

TEXT FLY WITHIN THE
BOOK ONLY

UNIVERSAL
LIBRARY

OU_216023

UNIVERSAL
LIBRARY

OSMANIA UNIVERSITY LIBRARY

Call No.

Accession No.

Author

Title

This book should be returned on or before the date last marked below.

SMITHSONIAN INSTITUTION
INSTITUTE OF SOCIAL ANTHROPOLOGY
PUBLICATION NO. 4

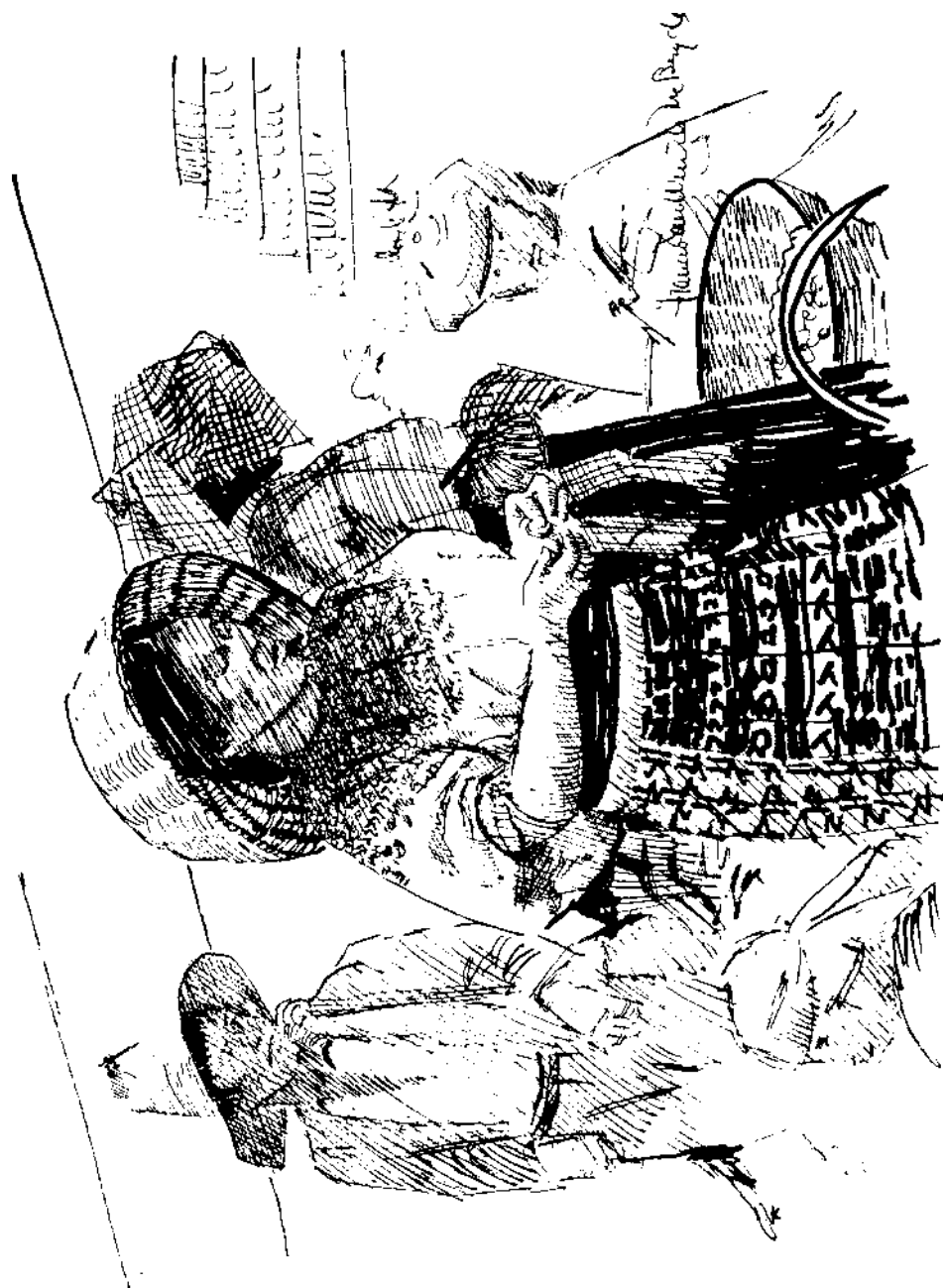
CULTURAL AND HISTORICAL GEOGRAPHY
OF
SOUTHWEST GUATEMALA

by

FELIX WEBSTER McBRYDE

*Prepared in Cooperation with the United States Department of
State as a Project of the Interdepartmental Committee
on Scientific and Cultural Cooperation*





SMITHSONIAN INSTITUTION
INSTITUTE OF SOCIAL ANTHROPOLOGY
PUBLICATION NO. 1

CULTURAL AND HISTORICAL GEOGRAPHY
OF
SOUTHWEST GUATEMALA
by



LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
INSTITUTE OF SOCIAL ANTHROPOLOGY,
Washington 25, D. C., June 21, 1945.

SIR: I have the honor to transmit herewith a manuscript entitled "Cultural and Historical Geography of Southwest Guatemala," by Felix Webster McBryde, and to recommend that it be published as Publication Number 4 of the Institute of Social Anthropology, which has been established by the Smithsonian Institution as an autonomous unit of the Bureau of American Ethnology to carry out cooperative work in social anthropology with the American Republics as part of the program of the Interdepartmental Committee on Scientific and Cultural Cooperation.

Very respectfully yours,

JULIAN H. STEWARD, *Director.*

DR. ALEXANDER WETMORE,
Secretary of the Smithsonian Institution.

CONTENTS

	PAGE		PAGE
Foreword	ix	Houses	41
Preface	xiii	House plans dwellings	41
Introduction	1	Construction	42
Field studies	2	Frames and walls	42
Landscape types	4		44
The Coastal Plain (<i>la costa</i>)	4		44
The piedmont (<i>la boca costa</i>)	5		44
The recent volcanoes	6	Pitch	44
The Cordillera (<i>Los Altos</i>) and Continental Divide	6	Materials	46
Interior valleys: Río Cuilco, Río Negro, and Río Motagua	7	Crests	47
The limestone massif: Los Altos Cuchumatanes	7	Household furnishings	47
Demography	9	Structures other than dwellings	48
Population	9	Indian costumes	48
Ethnographic elements in the modern population	9	Early types	49
Indians	9	Modern costumes	49
Ladinos	12	Men's dress	51
Negroes	13	Women's costumes	54
Population densities and centers	14	Crafts and industries	54
Physical factors affecting population density	14	Pottery	56
Cultural factors affecting population density	15	Basketry	57
Towns and villages	15	Tree calabashes (<i>jicaras</i>)	57
Agriculture and food supply	16	Foodstuffs	60
Maize cultivation: the milpa	16	Lime	60
Highland milpas	17	Metates (grinding stones)	61
Lowland milpas	22	Textiles	61
New World crops other than maize grown in the Highlands	25	Stick-loom weaving	62
Beans	25	Treadle-loom weaving	62
Cucurbits	25	Cotton	63
Manioc	26	Wool	65
Tomatoes	26	Wool dyeing	66
Potatoes	27	Cantel electric cotton mill	67
Old World crops of post-Conquest introduction	27	Palm-leaf raincoats (<i>suyacals</i>)	67
Highland field crops	27	Palm hats	68
Highland fruits	29	Mats	68
Lowland crops	29	Sandals and other leatherwork	68
Money crops	30	Dance regalia	69
Vegetable-garden culture	30	Lumber	69
Solola-Panajachel area	30	Furniture	69
Almolonga	31	Ropes	70
Aguacatan	32	Brooms	70
Plantation culture	33	Soap	70
Cacao	33	Candles	71
Coffee	34	Charcoal	71
Bananas	35	Incense	71
Cinnamon and sesame	36	Commerce and markets	71
Domesticated animals	37	Ancient trade	72
Cattle	37	Local specialization	72
Beasts of burden	37	Mineral and forest products	74
Sheep and goats	38	Agricultural products and associated goods	79
Pigs	38	Fish, reptiles, and wild game	80
Fowls	39	Pottery	80
Undomesticated food animals	39	Textiles	81
Iguanas	39	Coarse fiber goods	81
Caymans	41	Miscellaneous products	81
		Markets	82
		Factors underlying markets	83
		Vendors and the market place	83
		Market days	

	PAGE		PAGE
Commerce and markets—Continued		Appendix 2. Major cultivated plants native to the Americas or early introduced—Continued	
Markets—Continued		Chief crops in Guatemala subsistence agriculture—Continued	
Selling and taxation	83	Squashes, pumpkins, and gourds (family Cucurbitaceae)	136
Fairs and pilgrimages	84	<i>Cucurbita</i> spp.	136
Settlements and settlement patterns	85	American cucurbits not in the genus <i>Cucurbita</i>	137
Size and composition	85	Exotic cucurbits probably of pre-Columbian introduction	138
The Spanish town pattern	86	Chiles (<i>Capsicum</i> spp.)	138
Town names	88	Secondary American starches: tuber and root crops	139
The municipio	88	Miscellaneous native American plants	140
General features	88	Cultivated and semicultivated plants employed in textile crafts	142
Cultural unity of municipios	89	Century plant (maguey, <i>Agave</i> spp.)	142
Santiago Atitlan: municipio boundary changes	91	Tuna ("prickly pear," <i>Nopalea</i> spp. and <i>Opuntia</i> spp.)	142
Land tenure	95	Blue-dye plants	143
Clustered and dispersed settlements	96	Cotton	143
Nucleating factors in settlements around Lake Atitlan	97	Native Highland fruit trees	144
Santiago Atitlan	97	Appendix 3. Useful plants of the Guatemala Pacific region	145
San Lucas, San Pedro, and San Juan	101	Palms	145
North shore villages	102	<i>Cohune</i> (corozo)	145
Ropemaking centers: San Pedro and San Pablo	103	<i>Coco</i>	145
San Marcos	120	<i>Coyol</i>	145
Santa Cruz and Tzununa	121	<i>Pacaya</i>	146
Garden villages	121	Native fruit trees	146
Santa Catarina Palopo	123	Exotic fruit trees	147
San Antonio Palopo	124	Minor fruits (probably indigenous)	147
Granaries of the eastern Lake region	125	Miscellaneous useful plants	147
Environmental basis of settlements away from Lake Atitlan	126	Herbs	147
Quezaltenango-Totonicapan Valley region	126	Swordbean	147
Summary and conclusions	128	Annatto	148
Appendix 1. Summary notes on the physical environment	131	<i>Pakixtc</i>	148
Geologic foundation of the landscape	131	Calabash, or gourd, tree	148
Climate and weather	131	Hedge plants	148
Soil types	132	Plants used for roofing, furniture, etc.	148
Natural vegetation	132	Minor plants	149
Regions of special emphasis in the field work	132	Glossary	150
Appendix 2. Major cultivated plants native to the Americas or early introduced	134	Bibliography	157
Chief crops in Guatemala subsistence agriculture	134	Explanation of plates	161
Maize, or Indian corn	134	Index of place names and geographical regions	181
Beans	134		
Probable origins of <i>Phaseolus</i> species in Guatemala	135		

ILLUSTRATIONS

PLATES

(All plates at end of book)

Frontispiece. A San Andres Xecul Indian soap vendor counting her change in the San Francisco el Alto market. (Sketch by Frances Van Winkle McBryde.)

1. Pacific Littoral, *a*, Dugout canoes at Tahuesco. *b*, Fresh-water well in the high sand barrier beach of Tahuesco. *c*, Washing clothes with well water carried in a gasoline can. *d*, Salt extraction from *playa* deposits at Tahuesco. *e*, Sun-evaporated salt at Puerto San Jose.
2. Pacific Coastal Lowlands and piedmont, *a*, Corozo palm (*Orbig-nya cohune*) forest about 5 miles inland from Tahuesco. *b*, Sewing a *suycal* (corozo palm-leaf raincape) at San Sebastian Retalhuleu. *c*, San Sebastian *suycal*es for sale at Solola by San Sebastian merchant. *d*, San Sebastian girl of 16 years carrying a water jar (*tinaja*). *e*, Anvil top of an intense coastal thunderhead near Mazatenango looking southwest from Highland Panajachel. *f*, General view of San Pedro Cutzan. *g*, San Pedro Cutzan dwellings.
3. Pacific Coastal Lowlands and piedmont, *a*, Cartload of *hoja de sal* (*Catathea*) leaves for thatch, *b*, Thatching a house with *hoja de sal* at San Pablo Jocopilas. *c*, Dwelling at Santo Domingo Suchitepequez. *d*, Clearing weeds for planting milpa at San Bernardino. *e*, Load of Aguacatan (Highland) baskets near Pueblo Nucvo, headed for San Felipe market, *f*, Maiatcango, looking north from railway station.
4. Pacific Coastal Lowlands and piedmont, *a*, Ladino fisherman making a net at Dolores Apulo, on Lake Ilopango, El Salvador. *b*, Men fishing with small hand nets in the Tarro River, San Pedro Cutzan. *c*, Load of Totonicapan tinware near Chicacao carried by an itinerant merchant. *d*, Young cattle from eastern Guatemala sold at Santo Tomas la Union by an Indian of Santiago Atitlan. *e*, Chicacao market scene.
5. Guatemala Lowlands and piedmont, *a*, Market of San Antonio Husita (Department of Huehuetenango). *b*, Atitlan volcano viewed from Finca Modi, elevation about 1,000 m. *c*, Heavy vegetation in the rainy monsoon area of the Pacific versant. *d*, Finca Helvetia, coffee drying in foreground, *e*, Cutting bananas at Finca Santa Adela, just east of Mazatenango. *f*, Indians loading bananas on freight cars for rail shipment to east-coast Puerto Barrios.
6. Lake Atitlan region map and index of costumes worn in Lake municipalities.
7. Costumes of Lake Atitlan region (from water colors by Frances Van Winkle McBryde). *a*, Solola man (Sololatcco). *b*, Solola man wearing coat. *c*, Solola woman (Sololoteca). *d*, Panajachel man (Panajacheleno), new style, *e*, Panajachel man, old style, *f*, Santa Catarina Palopo man (Catarineco). *g*, Santa Catarina Palopo woman (Catarineca). *h*, San Andres Semefebaj woman (Sanandrcsaula). *i*, Sari Pedro la Laguna man (Pedrano). *j*, Santiago Atitlan man (Atiteco) old style. *k*, Santiago Atitlan woman (Atiteca), old style. *l*, Santiago Atitlan man, new style, *m*, Santiago Atitlan woman, new style, *n*, Cerro de Oro woman, *o*, San Antonio Palopo man (Antonero).
8. Indian types in the Lake Atitlan region, *a*, Nahualla woman (Nahaulefia, Xancatal). *b*, Santo Tomas Chichicastenango man (maxefio). *c*, Santo Tomas Chichicastenango woman (Maxefia). *d*, Tecpan woman (Tecpaneca). *e*, San Juan Comalapa woman (Comalapena), in Tecpan market.
9. Stick-loom weaving and spinning, *a*, Panajachel woman weaving: lifting heddle and pushing batten through. *b*, Panajachel woman weaving: packing down weft thread with batten, *c*, San Antonio Palopo woman weaving: lifting heddle and pushing up reeds which maintain warp cross, *d*, San Pedro la Laguna girl spinning white cotton.
10. Solola and vicinity, *a*, Solola seen from steep slope to north, looking due south, *b*, Adobe and thatch Indian dwelling in east central Solola. *c*, Lower course and delta of Quixcap River, flowing into Lake Atitlan. *d*, Looking south along a Solola street, *e*, Cornfield about 4 miles north of Solola; elevation about 2500 m. *f*, Father and son making adobe blocks in the lower part (south) of Solola, looking northwest, *g*, Northwest edge of Solola (Quixcap River valley). March 1932.
11. Indians going to Solola market. Ancient trail to Coucepcion just east of Solola.
12. Indians going to the Solola market, *a*, Adjusting a mulcload of onions at Panajachel. *b*, Selling honey from Antigua at Solola during the Semana de Dolores fair. *c*, Santiago Atitlan men arriving at Solola with Lowland cargoes in carrying frames (*cacastes*). *d*, San Jorge (Solola) man climbing trail to Solola market with a gasoline-box load of pauela. *e*, Load of iguanas from Chicacao passing through Panajachel en route to the Highlands.
13. Animals to market, *a*, Two iguanas, a parrot, and tropical fruit on the trail just below Solola (from a water color by the author), *b*, Solola women in their Friday market with a turkey and two chickens for sale, *c*, Chichicastenango and Quiche (extreme left) men selling young pigs from Chiche at Solola. Inset shows maimer of driving pigs.
14. Solola market and vendors, *a*, Argueta (Totonicapan) pottery vendors, headed for Guatemala City, pause for lunch on the central square, *b*, Santo Tomas Chichicastenango merchants selling miscellaneous "ten-cent-store" items, *c*, Totonicapan man selling maize to a Solola woman, *d*, Argueta woman, left, selling vegetable pears (*giitsquiles*); two Chichicastenango men

- with roast cayman (center) from near Tahuesco and plantains from Mazatenango; San Antonio Palop6 man (right) selling aniseed *e*, Patanatic (Chichicastenango) men selling quicklime, *f*, Local onion vendors, *g*, *hi* front of the hot-lunch booths during the Semana de Dolores fair, 1932.
15. Solola Easter procession. "El Señor de las tres caídas" (image of Christ carrying His cross) moving down east side of central park on hooded men's shoulders.
 16. Patron-saint's day procession at San Jorge, below Solola.
 17. Ceremonial scenes, *a*, Maize-planting mass inside a leaf-covered shelter near San Jose Chacaya. *b*, Close-up of an altar for a planting ceremony, with corn ears dressed as saints, *c*, Solola *chirimia* player and his drummer son during a fiesta, *d*, Solola marimba players at a small modern instrument, *e*, Chichicastenango man playing old-type marimba with gourd sound-boxes. *f*, Ceremonial dance masks at Solola, en route to a *fiesta*. *g*, Conquistador masked dance at San Andres Semetabaj.
 18. Panajachel. *a*, Panajachel River delta and village. *b*, Tzanjuyu (Panajachel) terminal pier and motor launch in 1932. *c*, Former mouth of Panajachel River, flooded by rising lake water, *d*, Tzanjuyu pier in March 1936, when water was about 15 feet higher than in 1932.
 19. Panajachel and vicinity. *a*, Mosaic panorama of Panajachel as seen from a 200-foot cliff at the northern edge of the village, *b*, Indian laborer beside a 3-year-old coffee bush (at his right) and shade trees at Finca Jaibal, west of Panajachel. *c*, Jocote varieties grown at Panajachel. *d*, Zacaulpa Indian youth on his way to work on a Lowland coffee plantation, spinning black wool while waiting for a motor launch, *e*, Large gully, caused by a flood in 1933, just east of the Panajachel delta, below San Andres Semetabaj. *f*, Foot of the gully shown in *c*.
 20. Panajachel vegetable gardens, *a*, Preparing flat plots (*tablones*). *b*, General view of gardens in southwestern Panajachel (upper right in plate 19, *a*), *c*, Panajachel man watering onions, using a pan to throw water from an irrigation ditch, *d*, Panajachel women watering hills (*nwmtones*) of pepinos as in *c*.
 21. Panajachel and vicinity, *a*, Local products, mostly *jocotes*, sold by women in the Panajachel market, *b*, The mountain road from Panajachel to Solola, blocked by a landslide during the rainy season, *c*, Fine Chinaulta water jars (*tinajas*) sold by an Argueta (Totonicapan) merchant, *d*, Typical wattle-and-daub, grass-thatched house in northern Panajachel (on road just off section shown at bottom of plate 19, *a*).
 22. Santa Catarina Palopo. *a*, The village viewed from a slope to the west, *b*, The village from a higher point at a greater distance, *c*, Onion *tablones* at the lakeshore. *d*, Indian men with fishing equipment, *e*, Small fish on bunchgrass stems, sold by Santa Catarina men in the Solola market. *f*, Santa Catarina crabs as they are sold in the market, *g*, The 1935 *intendencia* (Indian political chief) of Santa Catarina with crabbing equipment.
 23. San Antonio Palop6. *a*, General view of the village, looking northwest, *b*, View of the village looking south-
 - west, *c*, Threshing wheat with horses' hoofs just south of Godines, about 500 m. immediately above San Antonio Palopo. *d*, Santiago Atitlan men on a trail near the scene of *c*, headed for the Tecpan market with Lowland fruit
 24. Boats on Lake Atitlan. *a*, Santiago mail canoe about to land at San Pedro, *b*, Disembarking and beaching a Santiago canoe at Panajachel. *c*, Large dug-out from San Pedro landing at Santiago, *d*, Motor launch at Santander pier, Panajachel, loading for a regular trip to San Lucas, *e*, Passengers disembarking from a Santiago canoe at Panajachel. *f*, Same as *d*, to show a line of pottery merchants about to get aboard.
 25. Santiago Atitlan. *a*, Thatching a house, *b*, Arrangements of houses at the southern edge of the village. *c*, Southern portion of the village, from a lava terrace to the east, *d*, Northern portion of the village (overlapping *c*). *e*, Scene of the Santiago market. *f*, Local woman carrying a *tinaja* of water from the Lake to her home.
 26. San Pedro volcano and village, *a*, Summit of the volcano as seen from a Pan American transport plane flying westward over the village of San Juan, *b*, Spinning agave (maguey) strand from raw fiber, *c*, Completing the spinning of three-strand rope at the forked stick, *d*, Scraping flesh from a maguey leaf that has been soaked in water, *e*, Spinning rope.
 27. Santa Cruz and Tzununa (on Lake Atitlan). *a*, Setting of Santa Cruz on a ridge top on the north central Lake shore, *b*, Santa Cruz as viewed from a high slope to the northwest, *c*, Santa Cruz man and woman catching small fish with a trap made of burlap coffee sacks. *d*, Tzununa (Santa Cruz) men seine-fishing, *e*, Santa Cruz (Tzununa) men, with old-style dress (three in center) and new (ends). *f*, Santa Cruz men selling limas in the Chicacao market.
 28. Santo Tomas Chichicastenango. A portion of the market as viewed from the top of the church.
 29. Chichicastenango and vicinity, *a*, The market seen from the pottery section, with the church in the background. *b*, Indian church official ministers to vendors in the market, *c*, Gullying of an overgrazed hillside just west of Chiche; San Pedro Jocopilas pottery, foreground, going to the Chiche market.
 30. Maize, cornfields (*milpas*), and erosion, *a*, Clearing high bunchgrass with a hoe, in the Cuchumatanes Mountains between San Pedro Soloma and Santa Eulalia. *b*, Cornfield and rural dwellings just south of Momostenango. *c*, Digging deep furrows of a cornfield between San Pedro Jocopilas and Sacapulas. *d*, Maize ears from Santa Cruz (Lake Atitlan). *e*, Head of a deep, gullied ravine (*barranca*) by the main road just south of Santa Cruz del Quiché. *f*, Pinnacled erosion features, locally termed "*los riscos*," at Momostenango.
 31. Huehuetenango region, *a*, Todos Santos father (right) and son. *b*, Men of San Juan Atitlan. *c*, Ladino plowing on the outskirts of Huehuetenango. *d*, Close-up of guitar making by Ladino of Huehuetenango. *e*, Church and market at San Juan Atitlan, showing outside cross typical of the Cuchumatanes region. *f*, Todos Santos Indian man plowing while his wife, with baby, leads the oxen, *g*, Todos Santos dwelling, showing "scissors" sticks commonly used here to weight down roof crest.

