers to sacrifice a chicken to "Da Chong Da Hang" if he will give the farmer a bountiful harvest. If the harvest is meager or fair, the farmer may not make the sacrifice in the field hut following harvest, as he feels that "Da Chong Da Hang" has not been looking after his interests. However, onece the promise of sacrifice is made most White Meo will honor it because there is always the fear that in the next year "Da Chong Da Hang" might be angry with them and give them poor crops.

The most important spirit of the harvest is "Da Shon Doo," the spirit of the sky. "Da Shon Doo" lives in the sky and is responsbile for the sun and rain. All growing things are dependent on him. As in the case of "Da Te" and "Da Chong Da Hang," sacrifice to "Da Shon Doo" will only be made by those households which have promised such a sacrifice at planting or during the growing season. Because of the importance of this spirit and the sacrifice to him, the following description of a sacrifice will be given.

In June 1966 before the rice seed had been planted in his newly cleared swidden, Lao Lee Sae Ya promised "Da Shon Doo" that he would sacrifice a pig to him if he would give them a fine rice crop. The sacrifice was promised for December 8, 1966. This date was chosen by Lao Ble Ju Sae Ya, the father of Lao Lee and shaman for the village of Mae Nai. Lao Ble Ju said that he chose this day because he knew that the rice harvest would be completed and the rice would be safely in the village house or barn. Lao Ble Ju was very careful to point out that this sacrifice was not part of the New Years rites. Many households do not promise or offer such a sacrifice and the date for the sacrifice is not arbitrary, but rather selected by the household making the sacrifice. He also told the investigator that such a sacrificial promise can be made to "Da Shon Doo" for protection of rice and opium only. These are the two most important White Meo crops, and if such a promise were made for the protection of corn, "Da Shon Doo" might be insulted. The ceremony began at 10 am. This time was chosen because most of the villagers were free and in the village. Before the large sow was tethered, Lao Ble Ju and his youngest son and grand-daughter went to the forest to cut the branches which must be placed in a

semi-circle around the sacred table. The "choong," as the table is called in White Meo, must be placed in position outside the house, but directly behind the wall on which the "Da Shon Doo" platform is located inside the house.

The "choong" was laid with four teacups; to the outside of the cups were two buffalo horns and a packet of spirit money. Directly opposite the teacups was placed a bowl of pork soup, a larger bowl containing rice in which joss sticks were placed, and a bowl of padi (unhusked rice). The sacrificial pig was trussed and tied to a tree limb. Lao Ble Ju then spoke to "Da Shon Doo" while standing in front of the sacred table. He said, "This is the pig that I will kill for you. It is very fat. It will taste good."

The sow was then killed by Lao Lee, who inserted a knife in the jugular vein of the animal. Lao Ble Ju remarked as the sow was struggling that there was not a special place for killing the pigs or other sacrificial animals. After the pig stopped sturggling, it was taken to the rear door of the house where scalding water from the animal fire was poured over the body. The bristles were removed by scraping and the animal was butchered by three men who completed the job within 35 minutes. The hindquarters of the pig were cut up and boiled. Some of the soup from this portion was then placed in the soup bowl on the sacred table. Lao Ble Ju then thanked "Da Shon Doo" for providing his family with enough rice for that year. "Da Shon Doo" was invited to eat from the "choong" and spirit money was burned beneath the sacred table. Approximately fifteen minutes later Lao Ble Ju returned to the "choong." He asked "Da Shon Doo" to turn the smooth side of the buffalo horns toward the sky when he had finished his meal. After throwing the buffalo horns on the ground ten times, the smooth sides appeared together, and Lao Ble Ju burned more money paper under the "choong." Lao Ble Ju then bowed and knelt three times before the table while chanting praise and thanks to "Da Shon Doo." The sacrifice was then over and the guests began to feast on the boiled pork that was offered to everyone present. None of the guests or other households received gifts of pork from the sacrifice other than that which they could eat while in Lao Lee's household. The remaining pork was salted and smoked for future use.[25]

"New maw lay chia," which can be freely translated as the eating of new rice, is a ritual sacrifice that takes place on the day when the last of the new rice is stored in the village. Two chickens and/or perhaps a pig are sacrificed to "Da Nia Da See," the mother and father spirit. The spirits of mother and father are offered food from the sacrifice and allowed to eat first. Then buffalo horns are thrown to determine when the spirits have finished their meal. Afterwards the guests and members of the household feast on the sacrificed animals.

The preparation of the implements and tools used during the rice harvest is undertaken about a fortnight in advance of the departure to the rice swidden. The principal tools include the "lia," sickle used in cutting the rice stalks; the "lay," a mat made from woven strips of bamboo used in the threshing and winnowing of the grain; "wa," winnowing tray; the "seng," cloth bag made from strips of bark and used to hold the winnowed padi; and the "pur," baskets made of bamboo strips and wooden frame in which the bags of rice are placed for the portage to the village.

Implements used in the corn harvest include a small piece of sharp bone called a "moo," which is used to pierce and husk the ears of corn while they are still on the stalks. Sometimes an iron "moo" is used, but this is not common. Baskets, "coo," especially made to fit the wooden pack-saddles, "neng da," of the White Meo horses, and the horses themselves, are prepared well in advance for the

corn harvest.

