

HEALTH SURVEY OF BOUN KHAN JARAI VILLAGE

M.E. Hall
Co D 1st Special Forces



HEALTH SURVEY
OF
BOUN KHAN
A
JARAI VILLAGE

VOLUME I
PHU BON - PROJECT II

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This is Volume I of two volumes presenting data obtained from Phu Bon - Project II. Volume II will contain findings on Nutrition, Rickettsial Diseases, Filariasis and Schistosomiasis.

P R E F A C E

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The reasons for having undertaken Phu Bon - Project II are ones of immediate and long term importance. Of long term importance is considered the knowledge of the existence and prevalence of various diseases throughout Viet Nam. This information has never been systematically investigated. It is this basic data which characterizes the health status of a population; and it is essential in properly estimating the health needs of a country.

Of immediate importance is information on disease patterns amongst the Montagnards of the South Viet Nam highlands who have recently acquired a most important strategic role because of their location. We have had virtually no valid information on diseases amongst the Montagnards. In addition, little is known about the animals of the region that may be vectors and reservoirs of various diseases. It is obvious thus that no adequate measures to prevent illness could be undertaken during the massive tribal translocation program which is presently being carried out. In addition, large numbers of American and Vietnamese troops are presently being committed in these same areas whose disease patterns are unknown. It has not been infrequent that large numbers of these troops have been immobilized and even evacuated by illness that could have been prevented. Since this commitment of troops in the central highlands appears to be one of long duration, additional knowledge on the area's disease patterns is needed.

It was thus decided by the Government of Viet Nam - Department of Health, U.S.C.M. - P.H.S., and the U.S. Army Medical authorities that a program be instituted to obtain valid information of disease prevalence in these areas. Phu Bon - Project II was then set up to obtain some of the information immediately needed and to explore field methodology in developing techniques which can be generally used in other highland areas as part of a nationwide disease prevalence survey.

Unfortunately, it is impossible to list all who participated in the project, one way or another, but we wish here to express our gratitude to these many helpers whose names do not appear in the following pages.

Saigon, VIETNAM
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I N T R O D U C T I O N

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Phu Bon - Project II is presented in three parts.

Part I considers briefly some general concepts concerning Montagnards and, in particular, aspects of the Jarai "way of life". In addition, certain characteristics of the study area Boun Khan are considered.

Part II deals exclusively with methodology.

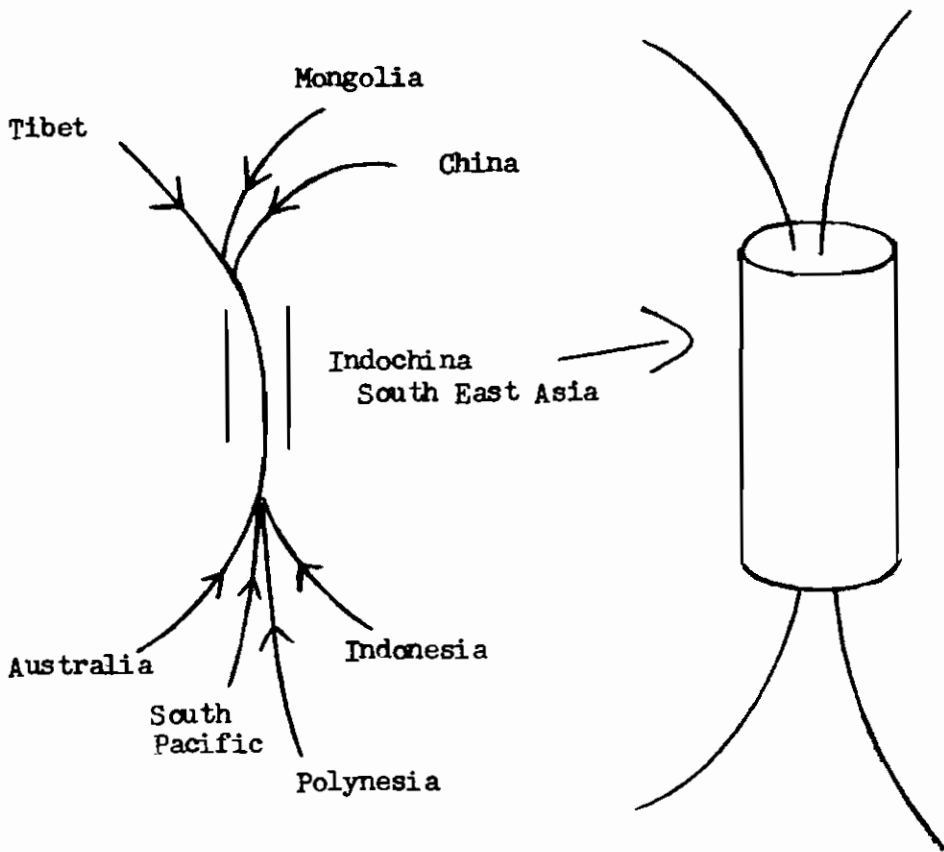
Part III is the presentation of the findings. A minimum of evaluation of these findings is attempted in this presentation.

PART I

Origin of Montagnards.

The anthropological history of the Southeast Asian peninsula is perhaps as ill defined as that of any area in the world today. The "Indochina" peninsula is said to contain from about one million to one and a half million "montagnards". These aboriginal tribes are called "Mois" by the Vietnamese, "Phnongs" by the Cambodians and "Khas" by the Laotians. The French labeled them "Montagnards" because literally they all live in the highland regions of the peninsula. The consensus of the few ethnological studies of the area agree to population drifts and movements from the north and from the south. Disagreement is unanimous though, when attempts to date these movements are put forth.

Population drifts.



Jarai of South Viet Nam

In this account we are concerned chiefly with the group living in what is known as South Viet Nam and numbers about 1 million. The principal tribes of this group are the Rhade or Ede, the Jarai or Djarai, the Bahnar and the Sedang. This investigation primarily deals with a Jarai community in the village of Boun Khan in the province of Phu Bon. The population of the Jarai is estimated to be from 150,000 to 200,000. They are composed of several sub-groups. Jarai Hodrung and Jarai Puans are chiefly in Pleiku and Phu Bon. To the north-west are the Jarai Halang or Arap. In Phu Yen are the Jarai Haroi. Some are located in Kontum as well as Darlac provinces. Their language is of the Malayo-Polynesian group.

Clan

The Jarai do not have a clan system but a matrilineal kinship. The groom is taken into the bride's home, and their children bear the mother's name. Inheritance moves on from mother to daughter.

Semi-nomadic

The Jarai is a semi-nomadic montagnard. He will move his dwelling only when he has exhausted the resources of the land he is living on. This may vary from 3 years to 10 years. Exception to this may occur if a major catastrophe takes place in the village such as a fire, epidemic, murder etc., and more recently as in the case of Boun Khan, because of the Government of Viet Nam's insistence and communist guerrilla harassment.

Animals - domestic

Cattle, water buffaloes, goats and horses are raised chiefly for their meat and are sacrificed during the many ceremonies. Chickens and dogs are always present in the villages and live solely as scavengers on various waste indiscriminately scattered about the village. The cows and buffaloes often belong to the more wealthy of the village. On the other hand, pigs are owned by all and usually are well cared for and fed regularly.