32. Highland sheep pastures, *a*, Rolling alpine meadows in the summit country, above 3,000 m., about 8 miles, east of Totonicapán. *b*, Meadows at nearly the same elevation 2 or 3 miles farther west, with afternoon clouds closing in. *c*, Sheep in high bunchgrass country at about 3,000 m., a mile or so north of San Juan Atitán. *d*, Field between San Cristobal Totonicapán and San Andrés Xecul, showing a sheep pen which is shifted every few days to fertilize the soil. *e*, Field showing similar sheep pen between Quezaltenango and Cantel.
33. Wool weaving in Momostenango. *a*, Weaver spinning "black" (natural brown) wool. *b*, Weaver and his grandsons carding and spinning white wool. *c*, Spooling black wool thread from a reel. *d*, Spooling thread (right) and setting warping frame (left) from the creel (right). *e*, Three generations of weavers twisting fringe ends of a finished blanket.
34. Wool weaving in Momostenango. *a*, Hot springs by the stream just north of the village, where men, women and children soak and bathe, and men felt blankets (inset: see also *d* and *e*). *b*, Indian family carding, spinning, and weaving. *c*, Dyewoods, mostly from Cobán, sold in the Momostenango market. *d*, Momostenango men felting a blanket by stretching and snapping it. *e*, Treading blankets with bare feet; part of the felting process. *f*, Long rows of vendors of woolen goods in the market as seen from a church tower. *g*, Heavy figured "muneca" (lit., "doll") blanket of the finest type made at Momostenango. (Inset shows close-up figures of deer-mask dancers, important in local religious ceremonies.)
35. San Francisco el Alto. *a*, View from church roof showing a section of the Momostenango market where new blankets are drying in the sun. *b*, Indian worshippers inside the church on market day (Friday). *c*, View from the church roof on market day, showing the main market in the square (left) and the animal market on higher ground (right) behind the municipal building. *d*, Scene in the animal market, overlooking the church and square.
36. San Francisco el Alto market in the central square, as viewed from the roof of the church.
37. San Sebastián Coatán and the weaving of shaggy wool rugs (*peyones*). *a*, Home and surroundings of one of three related families of weavers, above San Sebastián Coatán, at about 2,600 m. elevation in the Cuchumatanes Mountains. *b*, Spinning and weaving beside the house at left in *a*. *c*, Summit (2,800 m.) meadow and forest of pine and cedar shrouded in fog, and five wooden crosses over a wayfarers' shrine (right) between Santa Eulalia and San Sebastián Coatán. *d*, Close-up of weaver twisting weft loops in bunches to be cut later, leaving loose ends 3 to 4 inches long. *e*, Pulling weft thread through the loom.
38. Upper Samalá valley. *a*, Panoramic mosaic of the valley, looking east (left), southeast, and south (right) from a slope immediately above Olintepec (foreground). *b*, Chile vendor in the Quezaltenango market. *c*, Pie de Volcán women in front of the Quezaltenango market enclosure, selling firewood from the slopes of Cerro Quemado and Santa María volcano. *d*, Santa María volcano viewed from the north base, near the settlement of Pie* de Volcán. *e*, Watering place (*pila*) on the central square at San Andrés Xecul. *f*, Panoramic mosaic of San Andrés Xecul from a ridge immediately west of the village.
39. Western Guatemala Highlands. *a*, San Andrés Xecul women selling soap in the Salcája market. *b*, Party of about 30 men thatching a house at San Martín Sacatepequez. *c*, Three men and a woman of San Martín Sacatepequez. *d*, Electric power dam at Santa María, on the Samalá River below Quezaltenango. *e*, Abandoned electric railway track just above Santa María, now used only as a trail by itinerant Indian merchants. *f*, Corozo palm spathes and palm leaves from San Sebastián Retalhuleu sold in Quezaltenango. *g*, San Juan Ixcóy women selling blocks of brown cane sugar (*panela*).
40. Brocading and foot-loom cotton weaving in the Upper Samalá valley. *a*, Ladino weavers at Salcája, arranging strands of jaspe (tie-dyed) yarn with a wooden comb to keep a pattern, for winding on the loom as warp thread. *bj* Indian girl of San Andrés Xecul brocading a wine-colored, figured collar on a white machine-made cotton huipil such as the one she is wearing. *c*, Totonicapán Indian man and his wife weaving bright-colored, figured cotton head bands on special treadle looms. *d*, Transferring a strand of white yarn from a number of spools on a creel, preparatory to tying and dyeing it with indigo. *e*, Strands of cotton jaspe yarn which has been bound with cord at regular intervals so as to form a white pattern on indigo blue.
41. Pottery in western Guatemala. *a*, Common types of pottery for cooking and washing, made in San Cristobal Totonicapán and sold in the local market. *b*, Ladino potter using a wheel at Huehuetenango. *c*, Open-air firing of pottery with twigs and bunchgrass at San Cristobal Totonicapán, while a Totonicapán pottery merchant, having bought a load here (right), prepares to set out for a Lowland plaza. *d*, Three Totonicapán merchants with assorted pottery bought in the San Francisco el Alto market, head for Lowland Mazatenango via Quezaltenango. *e*, San Miguel Ixtahuacán pottery sold in the San Juan Ostuncalco market. *f*, Small, figured ceramic ware from Totonicapán sold in the Chicacao market. *g*, Assorted pottery, bought in the San Francisco el Alto market, sold by merchants in the Mazatenango market.
42. Inland salt, pottery, and other products. *a*, Two loads of San Pedro Jocopilas jars arriving in Santa Cruz del Quiché, brought by San Pedro merchants. *b*, Water jars (*tinajas*) from Chinautla, the finest of this type vessel made in Guatemala, sold by an Argueta merchant in the Santiago Atitlán market. *c*, Chinautla women arriving barefoot with cargoes of water jars carried by tumpline (*mecapal*) from their homes to the Guatemala City market. *d*, Sandals made of discarded automobile tires for sale in the San Salvador market; commonly seen also in Guatemala. *e*, Sacapulas viewed from the northeast, showing broad salt *playa* (light areas left of center) just east of the town. *f*, Sacapulas woman pouring thick brine, leached from *playa* (*e*) dirt, filtered and boiled down, into molds. *g*, Part of a textile woven on a stick loom at Concepción Chiquirichapa (left)

compared with a modern Italian textile piece to show design similarity.

43. Rabinal tree-calabash (*xicara*) industry, *a*, Preparing a pitch pine smudge for soot accumulation in a special stone oven, *b*, Smearing soot on a tree calabash which has been smoothed with an alder leaf and smeared with yellowish wax boiled out of the scale insect *Llavea axm*, *c*, Cutting trceries on a blackened tree calabash by turning it against a sharp carving tool, *d*, Female *Llavea axm* and eggs, enlarged 3 diameters, *e*, Finished *xicara* reduced about 3 diameters. *f*, Calabash tree (*Crescentia alata*) in a dry valley of eastern Guatemala, near San Pedro Pinula.
44. Scenes in the Guatemala Highlands, *a*, Antigua market, in the ruins of a colonial church, *b*, View of the Guatemala Highlands from northwest of Tccpan (foreground), *c*, San Antonio Aguascalientes man near Antigua with a load of rushes for mats, *d*, Antigua and volcanoes Fuego (left) and Acatenango, as seen from an air transport in the northeast, *e*, Oxcart in eastern Guatemala, near the El Salvador border. *f*, Selected ears of maize for seed, hanging up by a dwelling in San Pedro la Laguna.
45. Lake Atitlan shore, northwest sector. (All photographs overlap except *d* and *e*.) *a*, San Pedro (center); looking west, *b*, San Pablo (center) and San Marcos (right); looking west-northwest, *c*, San Pablo (extreme left), San Marcos (left center) and Tzununa (right); looking northwest, *d*, Tzununa (left) and Jaibalito (extreme right), municipio of Santa Cruz; looking northwest, *e*, Santa Cruz (left center); looking northwest. *f*, Solold (right center, middle distance); Rio Quixcap delta and Finca Jaibal (right foreground); San Jorge (extreme right, above Jaibal); looking almost due north. (Photographs courtesy of U. S. Army Air Forces.)
46. Lake Atitlan shore, eastern half, *a*, Rio Quixcap delta and Finca Jaibal (left); Finca San Buenaventura center; Rio Panajachel delta and Panajachel village (right); Solola (upper left); looking north-northwest. *b*, Panajachel (left); Santa Catarina Palopo (extreme right); San Andres Semetabaj (upper right center); looking northeast, *c*, San Antonio Palopo, extreme right; looking east-northeast, *d*, San Lucas Toliman, village and bay; looking almost due south, *e*, San Lucas Toliman (extreme left); coffee groves (left half); Tzanguacal Peninsula (right); Atitlan and Toliman (right) volcanoes in background; looking south-southwest. *f*, Cerro de Oro, parasitic cone (left) on north base of Toliman volcano; looking southeast. (Photographs courtesy of U. S. Army Air Forces.)
47. Southwestern Lake Atitlan, Santiago Bay and village; looking south-southwest. (Photograph courtesy U. S. Army Air Forces.)

FIGURES

	PAGE		PAGE
1. Selected Guatemala climographs (see map 6): 1, Quezaltenango; 2, Panajachel; 3, El Rosario Tumbador; 4, Las Mercedes; 5, Helvetia; 6, Buena Vista; 7, San Sebastian; 8, Santa Cecilia	8	2. Explanation of symbols used in map 14.	40

MAPS

	FACING PAGE		FACING PAGE
1. South Guatemala	xiv	13. Livestock, wild animals for food, and animal by-products of South Guatemala	38
2. South Guatemala, relief shading	2	14. Houses of Southwest Guatemala	40
3. Southwest Guatemala	4	15. Pottery centers and trade of Southwest Guatemala	54
4. Limits of first-hand observation in Southwest Guatemala	6	16. Textile crafts of Southwest Guatemala	62
5. Major geological regions of South Guatemala	8	17. Basketry, matting, cordage, and other coarse fiber products of Southwest Guatemala	68
6. Climatic regions of Southwest Guatemala	10	18. Mineral and forest products of Southwest Guatemala	72
7. Natural vegetation of Southwest Guatemala (generalized)	14	19. Indian markets and trade streams in Southwest Guatemala	84
8. Population density of Southwest Guatemala (generalized)	18	20. Lake Atitlan region	98
9. Agriculture: major producing centers and zones of Southwest Guatemala based on elevation	30	21. Solola and vicinity	100
10. Agriculture: truck-gardening centers and trade of Southwest Guatemala	32	22. Solola market	104
11. Agriculture: cacao-producing region of Southwest Guatemala in the 16th century	34	23. Panajachel	122
12. Agriculture: modern coffee-producing region of Southwest Guatemala and migrant labor		24. Quezaltenango market	124
		25. Santo Tomas Chichicastenango market	128

FOREWORD

By JULIAN H. STEWARD

Director, Institute of Social Anthropology

In its studies of native American communities, the Institute of Social Anthropology not only seeks to present cultural descriptions and analyses that will constitute valuable data for a practical understanding of the peoples, but it strives to contribute to the formulation of the scientific problems involved and to the development of a methodology for their solution. The most important fact about these peoples is that they have always been and are today intensive horticulturists, despite many changes since the Spanish Conquest. Consequently, if their potentialities for future change under the stream of national influences are to be appraised, it is of the utmost importance to understand their agrarian basis of life and the behavior patterns influenced by it.

Anthropology in general has paid very inadequate attention to land use and to the complex of socioeconomic activities revolving around it. An obvious explanation of this is that studies of environments and their exploitation lie beyond an anthropologist's technical skills and require the special knowledge of a cultural geographer. A more fundamental reason, however, is that the problem of environmental conditioning of culture has not been properly formulated and that anthropologists approach it with some trepidation. They tend to think of the problem as one of production and consumption, that is, of economics. But to avoid the suspicion of advocating economic determinism, little effort is made to relate exploitative activities to social structure and social behavior, and cultural determinants are sought in other directions. Another reason for the slight consideration given economic factors is that the concepts are taken from Euro-American civilization. In this culture, technology is so advanced that essential subsistence needs are quite secondary in importance, and man's adaptation to his environment is cushioned by thousands of technical processes and scores of socioeconomic institutions. Economics has become a series of specialized considerations dealing with the

production and consumption of goods, and if any thought is given its limitations on social and political structure it is mainly intuitive or philosophical. In more primitive cultures, every exploitative activity requires the adaptation of many other activities that are not ordinarily thought of as economic. In stating the problem, therefore, the term "human ecology" is preferable to "economics." This term has the advantage of implying that the problem is not one of demonstrating that certain institutions which are economic in the narrow sense directly cause certain social institutions, but that a series of modes of behavior and institutions are connected through various kinds and degrees of interdependency.

The main problem of human ecology is to ascertain the limitations which each set of exploitative activities places on other modes of behavior. To meet its essential wants of food, clothing, housing, and manufactured goods, any society exploits its particular environment by means of its special technology. There are only a limited number of ways in which seeds of different kinds can be gathered, game hunted, or the soil cultivated. Each set of subsistence activities in turn somewhat restricts the manner in which individuals may associate with one another, live together in social groups, and carry on certain group activities. In some cases, the limits of variation in socioeconomic patterns are so narrow that a change in the social structure could be effected only through a revolution in technology. In other cases, considerable latitude is possible, and purely historical factors can be seen to have a definitive role.

Certain very primitive peoples, such as the seed-gathering Paiute and Western Shoshoni, had a society that was predetermined within narrow limits by ecological factors. To survive, these people had to disperse in family units during the greater part of the year. Large and permanent villages were precluded for want of ability to acquire and transport sufficient stores of food to central points where

people could remain together. Life revolved around the individual family, which was only in temporary association with other families, and strong political controls and various sociopolitical features dependent upon prolonged and intimate contacts between persons were lacking. The only variations were in such patterns as shamanism or preferential marriage, the origin of which is therefore a historical problem.

In the case of the more advanced horticultural peoples of America, a recognition of the ecological limitations is fundamental to an understanding of their present patterns and of their potentialities for change. In aboriginal times, the environment was exploited through fairly intensive hand cultivation of farm crops. Surplus production allowed leisure for developed handicrafts in which there was some local specialization. Under the aboriginal type of land utilization, various socioeconomic patterns were logically possible. People might have been scattered in individual families, each owning and living on its own land, as in the modern United States. Actually, however, the rural community became the prevalent pattern, and in many cases it appears that the surrounding lands were communally owned, being assigned annually to families. Despite a great population density, the size of these communities was limited by primitive transportation devices. Towns never exceeded a few thousand, and cities in the modern sense were unknown. Production was predominantly for family consumption, and essential social and religious activities, the precise patterns of which varied widely in each region, were community affairs.

The Spanish Conquest introduced new exploitative devices that greatly widened the latitude of possible ecological patterns. The plough, steel tools, new crops, and domesticated animals increased farm output, while beasts of burden and in some places wheeled vehicles made it possible for larger population centers to develop and for goods to be exchanged over greater distances. Presumably, these new factors permitted several possible social and economic arrangements, the choice of which was determined by historical factors. Where the Indian was left comparatively unmolested, he could and evidently sometimes did continue more or less in the aboriginal patterns, the greater productivity serving mainly to increase his wealth. But in large areas, the hacienda system, an entirely new socioeconomic pattern, was introduced by the conquistadors. Under this system

a single Spaniard came to own a large estate, on which he produced a limited number of cash crops in great quantity for sale on an outside market. He hired Indians, whose lives he strictly regimented, to do the farm labor. Whether or not Indians came under the hacienda system depended above all on whether the crops that were in demand in the national or world market could be grown in and transported from the region in question.

In most areas where the Indian came under the hacienda system, he rapidly lost not only his basic economic patterns but the essential social structure and behavior depending on them. Only residues of native attitudes and fragments of surreptitiously practiced native religion remain. Under haciendas, acculturation was sudden, drastic, and undoubtedly traumatic, and at first it was imposed by force. But there is no reason to assume that ecological changes which slowly infiltrated without compulsive adoption were any the less compelling for being more gradual. Where Indians have had environmental potentialities for surplus production, an accessible market, and opportunity to learn the cash system, acculturation has already taken them far toward assimilation to national culture. Crop specialization and cash sales have led to individual land ownership which in turn has disrupted the aboriginal family structure and community work habits. When the Indian comes to rely predominantly on a cash crop, his ignorance of improved farm techniques, together with his lack of capital for improved equipment, so handicaps him competitively that the process of acculturation commonly terminates in his selling his land and becoming either a farm laborer or a worker in manufactures. Meanwhile, exposure to outside influences gradually eradicates his Indian characteristics.

It appears that in many respects Indian acculturation throughout the area of aboriginal intensive horticulture has been very similar, but it would be hazardous in the present stage of knowledge to generalize too broadly. The particular need is to establish more precisely the limitations on land use in each locality. Then only will the role of historical and personality factors be clear. For Southwest Guatemala, McBryde has clearly set forth the land-use factors which caused widely different acculturational trends in nearby areas. In the Lowlands and lower mountain slopes where sugarcane, bananas, cacao, coffee, and other crops could be grown in abundance for export, the hacienda system was implanted and

FOREWORD

the natives ceased to be "Indians." In the Highlands, which are unsuited to these cash crops and which lack important mines and other resources of interest to Europeans, the Indians have retained a large number of their aboriginal ecological patterns, while their inaccessibility has spared them many acculturating influences. And here, local cultural variation is more or less commensurate with geographical variation from one locality to another.

Clarification of the ecological limitations on cultural variability clears the ground for identification of the precise historical factors that bring about acculturation. When the ecological and historical factors have been identified, it is of value to examine the processes of acculturation in detail, focusing attention on the individual through recording case histories, analyzing personality structure, and revealing attitudes that expedite or inhibit change.

Such analyses are important in two respects. First, individual conflicts and resistance to new patterns of behavior affect the rate of change. Second, psychological orientations determine the direction of change where ecological patterns allow a choice of alternatives. The general trends of acculturation in the New World, however, have had little reference to the Indians' feeling about them. While new ecological adaptations have broadened the range of socioeconomic possibilities, persistent acculturational forces have actually narrowed the choice. Economic, social, and even religious influences have all been fairly compulsive. But so long as the Indian remains agrarian, the primary need is to understand the potentialities of his land-use systems. This means that cultural studies must be made in conjunction with analyses of the type that McBryde so well presents in the present monograph.

PREFACE

The present monograph, based primarily upon a thesis completed at the University of California for the degree of Doctor of Philosophy in geography in 1940, is the result of field research which extended over many years. The work was made possible by the assistance and cooperation of a number of institutions and persons both in the United States and in Guatemala and several other American republics.

Experience in this field began in 1927-28, when I accompanied Mr. Frans Blom on a trip of archeological reconnaissance for Tulane University through the almost uninhabited Maya country of Chiapas, Guatemala, British Honduras, and Yucatan. This expedition was a memorial to John Geddings Gray, of Lake Charles, La., and was financed by the Gray family. In 1932, as a Fellow at Clark University, I took part in the program of Maya research of the Carnegie Institution of Washington, and made an intensive field study of Solola, Guatemala, a major market center in a region of diversified and active native commerce. This work, supported by both Clark University and the Carnegie Institution, projected into the modern period historical studies of Mayan trade which I began the previous year while a Fellow at the University of Colorado. The field notes were prepared for publication at Tulane University during the following year. It is hoped that many of the errors in that preliminary report (McBryde, 1933) are corrected in the present monograph.

From October 1935 to November, 1936, as a Pre-Doctoral Fellow of the Social Science Research Council, I conducted a study of regional economic specializations among the present-day Maya of Guatemala. My wife, Frances Van Winkle McBryde, accompanied me and made water-color sketches of the Indians. I am indebted to the Department of Middle American Research of Tulane University, the United Fruit Company, and the International Railways of Central America for helpful cooperation, and to Captain and Mrs. Richard B. McConnell, of New Orleans, for financial assistance on this trip.

Between 1937 and 1940, on periods of leave from Ohio State University, I supplemented field information with further historical material from the Bancroft Library and from the Sauer Collection of photocopies of Spanish Colonial manuscripts made in Madrid by Dr. Sanford Mosk. The historical and

field data formed the basis of the doctoral dissertation, "Native Economy of Southwest Guatemala, and its Natural Background," *which is deposited in the University of California Library.

The thesis was augmented and revised in the light of material gathered in 1940-1941 in Guatemala, Oaxaca, and Chiapas, when I made field studies primarily of native crops, agriculture and ethnobotany, and collected seeds of economic plants, especially species of *Phaseolus*. This trip was made possible by a National Research Council Fellowship in the Natural Sciences supplemented by a grant from the Graduate Division of Ohio State University, in the form of a graduate assistantship for my wife. Other material assistance and courtesies were accorded by the Institute of International Education in administering a Pan American Airways Travel Fellowship; the United Fruit Company; Tulane University; the Carnegie Institution; the Bureau of Plant Industry of the United States Department of Agriculture; the Botanical Museum of Harvard University; Mrs. R. Maury Sims, of Berkeley, California, who accompanied us into the field; Mr. Robert D. Feild, director of the Art School of Newcomb College; and Mr. Giles Healy, of New York.

During the research periods outlined above, Dr. Carl O. Sauer, Chairman of the Department of Geography, University of California, has been my main source of inspiration and guidance. Mr. Frans Blom, a veteran of jungle archeology and exploration, has also been extremely helpful and encouraging. Others who have taken an active part in furthering my field excursions are Dean Alpheus Smith and Dr. Eugene Van Cleef, of Ohio State University; President Samuel Zemurray, of the United Fruit Company; Dean Robert Redfield, of the University of Chicago; Prof. W. W. Mackie, of the University of California, who experimented with the beans collected in Guatemala; Prof. J. W. Gilmore, University of California; Dr. P. C. Mangelsdorf, curator of the Botanical Museum of Harvard University, who studied my maize collections from Guatemala; and President W. W. Atwood, of Clark University.

In all my field seasons in Guatemala, the members of the Carnegie Institution of Washington have been extremely cooperative and helpful. These in-

PREFACE

eluded, besides Dr. Redfield, Drs. A. V. Kidder, Oliver Ricketson, Sol Tax, and Robert and Ledyard Smith. During 1935-36 we worked in the Lake Atitlan area at the same time as the Taxes and I was able to get the ethnologist's point of view and observe his field methods. The importance of the ethnological approach in cultural geography cannot be overemphasized. All too frequently the geographer is prone to regard the inhabitants of a region as just so many clusters of dots on the map, and to discuss them as he would the plant cover. Dr. Tax lent me several of his preliminary field reports and critically read my manuscript. Dr. Kidder likewise read certain cultural portions of the dissertation. I am grateful for their helpful suggestions.

Dr. Lila M. O'Neale, chairman of the Department of Decorative Art, University of California, and a leading expert on the native textiles of Peru and Guatemala, read the sections of the report dealing with weaving and textiles. She accompanied us on many of our field trips in Guatemala in 1936, when she was making a study for the Carnegie Institution, and provided valuable technical information concerning weaving and related crafts.

During 1940 and 1941, in Huehuetenango and Quezaltenango, we spent several weeks at the same pension with Dr. Paul C. Standley, of the Field Museum of Natural History. Having written standard reference books on the flora of nearly every other Central American country, he was making collections and observations for his work on the plants of Guatemala. Dr. Standley's suggestions both in conversations and in connection with reading the sections of my manuscript dealing with useful plants were most valuable. Mr. B. Y. Morrison, of the United States Department of Agriculture, read the sections concerning crops and agriculture, and I am grateful for his comments and criticisms.

In the preparation of base maps, I found the American Geographical Society Millionth Map, Ciudad Guatemala Sheet, especially useful. In 1937 I made a pantograph enlargement of it on a scale of 1: 500,000, incorporating a few revisions and corrections based on field observations, especially for the Lake Atitlan region, and adding symbols to show the approximate numbers of Ladinos and Indians in each community according to the 1921 census.

For certain items of equipment, including a 1:48,000 scale, essential to my work of mapping Lake Atitlan with a Brunton compass in August

1936, I am indebted to American members of the Guatemala-Honduras Boundary Survey Commission (Comision Tecnica de Demarcacion de la Frontera entre Guatemala y Honduras). These included especially Mr. Sidney H. Birdseye, director, and Mr. David Lindquist, who were mapping the boundary by means of aerial photography.