Opium harvest requires fewer and smaller implements. Great care is taken, however, to see that they are ready well in advance. The small trident knife, "chia ying," is carefully sharpened by the best blacksmith in each household. The "dua ying," a small blade similar to an artist's palette knife is used for scraping the partially dried, but still sticky, opium from the incised poppy bulb. Finally the small tin cans called "ti" are collected and cleaned so that they are ready to hold the freshly cropped opium.

Harvesting procedures do not vary very much from household to household. The rice crop is cut row by row, but it does not concern the Meo on which side of the swidden or on which row they begin cutting. The whole field is cut in this manner, and then left to dry for three days in the sun. If it happens to rain during harvest, they must allow the rice to dry for a longer time until it is dry. The rice stalks are cut in bundles with the "lia," and the motion used is an inward swing coming mainly from the wrist. It takes a White Meo man two days to cut and bundle one rai, if he is not an opium smoker or doesn't have other infirmities. It takes two men one day to thresh one rai of rice and two days to winnow one rai.[26]

Corn is harvested in two ways. If corn is the only crop in the swidden, the Meo will cut the ears row by row from the standing corn stalks by inserting the "meo" into the cob and extracting it. However, if the corn has been intercropped with opium poppies or vegetables, they will cut the stalks row by row and place them around the edge of the swidden. The ears of corn will then be extracted from the piles of stalks around the swiddens. This second procedure is used to protect the young poppy and vegetable crop.

Opium is cropped over a ten-day period. Using the "chia ying," the poppy bud is incised on one side. The White Meo start to cut in a group on one side of a swidden, gradually working toward the other side. Only the larger buds are incised during the first cutting. Six or seven days later they return to the swidden to incise the smaller buds and at this time a second incision is made in the already cut bud if it is still green. The White Meo in Ban Khae and Mae Nai do not practice tertiary cutting. In the first cutting they obtain more than twice as much opium as in the secondary cutting. The scraping of the bud is usually done on the day following the cutting or in the late afternoon after the cutting for one area has been completed. It is not necessary for the opium sap to dry in the sun; however, the weather must be dry and there must be a good wind. Many White Meo feel that the best quality opium is dried overnight rather than in the hot sun. The white sap must turn dark brown before scraping. The most common sequence for harvesting opium is to incise a swidden of poppy in the afternoon and to scrape the buds in the following morning. These patterns of work should be maintained throughout the harvest. It takes one man about three to four days to complete the cutting of one rai. The scraping takes three or more days. Six or seven days is approximately the average time it takes one man to harvest one rai of opium. Opium crops are never estimated in advance because the crop is unpredictable.

Threshing and winnowing of rice are done by the whole household. It is most common to see the men cutting, the women threshing and the men winnowing. The threshing is done in an area enclosed on two sides by blankets hung from posts. The stalks of rice are beaten against a bamboo mat lying on the ground. The work is arduous and the air filled with chaff. Winnowing is accomplished by climbing up on a high stump or placing a platform between two high tree stumps and shaking the

padi onto a bamboo mat beneath. The chaff is blown away by the wind. A tray of rice will be winnowed two or three times before it is placed in the "seng" for transport to the village. If there is little wind, a man will stand below the winnowing platform with a "chur," or winnowing fan. He will fan the padi as it falls and continue to fan it on the mat. When the rice has been transported to the village a certain quantity will be separated from that stored in the house or barn and will be dried in the sun for one day before milling in the house. If two households should cultivate and harvest a swidden, the crop would normally be divided in half. However, if there are two workers from one household and one from another, the crop will be divided in three parts with 2/3 going to the first household and 1/3 to the second. The measurement for division of unhusked rice is either the "tang" or the "pip."

Rice is stored in a small barn near the house or in a large basket in the house. Corn is usually stored in the barn, but if there is no barn it is tied to a string which is strung from the rafters or placed in baskets in the storing area, or loft, over the cooking fire. Opium is stored in the bedroom or, if there is a large quantity, it may be buried in the ground. It is usually buried within the house. The following types of food are stored in the loft: deer meat, corn seed, pumpkin seeds, roots of medicinal and non-medicinal plants, medicinal leaves. Bamboo sections used as containers often hold opium seeds, water for drinking, meat or vegetables. Baskets are of four types: "tur bong," or yoke basket used for carrying short distances; "cur," or back pack used for carrying wood, corn and banana plants long distances. The "cur" is not used for carrying rice because of its open net bottom; the "tur" is used for rice; finally there is a wooden rack called a "kee" which is used for the transport of banana plants, firewood, and grass for the horses.

The selling of crops is mainly restricted to opium. In Ban Khae opium and potatoes are the only cash crops, while in Mae Nai it is opium and peaches.[27] Rice is occasionally sold to other Meo within the village. Corn is rarely, if ever, sold even within the village or clan because there is never enough to feed the household pigs. Peaches and potatoes must be marketed in the nearest Thai town, and the transportation to the nearest road is provided by the Meo themselves. Opium is sought after and sold within the White Meo household to Haw and Thai traders who come to the Meo villages. Long-standing trade relationships are usually developed with traders who can be trusted.