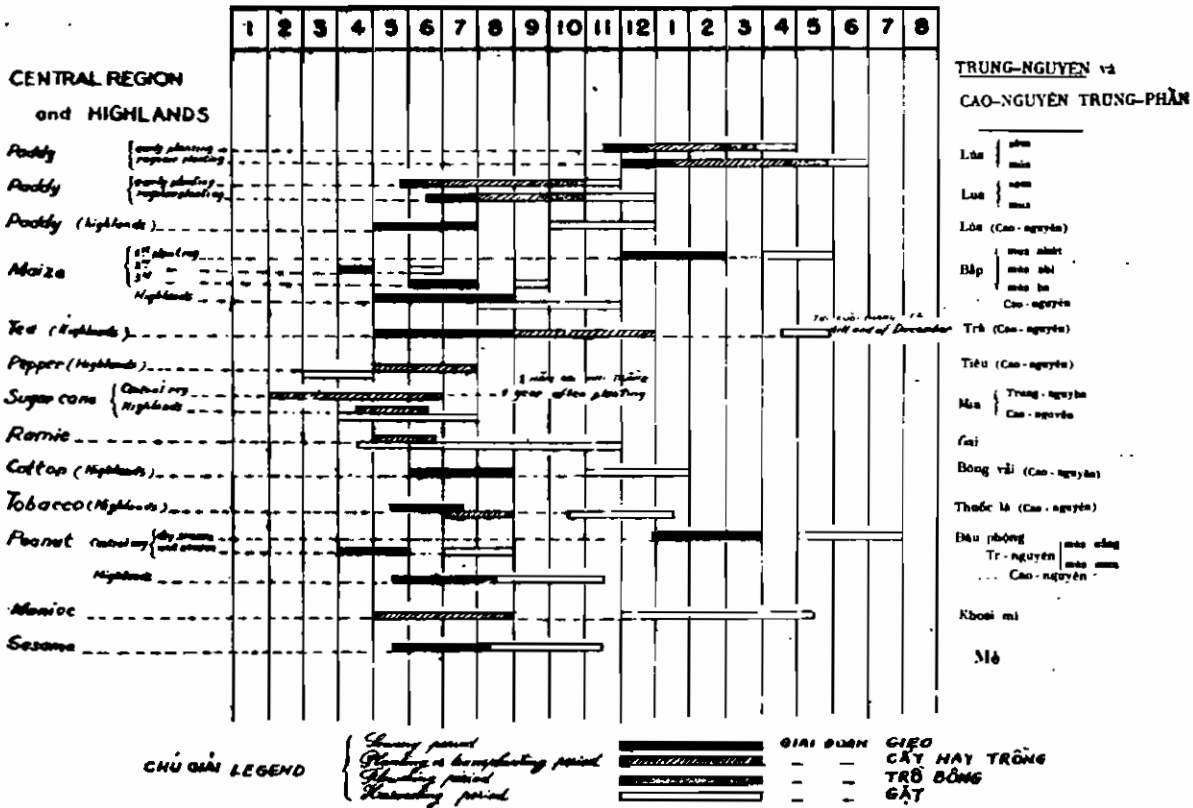
Land and Agriculture

" A Jarai village usually has a specific territory on which its residents can practice agriculture. Each family has its individual fields which are worked in common. Limits of family land are well defined and often fenced". (1)

(1) Michigan State University, Research Report on the High Plateau, June 1957.

AGRICULTURAL CALENDER (1)

MONTHS
Tháng



**(1) DEPARTMENT OF RURAL AFFAIRS, OFFICE OF THE SECRETARY GENERAL,
SERVICE OF AGRICULTURAL ECONOMICS AND STATISTICS**

The predominant method of agriculture is clearly described in a study made by a research group in 1957 and has changed little.(2) This method is called RAI by the French and Shifting-Rai by the Anglo-Saxons. "The area selected for shifting-rai agriculture must be covered with forest or thick growth. Several months before the rains are expected to begin, the trees and brush are cut and allowed to dry. The fields are then burned by a group of Montagnards who guard the fire to see that it doesn't spread to adjacent areas and also to see that all the wood burns. After the rains begin, the fields are raked and planting takes place. This is done with digging sticks and hoes or bamboo tubes to cover the holes. Generally, provisional shelters are constructed on the edge of the field. If the field should be located some distance from the village, the men will remain in this shelter for the duration of the planting and harvesting. In the interim, a group of young men will remain in the shelter to guard the fields. This system permits them to keep their village in the same location while fields can be changed frequently with shifting-rai agriculture, a field can be cultivated for two or three years and then a new area must be cleared. The field is then left fallow from five to ten years while other fields are cleared and cultivated. Usually, a group will cultivate the same set of three or four fields in a continuous cycle. There are apparently magico-religious factors in the selection of new areas to be cleared and cultivated.

In addition to the mountain (dry) rice cultivated in the rai, a number of secondary crops also are grown. Maize may be planted in rows alternating with rice. Manioc, taro, cabbage, eggplant and a variety of other vegetables are also cultivated in the rai. Tobacco usually is planted in small patches set apart from larger fields". A variety of legumes are also planted in gardens around the individual dwelling and in fields very close to the village. Other plants cultivated include peppers, indigo, saffron, potatoes, cotton, bananas, papayas, mangoes and sometimes oranges.

Diet

The basic staples of diet are thus rice and maize with a variation of the above mentioned vegetables. The meats eaten include beef, buffalo, pork, chicken, goat, snake, turtles and rats. Fish is also eaten when available. These meats are usually eaten during one of the many celebrations and are consumed almost raw. Often the entire animal is

just thrown on a fire and steamed in its hide. The entire animal is consumed including the half filled intestines which are highly regarded. As highly regarded, is a preparation of chopped raw meat mixed with blood from a freshly killed animal.

Two meals are taken daily and there is little variation in preparation of these meals. The daily quantity of rice is washed and placed in an earthenware or metal pot filled with water. A second pot of water is placed on the fire along with the first. Into this second pot is placed a variety of vegetables depending on the season but always highly spiced. The meal that follows of rice and a kind of vegetable mixture is eaten with the fingers.

Drinking water is usually obtained daily from streams or springs by the women and is kept in gourds.

Alcohol rice wine is drunk frequently by men, women and children. It is not infrequent to see the complete adult population in a drunken stupor during one of the festive occasions. Tobacco rolled in banana leaves is regularly smoked by adults and children.

Dwellings

Each Jarai extended family has its own dwelling of bamboo walls and floors covered by a thatched roof and is raised on stilts 4 - 5 feet above the ground. The house is usually rectangular with dimensions between 10 - 20 yards by 5 - 10 yards and is oriented on the north-south axis. There is usually one entrance and one exit as well as an entrance and exit platform which serve as porches. The dwelling is usually surrounded by a rudimentary fence which also encloses an individual garden and one or two smaller "paillots" which serve as rice and maize storage bin as well as animal stable or pen.

The interior of the paillot is usually one large room. On one side against the bamboo wall are kept the rice wine jugs which may contain a mixture of rice and yeast in the process of fermentation. Other jugs may contain valuables and clothes. Also along the walls are kept the various utensils and instruments of everyday labor and living. From the roof usually are hung various plants, seeds and meats in the process of being dried.

The cooking is done on one of the usual two cooking squares or hearths found in every paillot. This is a one meter square bamboo box containing about 6 inches of dry clay on which the daily wood fire is built for cooking and warmth.

Sleeping is done on straw mats placed on the floor by the hearths.

Labor

The women do most of the work at home and in the fields. As in the majority of the mountain tribes, the men are found in the village except during field cleaning days and while hunting. During the Winter, after the harvest is in and there is no work in the fields, the women spend most of their time weaving the wild cotton fibers into a characteristic cloth used for clothing - sarong, like skirts and loin-cloths. The men spend much time weaving baskets and making crossbows, arrows and other utensils. The dry winter is also the period when much of the rice wine drinking is done.