Señor Don Moists Rivera, of Panajachel, owner of Hotel Tzanjuyu and several fincas and other properties on Lake Atitlan, gave us ample quarters for our own housekeeping in his large coffee plantation house at San Buenaventura, Panajachel. We made our headquarters and operational base here for several months during 1936. He furnished us with a small outboard motorboat in which I was able to traverse nearly every part of the deep and treacherous lake. Without this assistance it would have been impossible for me to make a satisfactory map of the entire area in the short time available. Señor Rivera also provided us with rooms in his rum warehouse at Santiago Atitlan, where we lived for 16 days during September 1936.

Other coffee planters who were especially hospitable and helpful were Mr. and Mrs. Gordon Smith, Finca Moca, the Donald Hodgskins, Finca Pacayal, and Mr. and Mrs. A. H. Buxton, Finca Santa Adela, where we made headquarters for several weeks during our sojourn in the Lowlands in 1936.

In the Indian country of the Highlands, we enjoyed the kind hospitality and friendly cooperation of the late Padre Ildefonso Rossbach, of Chichicastenango, the late Padre Carlos Knittel and his late sister, Maria, of San Francisco al Alto, and Padre Francisco Knittel, of Momostenango.

Through the courtesy of Dr. Rudolph Matas, noted New Orleans surgeon, who wrote letters for us to his good friends in Guatemala City, we had the privilege and pleasure of meeting Drs. Mario J. Wunderlich and J. M. Fiallos and their families. To them we are indebted for many kindnesses; they did much toward making us feel so completely at home in Guatemala.

Other special friends in Guatemala City who went out of their way in our behalf were Mr. Deane Wells, formerly of the United States Consulate, Mrs. Lilly de Jongh Osborne, and Mr. Peter Clark Wilson.

Several Government officials in Guatemala proved to be almost indispensable to the success of our field work. As Director of Roads, General Miguel Ydigoras Fuentes in 1940 gave us information, maps,

PREFACE

and a letter to highway employees, which were of inestimable value to us on a great many occasions. As Jefe Politico of San Marcos in 1935-36, he had performed similar services for us. In 1944 he obtained under difficulties some rare plant material which was essential to certain bean identifications.

Our cordial friend, Seior Don Manuel Tejada Llerena, Director of Customs in Guatemala during the years when we were there, personally arranged for exemptions from duties on our equipment, including our car in 1935.

Sefior Don Delfino Sanchez Latour, of the Foreign Office, facilitated diplomatic negotiations for us on a number of occasions. Dr. Erwin Deger, of the Instituto Quimico-Agricola Nacional, made tests of soil samples for me. Prof. J. Joaquin Pardo, director of the National Archives, assisted in my search for historical sources, and has faithfully provided me with his quarterly Bulletin for many years.

The jefes politicos (governors) of all the departments in which we worked extensively were most cooperative in writing letters to local town and village authorities. This was done in Solola, Totonicapan, Quezaltenango, Huehuetenango, San Marcos, Retalhuleu, Escuintla, and Suchitepequez. Almost without exception the local officials went far beyond the requests in extending courtesies and genuine hospitality as well as routine assistance. Indian guides, informants, interpreters, and carriers helped us on innumerable occasions. Empty schoolrooms or municipal headquarters were furnished us as places to sleep if no other facilities were available, as was often the case when we circled the Cuchumatanes region on muleback in 1940.

It has been upon the friendly attitude of thousands of individual Indians throughout the regions where we worked that the completion of our studies has depended. Their willingness to answer hundreds of apparently nonsensical questions, often with giggling and obvious embarrassment, regarding their farming and crafts and trading activities, even to provid-

ing seeds and samples of their workmanship, has made it possible for us to wander among them at will and obtain almost any information we needed at first hand and with a minimum of distortion.

To my father, Dr. John M. McBryde, Dean of the Graduate School and Professor of English Emeritus of Tulane University, I am indebted for assistance in preparing the manuscript and in reading the proof.

Dr. Julian H. Steward, Director of the Institute of Social Anthropology, made valuable suggestions and editorial criticisms concerning the organization, context, and wording of the monograph. The final phase in the preparation of the manuscript was completed in the Institute.

Parts of this study have been presented as illustrated papers and map exhibits at the annual meetings of the Ohio Academy of Science: geography and botany sections, in 1938, 1939, and 1940, and in 1942 botany, zoology, geography, and anthropology sections. In 1941 my illustrated paper and map exhibit at the New York meeting of the Association of American Geographers was based on material now incorporated in this monograph.

An exhibit of photographs and my wife's water colors of Indian types, arranged around the Lake Atitlan map, was on display at the Golden Gate International Exposition, San Francisco, during 1939 and 1940.

Except for plates 45-47, all photographs, maps, and diagrams in this report were made by the author. Permission to use the aerial photographs in plates 45-47 was granted by the United States Army Air Forces. I am grateful to my wife for her excellent water-color sketches and for assistance with lettering. Miss Edna Kelley, cartographic draftsman in the Topographic Branch, Military Intelligence Service, rendered important aid in the mounting of photographs and the preparation of legends and overlays on several of the maps, especially Nos. 3, 8, and 23.

Cultural and Historical Geography of Southwest Guatemala

By FELIX WEBSTER MCBHYDE

*Geographer, Military Intelligence Service, War Department**

INTRODUCTION

Without risk of being justifiably branded an environmental determinist, a geographer may point out direct and striking relationships between man and his habitat in Southwest Guatemala. In such a mountainous region within the Tropics, to understand the culture it is essential to have a good knowledge of the physical elements, especially those which most strongly affect human activities. High, rugged mountains, some mostly of limestone, others, lava and ash with many volcanic cones; deep sharp-cut gorges; low-lying plains; and lofty but limited plateaus: these contrasted relief regions largely determine the major patterns of drainage, climate, vegetation, and soils. The physical complex is closely reflected in the distribution of population and human activities.

These general facts are evident in a measure even from a casual perusal of maps of the region, and they may be observed in similar settings in other parts of the world. It has been my purpose, in addition to studying cultural manifestations, to attempt an analytical description of the physical landscape, especially in terms of those elements which are critical to the native economy. The economic scene and the material adjustments of man to his milieu

demonstrated and explained in part, at least, by depicting the extent of coincidence of human and natural phenomena.

In view of an almost complete lack of preexisting data detailed enough for the study which I was undertaking, it was necessary from the start to collect almost all information by direct field observation. This meant not only original base maps, plans, and photographs, but also endless "cabbage counting" for which geographers are sometimes mildly ridiculed, and not always without some justification. Only the most general and obvious statements may be made without being accurately qualified, unless the field observer checks his conclusions constantly with counts and measurements. If these are not intelligently synthesized, correlated, and shaped into significant generalizations, they lack geographically even the merits of a good stamp collection.

But any counting and measuring will result in truer pictures than many of those contained in some of our leading reference books on Latin America. It is commonly believed, for example, that the native markets of Central America and Mexico, and elsewhere in Latin America where there are simple cultures, are mainly social gathering places, of little

There is probably no region in the New World that surpasses western Guatemala for illustrating direct relationships between culture and nature. Here is one of the largest concentrations of individualistic Indian populations, preserving much of its Maya background. This important cradle of pre-Columbian American Indian civilization, which is well documented historically and archeologically, is centered in Guatemala and Southern Mexico. A great number of important New World domesticated food plants appear to have originated in this region. The maize-beans-squash complex was probably developed to a high degree by the Maya in the Guatemala-Chiapas Highlands before they expanded northward into Yucatan. There the civilization advanced, a unique example in the Americas of a high culture based on maize in the Lowlands. The explanation lies probably in the long dry season (too dry for manioc) and the lack of streams for irrigation in the Yucatan Peninsula.

With the invasion of the Spaniards in the early 16th century and of European and North American industrial adventurers after the mid- 19th century, new elements of blood and culture were injected, providing an excellent field for the study of acculturation in its historical stages.

In view of the great range of physical and cultural variables which enter the scene, the only adequate

geography is microgeography. In this monograph an attempt is made to describe in some detail the material culture of Southwest Guatemala and to point out the variations and distributions in terms of the physical setting. Food, shelter, and clothing are examined as to their nature, sources of raw materials, methods and places of production, and their movement in trade. Native and exotic agricultural products and crafts are listed and described also with reference to the areas and communities which produce them, and to the smaller groups within the communities. Possible physical reasons for specializations are suggested, and products are traced from producing areas to markets and consumers, by the routes followed and by the transportation means employed. Though ancient traditions are often the only factors which can explain economic localizations (and the almost invariable answer the Indians give to the question, "Why?"), emphasis in the field work was placed upon observable physical factors.¹ With these we may block out environmental limits within which human activities are subject to choice and, once established, are maintained through tradition.

Distributions of population, land tenure, culture areas, and settlement patterns are considered as related to relief, water supply, and other environmental elements, as well as historical background, in an effort to explain the complex and varied cultural landscape.

FIELD STUDIES

For purposes of comparison, to bring out various human relationships in diverse environments, three interrelated areas, each having quite distinct physical and cultural characteristics, were selected, one in each of the so-called "zones," *tierra caliente*, *tierra templada*, and *tierra fria*. These, which are treated in more detail in Appendix 1, are summarized as follows: (1) low Piedmont-Coastal Plain (Patulul to Retalhuleu), (2) intermediate Lake Atitlan Basin, and (3) high Valley of Quezaltenango (San Juan Ostuncalco to Totonicapdn).

Piedmont-Coastal Plain.—The east-west extent of my survey here during the months of February and March, 1936, was approximately 35 miles (56 km.), from Patulul to Retalhuleu. This was extended in 1941 westward to Coatepeque and eastward to Escuintla. Most time and effort were concentrated in the western portion of this section, between Chica-

cao and Retalhuleu, from as low as 200 m. (656 ft.), at Santo Domingo Suchitepequez, to as high as 1,000 m. (3,280 ft.), at Santo Tomas la Union. I traversed the Lowlands by road along the Rio Tulate to Tahuesco, on the shore of the Pacific Ocean, in 1936, and to Puerto San Jose in 1941. In all, 24 towns, settlements, and fincas were visited and studied in more or less detail, including analyses of 12 markets, and a diagram of that of Chicacao. The largest is the market of Mazatenango, having well over 1,000 vendors per week.

This region includes the physical provinces of the Coastal Plain and a portion of the *boca costa*, up to 1,000 m. Geologically and edaphically, it is mostly unconsolidated volcanic material, young eruptives

¹Two ethnologists, Sol Tax and Robert Redfield, have concerned themselves especially with social aspects in their studies of communities in Guatemala, made as a part of the Carnegie Institution program.

and alluvium, the piedmont of the cone chain, with numerous small rapid streams entrenched across it, flowing from north to south. The climate is mainly "tierra caliente": tropical monsoon (short dry period in winter) with annual rainfall between 300 cm. (118 in.) and 425 cm. (165 in.) and a southern margin of savanna (long dry period in winter). Natural vegetation consists of monsoon forest, and deciduous park-savanna at lower levels (map 7).

The most important economic fauna, of no great significance, includes large fish and shrimp in the ocean and lower rivers near the ocean; small fish and large shrimp (genus *Macrobrachium*) in the mountain streams, though not in merchantable quantities; iguanas, in abundance, and caymans, now becoming scarce, in the outer Coastal Plain. The last two named are particularly important Lenten commodities. Iguanas appear in quantity in the markets, alive, only during laying season (December to March, inclusive). I was told at Pueblo Nuevo that deer hunting was a common sport.

There is easy access to all the area by roads and trails.

Lake Atitum Basin.—In all, there are about 23 settlements, villages, and towns, close to the lake. During a total of approximately 6 months (a portion of every month of the year, so as to observe seasonal aspects) on the lake in 1935-36, I visited all but one village. In 1932, I spent nearly 3 months at Solola (McBryde, 1933), and returned many times in 1935-36 and 1940-41. In 1936 and again in 1940, the related outlying centers of Tecpan, Patzum, and Chichicastenango were also visited. Market lists were made for 7 centers and diagrams for 2.

Fourteen villages have been built close to the Lake shore, but high enough to avoid inundation.

The highest degree of microgeographic diversification anywhere in Guatemala is to be found here; it is probably not exceeded elsewhere in the world. Many of the villages may be separated from their neighbors by 2 miles or less, and yet, being isolated by physical barriers such as precipitous headlands, cliff shores, and a dangerous lake surface, they may have distinct economies, dress, and even vocabularies. (See pp. 97-126). At one point on the Lake shore, villages are not even connected by trail; at others, there is only a tortuous path skirting a precipice. High altitude range brings about climatic contrasts, from hot tropical conditions at the lower levels, to cold mountain summits, with vegetation from heavy monsoon forest conditions, as behind San Buena-

ventura, to markedly deciduous, scrubby oak-pine woods and chaparral interspersed with areas of open bunchgrass and meadows. Within an almost vertical 600 m. (1,968 ft.) elevation zone, crops range from sugarcane to wheat and potatoes; fruits, from papayas to peaches.

Add to this the convergence of three linguistic areas, also the recent injection of several small communities from remote regions in different directions, and the picture of complexity is fairly complete. It is in marked contrast to the more populous and homogeneous areas of the Pacific Piedmont and the Quezaltenango Valley.

Valley of Quezaltenango.—Extending east-west about 18 miles, between San Juan Ostuncalco and Totonicapan, the more thickly settled portion of this almost level, open valley ranges in elevation from 2,350 m. (7,710 ft.) at Quezaltenango to 2,500 m. (8,202 ft.) at Totonicapan; I concentrated upon this valley and its surroundings during April and portions of May, July, and August, 1936, going down the canyon of the Samala as far as Santa Maria (1,650 m. or 5,413 ft.) and up on the northern wall as high as San Francisco el Alto (2,600 m. or 8,530 ft.), one of the most elevated Indian villages in the country. During this time I visited San Marcos in the west, and Momostenango and Huehuetenango in the north, the first two having about the same elevation as Quezaltenango, the latter somewhat lower (1,900 m. or 6,234 ft.). Of these, Momostenango is the only one having close commercial connections with the Quezaltenango Valley.

In this Highland region, I studied 25 Indian communities, and analyzed 12 markets, making a diagram of that of Quezaltenango, probably the largest Indian market in the entire Republic, with the possible exception of the capital. There are two others in the valley region that each have over 1,000 vendors a week, namely, those of Totonicapan and San Francisco, the latter meeting but once a week (map 19).

Physically the Quezaltenango Valley region is entirely Quaternary volcanic (Sapper, 1925, p. 2). Forming the northern watershed of the valley is the high Continental Divide range, mainly striking northwest to southeast, with elevations between 2,800 m. (9,186 ft.) and 3,300 m. (10,827 ft.) and belonging to the older period of volcanism. The young cones of Santo Tomas, Zunil, Cerro Quemado, and Santa Maria constitute the south wall. The northern continuation of the first two encloses the valley along the east, near Totonicapan, while in the west it is shut

in largely by the range of the Continental Divide, which swings southward near San Juan Ostuncalco. Thermal springs are fairly numerous. There are at least seven important ones: two near Quezaltenango, two near Momostenango, and three near Totonicapán (which gets its name therefrom). All are utilized for washing clothes and bathing, often for therapeutic purposes. Near Momostenango, hot water is essential in the felting of blankets and woolen cloth, which represent the chief basis of the local economy. One thermal spring below Zunil has the characteristics of a small geyser.

The floor of the open valley is so level as to resemble an old lake bottom, though there are no beach lines, lacustrine deposits, or other apparent evidences to indicate the former existence of a lake here. Stratified pumice beds, though probably wind-laid in places have the appearance of having been sorted and deposited by water. Undoubtedly, thick strata of yellowish to cream-colored ash, ejected from the four adjacent cones, filled up a former canyon which may have been cut to a considerable depth. This pyroclastic material, along with alluvial and colluvial detritus of volcanic origin washed down from the steep slopes, is the chief constituent of the deep and fertile soil of the valley. The tributaries of the Samala River curve and zig-zag through rather narrow entrenchments 10 to 15 m. (33 to 49 ft.)

deep, with a gentle gradient that averages about 150 ft. per mile (about 28 m. per km.). The climate of the only station for which data are available, namely, Quezaltenango, is cool, with light annual rainfall concentrated almost entirely in summer. The rainfall is probably somewhat heavier along the north side of the valley, which is less sheltered from moist south winds. The area, almost treeless (pi. 38, *a* and *f*), is mainly planted to corn, vetch, wheat, potatoes, and beans, though short-grass pasture is considerable, mostly fallow crop land. It is grazed almost entirely by sheep; by systematically shifting their pens, soil fertilization is accomplished. This practice is very widespread in the Highlands (pi. 32, *d* and *c*). Bunchgrass, and pine border the valley higher up along the slopes, the latter being particularly abundant toward Totonicapán.

An examination of map 1 will reveal a network of trails and roads across the Upper Samala Valley, in the region around Quezaltenango. There are many more, almost innumerable footpaths leading out from the numerous centers of population to the rural dwellings and crop lands of this densely settled basin. It is so level and open that intercommunication is free and markedly developed. This is apparently reflected in a far greater cultural uniformity here than in the Lake Atitlán region, where communities are isolated.

LANDSCAPE TYPES

THE COASTAL PLAIN (LA COSTA)

Along the Pacific shore there are high barrier beaches (pi. 1, *b* and *c*) and, especially at the mouths of the numerous rivers, hooks, spits, and sand bars. These enclose inlets and lagoons, of various degrees of brackishness, some of them estuarine—narrow, coastwise embayments, which in Louisiana would be called "bayous." They extend along almost the entire littoral, generally referred to by the natives as "*orillas del mar*" to distinguish it from the greater *costa*, or Pacific Lowland. A number of widely separated Ladino (non-Indian; see p. 12) shore settlements have been established, two of them ports with rail connections; but for the most part they are tiny hamlets clustered on the sand as at Tahuesco, shaded by graceful coco palms. The inhabitants here take full advantage of the quiet, black waters of these lagoons, where canoe navigation is safe (pi. 1, *a*). They live by seine fishing and by evaporating salt from sea water, or "cooking" it from salt-crusted silt (pl. M).

Back from the beach, mainly along the lower river banks and inner margins of the lagoons, areas of massive mangrove swamp alternate with jungles of low-growing fan palms where the ground is drier. Farther inland, groves of magnificent corozo palms (pi. 2, *o*) are scattered through the Coastal Plain, relics of more extensive and luxuriant forests of former times. For the most part, however, the flat alluvial Lowland is covered with rather open vegetation (pi. 3, *a*, *b*, *d*); large, grassy pastures and sporadic cornfields and canebrakes, shaded in patches by tall, spreading trees, the branches of which are draped with the sprays of orchids, bromeliads, and other epiphytes. Large fleet-footed, gray-green and brownish iguanas, like miniature ghosts of prehistoric monsters, may be glimpsed, especially during the dry season, sprinting across the trail on tiptoes, their long tails held well above the ground as they scurry to the safety of giant tree trunks.

Sparseness and a seared aspect of the vegetation are especially apparent during the long dry season

(*verano*, literally, "summer") which lasts from November through April (McBryde, 1942, a and b). With the heavy rains of the wet months, especially along the south slopes of the mountains, the outer Lowlands are flooded. Roads and trails become mires, and transportation is extremely difficult. These conditions account in large measure for the sparse population which has always characterized the region.

The many slightly meandering streams and small rivers that flow across the Coastal Plain are bordered for the most part by heavy gallery forests, where tall trees and dense undergrowth obscure the banks and cast heavy shade.

Since shortly after the Conquest, the Lowland savannas have served as important grazing lands for cattle, introduced by the Spaniards, and large *estancias*, or ranches, still dominate the cultural picture.

For an average width of about 25 or 30 miles (40 to 48 km.), this flat, thinly peopled, park-savanna landscape stretches inland from the seashore, along the entire Pacific coast of Guatemala (map 7). The narrower western section is called *Costa Cuca*; the wider central part, *Costa Grande*; and the narrow eastern Lowlands, *Costa de Guazacapan*. Where visibility is not obscured by low-hanging clouds or broad-leaved trees, there is a striking northern sky line of blue mountains, studded with sharp volcanic cones and cleft by deep canyons.

THE PIEDMONT (LA BOCA COSTA)

As one approaches the mountains, the gradient steepens, and the forest closes in more and more. There are immense trees having wide, buttressed bases and great, spreading branches matted with orchids and ferns, and hung with fine, rubbery lianas and aerial roots. Many of the massive trunks are gripped, Laocoonlike, by heavy twisted vines. Such a foreground as this frames the occasional glimpse of the verdant wall of foothills beyond, dominated by steep-sided, mist-shrouded blue volcanoes. The shaded air is cool and damp, smelling of rich, moldy earth, for plant life is lush. Bright-colored birds of infinite variety dart through the sheltering foliage.

The Pacific versant here is ribbed with narrow ridges that divide innumerable straight, parallel rivulets, swift-flowing, sharply entrenched, often deep, so that in traveling along the piedmont one must be constantly ascending and descending at frequent intervals. This is what made journeying a series of "dangerous crossings" for Fray Alonso Ponce (16th

century priest, the *comisario general*, who traveled through New Spain) and other early voyagers; it is what made railroad building, 300 years later, in places almost a matter of laying trestles end to end, and made maintenance a serious problem.

Through the lower piedmont there are a number of small Indian settlements, some of them, as in ancient times, colonies of Highland aborigines seeking to augment and diversify their agricultural returns (map 11). These settlements are strewn between the line of railroad towns, which are centers of supply for the coffee plantations above and the cattle ranches below. About the villages there are but few small, inferior remnants of the cacao groves that once covered the region, the famous "mines"² of the Lowlands from Soconusco to Salvador.

Higher up are the coffee plantations, or *fincas*, to which economic emphasis has shifted within the past 80 or 90 years. Here the natural forest has been thinned, leaving only enough trees to shade the neat rows of well-cleared coffee bushes. Along many of the rocky stream courses, however, the heavy monsoon forest remains as if in primeval state. Some humid slopes are covered by almost pure stands of giant treeferns (pi. 5, c). Rainfall is exceedingly heavy from April through November, and temperatures are warm all the year (map 6).

Occasionally, a *finca* is adorned, as at Moca, by an artificial lake, bordered with tropical flowers and shrubs (pi. 5, b). The dark water now and again reflects the jerky flight of majestic serpent-necked egrets, startlingly white against the deep green wall of forested slopes and the towering blue cone of Atitlan. On most of the larger plantations, lawns and gardens, graced by treeferns and palms of many sorts, surround the clusters of large buildings which are the homes and administrative offices of the aristocratic planters of the *hacenda*. A short distance away compact rows of little tin-roofed shacks (*ranchos*) house the Indian *mozos*, or laborers, who clear and harvest the coffee.

In certain sections, where secondary cones and foothills rise sharply above the bases of volcanoes, the lower piedmont is quite mountainous (pi. 46, f). As the ascent toward the Highlands progresses, the forested stream courses become deeper and wider, the clear waters tumbling in rapids and cataracts.

* Cacao was the "money" of the Mayas and Aartecs, and certain early chroniclers referred to the groves as "mines." Some of these were owned by Pipil (Mexican) colonists, but most of them belonged to Highland Maya planters. The coast of Soconusco was especially famous for cacao.

THE RECENT VOLCANOES

Abysmal indeed are the canyons where rivers flow between lofty volcanoes, providing narrow lines of communication between Highland and Lowland. The spectacular grandeur of this landscape defies description. Many of the long-dormant cones are wooded to their summits, except for open patches cleared for cornfields (pi. 26, a). * High up, the natural vegetation becomes less luxuriant, with oaks and pines sprinkled over slopes covered with bunchgrass.