Spoilage is a major problem with Meo crops. Rice usually spoils in the second year of storage. Many White Meo estimate that 1 to 2 tang out of 20 spoils each year. Corn is often stored in the loft to prevent insects from devouring it, but it is estimated that as much as five out of twenty tang are spoiled by insects. Insects do not harm opium, but if it is exposed to salt or spices it cannot be used. If opium is stored underground and is exposed to water it may spoil. Potatoes must be harvested after three days of continuous sunshine, otherwise about 10 tang out of 20 will spoil. If they are picked during sunny weather perhaps only ½ tang out of 20 will be lost.

Damage by animals is another cause of spoilage. Rats are a major destroyer of stored corn. The Meo traps are ineffective. They would like to keep cats but they say that this is impossible with dogs. Domestic animals also break into the storage areas and eat up grain. Chickens are perhaps the major domestic culprit. Loss through theft is minimal. Occasionally rice or bananas are stolen from the house but only in small amounts. Opium is always well hidden and there are few thefts.

Secondary harvesting is limited to opium as noted above. Potatoes, however, are often planted and harvested twice in a year. They are planted in the 7th month and harvested in the 10th and 11th months and planted again in the 12th month with harvesting in the 3rd and 4th months. The first crop of potatoes is usually sold, while the second is kept for household consumption.

After harvest in the corn swidden the stalks are cut and the roots hoed and pulled out. All the debris is left in the field if there is no opium crop. If there is an opium crop some of the debris is piled by the side of the swidden. The debris is left to dry and decompose for four or five months before being hoed under. Following the rice harvest the swiddens, including the rice stalks, are burned. Since it is not usual for the White Meo to cultivate rice in the same field for two successive years, corn may be planted in the swidden on the second year. If this is the case nothing will be done to the swidden after burning until the holes for the corn are hoed. The stalks of the poppy are left in the swidden to dry for one month after harvest. Then they are pulled out and left on the ground for three or four months. When the swidden is hoed at corn planting time the dried and decomposed poppy roots and stalks are turned under. In an old potato swidden (any swidden after the first year), the soil is not turned after harvest. When the second crop is planted new holes are dug and the potato is placed in them. A newly cleared potato swidden must be hoed and the soil turned after burning.

Estimated yields per rai from swiddens vary considerably. Discussions with the heads of ten households in Ban Khae revealed the following figures. The discussions were held as a group and contrasting estimates were noted in arriving at the estimated yields: In a newly cleared swidden the first crop of potatoes will yield between 50 and 60 "tang" per rai. The second crop yields 50 or 60 "tang" per rai. A newly cleared, or first year, opium swidden will yield, at first cropping, 6 or 7 "kan" per rai. Second cropping yields 2 to 3 "kan" per rai.

In another discussion of yields with three of the wealthiest White Meo villagers, the following estimates were given:[28] The figures in these estimates are given by successive years of cultivation in one swidden.

Rice- in the first year of cultivation will yield 20 to 25 "tang" per rai. In the second year 10 "tang" per rai. The White Meo do not plant rice for three years in succession so there was no estimate for the third year.

Corn- in the first year of cultivation yields 15 to 20 "tang" per rai. In the second and third years an equivalent yield is estimated. In the fourth and fifth years the estimated yield may fall to 9 "tang" per rai. After the fifth year a corn swidden may be fallowed or cultivated exclusively in opium poppies.

Potatoes- in the first year will yield 50 to 60 "tang" per rai. In the second year the yield may be equivalent to the first, but the potatoes are usually smaller. The third year estimate is between 20 and 30 "tang" per rai. Potatoes are not grown in the same swidden on the fourth successive year.

Opium- in the first year yields 8 to 9 "kan" per rai. The same estimated yield is maintained for four years. On the fifth year the swidden may yield 4 to 5 "kan" per rai. The White Meo will usually abandon their opium swidden after the fifth successive year; however, if the soil is good and the crop does not diminish they may cultivate a swidden for as much as 10 to 15 successive years.

As noted previously, the White Meo do not usually have gardens in the village; however, the village plot of Lao Ying Sae Ya in Ban Khae is an outstanding exception. He manures his garden and grows cabbages and other green vegetables. Spice gardens are cultivated near the corn swidden. "Quot Saw," hot pepper is grown, but rarely used by the White Meo. Among the other spices are: "tok ki," a type of basil; "jot su ki," or coriander; "kya," which is a type of hot root used with fried foods; "kay" or garlic; and a number of lesser spices. The White Meo have no ornamental or ritual gardens; however, they do grow medicinal gardens. The medicinal garden of Ban Khae is cultivated by the "Chua Da," or medicine woman Na Choo Sae Wa. Na Choo's garden is located in an inconspicuous spot near her house. It is 6 feet by 8 feet in size and the plants are protected by a plank fence.

Derivative foods made by the White Meo consist primarily of rice cakes of various types: "Ma un'jua" is a small rice cake made from pounded glutinous rice which has been dipped in molasses before eating; "ua kee" is made from a mixture of glutinous rice flour and sugar which is fried and eaten hot; "ua tua" is made from pounded glutinous rice and sugar which is wrapped in banana leaves and toasted in the ashes of the cooking fire; a variation of "ua tua" is made by substituting "chao jao" for glutinous rice flour, mixing it with sugar and wrapping it in banana leaves. These cakes are placed in a bamboo rack and steamed over the pig-fire. Sweets made from corn include "ua plauku chia." This cake is made by first husking the cob and grinding the kernels. Then the flour is mixed with sugar and wrapped in banana leaves and steamed over the pig-fire. Bananas are fried in lard and eaten. This is called "chee chow kee."