Attitudes on Disease

Accidents, whatever they may be, are considered as being caused by the spirits. Evil spirits may be employed by certain sorcerers to cause accidents that may even lead to death.

Illness of various kinds is thought to be brought on by a break in the natural equilibrium of nature. This break is usually brought about by individuals who have violated one or several of the many taboos. The violation of taboos may bring on the wrath of certain spirits on the whole village. For example the rains may be delayed or the stream may go dry etc. In order, therefore, to cure illness or bring on the rain, sacrifices must be made to the appropriate spirit who has been offended and who can restore the natural equilibrium of nature. To do this, the Jarai call in the Divine-spirit man or Pojao Pogai, as they call him, whose function is to identify the offended spirit. Elaborate ceremonies precede the moment when he identifies the spirit. He then advises his client what animal is to be sacrificed and how many jars of wine are to be opened for the ceremony of appeasement. The village sorcerer is then called in to preside over the sacrificed ceremony.

Traditional Remedies

In addition to the sacrificial ceremonies, the Jarai use various preparations of leaves, roots and tubercles.

Dr. Nguyen Khac Hai cites the following. (1)

(1) Nguyen Khac Hai, Etude anthropologique et medico-Sociale des Jarai de Fleiku, 1963.

1) Preparations or Pastes to be applied.

a. Toa moa tlan.

The leaves of this plant are mashed in water and the preparation is applied against wounds caused by metal blades or objects.

b. Teng.

A similar preparation as a. used for furuncles and pustules.

c. Hla Kotak pal.

Juice of the mashed leaves of this plant is placed in the eyes to cure various conjunctivitis.

d. Roka.

Used for various infected wounds.

e. Rua Ko.

Paste is placed against the forehead to cure headaches.

f. Rua Kla.

The leaves of this plant are chewed and then the paste is placed on the abdomen to cure abdominal cramps.

2) Preparations taken by mouth.

a. Akla Kel.

Roots of this plant are boiled in water which is then taken by mouth to give strength by women having given birth.

b. Boh hokek amang ia bu dah phun nhu.

The fruit or leaves are used against chills and fever
(malaria)

c. Akha Kiao hla Kar hang hla ho bo-i nhu.

Roots are used against diarrheas.

d. Hla tokla bu dah akha nhu.

Also used for diarrheas.

e. Hla po-o.

Used for coughing.

3) Liquid extracts.

a. Angin di.

Used for post-partum complication such as fever and hemorrhage.

Religion

The life of the Jarai as that of all Montagnards is ruled by superstition. The various elements of nature are merely manifestation of the various spirits or gods. Among the more revered gods and goddesses are God of the Sky - Yang, Goddess of water - Yang Ea, Goddess of mountains - Yang Cu, God of trees - Yang Koyao, Goddess of rocks - Yang Boh Potao, God of House, etc.

Sacrifices or ceremonies to these gods may be done anytime or anyplace by specially designated individuals or elders. They have no special altars or "holy places". However, certain sacrificial rules for animal sacrifice are always adhered to, that is place and manner in which they are sacrificed.

No important occasion or task in the Jarai's life is undertaken without a sacrifice to one of the spirits or gods.

Some of the more important ceremonies are those for the first rain, the clearing of new forest, the planting of rice, the germination of rice crop, the harvest, the storing of the rice and the most important of all - " la fête d'abandon des tombes ou Ban Bai Thi. " (1)

Birth

Giving birth amongst the Jarai as in the majority of the Montagnards is perhaps for good reason, the most dangerous of natural functions. Each village has one or two elder females who have more or less developed the role of a midwife. Their status is not one of any importance for the greatest faith in a successful delivery is placed on the sacrifices to the spirits undertaken prior to giving birth.

As the first pains of labor appear, one to several of the elder females of the village are called. The woman in labor assumes a sitting position on a low stool and often holds on to a cord suspended from the roof of the hut. One of the assisting women stands behind with her knees against the back of the parturient and massages the uterus with movements from top to bottom. A second woman stands ready to receive the infant. The cord is sectioned by a sharp bamboo blade after it is tied off by a cotton fiber.

Present during the delivery may be the husband and several of his family and friends. When the child is born they immediately prepare certain concoctions from various roots which are given to the parturient for strength and to stop the bleeding.

The normal duties of the housewife are assumed within 4 to 6 days after birth. The newborn is always breast-fed as well as forcefed by mouthfuls of masticated and partially digested rice by the mother.

Spontaneous abortions are considered as a minor illness. Criminal abortions are not rare. Usually they are provoked manually between the 4th and 6th month by brutally massaging the uterus and manually extracting the contents of the uterus from the vagina.

In the past infanticide was practiced with twins, malformed and sometimes children born out of wedlock.

(1) - Nguyen Khac Hai

Bibliography

- (1) - Nguyen Khac Hai, Etude Anthropologique et Medico-Sociale des Jarai de Pleiku, 1963.
- (2) - La religion de Montagnards du Haut-Dong-Nai, Bulletin Société d'Etudes Indochinois (B.S.E.I.), No. 3, 1949, J. Dournes.
- (3) - Curiosités Toponymiques et folkloriques du Sud-Vietnam B.S.E.I., No. 3, 1960, Thai Van Kiem.
- (4) - B.S.E.I., No. 1. 1951, Généralité sur les populations des Montagnards du Sud Indochinois, L. Lieurade.
- (5) - Research Report on the High Plateau, Michigan State University, June 1957.

For additional information, the following bibliography on Montagnards has been prepared.

R.P. Alberty (avec P. Guilleminet): Coutumier de la tribu Bahmar, des Sedang et des Djaray de la province de Kontum, 2 vol.

A. Baudrit: La naissance de Dalat - Revue Indochine, No. 180, du 10-2-1944, p. 23.

Y Bih Mié Blo: Evolution culturelle des P.M.S.I. - Revue Education, No. 16.

B. Bourotte: Essai d'histoire des populations montagnardes du Sud-Indochinois jusqu'à 1945 - Bull. Soc. Etudes Indoch., t. XXX, No. 1, 1er trim., 1955.

Dr. Delbove: Groupes ethniques, impaludation et prémunition dans les régions d'hyperendémicité palustre de l'Indochine méridionale - Rev. de Méd. et d'Hyg. d'O.M., No. 155, du 15-6-1948, p. 110

Dr. Delbove: Le paludisme et les Mois (réponse à un article de M. Raulin) - Bull. Soc. Etudes Indoch., t. XXII, 2^e sem., 1947.