Some volcanoes are sharp-edged, grayish, and bare at their summits, the recent ash having not yet been invaded by vegetation. These are only lightly etched with gullies, whereas the older ones are deeply dissected. Quite commonly there are clusters of cones, lined up across the main file. In these groups, invariably the oldest cone is at the northern end and the youngest at the southern. This is best illustrated near Quezaltenango. At the southern edge of town is old, eroded Cerro Quemado; 5 miles (8 km.) to the south is high, conical Santa Maria, which erupted violently in 1902; an equal distance still farther south is the new volcano "Santiaguito" which began to grow after the lateral explosion of Santa Maria (pi. 38, d). Similarly Atitlan, a high, sharp cone with fumaroles, is south of older, rounded Toliman, in a single cluster (pis. 23, b and c; 24, c); and Fuego, with a consistent history of frequent eruptions since prehistoric times, is immediately south of Acatenango, which has no such record of activity, though the two form one great double cone (pi. 44, d).

So straight is the row of peaks, ranged along the inner margin of the Coastal Plain, that from the top of one near the center the others appear to be bunched on opposite horizons, northwest and southeast. Ordinarily it is only in the early morning, however, that they stand out sharp and clear; for the rising sun often ushers in a sea of clouds that soon envelops the summits. During the rainy months they may be thus obscured for days at a time. And when the *roza*, or burning, is in progress, before the corn is planted, the air is filled with an almost impenetrable blue haze. This is especially noticeable during April.

THE CORDILLERA (LOS ALTOS) AND CONTINENTAL DIVIDE

The term "Los Altos" is popularly applied to the lofty Cordillera, the Continental Divide range, along

the seaward slope of which the file of recent cones has developed, in many instances to the same height as the older range, or even slightly higher, and in a line that parallels its axis. Today, as apparently was the case in late pre-Columbian times, this is the most populous homeland of the Central American Indians. The high basins that have been formed between these ranges offer almost ideal conditions for human settlement, with cool climates the year around, volcanic ash of enormous depth, which weathers to excellent soils, and abundance of streams, fed by heavy rains from May through October.

The asymmetry of the physical landscape in this zone reflects the geologic contrast (map 5): to the north, gently rounded mountains of older volcanic structure, with occasional subdued peaks and flat-topped remnants; to the south, sharp cones, geologically recent, with great canyons between them, through which, on a clear morning, the broad expanse of Lowland verdure may be seen stretching hazily, flecked with occasional lagoons, to the faintly^s gleaming band of the Pacific Ocean on the distant horizon (pi. 47).

Oak and pine woods are scattered through the Highlands, remnants of forests once far more extensive, which have fallen before the axes and fires of shifting native planters. Cornfields and grassy and bushy clearings that have periodically yielded crops in the past, cover great areas, even on steep slopes that were once heavily wooded. Coarse, sedge-like tufts of giant bunchgrass share with pines the upper elevation zones, while rolling, misty summits among the highest mountains are crowned with cypress groves (pi. 32). In this lofty land are flowered meadows, always damp and green, where shepherds find a winter haven for their flocks of black sheep, far above the seared pastures of the lower country. On the summits, when the afternoon clouds have swirled in from below, one has the sensation of being on an island floating in vaporous space. Sometimes, when the fog is especially heavy, there is the impression of being under water, and the feathery branches of cypress and pine loom like giant seaweeds.

Except for limited plateau areas, and the open, level basin around Quezaltenango, the Highlands may be characterized as a land of *barranca* (ravine or gorge) landscapes in dissected mountains. The immensely deep canyons are often so sharp and abrupt that the unwary traveler is likely to come upon them most unexpectedly. The white buildings

of a village, gleaming in the bright sunlight beyond the pines, may appear to be only a mile or two away, seemingly just ahead through the clear, cool air, as on a level, unbroken plain. Yet, another hundred yards will reveal that the nearer trees stand upon the brink of a narrow abyss, where the ubiquitous *sopilotes*, or vultures, soar and wheel gracefully far below, as they ride the turbulent air currents of the gorge. The trail will lead down, down, zig-zag through the whistling pines, to a little stony rivulet that tumbles noisily over the rocks; then, toilingly up on the other precipitous side. The lonely, metallic, down-the-scale notes of the *guarda barranca* are generally heard again and again through such a gorge; in fact, it is difficult to recall the impressions of a *barranca* without them. These birds are such an immemorial element of the canyons that the pre-Spanish Cakchiquels mention them (*chahalcivdn*) in their history (Brinton, 1885, p. 77). And the stocky Indians that slip noiselessly by on the trail, often laden with a bulky load of some sort, are equally a part of the scene. A high-pitched, courteous "*Adio-o-s pue-e-s, Senor,*" drawled between labored breaths, is the usual greeting, as a load of pottery or chairs, larger than the little merchant beneath it, moves slowly but steadily up the tortuous trail. There may not be even a glance from the passing Indian; or he may merely move his eyes as he speaks, for the weight of the burden is brought to bear upon his forehead by the broad *mecapal*, or tumpline, stretched across it.

Distances are increased by these canyons, not only in the numbers of miles, but also in the difficulty with which they are traversed. After centuries of life in this habitat, however, the Indians have become accustomed to arduous travel on foot; relief obstacles are overcome to a remarkable degree, for the mountain trails are well traveled. On market days great crowds of Indians toil up the steepest of slopes (pi. 12, d).

Distinctive towns and villages, and populous countryside with extensive clearings and well-kept fields are characteristic of much of the cultural landscape throughout the Highlands.

INTERIOR VALLEYS: RIO CUILCO, RIO NEGRO, AND RIO MOTAGUA

The interior valley country, which is drained by rivers flowing nearly east and west, is largely out-

side of the volcanic provinces. From the canyons, and even the piny ridges between, no eruptive cones are visible. The ash-covered area extends only to the southern margin of the Cuilco and Negro systems, and *barrancas*, though impressively deep, are not so sharply incised, nor do they often have the nearly vertical walls seen farther south (pi. 42, e). The major east-west valleys are structural, having been formed by the same ancient folding which uplifted the adjacent mountains.

With highlands to the north and south to intercept the moisture of marine winds from both the Atlantic and the Pacific, little rain falls in the inner valleys, and nearly all of it comes between May and October, inclusive. In the bottom of the deeper arroyos, dryness is reflected in the plant life, with acacias, mimosas, and cactus forms prevailing (map 7).

THE LIMESTONE MASSIF: LOS ALTOS CUCHUMATANES

An immense fault block that rises over 1,000 m. (3,280 ft.) above the trough of the Cuilco and Negro drainage basins, with a great escarpment forming the steep southern face, the Altos Cuchumatanes is the most elevated mountain region of its area in Central America. It is essentially a massif of dolomites and limestones, in sharp contact with granite, presenting an extraordinarily rugged, deeply dissected surface.

Above the thorny chaparral and cactus of the warm, dry canyon of the Rio Negro, the higher reaches of the mountains are covered with pines and coarse grass. Still higher, the smooth, undulating summit area of the Cuchumatanes, foggy, cool and moist the year round, is covered with scattered junipers, pines, and cypress, and with rolling meadows. The landscape is in many places like that of the highest points in the Cordillera, and it is even more important for sheep grazing. Flocks are driven here from long distances, and wool is abundant enough to support the many weaving centers throughout the area. There are certain cultural characteristics of the Cuchumatanes region that resemble the Las Gasas region of Chiapas (Mexico) and that distinguish it somewhat from the rest of Guatemala.

The high south wall of the Cuchumatanes marks the northern limit of the region that falls within the scope of the present study, and is considered as the northern boundary of Southwest Guatemala (map 3).

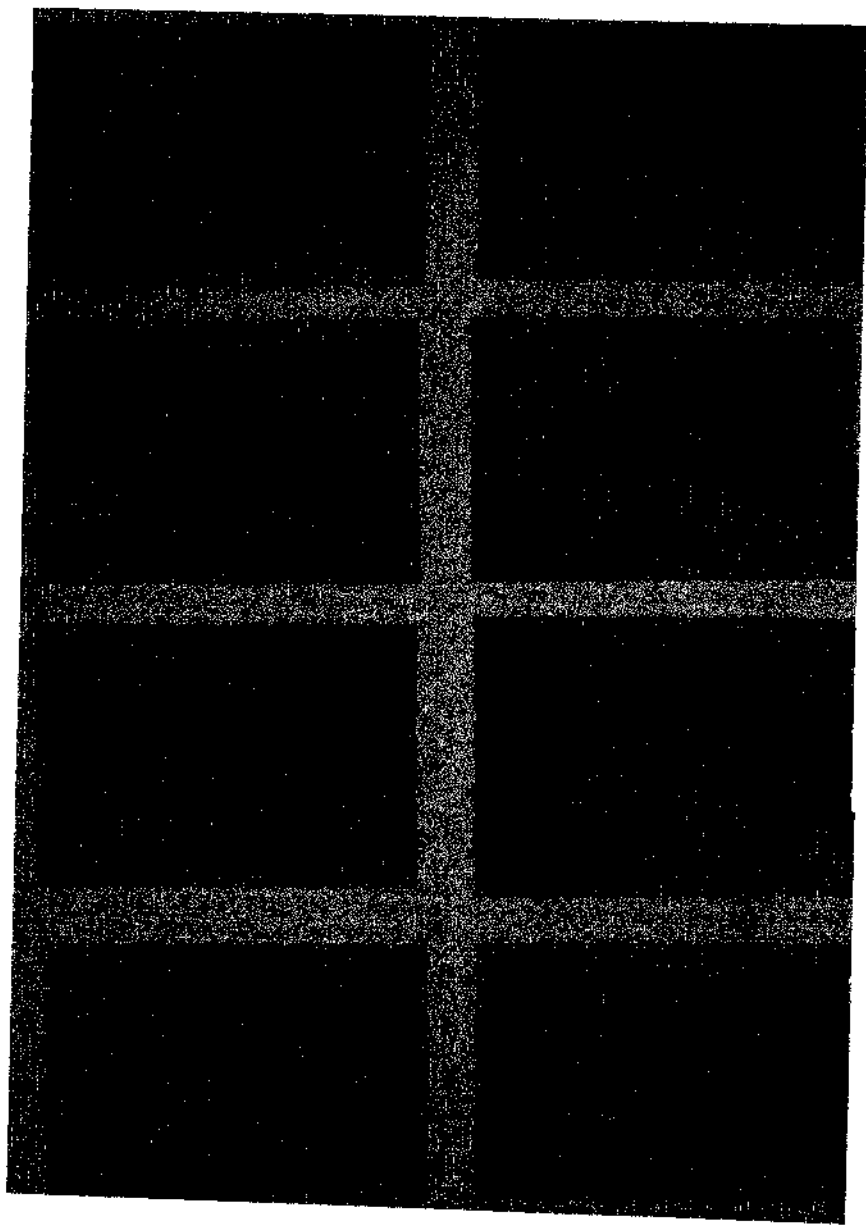


FIGURE 1.—Selected Guatemala climographs (see map 6): 1, Quezaltenango; 2, Panajachel; 3, El Rosario Tombador; 4, Las Mercedes; 5, Helvetia; 6, Buena Vista; 7, San Sebastián; 8, Santa Cecilia.

DEMOGRAPHY

POPULATION

An estimated (1936) 2,450,000³ inhabitants of Guatemala, some 60 percent of them Indians, and most of the rest Ladinos (middle and lower-class native-born inhabitants of white, mixed, or even Indian blood, but culturally Spanish),⁴ live in an area of about 108,000 sq. km. (about 43,000 sq. miles). The percentage of Indians varies widely, from approximately 14 percent in coastal Amatitlán to 97 percent in highland Totonicapán.

ETHNOGRAPHIC ELEMENTS IN THE MODERN POPULATION INDIANS

The Indians of Southwest Guatemala are short (men about 5 ft. or 152.4 cm., women 4 ft. 8 in. or 142.3 cm.), slight of bone, of medium musculature, and for the most part, dark reddish brown in color. Marked prognathism, large mouths with thick lips, and poor teeth are common facial characteristics, as are Mongoloid eyes; hair is black, straight, and lustrous, and baldness is rare. Variations in skin color are numerous, the dark shade of the Xank'ab'ales (Nahuala-Santa Catarina Ixtahuacán) suggesting an admixture of Negro blood; Santa Cruz la Laguna natives also appear quite dark; while Pedernales are noted for their lighter skin color and relatively handsome appearance. Various legends tell of a band of white settlers, pirates according to one common version, who came in and intermarried in a very early date. Physical traits are often found to characterize entire municipios or larger groups wherein relationships are close. Medel wrote that Indians of the Tropics were darker than those of extratropical regions, who appeared but little different from the Spaniards (Medel, Ms., p. 193, 216).

³ My estimate is close to that of the Foreign Commerce Yearbook or 1937 (2,420,273). (See U. S. Bureau of Foreign and Domestic Commerce, 1938.) The 1939 Statesman's Yearbook gives an estimate or 1937 of over 3,000,000, while the official Guatemala Government figure for 1941 is 3,283,209. When this is compared with the 1921 total of 2,004,900, the growth of over 60 percent seems phenomenal. I estimated an increase of approximately 30 percent, or 2,600,000, for 1940, on the basis of past rate of population growth.

⁴ For a fuller definition of "Ladino," see p. 12. Ladinos and upper-class whites of Spanish descent (the aristocracy of Guatemala are not called "Ladinos" except in the census) are politically, socially, and economically superior to the Indians, who generally occupy a position almost comparable with that of Negroes in the South of the United States.

⁵ According to measurements listed by Strong (1934, p. 32), the average height of 251 men, from 5 different villages was 154.1 cm. (5 ft., 14 in.); 121 women, 141.4 cm. (4 ft., 7 in.). Chicicastango men and women were shorter than those farther north.

Musculature is unbalanced, particularly among the men, who generally have tremendously developed necks and legs, yet slight, almost frail arms. Since they travel long distances at frequent intervals with heavy loads on their backs, and climb steep trails much of the time, such a condition is not difficult to understand. However, even canoeists on the lake show little better development, despite frequent use of paddles. Their lifting power in back and arms is not great; I have found that two or three men will struggle painstakingly to beach a small dugout that, judged by American standards, requires no great effort for one (McBryde, 1938, p. 14). Traders carry loads commonly weighing 100 pounds (45.36 kg.) or more, but one may observe that they do nearly all the work of lifting with their legs. The loads are generally set up on some object (*cacastes* or carrying frames have legs to aid in this purpose), the *cargador* squats very low, adjusts the tumpline across his forehead, then lifts the load from the ground by straightening up with a powerful push. (For illustrations of *cacastes*, which are made in Totonicapán, see pis. 12, c; 13, a; 23, d; 39, e.) The back plays little part in this process, though often there is some aid with the arms in "shoving off," by using the long pointed staff (5 or 6 ft. or somewhat less than 2 m., long, with sharp metal tip) frequently carried by merchants (pis. 4, c; 12, c; 13, a; 23, d; 39, e).

Women seem to have arms as well muscled as those of men, for they spend much of their time grinding corn and washing clothes, operations that not infrequently are performed with a sizable baby slung on behind. In many regions, especially along the lake shore, they derive considerable exercise also from climbing 2,000 feet up a steep trail to market with such a burden, then adding a large basketload of produce, balanced on the head, during the return trip.

Better than words can describe, the sketches and photographs show characteristic native types seen in various villages, particularly those around the Lake (pis. 6, 7, 8, 9), bringing out their physical type as well as their dress.

Whereas in Mexico and in El Salvador a great proportion of the Indians have dropped their native languages and speak only Spanish (which makes the linguistic census classification unsatisfactory), this is not true to the same extent in Guatemala. Except in

the eastern departments, where Ladinos predominate, most Indians of the region under consideration in this report still speak varieties of Maya known as Quiche, Cakchiquel, Zutuhil, and Mam. These are mutually unintelligible, for the most part. Even within one linguistic region, there are local expressions and idioms which are used only in certain municipios. As a consequence of these linguistic differences, Spanish is the trade language largely depended upon in markets where diverse tongues converge.

The present inhabitants of Guatemala, especially the Indians, are essentially vegetarians. Maize supplies perhaps as high as 80 percent of the total food consumed. It is eaten mainly in the form of tortillas (thin, unseasoned griddle cakes) and tamales, though gruels, hot (*atol*) or cold (*posol*), and *pinol* (ground, toasted maize and spice drink; see p. 148) are commonly made from maize, and the ears in milk stage (*elotes*) are often roasted and eaten during the season of their immaturity. An extensive survey throughout the area indicated that tortillas are eaten more than tamales only where firewood is abundant. This is because much more fuel is required to heat a griddle with a few flat cakes on it than to boil enough water in a deep jar to cook a large number of closely packed tamales. Consequently, in an open area where firewood is at a premium, as in the high Valley of Quezaltenango, nearly all maize is eaten in the form of tamales, and tortillas are rare. Toasted tortillas (*totopostes*), the only ones that are sometimes salted, are taken on long journeys, for they do not become sour. Nearly dry paste of black beans is also a common food for the trail.

Beans, especially black kidney varieties from bush and vine, are second in importance to maize in the diet, and they supply a large proportion of the protein requirements. A variety of fruits and vegetables, mostly native and including many wild greens (as *chipilin*, pp. 142, 147) that are gathered, provide much of the rest of the food. Special beans have been developed for eating in the pod (*ejotes*). Little wheat bread and meat are eaten, and then nearly all on festive occasions, as both are relatively expensive. Ladinos eat more of these introduced foods, along with European vegetables, than do Indians (see p. 37).

Coffee is the common drink. Water is almost always heated before it is drunk by the Indians, as cold water is considered "bad for the stomach." Thus, unknowingly they check dysentery, typhoid, and

other water-borne diseases. Chicha, widely made ferment of maize (usually black), is also boiled in the process.

Native Indian population is especially concentrated in the Guatemala Highlands as it apparently was also before the Conquest. Most of the archeological sites of Southwest Guatemala are in the Highlands and along the piedmont,⁶ while they are almost lacking on the low Pacific Coastal Plain. Kroeber (1939, p. 161) has concluded that "... in general, prehistoric, historic, and modern populations in Mexico and Central America tend to be dense and sparse in the same areas." Population figures in Spanish Colonial records are vague and unreliable, so that we can, at best, only approximate the numbers of Indians living in the region even during historic time. For this reason, estimates must be only expert guesses, and authorities vary widely in their tabulations. Whereas Sapper (1924, p. 100) arrived at a total of 5 or 6 million inhabitants for Central America (including Chiapas) in 1500, Kroeber's more moderate and carefully thought-out estimate is only 3,300,000 for all of Mexico and Central America (*ibid.*, p. 460).

The temporary impact of the Conquest, with consequent reductions and eventual recovery of native populations, has been summarized by Kroeber as follows:

The Conquest no doubt did cause shrinkage in numbers; but in the well-settled regions this effect seems to have been transient, and probably began soon to be made good by an increase attendant on the new experience of internal peace under Spanish Colonial government ... If our 3,000,000 [for areas of high culture in Mexico and Central America (Guatemala and El Salvador)] be accepted as anywhere near the truth, there has been a definite increase not only of total population, but also of Indian population in Mexico, [and Guatemala and El Salvador] since aboriginal time [*idem*],

Kroeber's estimate of 12,000,000 Indians (including half of the Mestizos) in Mexico and Guatemala in

⁶ It was here that Alvarado encountered the greatest resistance during his invasion of Guatemala in 1524. Of this, Bernal Díaz writes that, after passing through (friendly) Soconusco, "which was in that time very populous with over 15,000 inhabitants," (archeological and his torical evidences, especially Ponce, 1873, indicate that this was mainly in the piedmont), they met resistance at Zapotitlan, where "many squadrons of warriors" defended a bad river (Samala?) pass. They were "not only from the 'poblaciones' of Zapotitlan, but from other neighboring towns" as well—the account indicates that these were piedmont centers—and were so numerous that the Spanish forces could hardly "get by the injured." Continuing toward Quexalteango (Xelaju), they were met on the open plain by "all the forces of those neighboring towns" (around and including Quexalteango), which amounted to more than 16,000 ("dos xiquipilea"). If we may base an estimate upon such a report, it will be concluded that there were considerably fewer Indians in that valley just after the Conquest than there are today.

1930 indicates a fourfold increase in the number of Indians in these two countries since the time of the Conquest. On the same basis, his 1930 calculation for Guatemala is 2,000,000 Indians. This country contains by far the greatest concentration of "pure" Indians to be found anywhere in Central America today.

Factors in the post-Conquest decline of the Indian population.—For the southwestern piedmont >f Guatemala specifically, the 1579 description of Japottitlan lists the following causes of reported population decline immediately following the Conquest:

- (1) Polygamy, practiced in pre-Columbian times, was forbidden by the Spanish.
- (2) Former living conditions of scattered populations were healthier than in insanitary towns into which Indians were forced by *reductions*.
- (3) Indians have imitated the Spanish in going on long-distance trade and labor journeys, in which the "change of airs and waters" seems harmful; also, bathing after sweating from such labors."

Indian numbers were much reduced by the Conquest through battle casualties, executions, and excessive exploitations in quests for high-value resources, especially gold.⁷

In those sections of Central America where gold was lacking there were disastrous results of exploitations of other ready sources of wealth. In the area of the modern Republic of El Salvador, where there has been much oppression of natives, the "gold" was cacao, as indicated by a letter from officials of the Audiencia de Guatemala to the Spanish King, April 8, 1584, in which extraordinary depredations of the Indians of El Salvador (especially the Izalcos) are described in detail. With Spanish recognition of Aztec demands for cacao, the value of this commodity more than trebled (as I calculated the new price, \$13.50 to \$15.00 per load of 24,000 beans), and certain Spanish planters near Sonsonate began intensive exploitation of the Indians.

"They began to put pressure upon their Indians and to make them plant great groves [milpas] of cacao, . . . making them work in them day and night . . . they became very sick because of the humid and hot country . . . thus many died and they went on dying because of this new work" (Anon., Ms. 1584, p. 12). Palacio (1866, p. 15) says in 1576 of cacao production in El Salvador that "in the four places of the Izalcos alone" more than 50,000 cargoes of cacao beans, worth 50,000 gold

pesos on the market, were produced. The cultivated area was estimated at "2 leagues [8 km.] square," or about 25 square miles. A cargo was three *xiquipiles*, or 24,000 beans (a *xiquipil* was 20 *contes* of 400 each, or 8,000). If this estimate is accurate, 1,200,000,000 cacao beans were produced annually on an area of not over 30 square miles (p. 33). In the "Relaci6n de la Provincia i tierra de la Vera Paz" (Anon., Ms. 1574 b, pp. 8-9, f. 96) there is an account of the losses through sickness and deaths among the Vera Paz Indians who went into the Pacific Lowlands. It is stated that Highland Indians could not go into the Lowlands beyond Tucurub toward the Golfo Duke, because they would "quickly get sick and die." Owing to this and to the deserted or "heathen"-infested lands in the vicinity, these Vera Paz Indians went to rent lands in Sonsonate, Soconusco, Chiquimula, and Zapotitlan, 8 to 12 days walking distance away. Here, too, many became sick and died.

Velasco (1894, p. 302) says of Soconusco, about 1571:

Although on the plain in the lower part of this province there are very good town-sites, the Indians inhabit the wooded slopes through their love of cacao, which yields best in country that is hilly, hot, and humid. The Indians of this province have declined greatly in number, due to the trials and tribulations associated with cacao cultivation: the 2,000 Indians of this province produce 400 loads (24,000 beans each) of cacao a year.

Fray Alonso Ponce's companions, in 1586, refer to the Soconusco lowlands as "*el Despoblado*," a region of well-watered cattle pastures where there are no towns (Ponce, 1873, p. 294). (See maps 8 and 15.) Pineda (1908), writing about 1570, says of Istapa:

The town of Ystapan is next to the Pacific ocean, half a league from the shore . . .; this town is very rich in cacao, there being many groves [*munchas myllpas*], with so much cacao that the Indians cannot process it, for, though it used to be a large town, it has declined greatly because of the numerous deaths, so that many groves had to be abandoned without anyone to harvest and process it.