There are two principal types of fibre products cultivated by the White Meo. Cotton is often cultivated in small plots near the corn field by women. It is planted in the 7th month and harvested in the 10th. Cotton seeds are placed in dibbled holes by using the same procedure as in rice planting. Each household has its own cotton seeds which are kept in a small cloth bag by the women of the household. To make a White Meo skirt for one girl it is necessary to plant about ¼ rai of cotton. Any extra cotton grown is usually made into rope. Cotton is called "sao." "Dan dong" is the White Meo word for the tree and the bark from which rope is made. The bark of the "dan dong" tree is stripped and soaked in water for one night. On the following day it is dried in the sun and then rolled and twisted into a strong rope. All other fibre materials used by the White Meo of Ban Khae and Mae Nai are purchased from the Thai.

The White Meo have a limited number of ritual taboos connected with the cultivation of crops. Perhaps the most significant is the abstention from all vegetables during the New Year Festival. Meat, usually pork or chicken, is eaten for three days. The White Meo say that if vegetables are eaten during these three days there will be grass in their swiddens in the following year. Another taboo at the New Year is a prohibition against throwing water within the house. They believe that the throwing of water will cause heavy rains in the following year which will wash away the good soil from their swiddens. The only taboo related to hunting or fishing trips concerns the telling of sexual tales on the day before the hunting or fishing party leaves the village. It is believed that such tales will frighten the animals.

The reason given by the White Meo for fallowing their swiddens varied from crop to crop. The situations given below are what the Meo feel to be usual fallowing periods. In the rice swidden it is best to fallow for 3 or 4 years after the first crop so that the grass and bushes can grow large. If the grass

and bushes are allowed to grow large, then the swidden can be burned and the soil will have a strong salty-sweet taste. Corn swiddens that have good soil should be fallowed for 4 years, after 4 years of cultivation. Corn swiddens with poor to average soil should be fallowed for 4 years after 2 to 3 years of cultivation. Weeds, grass and bushes should grow high before the swidden is recultivated so that the soil will have a salty-sweet taste after burning. Potato swiddens should lie fallow for 3 years after the first two crops. Then they can be burned and recultivated. The soil must taste salty and sweet. After 7 to 8 years of cultivation the opium swidden should be fallowed for 5 to 6 years If the swidden is cultivated for more than 7 or 8 years, the soil will not taste salty-sweet. The poppy plants will be stunted and the buds will grow unevenly and have very little sap..

The length of the fallowing period varies from crop to crop depending on the Meo experience with the crop. Opium requires a soil with a strong salty-sweet taste. If a poppy swidden is fallowed for a short time, the opium will be of poor quality and quantity. The White Meo feel that a good soil for opium is difficult to find, so that they must preserve what they have. Potatoes do not require a soil as salty as opium; therefore, the fallow period can be shorter even though the periods of fallowing are more frequent. Because of the varying lengths of fallowing periods for different crops, the types of secondary growth also vary. In the potato swidden with its short period of fallow the secondary growth is primarily grasses, especially Imperata cylindrica, with some small shrubs. Rice and corn swiddens under fallow are predominately grass and saplings seeded from the primary forests nearby. Opium swiddens with fallowing periods of 5 to 6 years have young trees predominating, with trunks averaging 6 inches in diameter.

The preferred original vegetation for an opium swidden is a primary forest with large trees. To obtain the salty-sweet taste required of good opium-growing soil, it is necessary to burn a large amount of brush and wood. Although climax forests are always preferred for the rice swiddens, corn may be grown in secondary forest swiddens with medium to small arboreal cover. For potatoes a swidden with small trees and grass is sufficient.

Selective clearing is not often practiced by the White Meo. Occasionally they will allow a tree to stand near the edge of a swidden. If the tree interferes with the cultivation of the swidden or creates unwanted shade they will cut it down.

There are a few fire-resistant trees and plants. The banana plant will not burn if it is not completely dried out. Many of the larger trees will also survive the burning. Although the smaller trees and seedlings are burnt, it is common to see the green leaves return after the first rain. Pine trees, especially Pinus insularis, appear to be especially hardy after a burning.

Types of fallow growth as noted by the White Meo fall into three groups. After the first year the "nya farang" grass overtakes a swidden. On the second year "siblya toma" scrubs and seedlings predominate, as is the case in the third year. In the fourth year the original forest growth has reasserted itself.

The White Meo prefer to have their swiddens close together in one area; however, they rarely find a large area with good soil throughout. They want to be together so that they can assist each other in guarding their swiddens against thieves and animals. In 1965 a basket of corn was stolen from Lao Ching's swidden. One rai of potatoes was stolen from Lao Sophia Sae Ya. In both cases they claimed that the thefts were by Karen. They did not go to the police, but spoke to the

Karen headman. Affinal relatives and members of the same lineage prefer to have swidden near each other, for then if someone is ill help will be nearby. Finally most Meo do not like to be alone. Many of the White Meo women complain of loneliness while they are in the field huts.

The ideal fallowing time as noted by White Meo informants is noted below:

Rice- swiddens should be fallowed for 7 years after 1 year of cultivation. After two years the fallow should be 11 or 12 years. There should not be three successive years of rice cultivation.