- R.P. Dournes: Structure sociale des Montagnards du Haut-Dong-Nai. Tribu des riziculteurs - Bull. Soc. Etudes Indoch., t. XXIII, No. 2, p. 101.
- R.P. Dournes: Chants antiques de la montagne - Bull. Soc. Etudes Indoch., t. XXIV, Nos. 3-4, p. 9.
- R.P. Dournes: Les Mois du Sud - Revue Education, No. 16 (spécial), juin-juillet-août 1949.
- Dr. E.M. Farinaud: Recherches sur les groupes sanguins dans les P.M.S.I. - Revue Med. d'E.-O., 1939.
- Dr. E.M. Farinaud (avec le Dr. Prost): Recherches sur les modalités de l'impaludation en milieu "moi" et en milieu "annamite" - Bull. Soc. Path. Exot., t. XXXVI, No. 7, du 12-7-1939, p. 762.
- P. Guilleminet: Note sur les amas d'objets à sens religieux dans le haut-pays Moi - Bull. I.I.E.H., t. IV, 1943, p. 369.
- P. Guilleminet: Ebauche d'une classification des Mois au point de vue culturel - Revue Indochine, No. 169, du 25-11-1943, p. 25.
- Dr. B.Y. Jouin: La Mort et la Tombe - Les cérémonies, prières et sacrifices se rapportant à ces très importantes manifestations de la vie des autochtones du Darlac - Travaux et Mémoires de l'Institut d'Ethnologie, Université de Paris, t. LII, 1949.
- Dr. B.Y. Jouin: Les traditions des Rhadés - Notions des Rhadés sur le commencement du Monde - L'arrivée des premiers Mois sur les Hauts-Plateaux indochinois - Leur origine insulaire - Bull. Soc. Etudes Indochinoises, t. XXV, No. 1, 1er trim., 1950, p. 3.
- Dr. B.Y. Jouin: Les Djarays, Les Rhadés - Revue Education, No. 16 (spécial), juin-juillet-août 1949.
- J. Lamarche: Chez les M'dhurs du haut Phu-Yên - Revue Indochine, No. 175, du 6-1-1944, p. 21.
- Lê Quang Kim: Le Pothi Otou ou la cérémonie de l'abandon des tombes chez les Djarays - Revue Indochine, No. 90, du 21-5-1942, p. 8.
- R. Numelin: Les migrations humaines.
- Dr. Yersin: De Nhatrang à Tourane par les plateaux mois - Revue Indochine, No. 137, du 15-4-1943, p. 3, No. 146, du 17-6-1943, p. 1 et No. 150 du 15-7-1943, p. 1.

Demography

As indicated, the demography of the Jarai as for all the Montagnards in South Vietnam is ill known. The following are several of the more complete and accepted population reports which show however important variations.

Population of Montagnards

Chief Tribes, Sub-Groups and Location

<u>Chief Tribes</u>	<u>Sub-Groups</u>	<u>Population</u>	<u>Provinces</u>
JARAI	Jarai Hodrung Puans	155,529	(Phu Bon (Pleiku (Kontum (Phu Yen (Darlac (Binh Dinh
	Halang or Arap	3,069	Kontum
	Harai	<u>6,056</u>	Phu Yen
	Sub total :	164,654	
SEDANG	Sedang	23,930	Kontum
	Ca Giong	7,746	Quang Ngai
	Da Vach	25,000	Quang Ngai
	Keht	29,586	Quang Ngai
	K'Tu	<u>16,800</u>	Thua Thien, Quang Nam
Sub total :	103,062		
BAHNAR	Bahnar	73,601	Binh Dinh, Kontum, Pleiku, Phu Bon
	Bonam	7,497	Binh Dinh
	Cham	<u>2,370</u>	Binh Dinh
	Sub total :	83,468	

<u>Chief Tribes</u>	<u>Sub-Groups</u>	<u>Population</u>	<u>Provinces</u>
RHADE	Rhade	72,127	Khanh Hoa, Phu Yen, Darlac, Quang Duc
	Krung	5,677	Phu Yen, Darlac
	M'dhur	<u>1,929</u>	Darlac, Phu Bon
	Sub total :	79,733	
KOHO	Koho (Sre)	18,989	Lam Dong, Tuyen Duc, Binh Long, Long Khanh
	Kil (Cil)	18,787	Khanh Hoa, Lam Dong, Tuyen Duc
	Churu	8,032	Lam Dong, Tuyen Duc, Binh Tuy
	Lat	1,271	Tuyen Duc
	Maa	<u>23,472</u>	Lam Dong, Quang Duc, Tuyen Duc
Sub total :	70,551		
TEU	Teu	8,214	Thua Thien, Quang Nam
	Toi Oi	15,360	Quang Tri, Thua Thien
	Van Kieu	<u>11,545</u>	Quang Tri
	Sub total :	35,119	
M'NONG	M'nong	14,876	Darlac, Quang Duc
	Nong	17,847	Quang Duc, Phuoc Long
	Sub total :	32,723	
S'TIENG	S'ticng	36,611	Quang Duc, Binh Long, Phuoc Long, Long Khanh
RAGLAI	Raglai	31,899	Khanh Hoa, Ninh Thuan, Binh Thuan, Lam Dong
CHAM	Cham	27,918	Khanh Hoa, Ninh Thuan, Binh Thuan, Binh Tuy
DIE	Die	7,013	Kontum
RONGAO	Rongao	<u>2,933</u>	Kontum
	Grand Total :	675,684	

MONTAGNARD VILLAGES (December 1962)

RHADE	Darlac	
	Khanh Hoa	12
	Phu Yen	5
DJARAI	Pleiku-Phu Bon	55
	Binh Dinh	18
	Kontum	9
BANHAR	Pleiku	33
	Binh Dinh	46
	Phu Yen	4
	Kontum	5
RHES	?	
CHAI	Quang Ngai	36
	Binh Dinh	5
	Ninh Thuan	6
	Binh Thuan	5
	Binh Tuy	2
NUNG	Binh Thuan	11
	Tuyen Duc	
SEDANG	Kontum	44
	Quang Ngai	3
STIENG	Binh Long	36
CALO	?	
CHORU	Long Khanh	4 Chrau
KOHO	Binh Tuy	8
	Khanh Hoa	4
	Lam Dong	3
	Tuyen Duc	7
RAGLAI	Khanh Hoa	22
	Ninh Thuan	7
	Binh Thuan	5
TRAU	Binh Tuy	2
	?	
DIE	Kontum	14
RONGAO	Kontum	9