Diseases.—The ravages of diseases were extremely disastrous in Guatemala. Shattuck (1938) has described these in some detail, though he said little concerning the three great decimating epidemics of the 16th century, which were described in the Cakchiquel history (Brinton, 1885). The first of these occurred in 1523 (an oft-repeated accompaniment of or prelude to the European impact, which here occurred in 1524), the second in 1559, the third in 1576. Though smallpox, the early occurrence of which in Mexico is well known (Carter, 1931, p. 53,

⁷ See Brinton (1885, pp. 177, 181, 183, 187, 189), regarding the futile search for gold in the volcanic Highlands of Guatemala.

ftn. 5), and measles have been much blamed for epidemic reductions of native populations at the Conquest, the symptoms enumerated in the *Annals of the Cakchiquels* (Brinton, 1885) regarding these three major 16th-century epidemics strongly suggest influenza of the virulent (autumn) 1918 type in the United States and elsewhere. This diagnosis was tentatively made after consultation with Dr. K. F. Meyer, University of California bacteriologist. Brasseur's suggestion of syphilis can hardly be considered, because of the symptoms; also, syphilis was probably endemic, while this epidemic came with the Spanish. Shattuck's suggestion that it was smallpox is little more acceptable in view of the nature of the disease and the fact that smallpox was known as "*viruelas*" Nor is Brinton's idea that it was measles (*ibid.*, p. 207) in keeping with the symptoms, which were fever, coughing, sore, swollen throat and nose, accompanied by nosebleed. There were a "lesser" and a "greater" pestilence, the latter of which may have been the pneumonic type (*ibid.*, p. 194). The suddenness of seizure, rapidity of spread, and great numbers infected (*ibid.*, p. 171) as well as relative immunity of children (*ibid.*, p. 173) and high adult mortality (*ibid.*, p. 171) are also in keeping with the characteristics of influenza.

Most convincing of all, however, is the fact that, prior to the 1559 epidemic, which was said to have come "from a distance," "six months after the arrival of" a President Royal from Spain (*ibid.*, p. 194), there was a 1557 influenza epidemic that ravaged "all of Europe," occurring in Madrid in August (Vaughan, 1921, table 1, p. 7; Hirsch, 1885-86, vol. 1, p. 8, dates the disease in Sicily, July, and Spain, October). The Thomson monograph (1933, p. 5) mentions the same epidemic (from Hirsch, 1883-86, vol. 1), characterizing it as "mild," and "from Asia," and quotes Stowe's "*Annales*" to the effect that an epidemic raged in England during the harvest of 1558. The 1559 outbreak in Guatemala was said to have been of the same type as that of 1523 (Brinton, 1885, p. 194). An epidemic of influenza was "widespread over all of Europe" in 1510 (Vaughan, *ibid.*, whose data were apparently from Hirsch, 1883-86, vol. 1, p. 8; for a fuller discussion of this subject, see McBryde, 1940; for reference to other diseases, see Shattuck, 1939).

LADINOS

Because of the importance of the term "Ladino" in Guatemala, and the common misinterpretation of

it by foreigners, it is well to consider the significance of the word. The greatest differences between an Indian and a Ladino are in culture rather than in blood. The latter speaks Spanish as a native tongue, though he may know an Indian dialect as well; he probably wears a necktie, shoes, and any other elements of European dress that he can afford; usually, though not always, he lives in town, and his house is ordinarily more elaborate than an Indian hut. The possession of a significant number of these traits makes one a Ladino (pis. 40, *a, d, e*, and 41, *b*). Only Indians have "cofradías" (religious brotherhoods) and "brujos" (medicine men), and speak Indian dialects when conversing among themselves.

The distinction is sometimes so hard to draw that illustrations will be necessary for clarification. In the Chicacao market during 1936 I frequently saw a large blonde woman with reddish hair and ruddy complexion, dressed like her Indian mother, in full Atitlan costume. Her father was French, yet she lived like an Indian, and was so regarded by everyone, despite the fact that her European traits were unmistakable. Ladinos on the other hand may have pure Indian blood, and it is only their mode of life which puts them into the presumably physical category of "Ladino." This must be borne in mind in considering the 1921 Guatemala census figures. Census takers were instructed merely to note "discreetly," on the basis of "easily recognized" characteristics, whether a person is Indian or Ladino, with no embarrassing questions asked. "The characteristics of each race are clearly marked. Note them in a discreet manner. . . . The race of each person shall be written without asking questions. . . ." (Ministerio de Fomento, 1926, vol. 1, p. 82.)

Simply wearing shoes and speaking fluent Spanish does not make an Indian a Ladino. The Atitlan butcher in the Panajachel Indian market certainly qualified in at least these two respects, and seemed to want to be a Ladino. But no native ever considered him one. If he moved to another community and opened a store, however, he could pass for a Ladino.

Though the etymology of the word "Ladino" is obscure and somewhat confusing, the definition given by Velazquez de la Cadena (Dictionary, 1868 edition) is enlightening: "1. Versed in an idiom, speaking various languages fluently. 2. Sagacious, cunning, crafty. 3. 'Negro ladino' (Am.). A negro who speaks Spanish so as to be understood." All but the third meaning were given also in the Dictionary of

the Spanish Royal Academy, 1791 edition.

Fuentes y Guzman (late 17th century) refers to "Mestizos and Spanish Ladinos" (1932-33, p. 409). A late 18th-century manuscript relating to Chiapa, in the Museo Naval, Madrid, reads as follows: ". . . they are called ladinos, because they speak Spanish, they are mulattoes, zambos, and other castes which are not Indian . . ." (Anon., Ms. 1783(?), p. 44). The early significance, then, was usually linguistic. Juarros defined a Ladino as an Indian who "professed Christianity" (Baily translation, 1823, p. 24).

The opposing factors of isolation and acculturation are of primary significance in the matter of speech. The Spanish language, like the wearing of shoes or the putting of full-sized windows in a house, is adopted by the Indian as he becomes "Ladinized," and it may well be taken as an index of this process. Accordingly, where the two racial types are in close contact, there will be more Spanish spoken by Indians than where they live apart. Such, for example, is the case in the Quezaltenango area, where many Ladinos live, and in the Totonicapán and Momostenango areas, where, though there are few people of European culture, many Indians are long-range merchants, and travel often as far as Salvador. They must speak fluent Spanish, as it is the trade language. A large proportion even of women (usually last to learn it) speak the national tongue in such areas as Quezaltenango, Totonicapán, etc.

Since Indians rarely settle permanently below the lower limit of the coffee belt, Spanish is consequently the language of the outer Lowlands, especially under 200 m. (656 ft.). The percentage of Indians in shore towns ranges from 0 (Tahuesco) to about 10 (Champerico); the proportion is usually about 2 percent. The few Indians here speak the European tongue almost exclusively. This was not considered, apparently, by Stoll (1884) when he drew his linguistic map. Sapper, however, made the correction (1897, Map 5), and it has been followed by others since. In the mixed villages of the piedmont most Indians, including women, have a good knowledge of Spanish, and many speak it well.

In remote areas, on the other hand, a considerable number of men may even be found who cannot speak enough Spanish to carry on an intelligent conversation. Native "intendentes" are chosen largely for their ability to speak Spanish, and usually in isolated settlements there are very few men to choose from. This is especially true of the villages of the more

secluded northwest shore of Lake Atitlán—San Pablo, San Marcos, Tzununa, and Santa Cruz—where there are practically no Ladinos; there is a 1,000-m. wall at their backs, and a wave-furrowed, wind-swept lake before them; nor do they have more than a very few canoes to traverse it. Those of the south-shore villages (and to a much lesser degree, those of the northeast), traveling frequently to the Lowlands, for the most part speak Spanish fairly well. It is almost the rule that Indian women of the Lake region lack knowledge of the national tongue, except for the most frequent vendors in the markets; and even there, in the plaza of Santiago Atitlán, many women do not even understand Spanish numerals. That is distinctly a local market, however, and there are few Ladinos, most of whom know a little Zutuhil. In the mountains behind Solola it will be found that most of the Indian women and many of the men are equally inarticulate in Spanish. On the other hand, there appear to be more Ladinos about the Lake than elsewhere in the southwest, except in the case of merchants dealing largely with Indians, who could speak one or more of the Maya dialects. Many of the non-Indian residents, even of a town with as many Ladinos as Solola, can carry on conversations in Cakchiquel; for it is often a necessity.

That Ladinos have long been established in the towns and villages of western Guatemala is indicated by Dollfus and Mont-Serrat through their population figures. Santa Cruz del Quiché, e. g., is said to have 3,000 Mestizos and only 1,500 Indians (Dollfus and Mont-Serrat, 1868, p. 524).

NEGROES

The first appearance of Negroes in Guatemala dates back almost to the Conquest of that area. García Peláez discusses this rather fully, citing an edict of Guatemala in 1553, a *cedula* of 1540, and testimony of Alvarado (recorded by Remesal, 1932, bk. 1, ch. 15) to the effect that African slaves were mentioned among the servants, characterized as "industrious workers," and were forbidden to bathe in rivers and springs where there were white women and girls. A ship in 1543 brought 150 Negroes, and a 1547 edict offered 3 to 6 pesos for the return of runaway slaves. García Peláez concluded, however, that the early Spaniards would rather marry Negroes than Indians (García Peláez, 1851-52, vol. 1, p. 63). This may in part explain the disappearance of

Negroes here, for they are rarely seen in Southwest Guatemala today; mulattoes along the littoral and elsewhere in the Lowlands represent perhaps the modern vestiges of this miscegenation. Most of Guatemala's small Negro population live in the eastern Lowlands, in Livingston and Puerto Barrios, where they are employed as stevedores.

Pineda, later in the 16th century, tells of certain Indians in Soconusco who had "male and female negroes as servants" (Pineda, 1908, p. 442). Alonso Ponce in 1586, when near Grionda, a place at the fork of the Camino Real where it branched to Chiapas and to Soconusco, passed "some negro women and others" (Ponce, 1873, vol. 1, p. 291). Later, at Quetzalapa, near Tonalá, in Soconusco, his party was given a calf and some salt, to make jerked beef, for "that uninhabited road which had to be traversed, by a *negro estanciero*" (ibid., p. 298).

Ponce also mentions (1873, vol. 1, p. 403) the appearance of "many Negroes" near Sonsonate (in modern El Salvador), a few near Los Esclavos, in eastern Guatemala (ibid., vol. 1, p. 406), and Negro laborers in Chiapas, (ibid., vol. 1, p. 437). From this widespread distribution before the end of the 16th century, mentioned quite casually, we see that Negroes were fairly numerous, and that their principal concentration was apparently in the Pacific area of Guatemala.

There may be some implication of Indian-Negro cross (zambo) in the same Santiago Zambo, the early village of the piedmont which today is Finca Zambo, in Suchitepequez. It is not far from the coastal lands of the Xankatales (Highland Nahuatl-Santa Catarina Ixtahuacan Indians), who are among the darkest-skinned of the Guatemala Indians, possibly because they may have absorbed some of the early Negro blood. Although Negroes as such apparently fade from history after the 17th century, it may be noted that even today, in various parts of the Lowlands, particularly in the shore towns, mulattoes and zambos can be recognized. I saw them in Tahuesco, and had reports of them also in other littoral centers. In the story of Los Esclavos as told by Dollfus and Mont-Serrat (1868, p. 33) it is stated that "almost all of the inhabitants are zambos. . . ." The account of Negro slaves does not agree with that of Ponce's companion, who said that a former president had released 10,000 Mexican Indian slaves, and even in 1586 the place was called Los Esclavos (Ponce, 1873, vol. 1, p. 318).

POPULATION DENSITIES AND CENTERS

The great, forested plain of Guatemala's largest department, El Perin, comprising over one-third of the Nation's land area, is in large part almost uninhabited, having an average density of about one-half per sq. km. ($1\frac{1}{4}$ per sq. mile) if we exclude Flores, a town of 1,500, wherein a fifth of the district's people reside. Three-fourths of the total are clustered in miserable little villages and chicle camps, scattered over this low, fever-ridden region. By contrast, the Highlands farther south present the other extreme, with thickly settled agricultural communities occupying the more favorable valleys and basins.

Exclusive of El Peten, the Guatemala density of population is about 35 per sq. km. (87.5 per sq. mile).

PHYSICAL FACTORS AFFECTING POPULATION DENSITY

Distribution of population is extremely spotty, with limited favorable areas having densities well over 100 per sq. km. (250 per sq. mile), adjacent to unpeopled volcanic slopes or deep *barrancas* (map 8). The line of demarcation is often sharp in the Valley of Quezaltenango, where the municipio of that name has a rural density of 127 per sq. km. (317.5 per sq. mile), while the adjacent volcanic mountains of El Baul, Cerro Quemado, and Santa Maria are virtually uninhabited above about 2,700 m. (8,858 ft.). Water supply is a determining factor of the first magnitude here; during the half-year dry season, springs cease to flow on the higher volcanic slopes. The steepness here is, furthermore, unsuited to house construction. Along the precipitous shores of Lake Atitlan (pis. 45 and 46), villages are crowded upon low ridges and terraces above high-water lines of both lake and streams (map 20). Only in the piedmont are terrain and water supply alike usually favorable, except on the sides of small ravines and secondary volcanic cones. Climatic advantages favor the Highlands, and often outweigh such detrimental factors as rugged terrain, remote water supply, and isolation.

It is in the Highlands, then, that population is primarily concentrated (map 8). Most Indian villages are between elevations of 1,500 m. (4,921 ft.) and 2,800 m. (9,186 ft.); plantation settlements between 350 m. (1,148 ft.) and 1,500 m. There is a distinct alinement of villages and towns, chiefly finca markets, along the lower isohyps (350 m.), with 14 major ones (over 1,000 population) and 11 minor ones, between about 250 m. (820 ft.) and 400 m.

(J,312 ft.), in the 80-mile stretch from Coatepeque to Chiquimulilla.⁸ Only nine of these are on the railroad, which winds above and below the 250-m. isohyps. Lower than this there are virtually no towns except the ports, which are small, open roadsteads, and most of the land is in large cattle ranches; above, the few centers are mainly concentrated along trade routes that lead between volcanoes to the Highland centers of San Marcos, Quezaltenango, Totonicapán, Solola, Chimaltenango, Antigua, and Guatemala City.

The 1,400-m. (4,593 ft.) to 1,500-m. (4,921 ft.) dividing zone between independent farming and plantation concentrations is strikingly coincident with the upper limit of the orographically conditioned zone of tropical monsoon climate (Köppen definition, hot and extremely rainy, except for a short winter-dry season, here December to March; map 6). This climatic region is essentially the same as the settled portion of the coffee belt (map 14), cultivation usually extending somewhat higher in elevation than settlements of coffee planters. The upper limit of coffee growth is about 1,650 m. (5,413 ft.) on slopes bordering Lake Atitlán. Above a variable elevation zone, the center averaging about 1,450 m. (4,757 ft.), climates are cool to cold, and below it, warm to hot; there is but one annual corn harvest above, and two below; the independent subsistence Indians live mainly higher, their plantation kinsmen lower than this level. At low elevations there are a few Indian villages, such as San Sebastián Retalhuleu, whereas in the mountains there are occasional small plantations, as of wheat. Yet, in broad terms, the generalization of Highland-village and Lowland-plantation holds true for Indian settlements.

In pre-Columbian times, just as today, there were Highland and piedmont concentrations, the latter for cacao and, to some extent, for maize plantation settlements, colonized from the Highlands. The centers of population were strung along the piedmont as they are now; but the mid-19th century shift from cacao to coffee here put the settlements at the base of the present plantation belt, instead of near the top, as in the case of lower-level cacao (maps 11 and 12). The only outer coastal cacao settlement to which I have found reference is that of 16th-century Ixtapa (Pineda, 1908, p. 429).

⁸These are, from west to east (italicized if over 1,000 population), Coatepeque, Genova, Flores, Nuevo San Carlos, Retalhuleu, San Sebastián, Mulua, San Andrea, Cuyotenango, Matatintingo, San Bernardino, San Antonio, San Miguel, Chicacao, San Pedro Cuttin, Santa Barbara, Patulul, Santa Lucia Cotzumalmpa, Siquinalá, Guachipilín, Bscuintla, Goanagtxapa, Taxiscó, Guatacapán, Chiquimulilla,

Pineda's statements tend to exaggerate the Indians' wealth, however (see p. 91).

CULTURAL FACTORS AFFECTING POPULATION DENSITY

A distinction may be made in the Highlands between certain almost purely agricultural areas of dense population and those where industrial pursuits have an important supplementary place in the regional economy. Since agriculture and trade are important in some measure to nearly all, these perhaps should be called, respectively, "agricultural-commercial" and "industrial-agricultural-commercial." In the southwestern Guatemala "Altos" (Highlands west of Patzicá and south of Huehuetenango) all the major areas of dense population fall into the latter category, with the exception of the Lake Atitlán Basin. Here some of the Lake villages have minor industries, such as the making of rush mats, or even fairly large-scale craft production, as in the fabrication of rope. Yet, generally speaking, it is an area without industries (nearly all artisans are imported), there being in their stead, as in the case of Solola and Panajachel, specialized, intensive vegetable culture, or, as at Santa Catarina Palopé, fishing, until a law was passed prohibiting it. Such substitutions seem to account for this exception to the general rule that Highland Indians are mainly craft Indians, having areal specializations, with goods produced by specialists among their communities.

Of all the well-peopled regions, that of Momostenango is perhaps the one in which more of the inhabitants are craftsmen and the population as a whole is less dependent upon agriculture than elsewhere. They market their woolen goods in large quantities as far as El Salvador and Honduras. It seems significant that here soil erosion has completely ruined more land than almost anywhere else in the Southwest. Areas around Santa Cruz Quiché and Chiché and between Patzicá and Totonicapán offer the only comparable examples of destruction with which I am familiar, and these are not so far advanced as are the rilled red clay lands and the famous pinnaced *riscos* of Momostenango (pl. 30, f). Here Indians from far-off Todos Santos Cuchumatán bring maize to sell in large quantities in April, when it is usually still plentiful in most Highland communities, but is very scarce in Momostenango. Much maize also comes from Quiché.

TOWNS AND VILLAGES

Maps 1 and 3 show by symbols the relative abundance of Indians and Ladinos in all the towns and villages which are included in the present study, as

well as a number of others. Figures are based usually upon the 1921 census, except where reason has been found to revise them, e.g., for boundary changes. From the maps it will be observed that the seashore centers are mostly villages of less than 1,000 population (under 150 Indians), in every case predominantly Ladino. Beyond the thinly settled park-savanna of the lower Coastal Plain, villages and towns lined up along the piedmont are for the most part rather evenly divided between Ladino and Indian inhabitants, and they contain, on the average, populations of around 1,000 (about half have more, and half less; see p. 15, fn. 8). Where they are larger, Ladinos usually predominate, as in the instances of Mazatenango and Retalhuleu, having over 5,000 Ladinos and from 1,000 to 5,000 Indians. Only one sizable Lowland village, namely, Santo Tomas la Union, is predominantly Indian (1,000-5,000 Indians; under 500 Ladinos). The major concentration of Lowland Indians is in the monsoon coffee belt, where they have settled permanently in great numbers on the fincas. This is not to be thought of as a dispersed rural population. The laborers are housed in small, compact settlements, much like our factory-labor districts or, even more, like the slave quarters of the Old South. The tiny, simple dwellings are built usually in close, even rows, near the administrative center, for convenience. Since many of the *colonos* or *rancheros* (permanent colonists) as well as the *temporadistas* or *jornaleros* (migrants) are from various parts of the Highlands (map 12), often representing several dialects, a finca-belt map of languages would look in places like a patchwork quilt. *

Above the elevation of the coffee fincas, predominantly Indian villages appear in great numbers. Only Santiago Atitlan and Comalapa have over 5,000 Indians and under 500 Ladinos (see p. 85). It will be noted that Indian villages are particularly common around Lake Atitlan, where every shore settlement is of this general type except Panajachel, a tourist center, and the only one having a main highway connection (San Lucas has a secondary one). Though the tourist trade is fairly recent, the route significance here is centuries old. Often Indian villages occur marginal to large areas of dense population; e.g., around the Quezaltenango Valley there are nine fringing villages, consisting almost entirely of Indians. The Ladinos, on the other hand, live mostly in the larger towns, such as Quezaltenango and Salcaja. They prefer this habitat, and the company of their fellows, just as most of the Indians prefer rural surroundings in their own

communities. From certain sections Ladinos are virtually excluded (except for a small official staff, including teacher, garrison commander, etc.); e.g., Santa Catarina Ixtahuacan and Nahuala Indians, though they drink as much rum as any of their neighbors, have decreed prohibition of the sale or manufacture of intoxicating liquor, apparently to keep out the Ladinos who would control its production, which is regimented by national law (McBryde, 1933, p. 103, fn. 52; see also Dollfus and Mont-Serrat, 1868, p. 71). Ladinos feel that their lives would not be safe among these "Xankatales"; probably they are right. Certainly, life would be neither prosperous nor pleasant for them. Many exceptions will be seen, of course, to both generalizations (Ladinos as town-dwellers; Indians as rural) but particularly in the industrial Indian towns of Totonicapan and Momostenango. These are the only two which have the character of towns, with over 5,000 Indians, and yet with only 500-1,500 Ladinos; the latter, town-building element being at a minimum. In every other case, centers that have been classed as towns have at least as many Ladinos as Indians (p. 86).

An arrangement of concentric circles has been used on the base maps to indicate towns (as distinguished from villages) of various sizes and ethnic compositions. Most Highland towns, usually Department seats, or administrative centers in large municipios, are rather evenly divided between Indian and Ladino elements. The commonest town type on the map is that having 1,000 to 5,000 Indians and 1,000 to 5,000 Ladinos. Patzum, Solola, and San Pedro Sacatepequez (San Marcos) may be cited as good illustrations of this type. Salcaja, Zaragoza, and the Port of San Jose are the only towns in which the Indian element is almost negligible (under 500). In all Guatemala, Quezaltenango is the only town besides Guatemala City having more than 10,000 of both elements. A map that classifies centers of population merely by numbers of inhabitants gives little idea of settlement types in Guatemala, for it ignores the all-important element of ethnic composition of the population.

AGRICULTURE AND FOOD SUPPLY

(See also Appendix 2)

MAIZE CULTIVATION: THE MILPA

The widely accepted term "milpa agriculture" used by O. F. Cook, of the United States Department of Agriculture, retired, to characterize native

Central American farming ("the planting of crops in temporary clearings," Cook, 1909, p. 308) is quite misleading as far as most of the southwestern Guatemala Highland region is concerned. So thoroughly worked is the soil, and so deeply furrowed with the broad hoe, that such a paradoxical term as "hoe plowing" is necessary to describe it (pi. 30, b, c). The hand implements of the Indians of this region are used with even greater effectiveness than a plow in preparing "contour" furrows. Yet fields so laboriously worked are "milpa" to them, and to anyone who visits the area; and hardly fitting the definition implied by the statements that "milpa agriculture appears well adapted to the needs of very primitive peoples, since only a minimum of labor and equipment is required. The ax or the cutlass is the only tool that is necessary" (Cook, 1909, p. 308). That this definition of milpa is not fully applicable as far as the southwest Highlands are concerned is clear from the following comparison: "The word that corresponds to milpa in Peru and neighboring countries of South America is 'chacra,' but this is applied also to lands that are terraced and tilled continuously in the higher valleys" (ibid., p. 308, fn. 2). The implication here is that if land is cultivated continuously it is not "milpa agriculture." Though Highland milpa land in Guatemala today is not elaborately terraced,⁹ it is contour-furrowed, and much of it is tilled as continuously as that of Peru. "*Chacra*" in Peru is applied to any cultivated field, not necessarily maize, and the term is also applied to a small farm; sometimes even to the amount of land included in a family subsistence farm.