Corn- swiddens should have 6 years fallow after one year of cultivation. Two years cultivation should have 10 years fallow, and 3 years cultivation 15 years fallow.

Potato- swidden after 1 year cultivation should have 4 years fallow; 2 years cultivation, 7 years fallow; after 3 years cultivation, 10 years fallow; after 4 years cultivation, 15 years fallow. Five years of successive cultivation should not be practiced.

Opium- swidden after 1 year cultivation should have 3 years fallow, after 2 years cultivation, 7 years fallow; after 3 years cultivation, 10 years fallow, after 4 years cultivation, 15 years fallow; after 5 years cultivation, 18 years fallow; after 6 years cultivation, 20 years fallow. Seven years of successive cultivation is not ideal.

Other types of land use, such as permanent land, grazing land and lumbering areas are not used by the White Meo of Ban Khae and Mae Nai. The White Meo have no fields which they cultivate for more than 20 years. Horses and cattle graze on the grass of fallowed fields, but with the rapid reforestation in north Thailand these cannot be termed permanent grazing areas. When lumber is needed the Meo go into the forest and cut the trees which are needed. "Sip pay" and "lot tur" are the hardwoods most often used in building houses. Wall planking is usually made from "cha baco" and "too chua," two medium-sized trees.

Protection of swiddens from fire is not effective, although there is a fine of Tcs. 300 enforced by the White Meo headman in Ban Khae. They say it is impossible to tell who set fire to a swidden or the surrounding forest. Cutting of already claimed or fallowed land can only be stopped by watching and catching the party involved. The guilty party can be taken to Thai court or more usually a settlement is reached by the parties involved and the White Meo headman. It is not uncommon for the White Meo to abandon a fallowed swidden. If the swidden is abandoned for more than 10 years, or the Meo who originally cleared the area migrates to another area, the swidden may be claimed by another party. Even if the swidden has been fallowed for 15 years, it is usual to ask permission to use it, if the original owner is still living in the area. Some Meo will try to prevent grazing in their fallow by fencing the swiddens; however, this is rarely done. The White Meo never plant seedlings or tubers in an effort to accelerate the fallowing period.

Footnotes

1. Barney, G., The Meo of Khouang Province, (1961).

2. Abadie, M., Les Races du Haut-Tonkin de Phong-The a Lang-Son, (1924).

3. Bantin, A., "Monographie de la Province des Haua-Phan," (1937).

4. Bernatzik, H. A., Akha und Meau: Problem der Angewandten Volken kunde in Hinterlandien, (1947).

5. The household of Lao Ju Sae Ya did not cultivate rice in 1965, 1966 or 1967. Lao Ju was an opium-smoker, as is his wife. There are no children in the household old enough to manage the work of clearing primary forest. Lao Ju hired himself out at Tcs. 5 per day when he needed money to purchase rice. More often than not his family ate corn as a staple.

6. The following description of White Meo measurements is given to facilitate the understanding of this report:

   a. Opium is weighed by "ta teng," or hand-scales. Thai coins, or "satang" are placed in the right scale and the opium to be weighed is placed in the left scale. There are three sizes of scales. The largest is used to measure one "joy," or 1.6 kgs. of opium. Measurements are made to the following equivalents: 2½ satang = 1 "tab"; 8 "tab" = 1 "hong"; 4 "hong" = 1 "khen"; 10 "khen" = 1 "joy." One "hang" = 32½ Rupees in weight.
   b. Rice and corn are measured in "pur," or baskets, and "pip," or kerosene cans. A "pip" is roughly equivalent to 20 liters. A "pur" is approximately 25 liters.

7. The five informants included: Lao La Sae Ya, Lao Ying Sae Ya, Lao Bua Pa Sae Wa, Lao Sopia Sae Wa, Lao Ching Sae Ya.

8. In the swiddens of Mae Nai the investigator has seen no exceptions to this succession cropping of corn (maize) or opium.

9. Table IV is from Halpern, J., Laos Project Paper No. 9, (1961).

10. In Mae Nai and Ban Khae there were no examples of a third year yield since it was accepted that a third successive planting would produce a negligible yield.

11. From the Royal Thai Forestry Department. No households will be specified in the interests of the villagers.

12. Controlled measurement of 100 sq. meters opium swidden and the analysis of the data will be made in the Third Technical Report, 1967.

13. Niwat Ruangpanich, Faculty of Forestry, Kasetsart University, Bangkok, (1967).

14. The household is the basic socio-economic unit of White Meo social organization. It consists of the nuclear family and any other persons living permanently within the household.

15. The challenge to a doubtful claim and the possibility of a double claim on land appears to occur more often in Ban Khae where land is scarce and there is competition between the White Meo, Karen and Thai for land. In Mae Nai competition is almost exclusively within the Meo community; however, there are limitations on land use enforced by the Thai Government.

16. In 1964 two households from Ban Khae claimed portions of the same site. The question of whose claim took precedence was brought before a council of household heads. The council ruled that the land claimed by both parties should be divided between them.

17. This soil is red laterite.

18. Note soil samples in previous section.

19. Binney, G. A., Third Technical Report, (1967).

20. Informants for these answers included: Lao Lee Sae Ya, Lao Bua Pa Sae Wa, Lao Ying Sae Ya, Lao Sae Lu Sae Lee, Lao Qua Sae Lee, Lao La Sae Ya.