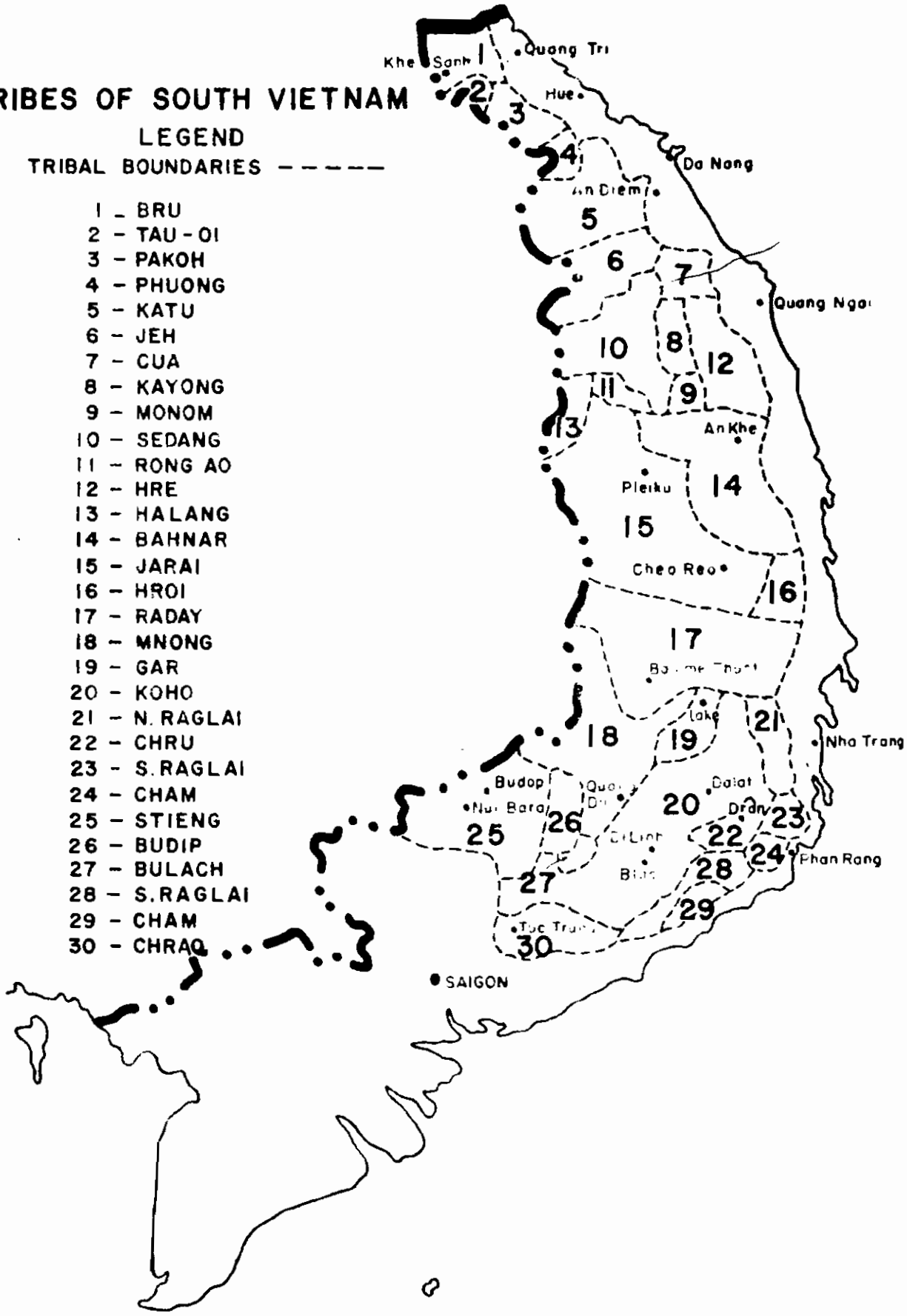
BANAI	?	
CAMBODIAN	?	
KATU (M'Dnur, M'Thur)		
	Quang Nam	82
	Thua Thien	3
MDHUR	Phu Yen	13
	Pleiku	1
H'NGH	Quang Ngai	7
MOA	Long Khanh	
	Tuyen Duc	4
	Quang Duc	2
	Lam Dong	6
HALANG	Kontum	4
M'NONG	Quang Duc	14
	Darlac	?
THO	Tuyen Duc	
	Long Khanh	9
	Binh Thuan	4
MOP	Lam Dong	1
PIEMAR		
RAI		
VAN KIEU	Quang Tri	20
TOI DI	Thua Thien	4
	Quang Tri	3
GO DONG	Quang Ngai	25
HAROI	Phu Yen	12
HALANG	Kontum	4
JO LONG	Kontum	7
BIH	Quang Duc	2
TA LUN	Binh Long	4
CIL	Tuyen Duc	3
LAO KIEU	Quang Tri	1

TRIBES OF SOUTH VIETNAM

LEGEND

TRIBAL BOUNDARIES - - - - -

- 1 - BRU
- 2 - TAU - OI
- 3 - PAKOH
- 4 - PHUONG
- 5 - KATU
- 6 - JEH
- 7 - CUA
- 8 - KAYONG
- 9 - MONOM
- 10 - SEDANG
- 11 - RONG AO
- 12 - HRE
- 13 - HALANG
- 14 - BAHNAR
- 15 - JARAI
- 16 - HROI
- 17 - RADAY
- 18 - MNONG
- 19 - GAR
- 20 - KOHO
- 21 - N. RAGLAI
- 22 - CHRU
- 23 - S. RAGLAI
- 24 - CHAM
- 25 - STIENG
- 26 - BUDIP
- 27 - BULACH
- 28 - S. RAGLAI
- 29 - CHAM
- 30 - CHRAO



Selection of Study Area

Boun Khan - Village in Phu Bon Province

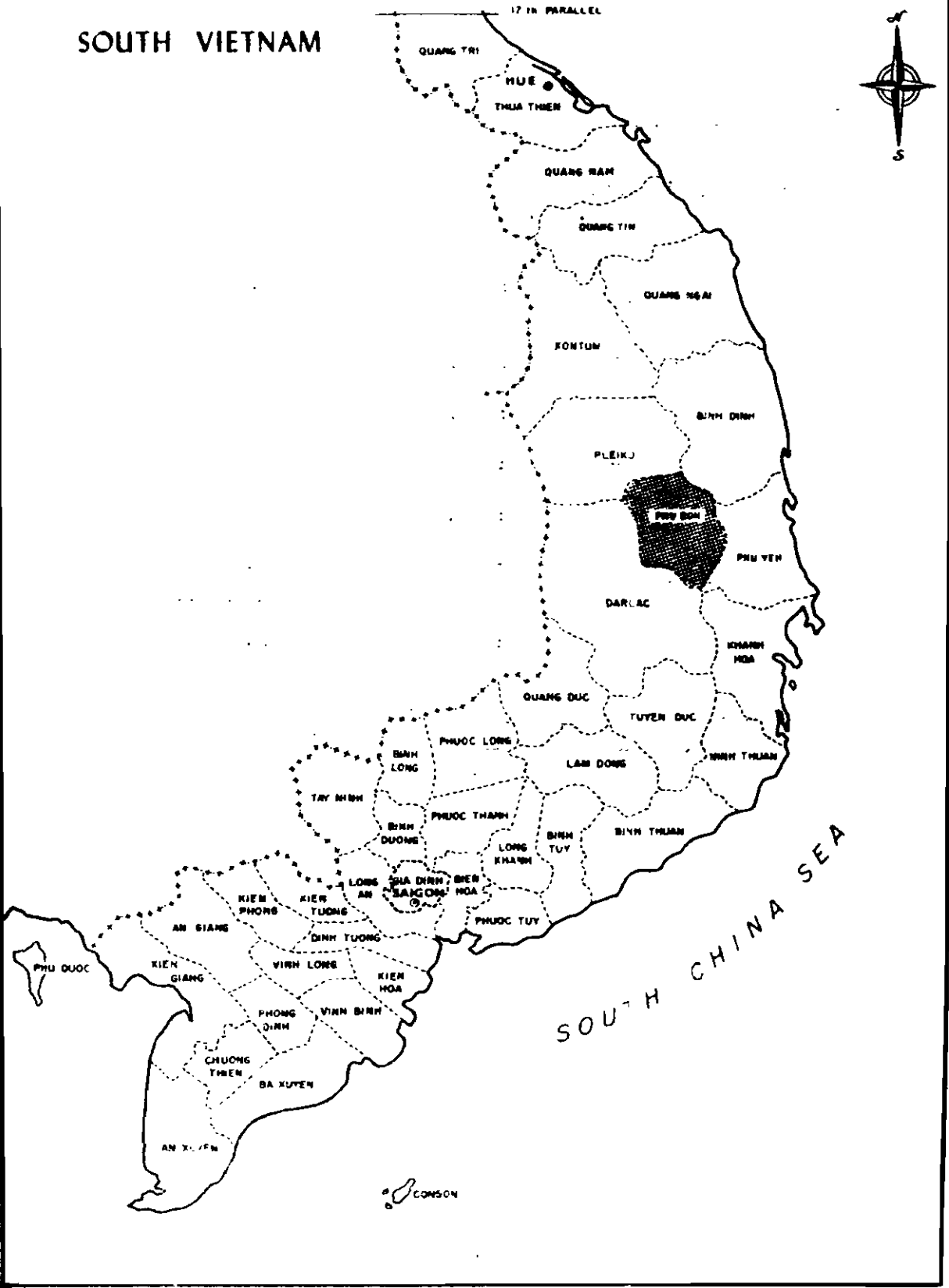
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The village of Boun Khan in the Province of Phu Bon in the central highlands was chosen as the area of the initial investigation because it satisfied a number of conditions. It is in the central highlands of Viet Nam, in an area occupied predominantly by the Jarai tribe which is one of the more important tribes of Viet Nam in terms of numbers and strategic location. It is an area from which a considerable number of American military personnel have been evacuated because of ill diagnosed diseases. It is also in a region where large numbers of French troops were immobilized frequently during the war of 1945-1954 because of "typhus like outbreaks."