There is not an individual in the entire area who would not call his cornfield "milpa"¹⁰ (except when speaking in his own dialect), as that is the one universal word for it, there being no general synonym. If a writer wishes to refer to "digging-stick culture," it would be preferable that it be done in those terms to avoid confusion.

That the word "milpa" was applied in colonial times to other than cornfields has already been brought out. Many 16th-century chroniclers wrote of "*mylplas de cacao*," though perhaps more commonly they were called "*hercdades*" Whether the Indians themselves used "milpa" in connection with *cacaotales* (cacao groves) is open to question. The

Indians of Atitlan in their letter to the King (Anon., Ms. 1584) spoke of "*hcredades de cacao*" yet even for maize, "milpa" was not mentioned, but rather "*sementeras de mats*" The Spaniards so often took names and words just as used by the Indians that their terminology presents fairly good evidence of native parlance. Today, any cornfield is a milpa, but in order to be a milpa it must have maize, and not some other field crop such as wheat, beans, or barley. It may have extraneous crops interplanted, however, especially beans, vetch, squashes, rice, sweetpotatoes, garlic, and sometimes maguey. Pure field plots of other crops than maize are generally referred to as *surco* or *de such* (e. g., beans: *jrijoles dc suelo*),

HIGHLAND MILPAS

Clearing and rotation.—A 16th-century Vera Paz report states that new clearings were made in the forest every 2 years (limit of yield in one place), after which the land was abandoned for 10 or 15 years (Anon., Ms. 1574 b, p. 8, f. 94).

In the Highlands today the *roza*, as the process of clearing and burning is termed, is generally confined to new fields prepared on land which has been idle long enough for a regrowth of bushes or trees. The same field is usually under cultivation for a number of years, until the yield declines excessively, then the plot is left fallow for 5 or 10 years or more, depending upon edaphic conditions. At San Andres Semetabaj, where there is good ash soil, though not so good as the decomposed lavas of Santiago, 5 years was said to be the limit of good yield, with virtual exhaustion and poor harvest at the end of 15 or 20 years. At nearby Panajachel, 5 years was also given as the limit of good yield; land is left then to go back to "bush" for 5 or more years. In that area, beans are sometimes interplanted,¹¹ and annual alternation of beans and maize is common. At Santiago it was stated that about half the natives interplant beans with maize (and some pole beans). In the higher milpas there, beans are not planted, and good maize yields are said to be limited to 3 or 4 years,¹² after which the land may be left fallow for 15 or 20 years, when vegetation returns. Lower down, land* (much of it alluvial) is reported to be good for annual planting for 10 or 15 years, after which beans are

* Distinct terraces, 3 or 4 feet wide, are to be seen near Totonicapan, in fields cultivated at the present time; ancient, stone-faced terraces are common in parts of Chiapas, notably near Ocosingo.

¹⁰ "Milpa" is also used to designate individual maize plants, or the maize considered collectively; often even "milpas" is heard as a plural when the plants are referred to.

¹¹ His practice was said to be objectionable at San Andres, because the vine-burdened cornstalk offers more wind resistance and falls more easily. Beans are usually planted in special fields at San Andres.

* This discrepancy as compared with north-side estimates of 5 years, even on poorer soil, may reflect the fact that Atitecos, having more-good land per capita, can afford to shift milpas oftener.

Agriculture: major producing centers and zones of Southwest Guatemala based on elevation.

			Native American crops and length of vegetative period	Average planting and harvesting period (if annual)		
				Planting	Harvesting	
Zone 1: Outer Lowlands (costa)			First, or main planting (<i>primero, fuego</i>); 3-4 months...	May ...	July-August.	
			Second (<i>segundo</i>); 3-4 months	August	October-November.	
			Irrigated; in humid depressions (<i>chahuite, or de riego, or de humedad</i>)	All year around		
Zone 2: Inner Lowlands and piedmont (costa and boca costa)			First (<i>primero, fuego, or ternaporada</i>); 4-5 months, ...	March-April	July-August.	
			Second (<i>segundo</i>), 5 months..	September-October	February.	
		328-4,429	<i>CuarenteHo</i> (quick-growing); 2-3 months	April		
			Chile			
			Manioc			
			Pineapple			
Zone 3: Highlands (Los Altos)			6-7 months (roasting ears, 4 months)	April	September.	
		1,350-1,500	4,429-4,921	7-8 months ¹	May	December.
		1,500-2,250	4,921-7,382	10-11 months	March ..	December.
		2,250-2,500	7,382-8,202	11-12 months, ...	February	January.
		2,500-2,750	8,202-9,022	12-13 months, ...		February.
		2,750-3,100	9,022-10,171	Kidney beans and tomatoes ,	May	December.
	1,500-2,000	4,921-6,562	Maize, 2 plantings; 6-7 months ..	(2) February July Invierno, June	August-September. November-	
Northern valleys (Rio Negro and Rio Se-leffua)	1,200-2,000	3,937-6,562				
Zone 4: Summits of mountains	Over 3,100	Over 10,171	No plantings (only sheep pastures)			
			Exotic crops	Average planting and harvesting period (if annual)		
				Planting	Harvesting	
2,000-3,100	⎵	Bananas				
		Coffee (see map 12)				
		Sugar (panela to Highlands in trucks)				
		Rice	March-April	June-July.		
		Habas (broadbeans)	April-May .	December.		
		Potatoes:				
		Small, native	January-February	July-August		
		Large "American"	March	June.		
		Wheat	May	December.		
		In Cuchumantanes Mountains . .	October-November	June-July.		

¹ At Santa Atitlan and San Bartolme, there is also an earlier planting, in February, with harvesting in August; vegetative period 7 months.

planted for a year,* thereafter beans are planted every second or third year, until the bean yield declines notably, which may begin after the second rotation. The field may then be abandoned for 4 or 5 years, and beans planted again, followed by maize.

Such repeated plantings, even with rotation, interspersed by short periods of rest, result in the extremely high proportion of cleared land that is so characteristic of the Highland landscape. The statement sometimes made/however, that the forest is never permitted to return (Kempton and Popenoe, 1937, p. 213), is widely refuted by observations

In much of the Highlands, there are monthly **weedings** for the first 3 months of growth.

Where newly cleared brush or woodland, felled by ax and machete (pi. 31, b) is to be disposed of, it is usually burned after a period of drying, a month or less before planting. In wooded areas, there are often a few large trees left standing in the milpa (pi. 10,g).

The time of planting and length of vegetative period are chiefly a matter of elevation (map 9). The following tabulation summarizes my observations in this regard:

Elevation		Average planting date	Average major harvest period
Meters	Feet		
1,500-2,250	4,921-7,382	Apr. 15-May 15 (wet season)	December-January.
2,250-2,500	7,382-8,202	Mar. 15-30 (dry season)	November-December.
2,500-2,750	8,202-9,022	Feb. 15-30 (dry season)	January-February.

around Solola, Totonicapan, and other areas, where furrows are clearly visible under pine forests. It is nevertheless true that some areas, as in the Quezaltenango-Totonicapan Valley, are largely deforested, and have been so since before the Conquest. Here there is little burning, and the *roza* is virtually restricted to weed cutting; for, even where there is a bit of brush or forest, it is conserved for firewood.

Planting.—Preparing the field and planting maize is usually men's work, as seems to have been the case since ancient times. Neither Oviedo nor Medel refers to planting by women. In part this division of labor is probably due to the heavy work involved, especially in felling trees and hoeing, but it seems to have also a symbolic significance, with the man regarded as the logical sower of the seed. Of the early writers which I have consulted, only Torquemada (1723, vol. 1, p. 328) refers to planting by women, which undoubtedly was exceptional. That women today plant other crops than maize, and aid in the harvest, will be brought out later.

The various steps in the preparation of a milpa (not new land) were outlined and named by Santiago Atitlan Indian informants as follows (lands near the village, elevations not over 1,700 m.):

In September, October, and November the cornstalks are gathered for fuel, temporary fences, and a number of other uses. The leaves (the only fertilizer used) are cut and dug under. Weeds are cleared 2 weeks before planting. Any burning of stumps, roots, and brush is done 1 week before planting, which takes place usually during the first 2 weeks of February.

Highland planting at elevations below about 2,250 m. (7,382 ft.) is, for the most part, begun after the first two or three heavy rains (sometimes called *sembradores* for this reason, especially in the Lowlands). Above that, colder conditions make it necessary because of the long growing period (nearly a full year) to plant as soon as possible following the month of frost hazard (January). Low temperatures, cloudiness, and fog retard the evaporation of moisture from the soil at these levels, compensating somewhat for the lack of rain.

Planting before the rains is to be found at San Bartolome Aguascalientes (2,500 m. or 8,202 ft.) and Santiago Atitlan (1,660-1,700 m. or 5,446-5,577 ft.), an exception to the general rule at this level. In both these regions, planting is begun during the first half of February and harvesting from the middle of August to December. For this early planting before the rains, the soil is said to be hoed deeper (as in dry-season planting in general), for better moisture conditions, than in plantings after rains, and hoed early, right after the previous harvest (Santiago Atitlan). In both of the above-mentioned localities, there is another planting in May with the rains, apparently a short-growing season variety, for it is harvested along with the earlier planted maize, beginning in August and September.

Fertilizers.—Throughout the Highlands above about 1,500 m. (4,921 ft.), fertilizing of the land is common and widespread, for climatic and soil conditions are less favorable there than in the Lowlands, where it is seldom practiced. The fertilizer consists in

some regions merely of old leaves of maize and other plants where the soil is good (Santiago Atitlan, Panajachel), or animal manure, which may be bought or gathered from the stables by the Indians, as at Solola. It is mainly obtained from their own animals (especially cattle; Cajola, Chiquilaja, San Andres Xecul) and mixed half-and-half with leaf litter. Estimates at Solola and at San Juan Ostuncalco agreed that about 10 or 12 sacks (80-100 lb. each) of this mixed leaf and manure fertilizer are used per *cuerda* (about 30 yd. sq.). A small amount is generally applied to each hill. The commonest and most important manuring practice of the Highlands in the sheep country, above 2,000 m. (6,562 ft.), is that of keeping the sheep at night in small movable pens, each about 10 to 15 yards square, made up of broad, vertical boards. These pens are shifted every fourth to seventh day, depending upon the number of sheep, each time to a new spot contiguous to the previous one. In this manner, a few dozen sheep may enrich a field of considerable size during a year. Special benefits to soil fertility are attributed to sheep urine. I have observed this practice at Solola, Cantel, San Francisco el Alto, San Juan Ostuncalco, San Andres Xecul, Pie de Volcan, and all through the Cuchumatanes Mountains, and have been informed of it in many other parts of the high sheep country. In many cases one may observe these enclosures, next to rows of adjacent squares of uniform size, the darker ones nearer to the pen obviously being those recently occupied (pi. 32, d, e). Pigs furnish fertilizer at San Francisco el Alto. Chicken manure is often saved (observed especially at Santa Cruz la Laguna), and human refuse was reportedly used at many localities, notably San Andres Semetabaj.

Tilling of the soil.—Before planting milpa in the Highlands of the southwest, the Indians do as good and often even a better job of furrowing with a hoe than they could do with a plow and animals, though the labor involved is enormously greater. Furrows as deep as 12 to 18 inches (30.5 to 45.5 cm.), about 3 feet (91.4 cm.) apart, extremely even and straight (and, on irregular slopes,¹⁸ always "contoured") are made with a giant, heavy hoe about a foot wide and almost square, having about a 5-foot handle, and used like a mattock, cutting deeply (pi. 30, a, b, c). Probably this was a Spanish Colonial introduction to replace pre-Columbian types, doubtless of bone and wood.

¹⁸ Tremendously steep slopes are cultivated. The angle of **slope** of a milpa on a lava terrace at San Pedro was 40°, or nearly the limit at which roan can stand upright.

Only in one Highland locality of the southwest was the digging stick reported for tillage. That was in Momostenango, canton of Tunayac, according to Don Ernesto Lang, an intelligent German storekeeper who has long lived in that town, and who is married to a native Indian woman. He said that "prior to about 50 years ago (1886)" all Indians used hardwood digging sticks of the Tunayac type, 6 feet (nearly 2 m.) long, with a wedge point.

In rows along each side^v of these freshly turned furrows, several grains (usually 5)¹⁴ are planted in each hole, a few inches deep.¹⁶ The holes, about 2 feet (60 cm.) apart, are made in some sections by sticks but often they are made by the hoe blade. They are usually made to alternate in adjoining rows so that the transverse space between the holes is the width of two rows.

As the maize grows, earth is hilled up around each group of plants, sometimes into mounds 2 feet or more in height, probably a defense against the frequent high winds of the plateau and mountain regions (pi. 10, e). Ox-drawn plows are not uncommon in the western Highlands. I have seen a few on the nearly level terrain near Quezaltenango, notably at San Mateo, and many near Huehuetenango, where they are used mostly by Ladinos (pi. 31, c). In the Cuchumatanes Mountains many Indians as well as Ladinos plow. This is especially true at Todos Santos Cuchumatán (pi. 31, j). Though plowing is usually confined to fairly level terrain, it is sometimes practiced on remarkably steep slopes, following contours as nearly horizontally as possible.

In Huehuetenango farmers said that, for the rainy-season planting, they plowed once, early in May, after two or three rains. The furrows were about 5 inches deep. Often some animal manure was added. For the dry-season planting, during January and February, there were three plowings—the first about November 1, some 10 inches (25 cm.) deep; the second about November 20, 5 inches (12.5 cm.) deep, and crossing the furrows of the first at right angles; and the third about December 10, the same direction and depth as the first. The growing period during both wet and dry seasons is 7 or 8 months.

^vInformation as to the number in each hole runs as follows—San Pedro Laguna and Santiago Atitlan, 5; San Andres Semetabaj, 5 average, 4 good land; San Francisco el Alto, 5-7; San Cristobal Totonicapin, 5; San Andres Xecul, 7; Cajola, 6-8. This varies with soil fertility; apparently, more seeds are used in poorer soil.

¹⁴ Usually 4-6 in. (10-15 cm.) except in dry-season planting, where it is deeper (8 in. or more); at Santiago Atitlan 6-8 in. (15-20 cm.) seemed usual, as also at San Juan Ostuncalco in the high valley.

The harvest.—Various preharvest practices such as the *dohlando*, bending over the top of the maize stalks, leaving the ears pointing downward, or cutting off the top of the plant a month or two before the maize is gathered, are commonly though* not universally employed to facilitate ripening. The harvest is often protracted, with net loads of maize ears being brought in as needed, and stored; when storage facilities are inadequate, the maize must be left in the field and gathered a few loads at a time. Various animal pests, however, discourage this practice. At Santiago Atitlan the maize is harvested as soon as possible, and is kept in the owner's yard. Women do a large share of the work of harvesting in many parts of the region, sometimes even carrying home heavy loads of maize, in addition to gathering it in the field.¹⁶ Maize is ordinarily shelled with the hand, as needed, being stored on the ear, sometimes in part of the house and sometimes in outside cribs (*trojes*).

Maize colors.—It is almost universal practice to plant maize according to color, keeping each separate insofar as is possible. The common colors in descending order of importance and abundance are yellow, white, black (actually, dark purple and, to a lesser extent, blue), red, "calico," and mottled (pi. 30, d). The first is most common throughout the entire region. Observations and informants' statements at 15 widely distributed centers from Lowlands to Continental Divide showed that yellow was first in quantity and was preferred for eating in all but one locality, where white seemed to have equal rank; white is a close second throughout the area, with black (purples and blues) and reds far less abundant. At San Andres Semetabaj a good informant stated that the dark-colored maize thrives on poor soil, where the others do not grow well. All different colors are eaten immature (*elote*), roasted, but much less than ripe, as tortillas and tamales. Red and especially black are preferred, as in Peru, for making chicha, a fermented drink.

Along the north shore of the Lake at both Panajachel and Santa Catarina Palopo, it was said that yellow maize was planted exclusively near the shore, mainly on alluvial land, whereas white (and a little black) was grown up on the steep slopes.¹⁷ One explanation for this was as follows: Yellow maize ripened earlier and if anyone put in a patch of yellow among the white, up where it could not be watched, it

would become a special prey to pests, particularly the *tepeiscuinte* (probably *Cuniculus paca*). There was no explanation as to why the slopes were not sown entirely to yellow, which should also nearly all ripen at once. Perhaps the yellow is more exacting as to soil, and, being preferred, it is planted on the best alluvial land.

Cuarenteño ("40-day" maize) is generally limited to elevations below 1,500 m. (4,921 ft.) and occurs in the three common colors, yellow, white, and black. It has a growing season of about 2 months.

Yield.—Average Highland yields, based upon a number of estimates made in various parts of the region, range from about 1 quintal (about 101 1/2 lb.) to 2 quintals per *cuerda*TM (32 varas of 33 in., squared, or somewhat less than one-fifth acre). This is roughly from 550 to 1,100 pounds (or about 10 to 20 bu.) to the acre.¹⁸ Tax (1937) and Stadelman (1940) have recorded average yields near the higher figure. Kempton and Popenoe (1937) give 10 bushels as the usual maximum yield for high cornfields, with 20 bushels the probable top yield lower down. Medel gave 16th-century yields as averaging 60- to 80-fold (ratio between amount of grain harvested and amount planted) in Guatemala and Tlaxcala on good maize lands; 200-fold, exceptional; yet for Nuevo Reino 25- to 30-fold was good (Medel, Ms., p. 140, f. 190). The probable average yield in highland Guatemala today is about 100 to 1, as in the fertile valleys of coastal Peru. In the United States Corn Belt the yield is commonly 200 to 1.

Secondary milpa crops.—The principal crops other than maize that go into the milpa are usually beans and squashes of various sorts. These depend upon the individual locality, where taste and often climatic conditions are the determining factors. They can best be illustrated by citing several examples of actual practice in different sections.

A large percentage, perhaps half, of the Atitecos (Santiago, 1,600 m. or 5,249 ft.) plant beans, along with maize, four to each hill at the same time as the maize. Near the Lake shore, back to about 100 m. (328 ft.), almost all milpa is interplanted with squash (some report *giiicoy*, a form of *Cucurbita pepo*, higher up), manioc, and sweetpotatoes, all being about 7 or 8 varas (of 33 in.) apart except the manioc, which is planted by each maize hill. Chila-

¹³ One quintal per *cuerda* is the estimate determined by Termer for the Cuchumatanes region, and quoted by La Farge and Byers (1931, p. 71), who reported similar yields.

¹⁴ By miscalculating the size of a *cuerda*, I gave the correct *eutrida* yield at Solola in 1932, but estimated it as 2 tons per acre (McBryde, 1933, p. 107). It should be about 10 bushels (550 lb.) per acre.

For 16th-century notes regarding harvest methods in Vera Pat, see p. 24.

None of these reports could be personally verified, but they checked in different localities. They are recorded with reservations.

cayote (*Cucurbita ficifolia*) is planted in the milpa at higher elevations.

At San Andres Semetebaj (1,900 m., 6,234 ft.) beans are sometimes planted along with maize, one bean to a hill. Squash and chilacayote are often planted in the milpa, usually about 20 feet apart, the vines running widely across the intervening spaces. *Habas* (*Vicia faba* L., the European broadbean; p. 28) are planted by a few, always in the milpa, usually 1 to 2 weeks later, at the time of the replanting of maize to fill gaps left by sterile grains.

At San Juan Ostuncalco (2,400 m. or 7,874 ft.) *habas* are planted in the milpa, always two to a hill (as is the case throughout this entire region), from 1 to 3 weeks after maize is planted, and when it has grown to about 4 to 8 inches (10-20 cm.). Sometimes both are planted together, but it is better to put the *habas* in later so that they will not shade the maize. Beans (usually black) are little planted, then always in the milpa; there is some piloy (*Phaseolus vulgaris macropus*), but it is not planted annually and it appears adventive in the milpa, coming up before the maize. Large chilacayotes that look like watermelons, but have white flesh and black seeds, are also planted in considerable numbers in the cornfields.

Habas are the most planted of the intramilpa crops at San Francisco el Alto (2,600 m. or 8,530 ft.). Two grains by each *mata* (hill, or cluster of plants) of maize, are put in the ground usually 8 days later, both being harvested at about the same time. Beans are planted as are *habas*, but in far lesser quantities. Many people plant a small, globular squash, one to every 15th or 20th maize *ptata*.^{*0} Chilacayote is far commoner in the milpa than is squash, however, and perhaps twice as abundant.^{*1} It being better adapted to lower temperatures.

Religious beliefs and superstitions connected with agriculture.—At several localities, notably San Andres Semetebaj and San Francisco el Alto, it was said that planting was done with the waxing moon. At the latter place an unusually intelligent Indian informant specified the time as between the first quarter and full moon.

Usually there are religious ceremonies associated both with planting and harvesting, particularly the former, and primarily in the Highlands (pi. 17, a, b). Any detailed elaboration of these is beyond the scope of this study. Planting ceremonies in the Solola region have previously been described, and parallel

practices in Chiapas and Yucatan cited (McBryde, 1933, pp. 77-81). Planting time is often locally stated as beginning on a specific date, probably a day in the native calendar. Lang of Momostenango, said that only within recent years (suggested 1920-25) have some Indians learned to disregard such days in favor of suitable weather conditions.

LOWLAND MILPAS

Though maize in the Lowlands is inferior and less important as a basic crop than it is in the Highlands, it is far from being rare, as some authorities have indicated.²² From the literature one would judge that the Coastal Plain is terra incognita. Even the 16th-century chroniclers who trod the length and breadth of the land usually said only that maize was grown in the Lowlands, where there were two or three harvests (the growing season here being 4 or 5 months), as well as in the Highlands, where there was but one (Medel, Ms., p. 140, f. 190). Maize is little grown in the outer, lower Coastal Plain, owing to flooding, short rainy period (May-October), and sparse population. An informant at Tahuesco, a Pacific shore settlement, said that probably less than half the inhabitants there planted maize, and, of those, many went somewhat "higher up" for planting. Much of the outer plain is flooded during the rainy season. Some of this lack of interest in agriculture is, however, due to the almost universal participation of the populace in saltmaking and fishing, activities which occupy much of their time.

Planting and harvesting months around San Pedro Cutzan, in the inner Coastal Plain near the piedmont, are shown in table 1. At Finca Pacayal,

TABLE 1.—Planting and harvesting months in the region around San Pedro Cutzan

(1,000-1,300 m. or 3,280-4,265 ft.)

Spanish names	Native names (Quiche?)	Planting month	Harvest month
Primerio, fucgo, tern-	N'acatic xinop ("burn? of the rainy season").	April	August.
	N'acatic xin sak'ij ("burn? of the dry season").	October	February.
Cuarentefio ("40-day" corn) ..		April	June.

"Maize is seldom planted by the Indians below 1,200 meters . . ." (3,937 ft) (Kempton and Popenoe, 1937, p. 213). On the contrary, there are three harvests, and truckloads go to the Highlands, with surplus above the needs of thousands of *mosos* in Highlands and Lowlands alike.

* It serves as a vegetable when immature, and confection when ripe; the flowers and greens are sometimes eaten also.

» Green, it is put into soups; ripe, it is cooked with sugar (p. 137).

above the upper edge of the double-harvest region, about 1,300 m. elevation, maize is planted in March and harvested in September (one harvest).

The degree to which these practices are attuned to the seasonal rhythm of rain fall²³ is seen in the fact that the first planting in the piedmont is done following the initial heavy rains (*sembradores* or "planter" rains) of late March and April, while the harvest comes during the relatively dry interval, the *canicula* or *veranito* of July and August. The second planting, often in the same field, follows the rainiest month (September), with the ground well soaked and another month of good rain ahead, yet with the dangers of excessive flooding and washing mainly past. For the ripening there are several dry months (January and February have minimum rainfall).