21. Binney, G. A., First Technical Report, (1966).

22. These figures were obtained from a random selection of ten households in Ban Khae.

23. Binney, G. A., Third Technical Report, (1967).

24. Fumikiller from Japan and Bayer from West Germany.

25. Other rituals of the White Meo New Year ceremony will be discussed in the 4th Technical Report.

26. These estimates were derived from a sampling of ten rice swiddens in Mae Nai in 1966.

27. A discussion of marketing will be included in the Third Technical Report, (1967).

28. Lao Ying Sae Ya, Lao Ching Sae Ya, and Lao Bua Pa Sae Wa were also considered the leaders of the village. Lao Ying was the major informant in this discussion.

29. Lao Ching Sae Ya, Lao Ying Sae Ya, Lao Sopia Sae Ya, Lao Qua Sae Lee, Lao Lee Sae Ya, Lao Bua Pa Sae Wa, Lao Pa Sae Taw.

TABLE I

Crop Yields, Mae Nai
(1965-66)

Household	Number in household	Rice crop (in "pur")	Corn crop (in "pur")	No. of rai in corn	No. of rai in rice
Lao Ju Jee Sae Lee	12	224	200		15
Lao Mao Sae Ya	7	50	55		7
Lao Lu Sae Ya	9	50	50		8
Lao Ja Sae Lee	7	60	100		11
Lao Tua Sae Ya	6	88	50		8
Lao Ju Sae Lee	7	-	15		3
Lao Cheng Sae Lee	9	170	200		13
Lao Qua Sae Lee	8	50	180		14
Lao Ble Ju Sae Ya	10	60	90		8
Lao Paw Sae Lee	4	12	50		5
Lao Ju Sae Ya	6	70	35		4
Lao Neng Sae Lee	9	200	260		18
Lao Lu Sae Ya	6	10	15		5
Lao Qur Ying Sae Lee	6	30	25		5
Lao Sae Lu Sae Lee	11	70	130		6
Lao Tua Sae Lee	6	105	160		12
TOTALS	123	1,249	1,675		142
AVERAGE	7.7	83.2	104		8.5

TABLE II

Crop Yields, Ban Khae

Household	Number in household	Corn; 1965 (in "pur")	Corn; 1966 (in "pur")	Opium; 1965 (in "joy")	Opium; 1966 (in "joy")
Lao Ying Sae Ya	10	15	12	8	12
Lao Wa Yee Sae Ya	12	30	22	5	4
Lao Yeng Sae Wa	8	16	20	2	2
Lao Tu Sae Ya	14	70	30	6	4
Lao Teng Sae Ya	16	20	20	1	1
Lao Pong Sae Wa*	1				
Lao Sopia Sae Wa	10	35	22	4	2
Lao Chung Sae Wa	5	10	10	2	2
Lao Wu Sae Ya	6	18	20	3	2½
Lao Song Sae Wa	16	60	40	5	5
Lao Puso Sae Wa	9	30	30	5	5
Lao Bua Pa Sae Wa	20	60	40	10	10
Lao Jong Sae Ya	9	15	10	3	2
Lao Pi Sae Ya**	5	10	-	2	2
Lao Dua Sae Ya	15	30	20	3	2
Lao Tua Sae Wa	12	25	20	4	4
Lao La Sae Ya	10	52	45	4	5
Lao Yia Sae Ya	13	30	30	4	6
Lao Chee Sae Ya	9	17	20	2	1
Lao Tu Sae Wa	8	20	20	3	2
Lao Seng Sae Wa	8	60	32	5	7
Lao Pia Sae Ya	5	40	30	2	1
Lao Co Sae Wa	16	60	30	7	6
Lao Chong Sae Wa	9	20	25	3	2
Lao Duan Dua Sae Wa	15	50	50	9	8
Lao Wa Sae Wa	7	35	30	2	3
Lao Pia Sae Wa	2	7	10	3	3
TOTALS		970	638	107	103½

*Lao Pong labours for others at Tcs. 5 per day

**Lao Pi's corn crop (1966) was consumed by bears.

Note: 1 "pur" is roughly equivalent to 5 gallons or 12 kgs. of padi (unhusked rice) or approximately 22 liters.

1 "joy" is 1.6 kgs.