Boun Khan is 3 kilometers from Hau Bon (Cheo Reo), the capital city of Phu Bon province which has an airstrip of 600 meters. Because of this, adequate air transport of supplies, equipment and specimens back and forth from Saigon was insured.

Furthermore, means for establishing secure laboratory and housekeeping facilities for team members were assured in the M.A.A.G. Compound of Hau Bon. In addition, the satisfactory working relationship between officials of the American civilian and military agencies, as well as the Government of Viet Nam civilian and military agencies offered the necessary conditions for a successful project.

SOUTH VIETNAM



Population of Phu Bon

Most recent investigations estimate the population of Phu Bon at between 60,000 and 65,000.

<u>Montagnard</u>	:	60,200
Djarai	:	8,500
Trung	:	8,500
M'dhur	:	5,200
Bahnar	:	6,516
<u>Vietnamese</u>	:	4,000
		<hr/>
Total	:	64,200

The province is divided into 3 districts : Phu Thien, Thuan Man and Phu Tuc. Boun Khen village is in Phu Thien district. The population is shown on map of Phu Bon.

Boun Khan is 3 kilometers south of Hau Bon on the edge of the Song Be river. National Route 7 runs through the center of the village square. It is a village of substantial numbers only since 3 years ago, when tribes-men from 4 neighboring villages were moved and resettled into the already existing cluster of huts which were on the present location. These 4 villages were :

B. MULIEN
 B. MULIEP
 B. HOENG (1)
 B. HOENG (3)

It is stated that the reasons for the relocation were Viet-Cong communist harassment and the need for more fertile fields. Officially, 139 families were listed as living in Boun Khan, but the last census taken some months before the survey listed 112 families:

* Official listing :

Families	:	139
Male Adults	:	154
Female Adults	:	323
Children	:	325
(under 14 years)		<hr/>
Total	:	802

* Recent Census :

Families	:	112
Male Adults	:	139
Female Adults	:	229
Children	:	
(under 14 years)	:	264
		<hr/>
Total	:	632

Discrepancies in the above figures are due to several factors : military conscription, movement to new villages, and communist defection have been amongst the more important reasons. A small number of families were absent during the survey because they were living at the site of distant farming fields which needed attention. It was the consensus of opinion that at least 95% of the people actually living in the western side of Boun Khan at the time of the survey were reached. Only the western side of the village was examined. It was felt an adequate sampling (over 50%) would be obtained.

* Survey Census : Total population on western side of road.

Families	:	75
Male Adults	:	81
Female Adults	:	134
Children		
(under 14 yrs):	:	111

Total	:	326
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Cows	:	60
Buffalo	:	100
Pigs	:	60

M.A.A.G.

The U.S. Military Assistance Advisory Group in Phu Bon at this time consisted of 12 officers and enlisted men stationed in Hau Bon in a well enclosed compound.

Climate

The characteristics of climate in the Boun Khan area are shown on table I. It must be pointed out, however, that the central highlands are characterized by variations in climate from one short distance to another-microclimate .

Health Facilities

The health facilities in the area at time of survey consisted of a single building with space for about 10 beds located in Hau Bon. One health technician, one rural midwife, several auxilliary personnel and 2 nurse-sisters were the entire staff.

Soil

The soils of Phu Bon (Cheo Reo) are chiefly podzolic soils and regurs on old alluvial sediments. Information supplied by the Government of Viet Nam - Department of Agriculture states that this unit is found exclusively in the Cheo Reo depression (Pleiku - Phu Bon and Phu Yen provinces). The predominant parent materials are old alluvial sediments of different ages (pliocene and pleistocene). Regurs are observed mainly on the clayey parts of the terrace in slight depressions. The somewhat higher parts of the undulating landscape are characterized by a complex of gray podzolic soils and red and yellow podzolic soils. Minor inclusions are alluvial soils, in the river valleys below the general level of the terrace. The elevation of the depression of Cheo Reo is from 150 to 220 meters above sea level. This depression is entirely surrounded by high basalt plateaus and mountains of the Anamitic range. In addition, regurs or grumsols (block tropical clays), rich in plant nutrients as well as red and yellow podzolic soils are found in Phu Bon.

A characteristic of the soil topography in Phu Bon is its varied nature. One may cross 3 or 4 different types of soil within 1 kilometer

For detailed information on soils the reader is referred to the Government of Viet Nam Department of Agriculture.

EV/kv

REPUBLIC OF VIET-NAM
DEPARTMENT OF PUBLIC WORKS AND COMMUNICATION
DIRECTORATE OF METEOROLOGY

T A B L E I

STATION : H A U - B O N (Cheo-Reo)

Lat. N. : 13°25 Long. E.G. : 108°26 Elevation: 150m

SUMMARY OF WEATHER CONDITIONS IN 1962

month	AIR TEMPERATURE (°C)				H U M I D I T Y (%)			R A I N F A L L (m/m)				S U R F A C E W I N D			
	Average	Difference with average figures	Absolute Maximum	Absolute minimum	Average	Difference with average figures	Absolute minimum	Total	Difference with average figures	Number of days with rain	Difference with average figures	Absolute Maximum rainfall in 24 h.	Main directions	Average speed	Maximum speed
	°C	°C	°C	°C	%	%	%	m/m	m/m			m/m		kmh	kmh
January	21,2	X	31,0	9,6	79,1	X	41	0,0	- 1,7	0	- 1	0,0	E; N	8	19
February	22,1	X	36,1	11,2	77,5	X	31	0,0	- 5,7	0	- 1	0,0	NE; E	8	17
March	25,8	X	37,7	16,8	72,6	X	13	5,0	- 8,0	1	0	5,0	SE	9	17
April	28,1	X	38,3	21,0	72,6	X	25	134,0	+ 62,7	6	+ 2	89,0	SE	12	24
May	28,2	X	37,0	22,6	78,7	X	32	68,0	- 66,0	8	- 1	24,0	W; NE; E	9	24
June	26,7	X	33,0	22,5	83,8	X	47	103,0	+ 1,6	14	+ 5	26,0	N	9	17
July	25,8	X	31,8	22,5	89,7	X	52	174,0	+ 15,5	21	+ 9	26,0	NW; W; N	10	24
August	25,8	X	33,0	22,0	87,4	X	52	141,0	- 35,7	11	- 2	71,0	N; NW	8	18
Sept.	25,1	X	31,0	21,2	91,8	X	57	337,0	+ 104,4	18	+ 2	55,0	NW	9	17
Oct.	24,4	X	31,4	18,0	91,0	X	45	226,0	- 32,2	14	+ 1	46,0	E	8	24
Nov.	24,0	X	33,1	18,0	88,4	X	47	50,0	- 74,9	9	+ 2	18,0	N	7	17
Dec.	21,4	X	31,0	12,0	83,0	X	42	14,0	- 16,1	2	- 2	12,0	N; E; SE	8	19
Year	24,9	X	38,3	9,6	83,0	X	13	1252,0	- 56,1	104	+ 14	89,0	N; E; SE W; NW	9	24

Signs used : = no rain
0,0 = with rain but it is too small and cannot be measured