In the outer Coastal Plain, where there is much less rain than in the piedmont, and the rainy season is shorter (May-October) the first two crops are planted and harvested during the rainy period (maps 6 and 9). At the port of San Jose the dates are as follows: *Fuego* (best yield, biggest ears), plant May, harvest end of July (*canicula*, minor dry period); *segundo* (minor yield, yet commonly practiced), plant August, harvest late October (end of rains). A third planting, *chahuite*, or *de humedad*, may be made in November, but only in low spots where the soil is wet; harvest is in February, and yield is generally good; *cuarenteno* is planted little if at all, as it is said to be unsuited to the climatic conditions here. The growing season for all corn is very short anyway.

Methods of cultivation.—For the most part, cultivation along the Coastal Plain and piedmont is practiced with implements of the type depicted by Bukasov (1930, p. 157, fig. 83, from Kaerger) for Michoacan, Mexico. Instead of the spearlike *coa* for piercing the ground, a long, pointed, fire-hardened pole (*macana*), held vertically in both hands, is employed. The *machete de escarda* or weed-hook of Mexico, is also used along the Guatemala Pacific Lowlands, where it is generally called *garavito*. It is a simple L-shaped stick, held in the left hand, pointing outward. Following each stroke of the machete, wielded with the right hand, the stick is rhythmically swung in its wake, flinging aside the severed weeds (pi. 3, d). The hoe plays an insignificant role in this region if, indeed, it appears at all. Thus, we might call this Lowland cultivation "dibble" or "planting-stick" culture.

The various steps in Lowland cultivation were outlined by an informant at Santo Tomas la Union (850 m. or 2,789 ft.) as follows:

The clearing and burning (*rosa*) take place during the first 2 weeks of March, before the rains have begun. The planting is then done, beginning on the *dia de San Jos*S (March 19)²³ and continuing through April, the final day being the *dia de la Cms* (May 10), though most planting is completed before the end of April. In the latter part of May, when the maize is about 2 feet (60 cm.) high, the first weeding (*tamegud*) is performed, the fast-growing Lowland weeds being removed from active competition with the aid of machetes. During July there is a second clearing (*peinado*), and then comes the harvest in August. For the *segundo* or second (October) planting,²⁴ the ground is cleared off in September. As in the first case, weeding is practiced twice, during November and December; the harvest is in February. In addition to having two harvests of maize, this municipio is well supplied with other basic starches. Cassavas, sweetpotatoes, bananas, and plantains are produced in abundance. Coffee is the chief money crop.

In at least one piedmont locality (San Pablo Jocopilas, 625 m. or 2,050 ft.) there was no first planting, but only the *segundo*. A good explanation for this is that a notorious insect pest, a large white grub (*gorgojo*) called "*gallina ciega*" (*Lechnosterna* sp.),²⁵ attacks the roots. The *secretario* of the municipio said he knew of no other place where this grub was so numerous as to discourage an entire planting. The grubs do not survive the heavy rains of summer, however, so that the "second" planting can proceed with impunity.

My impression is that there is less harvest labor performed by women in the Lowlands.

Highland-Lowland maize exchange.—With Highland and Lowland harvests coming at different times of the year, price fluctuations result in inter* regional movements of maize. Between the first and second harvests of the Lowlands, especially in November and December, when thousands of Highland Indians are down for the coffee harvest, Highland grain is taken to the Lowlands in quantity. At Chicacao it was said that Highland vendors, especially Atitecos, bring maize down in November, and sell mostly to *finqueros*. Highland maize also goes to the Lowlands from May to July, when

²³This same date was given independently at San Pedro Cutaan a* the day when the first planting begins.

²⁴The second planting was said at San Pedro Outran to be divided into two parts: early variety, September 15-30; late, "60-day" variety, October 1-18 (*dia de San Lucas*).

²⁵Anuario del Servicio Tecnico, 1932, p. 90. For reference to *gorgojos* in 16th-century Vera Pa*, see p. 24.

Coatepeque, for example, imports approximately 8 tons a month. Maize goes up into the mountains between August and October (harvest of *pringero*), even as late as December upon occasions, and again to some extent, after the harvest of the *segundo* (February), probably mostly in March, for the month of plenty in the Highlands is January, continuing into February. It is for this reason that the *segundo* goes less into the mountains than the *pringero*.²⁰

There appear to be numerous instances of Highland Indians who rent milpa land in the Lowlands (or have coastal colonies) and thereby supplement their maize supply. This was particularly in evidence in the small northwest Lake Atitlan municipios. It was well illustrated at Tzununa (*aldca* of Santa Cruz) on Christmas Day, 1935, when a man arrived from the Lowlands with a *cacaste* load of large-grained yellow flint, most of it badly perforated by weevils, from his August harvest, on rented land at Finca Mercedes (on the railroad, near Nahualate). He had planted about an acre (4 *cuerdas* of 40 *varas* square); there are perhaps 10 men at Tzununa who do this. They plant both *pringero* and *segundo*, harvesting the grain all at once and storing it in Lowland cribs, going for it as it is needed. Supplementary maize has doubtless been an important incentive for migration to and colonization in the Lowlands since pre-Columbian times.

Such procedure seems to throw new light upon certain migratory agricultural practices in Central America which have been explained by other presumed conditions, such as soil exhaustion, whereas climatic conditions may well account for them. Cook, for example, calls attention (1921, p. 315) to the custom of Indians from San Pedro Carcha near Coban, who "may plant milpas in the district from Senahu and Cajabon and carry maize home on their backs 50 or 60 miles" (80-97 km.). Sapper's climatic map (which is apparently most accurate for Vera Paz) shows that the Coban area has constantly humid (Cf) climate; Senahu tropical monsoon (Amw), with a distinct, though short, dry period in winter (Sapper, 1932, vol. 2, pt. H, p. 59, fig. 13). (For Koppen climatic symbols, see map 6 and Appendix 1, p. 131.) Cook, in an earlier paragraph, writes of the detrimental effects of the excessive and prolonged rainfall of the Coban area, but makes no comment upon the possibility of this affecting migrations.

²⁰ These data are sketchy and the dates of maize movement have not been widely checked.

Not to lose a possible chance that dry weather may come late in the season the Indians plant their milpas and burn them afterward, if possible. In moist ground the seeds or young seedling are not killed by the fire sweeping over them, but usually only a partial crop is secured. . . . In wet years the coffee planters find it necessary to import maize from New Orleans to feed the native population ____ [Cook, 1921, p. 313]

That Lowland planting in the monsoon area was an expedient for offsetting climatic difficulties, and that such planting was ancient practice in the Vera Paz area is brought out in the *Relacion* of 1574 (Anon., Ms. 1574 b). The two Lowland harvests described in that manuscript correspond roughly with those of the Pacific Lowlands today; the dates in Vera Paz being as follows: April planting—October, major harvest; November planting—May, minor harvest. For the April planting, the difficulty of the burning process is evident from the statement that it must be done during the "20 dry days" (Anon., Ms. 1574 b, p. 7, f. 94). Though Lowland maize was secondary, it must have served at times an essential supplementary role (as maize from New Orleans and elsewhere does today) during wet or otherwise unfavorable years in higher regions. The 1574 manuscript states also that "they go to plant in the Lowlands two or three days' walk distant" (*ibid.*, p. 8), specifically referring to chile (*aji*) but implying maize planting as well.

Harvest methods to offset difficulties attendant upon excessive humidity in Vera Paz included smoking and storage in underground vaults:

. . . the maize is fumigated to preserve it; it is put in pits with fire under it for 10 or 15 days and that which is not smoked is bad for bread; and also it will be attacked by weevils within two or three months. To preserve maize all year, it is put below ground in vaults or silos, where it may be kept not over four months in the Lowlands or a year in the Highlands [*ibid.*].

Other plants in Lowland milpas.—Several varieties of beans (especially the small, black kidney; p. 136, table 6) and squashes are planted in the Lowland milpa, usually at the same time as maize.²⁷ The commonest squash is apparently *ayote blanco* (tamaloyote), which it was said at Santo Domingo was planted in amounts not exceeding four or five vines per *cuerda* (about 25 to the acre). It appears that in the Lowlands, however, Indians usually plant separate gardens for crops other than maize, rather than mixing them in with the milpa; this is a more common

²⁷ Since my work in the Lowlands was confined to the dry acazon, first-hand details of planting methods are lacking for this region.

practice than in most of the Highlands (not even excepting the Lake shores). More different crops will grow with greater luxuriance and rapidity in the warmer, more humid climate, and richer soils. Hence we see at such a Lowland colony as San Pedro Cutzan small separate patches of pineapple, especially white "coco" (sometimes interspersed with *maguey*), squash, chile (Santo Domingo, verde, and chiltepe), beans, sugarcane, *guisquil* (in enclosures), tomatoes, rice, manioc, besides the groves of cacao and coffee (the two sometimes interspersed). There are also bananas, mixed clusters of such trees as breadfruit, *achiote*, corozo, and other minor plants. The Pedranos in their Lake village often mix maize and other plants, native and exotic, annual and perennial, to an extraordinary degree. One milpa which I examined near the Lake, just southeast of San Pedro, contained some squash and *maguey* interspersed with maize, and near it, separated by one of the many stone walls, a plot without maize, but rank with *maguey*, cotton, manioc, squash, *miltomate*, tomatoes,³⁸ chile, and coffee, in addition to scattered trees of mango, anona, and guava. Chickpeas (*garbanzos*), the chief money crop, are planted in separate fields.

In one locality in the Lowlands (San Bernardino, 400 m. or 1,312 ft.) rice was said to be interplanted with maize, both crops being planted with the *macana* (dibble).²⁹

NEW WORLD CROPS OTHER THAN MAIZE GROWN IN THE HIGHLANDS

Several major American field crops, other than maize, are planted in the Highlands, above 1,500 m. (4,921 ft.). Outstanding among these are beans and cucurbits.

BEANS

The commonest *jrioles* are small, black ones (*Phaseolus vulgaris*), though some red and white varieties are also planted. As a rule, beans are much more commonly planted in special fields than they are mixed in with the milpa. The three major bean centers of the Lake region are San Andres Semetebaj, Santiago, and San Pedro, with Santa Catarina and San Antonio also of importance. At the first locality, bean fields are often alternated with maize in annual

rotation, "to fertilize the milpa," according to Indian planters. Three beans are planted to a hole, the "width of a hoe blade" (actually about 15 in.) apart, "to facilitate clearing." These *jrioles de suelo*, always superior to *jrioles de milpa*, or cornfield beans, are planted in June and harvested in December. At Santiago three specific dates of planting were given: May 20, June 29, and August 1 to 5, with special significance attached to August 2 as the "eighth after the day of Santiago" (July 25). Preparation of the soil consists in clearing weeds and trenching; the growing season is 3 or 4 months. At San Pedro planting is mostly done in May, with the harvest in August, so as to make way for *garbanzos*, the main money crop, which is planted a week after beans are out and is harvested from January to March.

Ejotes (string beans) are gathered in some measure, but by far the major part of the bean harvest comes after the seeds are well dried in the field. Good quality *jrioles de suelo* are mainly limited to elevations between about 1,500 and 1,900 m. (4,921 and 6,234 ft.); they are virtually lacking in such a high region as the Quezaltenango-Totonicapan Valley (2,250-2,400 m. or 7,382-7,874 ft.), and even Solola (2,150 m. or 7,054 ft.). Though planted on the Coastal Plain, as low as 300 m. (984 ft.), they are of inferior grade in the Lowlands. It is for this reason that beans from around the Lake are at a premium, and go in trade both to Highlands and Lowlands, fetching a better price than local products.

CUCURBITS

Squashes.—(See pp. —.)

Guisquiles, or *vegetable pears*.—As a rule, almost all parts of the *guisquil* are eaten—fruit, greens, and root (*echintal*). From San Andres Semetebaj entire cargoes of *echintal* are taken to Chicacao and other Lowland markets. The light-green fruit (p. 14, d) appeared in greatest relative abundance and variety (large spiny, and egg-size, smooth)³⁰ at San Andres Semetebaj, as did the root; greens seemed to be sold on a particularly large scale at Santiago. *Guisquiles*, which have a wide elevation range, are ordinarily planted in small enclosures, usually about 2 by 2 feet (60 by 60 cm.) square and 3 feet (91 cm.) deep and made of sticks or canes (p. 22, d). The plants are cultivated in abundance up to about 2,200 m. (7,218 ft.), above which elevation they are less

²⁹ These were not the regular garden tomatoes, which are carefully cultivated by the shore, planted each in a neat mound with a round hole about 15 in. (38 cm.) across, and watered from the lake by hand. (See pl. 20, d.)

³⁰ This was not verified by first-hand observation, but was described by a reliable informant

³⁰ According to Bukasov (1930), "smooth chayotes without prickles are found very rarely . . . In Vera Paz a chayote with exceedingly small fruits, the size of a chicken egg, is depicted (primitive form)."

in evidence. In the Quezaltenango-Totonicapan Valley area, for example, they are little planted, and almost never appear in the markets of that region.

Only at Santiago Atitlan have I seen field plantings of *güisquiles*. The entire fruit is planted, one or two in a hole, separated from the next by as much as 4 or 5 yards (3.7 to 4.6 m.), the vines climbing widely over the great lava blocks. Most of the field plantings of *güisquil* are to be found on the large alluvial plain (El Plan) south of Santiago.

I was told at Santiago that the principal harvest of *güisquiles* was in November. Greens were gathered in particular abundance in September. The plant is perennial, and a large vine gives a copious annual harvest. Tax reported 150 fruits a year at Panajachel (Tax, 1936, Ms. Panajachel). Bukasov gives 100 a year as the average number of fruits from a mature vine in Mexico (total of 200 to 500 during a 4- to 6-year lifetime), where the root crop (cut annually) materializes after the second or third year. Roots of 22 pounds are recorded after many years in the ground (Bukasov, 1930). I have seen "wild *guisquil*"³¹ (*chimachoj*) roots of this size sold in markets between Quezaltenango and Momostenango, in the region where it is widely used as a soap for washing wool, in preference to all others for this special purpose.

MANIOC

Along many of the alluvial fans that border Lake Atitlan, sweet manioc, or cassava, is planted in limited plots. This altitude (1,600 m. or 5,249 ft.) is about the upper limit of the cultivation of manioc, which is grown typically and almost exclusively in such sites as the one herein described. The small alluvial area (not over 2 or 3 acres) below Santa Cruz, as it appeared on December 21, 1935, will serve as an illustration. In addition to a bit of milpa 30 paces (meters) square, containing a few squashes and bottle gourds (*tecomates*), and bordered by such fruit trees as oranges (7), limas (5), *jocotes* (12 chicha, 6 petapa, 6 corona) (pi. 19, c), mangoes (6), *matasanos*, *injertos*, and bananas ("majunche" var.), was a bed of manioc 15 paces square. The plants, a little over a year old, were from 7 to 9 feet (2.1 to 2.7 m.) high, and were spaced about 5 feet apart.

³¹ Bukasov stated that *Chayota edulis* is "apparently not known in wild state," and reported a wild relative only in Costa Rica (Bukasov, 1930, p. 319). I have been unable to identify the *chimachoj* which is so widespread both in growth (apparently to high altitudes) and use in the Totonicapan region. But probably it is either *C. edulis* "in wild state" or a wild relative, as the natives say. *Güisquil* is *chima* in Kekchi (Standley, 1930, p. 437), and I recorded at Santiago Atitlan "ch'imaly" (Zutuhli) and at San Andre's Xecul "ch'una" (Quiche).

Just above the manioc was a plot of *miltomates*, 15 by 30 paces, and a single row of sugarcane, for home consumption. A large area then flooded by the Lake had formerly been planted to tomatoes, squash, maize, sweetpotato, and especially manioc.

At Panajachel, rows of manioc, the plants spaced about 10 feet apart, are often planted between vegetable *tablones*.

TOMATOES

In nearly all of the Lake-shore villages, tomatoes are planted in special gardens bordering the water so as to facilitate hand irrigation. They are particularly abundant and important at Santiago, San Antonio, and San Lucas, with San Pedro, Santa Cruz, and San Marcos secondary. Tomatoes from all five of these towns reach Highland markets as far west as Quezaltenango, taken by Lake villagers and by Totonicapan middlemen. Fewest tomatoes are grown at Panajachel and San Pablo (dry-season planting at both). Very small *culcra*³² medium *criollo* (1 to 2 in.) and large "American" (U. S.) varieties³³ (San Pedro) are grown. At Santiago, which is taken as an illustration, mostly tomatoes "del pais" or *criollo* are cultivated. The major planting is done between August and October. After the rains stop, around the end of October, watering is necessary every third day, morning and afternoon, and is usually performed by the entire family. The growing season is 7 months. The usual practice with dry-season tomatoes is to plant them about 4 feet (1.2 m.) apart, in large mounds of soft, rich alluvial sandy loams (to which fertilizer is added in many cases), with a round hollow over a foot across in each hill, for retaining water (pi. 20, d). Almost all are within 100 yards (91 m.) of the Lake shore. Watering is usually done with water jars (*tinajas*), ordinarily women's vessels (pi. 25, f), but here used by men and women alike. Gourds are also sometimes employed. At Santiago, large lava rocks that cover the slopes are painted with round whitewash spots 6 or 8 inches (15 to 20 cm.) in diameter, "for frightening blackbirds, skunks, and other pests," according to one inhabitant.

Tomatoes are less abundantly grown during the rainy season, when they seem to be inferior and are most expensive, often costing 10 cents a pound during the late months. During Holy Week, they are cheapest, one-fifth of a cent a pound.

Planted in June and harvested during the dry season, mainly at San Antonio.

Growing season usually entire dry period (October-May).

*

Lake Atitlan is near the upper limit of tomato cultivation which averages about 1,800 m. (5,900 ft.).

POTATOES

The several types of potatoes, both "native" and "American," are discussed in Appendix 2. Many fields in regions above about 1,900 to 2,000 m. (6,234 to 6,562 ft.) are planted to this tuber, and particularly those higher than 2,200 m. (7,218 ft.), preferably those having light soils. Manuring was reported at San Juan Ostuncalco, Almolonga, and elsewhere. The premium potato areas in the high Quezaltenango region are, besides Almolonga, Concepcion Chiquirichapa (also nearby San Martin Sacatepequez, almost all inhabitants of which plant potatoes as well as maize), where pumice-nodular soil, recent ejecta from Santa Maria volcano, is widespread. Big white "American" varieties are planted here annually, in February and March, and are harvested in June. This is the season also at Almolonga. The little red *criollo* ("native") variety goes in the ground usually in December and January and is dug in July and August. In several sections it was reported that little "native" potatoes (white and red) have a "perennial" habit; that they are harvested only in part, with many left in the ground, and are not planted, but reappear annually in the field.³⁴ They were said to have been planted much more a generation ago (1900-1910) than now.

This primitive method argues for the antiquity of the potato in Guatemala. It was reported at San Cristobal Totonicapan and in the Momostenango area (cantons of Santa Ana, Tunayac, and to some degree in Buenabaj, according to Don Ernesto Lang). In the latter region there was said to be also some annual planting in April with yield in 5 months.

"Bingham, in 1887, wrote of his observations between Argueta and Totonicapan: ". . . on the hill-sides were ancient potato-fields only cultivated by digging the tubers, and this process has gone on for years—the Indians digging at the bottom of the slope as potatoes are wanted, leaving enough for seed, and arriving at the top by the time the rains begin . . . The Indians declared the potatoes had never been planted, but their ancestors had dug them from remotest time." (Brigham, 1867, pp. 136-137.)

The Russians, their efforts trained upon the potato more than any other plant, derived great interest from this passage. Their finding of a potato at Quezaltenango which was "certainly not *S. tuberosum*, the common cultivated potato of Europe or the U. S. A., but belonged to another Andean cultivated variety *S. andigenum* Juz. et Buk." was regarded as possibly verifying Brigham's suggestion that the potato near Argueta "was undoubtedly not the common cultivated potato." (Bukasov, 1930.) The Russian collection from Guatemala included also *S. tuberosum*; they seem to have overlooked the current practice of leaving the potatoes in the ground, though they described it as widespread in Colombia. "The cropping of the potato is in places very primitive . . . The harvesting is done yearly without planting again" (ibid., p. 198).

OLD WORLD CROPS OF POST-CONQUEST INTRODUCTION

HIGHLAND FIELD CROPS

Wheat.—A 16th-century report (Medel, Ms., p. 145, f. 192) states that the first wheat cultivated in the Western Hemisphere was brought from Spain and planted by a Negro in Mexico, whence it spread elsewhere in the New World. It was said to have been brought by a slave who had stored a few grains in his master's coin box.

The Vera Paz *Relacion* (Anon., Ms. 1574 b, p. 4, f. 93), tells of repeated unsuccessful attempts at planting wheat in that region, where it grew only at San Cristobal and Tactic, was badly rotted by excessive moisture, would not make bread, and soon was given up. Ponce (1873, vol. 1, p. 392) saw wheat as early as 1586, and as far equatorward as southeast Salvador (San Miguel volcano, lat. 13°30'N.).

The wheat planted in Southwest Guatemala is summer wheat, being planted in May and early June after the beginning of the rains, and harvested in December and January, with sickles. In the Cuchumatanes Mountains, however, most wheat is planted in October and November, and harvested in June and July. The land is hoed much as it is for maize, but not so deeply—usually 6- or 8-inch (15-20 cm.) furrows, some 20 inches (51 cm.) apart. At intervals of about every 15 or 20 feet (4.6-6 m.) little earthen dikes are constructed across the bottom of each furrow. This was observed everywhere in Southwest Guatemala. It was assertedly (at Cajola) "to retain the water and to prevent gullyng." The grain is sown by the handful, and covered with about an inch of dirt. Wheat is not manured, as that reportedly tends to make it run to excessive leaf, with poor grain development. A Ladino on the Lake said he tried planting wheat on the fertile saddle between volcanoes Atitlan and Toliman, and that it grew 4 or 5 feet (1.2-1.5 m.) high, with such a reduced grain yield as to make the harvest insignificant.

Varietal names of wheats given at San Juan Ostuncalco are as follows: Colorado (commonest), White Italian (very little), and a large "foreign" wheat called *trisco* (planted in July and August, harvested in January); at San Francisco el Alto the *criollo* is a small, long-grained variety, in addition to which there is a diminutive, round type said to have been introduced from California about 1933. Colima wheat was said to be planted at Salcaja.

In some higher sections (San Francisco el Alto) almost as much wheat as maize is planted. Often, broadbeans (*habas*) are put in between the rows of wheat, though considerably less than half of the fields are so mixed, even where this is practiced (e.g., Chiquilaja). *Habas* do not climb, being erect and straight, but they are much branched and grow to a height of 3 feet (91 cm.) or more, so they would shade shoots of other plants if the latter were not started 2 weeks or so in advance to meet the competition.

North of Solola, especially above about 2,500 m. (8,202 ft.), in the vicinity of Los Encuentros, wheat acreage appears to be almost as great as maize. The threshing method in the southwest Highlands is primitive, consisting of driving several horses around in a circular corral about 30 feet (9 m.) in diameter (pi. 23, c). Winnowing is usually made easy by the strong winds that characterize this region. Dollfus and Mont-Serrat (1868, p. 522) commented upon the abundance of wheat in this area in 1866.

The wheat grown in Guatemala is sold to large flour mills that are located in most of the principal towns (e.g., Solola,³⁵ San Juan Ostuncalco, Quezaltenango, Totonicapan). It seems to make good bread, though the gluten content is probably not high.⁸⁶

Large (% in. thick, 15 in. in diameter) "wheat tortillas" were said to be eaten at San Francisco el Alto. When maize becomes scarce, just prior to the harvest, in some regions wheat, plantains, and green bananas are assertedly mixed with maize in the tamales and tortillas.⁸⁷ At San Juan Ostuncalco it was stated that at least half the inhabitants mix wheat with maize in the *masa* (unsalted ground-maize mash for tortillas and tamales, posol, etc.) through preference, rather than necessity or abundance of wheat.