TABLE III

1965	Monthly Rainfall	Max.Day Rainfall	No. of Days of Per Rains Month	Max. Temp.	Min. Temp.	Aver. Temp.	Aver. Max. Temp.	Aver. Min. Temp.	Humid-ity	Wind Velo.	Evapo-ration
Jan.											
Feb.											
Mar.											
Apr.											
May											
June	135.8	30.6	10								
July	182.6	34.6	13	81.5	61.0	71.2	74.6	64.5	91.8	20.6	3281.3
Aug.	403.2	83.4	18	77.5	61.6	66.6	73.2	64.4	92.8	13.1	2866.2
Sept.	352.4	48.6	15	77.6	62.5	70.0	73.8	64.4	91.8	11.3	3313.4
Oct.	219.5	107.4	9	78.5	57.0	67.7	73.2	62.7	92.9	12.0	3076.2
Nov.	46.7	22.1	4	75.5	54.0	64.7	71.4	59.1	93.0	19.3	2065.8
Dec.	59.9	42.2	2	75.5	49.5	62.5	69.6	57.8	95.4	10.2	1872.4
Total	1400.1	368.9	71	466.1	345.6	402.7	435.8	372.9	557.7	86.5	16,475.3
Aver.	--	52.7	--	77.7	57.6	67.1	72.6	62.1	92.9	14.4	2745.9
1966											
Jan.	5.4	5.4	1	79.0	48.0	63.5	73.2	58.1	88.9	13.2	3949.3
Feb.	---	---	---	84.5	55.5	70.0	79.3	60.6	73.5	16.2	3929.0
Mar.	---	---	---	88.0	60.5	74.2	84.6	65.5	51.8	16.7	6035.0
Apr.	12.5	5.6	3	90.0	62.5	76.2	87.6	68.7	62.3	13.1	6266.6
May	209.7	39.0	14	93.0	62.5	77.7	80.7	66.9	85.9	19.7	3991.2
June	61.9	17.9	12	78.0	62.0	70.0	75.4	65.5	83.8	18.6	2976.7
July	295.5	53.8	20	80.0	61.5	70.7	70.8	65.5	90.8	16.6	2498.4
Aug.	435.7	50.9	26	78.5	62.5	90.5	73.3	65.7	90.0	16.5	2826.4
Sept.	331.3	79.8	15	78.0	60.0	69.0	73.4	64.0	86.5	12.5	2953.1
Oct.	175.1	86.9	11	79.0	58.5	68.7	73.3	64.7	89.3	13.8	2744.5
Nov.	13.2	4.7	5	77.0	54.5	65.7	73.1	61.4	90.9	8.4	1862.7
Dec.	11.4	10.4	2	77.5	51.0	64.2	70.8	59.0	91.4	9.0	2679.2
Total	1551.7	354.4	109	982.5	699.0	840.4	915.9	765.6	985.1	174.3	42,711.8
Aver.	---	35.4	---	81.9	58.2	70.0	76.3	63.8	82.1	14.5	3559.3

TABLE IV

Rice Production

Province; Type of Cultivation		Padi Seed per Hectare (in kgs.)	Estimated Yield (in kgs. per hectare)	Ratio of Rice Yield to Seed
Champassak	na	34	1,376	40.5
	hai	23	3,347	14.6
Saravane	na	22	987	44.9
	hai	66	1,139	17.3
Savannakhet	na	44	1,168	26.5
	hai	37	931	25.2
Khammouane	na	70	950	13.6
	hai	36	814	22.6
Vientiane	na	62	1,593	25.7
	hai	63	1,710	27.1
Luang Prabang	na	96	1,252	13.0
	hai	27	1,756	65.0

Village	Population	Households	No. of Na	No. or Hai	Harvest to Seed Ratio; Na	Hai	Yield per Na (kgs)	Yield per Hai (kgs)
Muong Noi	522	132	28	104	70	40	5,600	1,296
Ban Na Lo	84	14	14	0	50	0	1,600	0
Ban Na Khang	70	16	5	11	45	30	1,080	1,312
Ban Na Tay	53	12	10	2	50	4	1,400	144
TOTAL	729	174	57	117				

*Note: the relative size of the fields is not known.