M E T H O D O L O G Y

-*-

P A R T I I

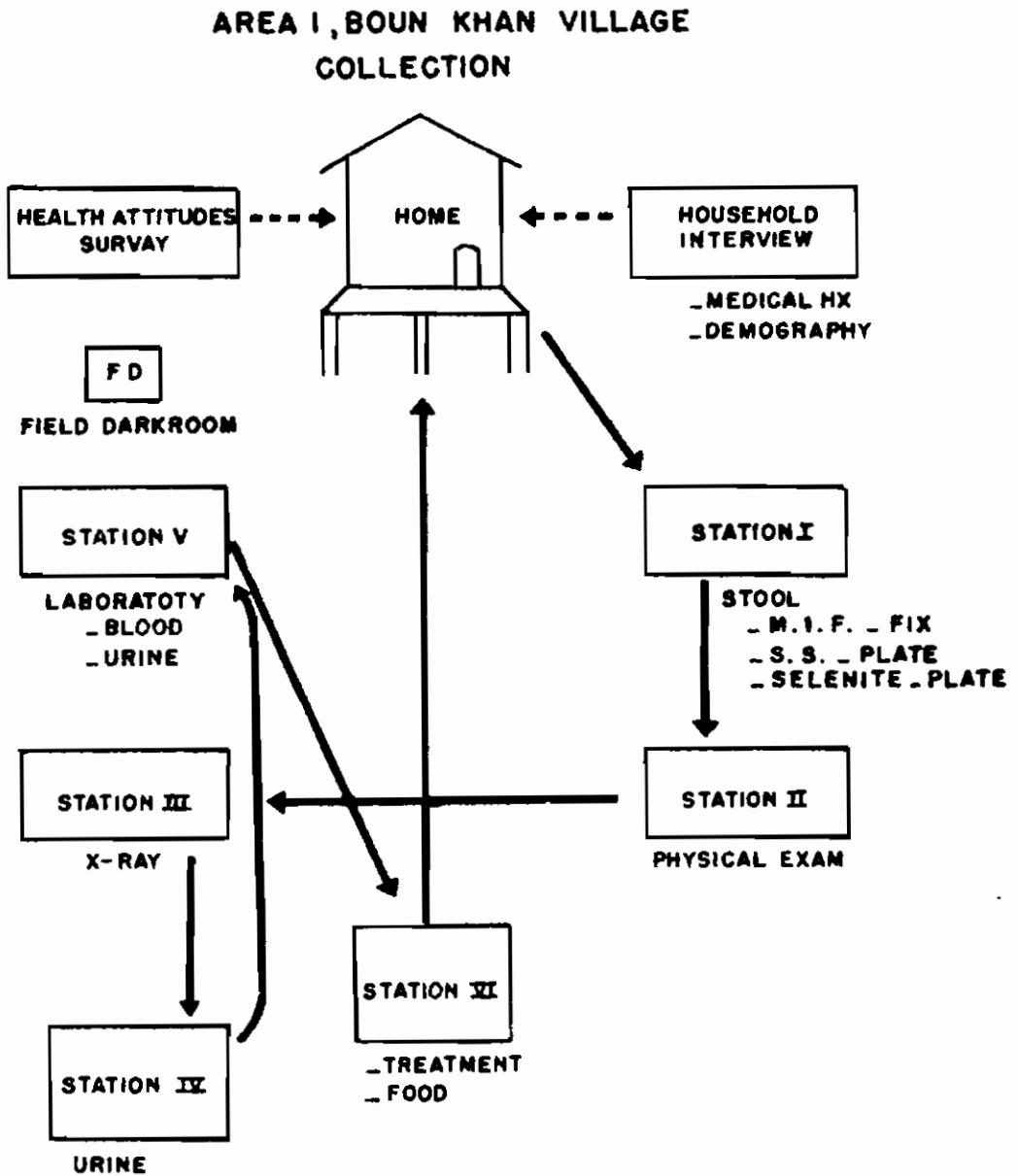


Typical dwellings and individual family plots.

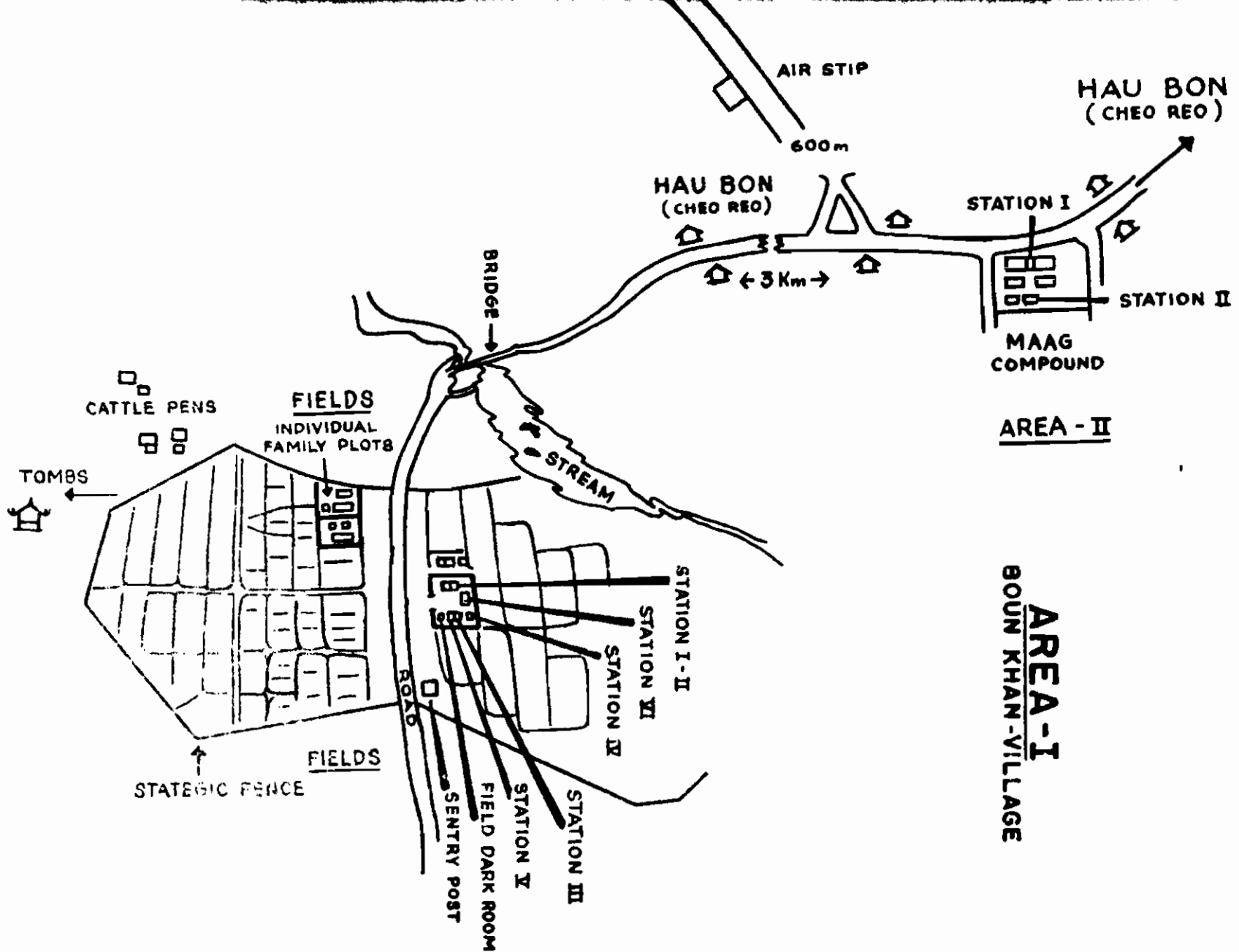
OPERATION PLAN

Schema :

The basic plan for the field operation is briefly described by the following schema.







AREA - I
BOUN KHAN - VILLAGE

AREA - II

HAU BON (CHEO REO)

HAU BON (CHEO REO)

STATION I

STATION II

MAAG COMPOUND

BRIDGE

STREAM

FIELDS

INDIVIDUAL FAMILY PLOTS

CATTLE PENS

TOMBS

STATGIC FENCE

FIELDS

ROAD

SENTRY POST

FIELD DARK ROOM

STATION I

STATION II

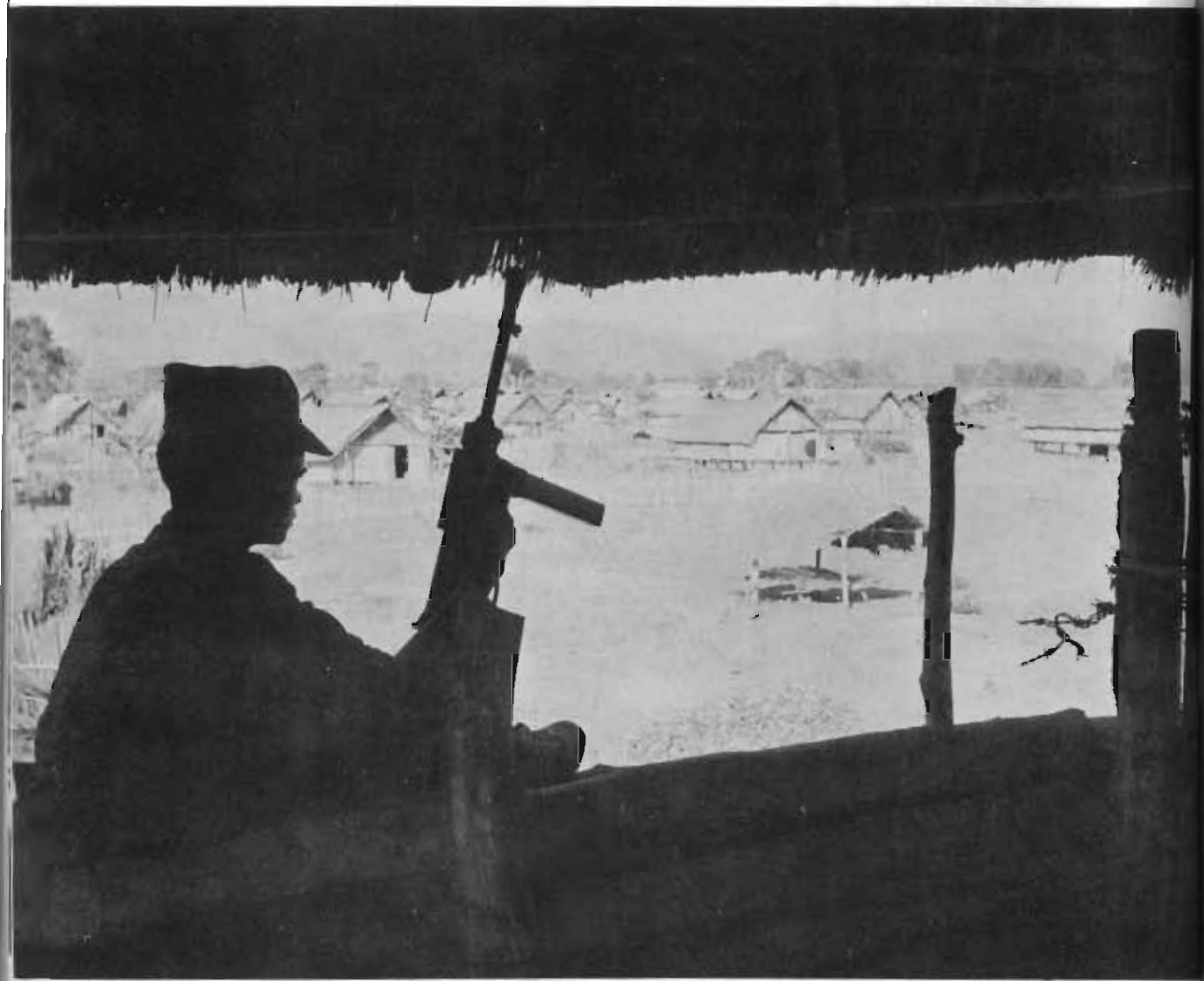
STATION III

STATION I - II

AIR STIP

600m

← 3 Km →



Sentry protecting Boun-Khan village.

AREA II, Hau Bon (Cheo Reo) MAAG Compound

Processing - Laboratories

-:o:-

STATION II

- Storage Refrigeration
- Incubation
- X-Ray developping
- Sterilization
- Preparation-supplies
- Receiving and shipping

STATION I

- Centrifuging-Whole Blood
Serum-Cells
- Hematocrits
- X-Ray reading

A R E A - III, SAIGON

--o:--

Station II

- 1st det. 7th Medical Lab.
U.S. Army Support Group
- Receiving)
 - Distribution) - Specimens

 - Preparation of Supplies

Station I

- USOM/PHD - SAIGON
- Communication and Supply
- Liaison

AREA IV - Diagnostic Laboratories

- 1st Detachment 7th Medical Laboratory
 - Receiving - Distribution of specimens
 - Preparation of supplies
 - Parasitology
 - Hematocrits

- United States Army Medical Research Unit, Kuala Lumpur
 - Leptospirosis
 - Typhus
 - Tsutsugamushi

- SEATO Bangkok
 - ARBOR Virus

- A.G.M.E.
 - Malaria
 - Relapsing Fever (Borrelia)

- National School of Biology
 - Parasitology

- Nutrition Research Laboratory
 - Urine B1 and B2
 - Urine - creatinine
 - Serum - Protein
 - Red cell B2

- Walter Reed Army Institute of Research
 - Filariasis
 - Schistosomiasis
 - Q Fever
 - Tsutsugamushi
 - Leptospirosis

- W.H.O. & U.S.O.M. - SAIGON
 - Tuberculosis

Detailed description of Operation Plan

Every morning (7:30 - 8:00 AM), a previously chosen sample of subjects presented themselves to Station I, Area I with a paper container containing a specimen of their stool. The paper container was given to each subject during the previous afternoon when the daily sample group to be examined was chosen and the household interviews were conducted. At this time, full explanation of the project and proper identification were made. An adhesive tape bracelet was put on each subject with a code number which was to identify all future specimens of that particular subject. A daily sample of 5 to 7 families were chosen giving an average of 25 to 30 subjects to be examined. Also during this afternoon interview, each subject was assigned a booklet in which the medical history was recorded. These booklets were assigned to the corresponding subjects the following day at Station I and accompanied them through the various stations where relevant data was inscribed (see enclosed Subject Booklet).

At Station I, the stool was received and recorded. A portion of the stool was placed in a fixative solution (HIF). From the same stool specimen cultures were made on Shigella Salmonella and Selenite plates. The fixed specimens were sent to Saigon for parasitology, and the plates were incubated and read in Station II, area II.

The subject was then referred to Station II. Weight and height were recorded. Each subject then underwent a brief physical examination (Subject Booklet).

At Station III, an X-Ray of the chest was obtained and the subject was then directed to Station IV (urine) after having been given a urine container.

The urine was then brought to Station V (laboratory) where it was analysed for sugar and albumin. Also at Station V, the following blood specimens were obtained :

- 1 - peripheral blood
 - a) Smear
 - Malaria
 - Berrelia
 - b) Filter paper
 - Filariasis
 - Schistosomiasis
 - c) Hematocrits