MAP OF PROJECT AREA

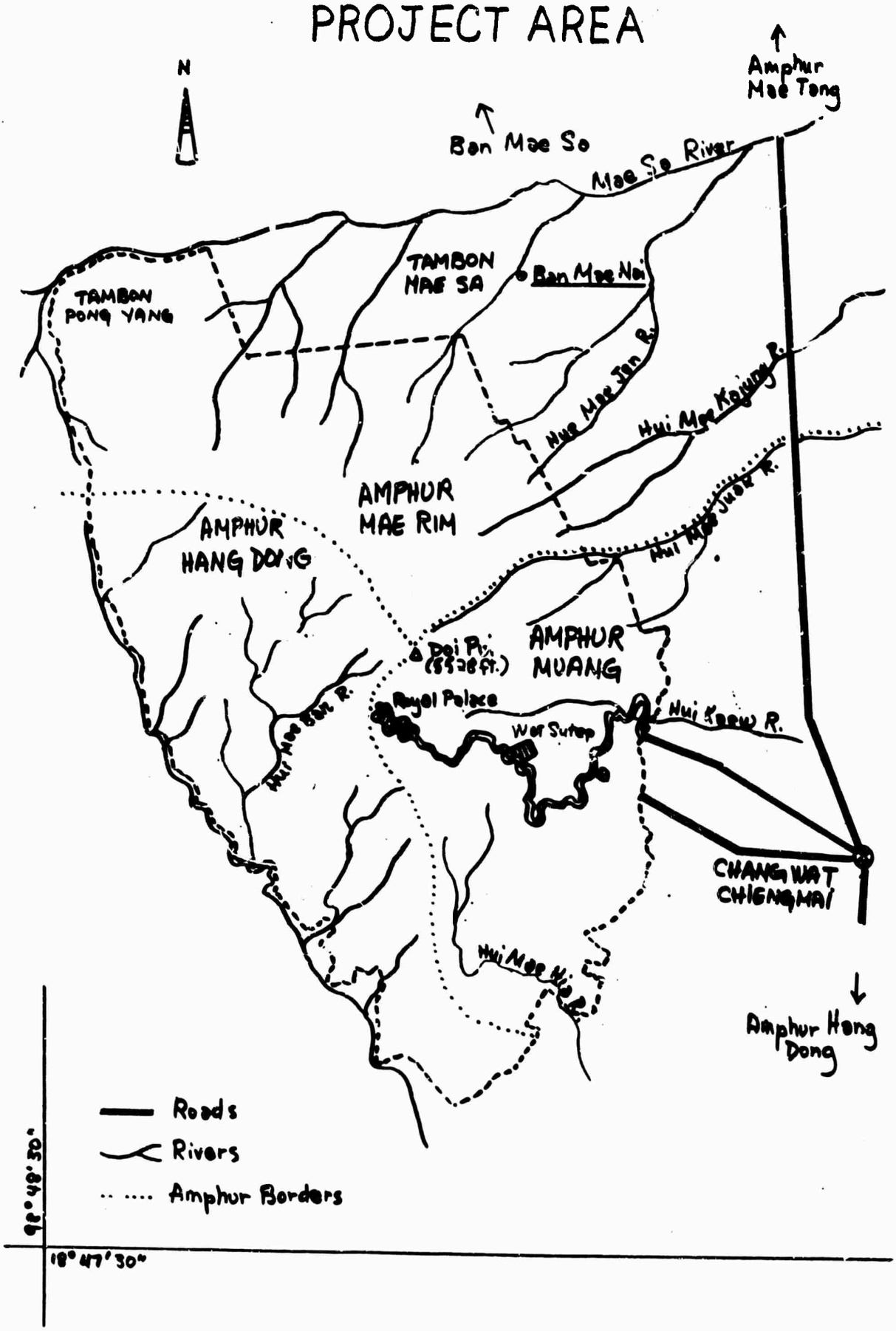

TABLE V

Agricultural and Sacrificial Calendar of Mae Nai

Month	Agricultural Activity	Sacrifices
December	1. Store rice in household 2. Fell trees for new swidden 3. Weed poppy swidden	1. "Da Shon Doo," as promised. 2. "Da Chong Da Hang," as promised. 3. "Naw Maw Lay Chia" or "Da Nia Da See,", when rice is stored in village. 4. Occasional sacrifice to "Tu Seng Tu Chi," Forest Spirit. 5. "Ua Neng," December 7th 6. "Seng Ka," December 12th 7. "Hu Blee," December 12th 8. "Su Ka," New Years Day 9. "Da Nai Da See," on one of the 3 days of New Years.
January	1. Weed poppy swidden 2. Crop poppy buds	
February	1. Crop poppy buds	
March	1. Pull out dead poppy stems 2. Continue to fell trees for new rice swidden 3. Clear swiddens	
April	1. Burn old and new fields 2. Hoe swidden	
May	1. Plant corn 2. Plant squash	1. Promise sacrifices to "Da Te," Field Spirit.
June	1. Plant hill rice 2. Plant peach trees	1. Promise sacrifices to "Da Te," Field Spirit. 2. Promise sacrifices to "Da Shon Doo," Sky Spirit.
July	1. Weed corn swidden 2. Turn soil in corn swidden	
August	1. Weed hill rice swidden 2. Begin to hoe corn fields 3. Plant garlic & peppers, etc. 4. Turn soil in corn swidden	
September	1. Hoe corn/poppy swidden 2. Harvest corn 3. Broadcast poppy & pak kanat 4. Cut grass in rice swidden	1. After corn harvest 1-2 chickens are sacrificed to "Da Te," Field Spirit.
October	1. Harvest hill rice 2. Weed poppy swidden	
November	1. Weed poppy swidden 2. Harvest & thresh hill rice	1. After rice harvest 1-2 chickens are sacrificed to "Da Te." 2. "Ua Te Kai" ceremony. Owner of poppy field promises sacrifice of 1-2 pigs to "Da Shon Doo," Sky Spirit.

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13. ABSTRACT

This is the second Technical Report for the project study of a Meo Community in Thailand constituting a preliminary review of environmental conditions prevailing in two White Meo communities in Changwat Chiengmai. The period of research covers approximately 16 months, from November, 1965 through March, 1967. The report comprises eight sections. The first concerns itself with introductory remarks by various writers on shifting cultivation as practiced by the Meo; the second reviews yields per household in the White Meo communities of Mae Nai and Ban Khao in northern Thailand and describes some ecological considerations of shifting cultivation in those communities. Climatic, edaphic, and biotic environmental distinctions are noted. The later sections deal with site selection, cutting, burning, cropping (harvesting), and fallowing in the local agricultural pattern. Swidden farming follows a locally determined, well-defined pattern. Primary forest land is preferred because of superior soils and the requirements of rice cultivation, even though secondary forests are less difficult to clear. Techniques of cultivation differ from area to area and often from village to village. Swiddens often are planted to a number of crops. Intercropping is primarily in corn-opium swiddens. There is an overlapping of plantings and harvests in many swiddens which lasts until the swidden is fallowed. Intercropping and the succession of crops, especially alternation of wet season cereals and dry season opium and legumes, amounts to crop rotation on a limited scale. Swidden farming requires more labor than permanent wet rice cultivation.

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