Broadbeans (*habas*).—The large broadbean is usually planted between rows of maize, or, less often,

* In 1932, two grades of flour were being milled at Solola, one selling for 290 pesos (\$4.83) a quintal (100 lb.), the other for 220 pesos (\$3.66). Wheat was bought from the Indians (mainly those from near Los Encuentros) for about 180 pesos C\$3.00 per 100 lb.

* According to the findings of Prof. John W. Gilmore, of the University of California Agronomy Department, a prolonged ripening period, moist and cool, may favor high weight and yield and good quality, but results in low gluten. Conversely, a short, dry, warm ripening period is conducive to high gluten content, but yield that ordinarily is less than in the first instance. (From a conversation with Professor Gilmore in 1939.) For an enumeration of important baking centers and the principal types of bread made, see p. 57 and also map 15.

* Tamales are eaten most in this section, according to every informant, for tortillas require more firewood, a scarcity in the open valley region.

wheat, in much of the higher regions (some above about 1,900 m. or 6,234 ft., but mainly above 2,200 m. or 7,218 ft.). Sometimes *habas* are grown alone in fields, as at Xepec, a little colony of Lucianos (from Sta. Lucia Utatlan) above Santa Catarina Palopo and in that municipio. Here maize, wheat, beans, and *habas* are planted, for the most part, separately, and rotated annually. Two miles away, at San Andres Semetebaj, broadbeans are usually planted in the milpa.

Varietal names given at San Juan Ostuncalco are: *bianco* (white, which is commonest), *morado* (purple), *asalporado* (floury?), and *amarillo* (yellow), the last three said to be planted mainly by Ladinos.

Many ways of eating *habas* were reported at San Francisco el Alto. They may be cooked in soup; or they may be boiled, ground, then boiled again, and made into a layered cake (op'en tayuyo), thin layers of maize and *habas* mash alternating, the whole then being rolled into a tamale and cooked as one. The latter is reportedly a luxury for special occasions. Besides being boiled in various ways, *habas* are toasted in the outer skin to a dark brown, in which form they commonly appear in markets (more often thus than fresh). Indians buy these extremely hard delicacies, which have a flavor resembling that of chestnuts, and munch them in the plaza with great cracking noises, a feat proving that many sound teeth may be belied by their miserable appearance.

Anise.—Anise is a specialty crop of San Antonio Palopo and, more recently, Ladinos of San Andres Semetebaj. It is planted in August and September, in separate fields, its growing season of about 5 months being mainly in the dry season, when it ripens (January).

Chickpeas.—*Garbanzos* (chickpeas) are grown almost exclusively at San Pedro la Laguna (and to a lesser extent at San Juan) where they have been a specialty since early Colonial times, as is also true of San Antonio anise. Chickpeas, planted during August in special-fields of about 4 or 5 *cuerdas* a family, have a growing season similar to that of aniseed, the harvest taking place from January to March. The yield was usually given as 150 pounds a *cuerda*. At that time Pedranos take sackfuls, transported mainly by mules, to the larger markets of the Lowlands and Highlands, going in numbers as far as Retalhuleu and Quezaltenango (see p. 76). The making of sweets from *garbanzos* is a Lenten spe-

cialty, which factor probably has acted as a stimulus to this crop since its introduction. The two principal sorts are *jalea* (sirupy jelly) and *mermelada* (preserves). Sold widely in great quantities but almost exclusively during Lent, *garbansos* are harvested at a period that coincides with the religious fast.

Barley and oats.—Barley and oats are raised on a small scale in some sections. The commonest type of the former is a large species of Nepal barley,⁸⁸ which is sold in the markets especially by itinerant Maxeños along with a dozen or more miscellaneous seeds, roots, and herbs, each in a separate little sack or package (pi. 14, b). Barley is consumed on a small scale as a "medicinal" plant, usually in broth (*atole*). For oats I have had only vague reports, and no specific data.

HIGHLAND FRUITS

The only fruit trees of Old World origin that are grown on a large scale in the Highlands of Southwestern Guatemala are apples and peaches. Both were grown in Guatemala at an early date, as attested by the Ponce account (1873, vol. 1, p. 441) which mentions them in 1586. Totonicanpan was particularly cited for the abundance of apples, and "some" peaches. The latter were noted especially at Comalapa, though they were said to be abundant even on the low-lying Lake village of Panajachel (1,575 m.). They are not to be found in the latter locality today, however.

Almost invariably, these fruits are of very poor quality; they are small, green, hard, and generally must be cooked in order to be made appetizing. Both fruits are especially abundant in the vicinity of Totonicanpan and Argueta. Peach trees are quite numerous in Solola, and even bear as low as Santiago Atitlan, yet the chief source of supply is Argueta, as many as 50 women from there commonly selling apples, peaches, and *habas* in the Solola market on Friday (map 22), during the height of the fruit harvest (September).

A few regions in the southwest produce high-grade apples, Chichicastenango, for example. Here, large red fruits resembling winesaps are produced on a small scale, along with the ordinary apples and peaches.

The desultory manner of cultivating fruit trees merely by planting seeds without grafting largely explains the low quality of the fruit. Gradual degenera-

tion has probably been continuous since Colonial times, with seeds planted for generation after generation, and little if any new stock brought in.

LOWLAND CROPS

Rice.—Rice is commonly grown in small independent Indian fields and in fincas along the piedmont, mainly, it seemed, between about 300 and 750 m. (984 and 2,461 ft.). I was told that "upland" rice (not flooded) was the usual type.

Four varieties were listed at Santo Domingo Suchitepequez: *criollo*, *cimarron*, *perlas*, and *colima*.

Rice is marketed, dry and polished, in small quantity by itinerant merchants⁸⁰ in the plaza, and by stores. It is often prepared in a thick, pasty, steaming hot broth, with milk, and sold usually by local women in the market.

Sugar.—⁴⁰ Sugarcane is grown and processed almost entirely in plantations along the piedmont, many of them low coffee fincas, where cane is planted in stream bottoms between coffee-covered ridges. Lake Atitlan alluvial shores, at 1,560-1,600 m. (5,118-5,249 ft.), are about on the upper limits of sugarcane growth. The labor of cutting and grinding cane is done mostly between January and May. Nearly all of the sugar consumed in Guatemala, especially that used by the Indians, is in the form of crude, dark-brown cakes (*panela*), common throughout Mexico and Central America (pi. 39, g). The cooked cane juice is poured into wooden molds where it crystallizes and hardens into compact blocks of a pound or two each. Shapes vary, there being hemispherical, square and flat, and "flower-pot" (truncated-cone) forms. The hemispherical ones are generally packed together as spheres (*pantes*), wrapped in dried banana leaves, usually two *pantes* to a package. They are largely trucked into the Highlands, wholesale, by shippers who are usually also storekeepers, and are redistributed among Indian merchants for retail, as at Solola, Quezaltenango, San Cristobal Totonicanpan, and other towns.

White sugar appears in markets in small quantity among mixed cargoes of itinerant merchants (q. v. under "Rice", this page, fn. 39).

⁸⁰ Usually by Maxeños, who have email sacks of it, often along with salt, panela, sugar, coffee (*oro* or unroasted bean), spices (especially chile), cigars, dried shrimp, trinkets, etc. (pi. 14, b).

⁴⁰Oviedo (1851-55, vol. 1, pp. 118-123) mentions the introduction of sugar into the West Indies, and the first lucrative mills there, early in the 16th century. Toward the end of the 16th century, however, sugar was not yet being produced in quantity in the environmentally favorable Pacific Lowlands of Guatemala, for it was doubtful whether there was a good market for this product (Anon., Me. 1570, p. 18). The west coast was isolated from Europe at that time.

* Specimens identified by Prof. J. W. Gilmore.

Cane grown by Indians is often sold in its raw state. In the Lake region, Santa Cruz and Tzununa especially grow cane along the alluvial flats, and sell sections of it in neighboring markets, especially that of Solola. Sugar was formerly produced on a commercial scale on Lake Atitlan, at the finca Jaibal, situated on the east side of the Rio Quixcap delta (map 20; pi. 45, /). The big flood of October 1881, however, wiped it all out, including three large mills.⁴¹

Melons.—Various watermelons are cultivated on the Coastal Plain. There were two types of seed at Santo Domingo Suchitepequez, one red and one black, that were said to be "native," in careful contradistinction to a "North American" (U. S.) yellowish-colored one. That all may be Old World is implied by the fact that they are called indiscriminately *sandia* (*C. itutins vulgaris*). A cantaloup (*melon*, *Cucumis melo*) is grown also along the Coastal Plain but in small quantity.⁴²

These fruits are fairly abundant in Lowland* markets, as at Mazatenango, but apparently they do not appear in the Highlands.

Melons of good quality in the outer Lowlands were described during the 16th century. That these may have been thought of as native is implied by the mention, in the same sentence, of other crops that were definitely pre-Columbian, such as sweet-potatoes (*camotes* or *vatas*), manioc (*yuca*), beans (*frisoles*), and squashes (*calavazas* or *ayotes*, which were "very nourishing"); then the writer speaks of *calavazas de Espana* in some places, and certain other Spanish plants grown "as curiosities" (Anoh., Ms., 1579, p. 18).

MONEY CROPS

VEGETABLE-GARDEN CULTURE ⁴³

SOLOLA-PANAJACHEL AREA

The distribution of this culture in the Lake Atitlan region, to the north between Panajachel and Los Encuentros, San Jose and Concepcion, is elaborated

in a later section (pp. 121-123). There are other centers, notably Almolonga and secondarily Aguatcatan, where garlic is the chief crop, but since my familiarity is greatest with the Lake center, illustrations will be drawn primarily from there.

The tablón as a garden unit.—The basic unit of this garden culture, as observed at Solola and Panajachel, is the *tabldn*, a vegetable bed of highly fertilized, dark loamy soil, usually of uniform width (3 *varas* of 33 in., or about 8 ft.) and somewhat variable length (average, about 30 *varas*, often slightly more, sometimes only half that, depending largely upon the space available). Indian gardeners at Solola in 1932 almost without exception stated that they commonly used 500 to 600 pounds of manure (horse and cattle), costing from 50 to 60 cents, on an average-size *tabldn* (about 9 by 80 ft.; pi. 20), before each planting. Less fertilizer is needed on the rich alluvium of the Panajachel delta, though all planters use some. A consensus of my informants was that everyone used manure, but it was mostly leaf litter from the *cajetales* (coffee groves), with much less horse manure.

The bed is neatly squared with great precision by skilled hoemen, so that it well suits its name (*tabldn*—a thick board), being as flat on top and as square-sided, indeed, as a plank (pi. 20). A retaining rim of dirt several inches high is often built along *tablon* edges. Between *tablones* and around them are dug trenches 15 to 20 inches (38 to 51 cm.) in depth, a foot or more wide at the bottom, having a profile that is between a V and a U, into which water is diverted when desired, to be thrown over the seeds or growing plants, with shallow tin bowls or gourds (pi. 20, c). This is done every third day during the dry season. Flooding is controlled by simple gates and dams that often consist merely of piled-up dirt. On slopes, *tablones* are arranged in steps, and appear as distinct terraces about 3 yards (2.7 m.) wide.

Irrigation.—The primary need of this culture is an abundance of available irrigation water. At Solola there are many small streams and springs, all of which are intensively utilized, with gardens of many *tablones* clustered along their courses (map 21). Much of the diverted water supply of Solola is used for this purpose, and below the town, water courses that have passed through the settlement continue their usefulness for irrigation. At Panajachel, on the delta, about one-third of which is covered with gardens, an intricate, fanlike network of diversion ditches fur-

⁴¹ Data furnished by Don Domingo Fuentes, of Solola. Coffee was replanted on the delta land by the Fuentes family, but it, too, was washed away* by a flood (October 1923). This vulnerable area has since been occupied only by a few cows, whose existence is insecure during September and October.

⁴² Collected by me at Santo Domingo Suchitepequez. Standley comments upon the rarity with which cantaloups are grown in Central America, either through dislike of the taste or difficulty of propagation (Standley, 1938, p. 1390). I am inclined to favor the latter explanation, since both Indians and Lacinos seem to enjoy eating them when they can get them.

⁴³ See McBryde, 1933, pp. 108-109. Sol Tax, of the Carnegie Institution, has made a detailed economic analysis of the culture at Panajachel (1936), though his results are as yet in manuscript form. They include the hours of labor and dollars of profit per man per crop.

nishes water to every portion where gardens are to be found (map 23). In addition to the main course of the Rio Panajachel, there are several small tributaries entering near the mouth.

Major crops.—The crops grown in *tabldnes* are mainly coles and allieaceous plants of Old World origin, with onions taking first rank (pis. 12, a; 14, /). Though some local inhabitants say that onions have surpassed garlic in quantity only in recent years, that such is probably not the case is evidenced by Mrs. Maudslay's statement, "To the Indian the chief glory of Panajachel is not its aguacates but its onions . . ." (Maudslay, 1898, p. 58). Her description of the delta indicates that it has changed but little since 1894 (*ibid.*, p. 57). Of the entire garden area of the north Lake basin, onions (always sold while small and green) represent probably 75 percent⁴⁴ of the total garden output. Garlic is also important at Panajachel, but this importance gets undue emphasis in the neighboring markets from the fact that garlic is not grown in the higher gardens, as around Solola, since it is too high and cold; and the big garlic center, Aguacatan, is far away to the north.

Minor crops.—Other important *tabldn* crops (Solola) are cauliflower, carrots, parsley, beets, cabbages, turnips, radishes, lettuce, and potatoes (the only American crop, and that not a local species). At Panajachel, it is too warm for potatoes; otherwise, the delta crops include all those grown higher up. On the other hand, there are many plants which, like garlic, will not bear well or even grow in the higher elevations of the Solola area; some of these are sweetpotatoes, manioc, and chiles, all of American tropical origin. Beans are planted in *tabldnes* only at Panajachel; results were said to be too poor for them at Solola.⁴⁵

Peas are minor at both centers; *miltomate* (husk cherry), both cultivated and naturalized, grows well in the latter. Native American crops (though most of them presumably of South American origin) almost equal European ones in number at Panajachel, whereas at Solola only the potato is American, and that from South America by way of Europe. Of South American origin also are pepinos, which, though not planted in *tabldnes*, are very important at Panajachel (pi. 20, d). Some strawberries (*Fra-*

garis chilensis) are grown in gardens, mostly by Ladinos and foreigners.

Though these two vegetable centers are removed by less than 5 miles, Panajachel, being nearly 600 m. (1,968 ft.) lower, and strongly influenced by Lake Atitlan, borders on a tropical climate, whereas Solola is truly in the mesothermal "tierra fria."

Growing seasons.—Growing seasons vary with the different plants. For garlic it is about 6 months, single cloves usually being planted at the end of the rainy season. > Onions, planted throughout the year, are transplanted at 3 months, when they are about 8 inches (20 m.) high, and require another 3 months for maturity at Panajachel, and slightly longer at Solola.⁴⁶

Often garlic, cabbages, manioc, and especially sweetpotatoes, are set out along the borders of onion *tabldnes*. Much space is devoted in small plots also to maize and pepinos on the delta (pi. 20, b, d). The latter crop is irrigated.

ALMOLONCA

Other than the Solola-Panajachel area, there is only one major vegetable-producing center in Southwest Guatemala, namely, Almolonga, in a tributary valley of the Rio Samala, southeast of Quezaltenango. This is said to be a recent center—important only since about 1910. The stream furnishes water for irrigation; also, there are lateral springs. Water from these and from ditches is scooped up and thrown over gardens by means of wooden boxes on 6-foot handles. Here the same vegetables are planted as at Solola, onions (all year) and cabbages (rainy season only) being outstanding in both places, with carrots, turnips, beets, radishes, and lettuce abundant as well. Many sorts of flowers are also cultivated. Tomatoes and garlic will not bear well at Almolonga. The former are grown on a large scale about 2 miles down the canyon, at Zunil, and are sold in quantity by Zunilefios.

In Almolonga, also as at Solola, there is a group of traders who specialize in handling fresh vegetables and flowers. These are sold in all the neighboring Highland markets by Almolongucnos, many also trucking them in great numbers to piedmont plazas. For the most part, women do the selling

⁴⁴My 1932 estimate for Soldi was 75 to 80 percent; Tax reported nearly two-thirds at Panajachel, garlic production being less than one-tenth that for onions.

⁴⁵Saltwort is mentioned by Tax as a minor *tabld** plant at Panajachel. Tax also introduced broccoli in 1937, and reported several families growing it.

⁴⁶See McBryde, 1933, fig. 12, p. 108. On the high slopes above Solola (2,500 m. or 8,202 ft.) 4 to 5 months is the necessary length of each growing period, from seed to shoot, as well as from shoot to maturity. For seed, onions are left in the *tabldn* for about 3 or 4 additional months, then they are harvested and hung up inside to dry,

in Highland markets, usually with mules for transport; there are also a few men. The coastal vendors are all men, using trucks which they hire, with drivers, for the purpose. They go mainly to San Felipe, Mazatenango, Cuyotenango, Retalhuleu, Coatepeque, and Colimba, returning with loads of Lowlands products, especially salt, *panela*, coffee, fruit, rice, maize during Lowland harvests (mainly August through October), and *hoja maxdn* (*Calathea macrosepal*), selling all of it mainly in Quezaltenango. Other important Highland* markets are those of San Cristobal Totonicapan, Cantel, San Francisco el Alto, and San Juan Ostuncalco. Highland maize goes to the Lowlands mainly in June.

It was said that 6 or 8 trucks (4 to 5 men to a truck) made the weekly circuit, as many as 14 trucks attending fiestas. A reliable informant stated that they went as far as Ayutla, and that formerly they got over to Tapachula, before increased export duties and governmental regulations put a check upon this international border commerce. Potatoes are reportedly taken to the Escuintla market from Almolonga by train, and two truckloads of them are said to go weekly to Guatemala City.

As in the Lake Atitlan *tablon* region, most vegetable seeds are imported in packets, from the United States, especially California. These are sold abundantly in markets near the *tablon* centers. Before the World War, according to local reports, much seed came also from Germany. Onion seed is locally produced. Much of this seed was said to have been brought from Oaxaca, Mexico.

Gardens at Almolonga are not made up of *tablones* like those of the Solola area, but are more irregular, with ditches around them. Some, at least, are wider (5 yd. in many cases). Fertilizer is necessary, especially for onions, both leaf litter and, to a lesser extent, animal manure being used. On slopes along either side of the valley, cabbages are grown only during the rainy summer. Suckers from old stalks are planted rather than seeds, as a rule. There are two "common varieties of these so-called "native" cabbages.

AGUACATAN

As Almolonga (2,300 m. or 7,546 ft.) is the western counterpart of Solola (2,150 m. or 7,054 ft.), having similar altitudes and crops, so, Panajachel (1,600 m. or 5,249 ft.) has rather a parallel in Aguacatan (1,700 m. or 5,577 ft.), at the south base of

the Cuchumatanes, in the Huehuetenango area, on the northern *tdgt* of the region considered in this study (map 3). Irrigation is easy because of the water of the Rio Negro and its numerous small tributaries, including springs that gush from beneath the massive limestone beds of the Cuchumatanes. I observed only onions planted under conditions similar to those of Panajachel in irrigated, fertilized *tablones*. Garlic appeared to be grown in gardens within the milpa, usually in plots of 2 or 3 *cuerdas*, or about half an acre. These are not *tablones*, though they are irrigated in the latter part of the growing season (September—February),⁴⁷

Of all the southwest region, and even areas bordering it, Aguacatan is the outstanding center of garlic production. As a few cloves of garlic will serve to season a great amount of food, 20 large sacks (about 80-100 lb. each) of this condiment sold wholesale by as many men every Friday in the San Francisco el Alto market⁴⁸ may be regarded as a considerable quantity. The extent of this garlic trade is evident from the following observation. On one occasion I observed, at the Guatemala-El Salvador border inspection station, 4 merchants from Quezaltenango on a bus crossing into the latter Republic. Their cargo consisted of 6 large loads (about 100 lb. or 45 kg. each) of Aguacatan garlic, all bought in San Francisco el Alto the previous Friday. These Quezaltecos said that until about 10 years before (1926) they all came on foot, with cargoes carried by mules: some 50 men in all, engaged in trade into Salvador.

Vegetables are supplied throughout Southwest Guatemala from these few centers (map 12). Recent expansion of the cultivation around Lake Atitlan (particularly onions and cabbages) is mentioned in a later section (p. 125). Occasionally, as at Pueblo Nuevo, it was reported that such European vegetables were grown in small plots for home consumption. To a large extent, these garden crops of Old World origin, such as beets, carrots, and cauliflowers, are eaten by Ladinos, the Indians apparently consuming very little other than onions and garlic, and those in no great quantity. They seem never to have acquired a taste for them. Though they eat greens in abundance, they prefer less expensive wild or native cultivated varieties, to which they are accustomed.

⁴⁷ In view of the limited time spent in this section, my observation* were not extensive, and these remarks might not be applicable to the entire community.

⁴⁸ San Francisco is about 40 miles by trail and road south of Aguacatan.

PLANTATION CULTURE

The great plantation crops of Guatemala's export trade today are coffee and bananas. Major plantation products of bygone eras, such as cacao, nopal, and to a lesser extent, cotton, have so declined as to be insignificant at present.

From the standpoint of the landscape of Guatemala, both natural and cultural, and of the human occupants of the area, coffee plantations are of interest in that they have brought fundamental changes in the plant cover, both cultivated and uncultivated; they have led to a permanent realinement and redistribution of large population masses, foreign as well as indigenous; and they have resulted in seasonal mass migrations, temporary dislocations of thousands of native Highland dwellers (map 12).

CACAO

The ancient Maya grew cacao on a large scale, and used the "beans" as a form of currency and for a highly prized drink, *chocolatl*, which only the wealthy upper class could afford. Their cacao plantations covered much of the Pacific Coastal Plain up to 600 m. (1,968 ft.), from Soconusco (Chiapas) to Nicaragua. In the wet savanna and monsoon belt (map 11), luxuriance of verdure assures the heavy shade and wind shelter so essential to the *Theobroma*, limited above by lowering temperatures, and below by excessive soil humidity, diminished rainfall, and hence thinner tree cover. Enormous quantities of cacao went to the Aztecs in trade and tribute, and the Spaniards, acquiring a taste for it and learning of its value, even increased the output under terrific pressure and at great cost of native lives. The production in El Salvador, estimated as 1,200,000,000 beans a year on 25 to 30 square miles of scattered groves (see p. 11), does not compare too unfavorably with modern yields (about 6,500,000,000 beans a year on 30 square miles of unbroken plantation; estimated from Barrett, 1928, pp. 94-96). The suggestion has been made above that cacao of the Lowlands from Soconusco to western Salvador was so prolific and superior as to exclude the less lucrative indigo, which has similar habitat requirements.

That some cacao was grown on the eastern versant is brought out in the Vera Paz *Relacidsn* (Anon., Ms. 1574 b, pp. 19, f. 101), but it was limited to small groves, often destroyed by floods and eaten by pests, for there were no permanent residents then in that distant, unhealthy region to take care of it.

Decline of production in Soconusco in favor of Suchitepequez is recorded by Ponce's companion

(Ponce, 1873, p. 293). No reason is given for this shifting of emphasis eastward.

Indians of the Lowlands, characterized by "lassitude and laziness," as distinguished from the energetic Highlanders, were said by Fuentes y Guzman (late 17th century) to depend too heavily upon the growing of one crop, cacao, their only economic pursuit, except, perhaps, for a "few plantings of cotton/" as a result of which, "if the cacao crop failed, they would perish from want and hunger." Plentiful harvests conversely led to celebration and revelry (Fuentes y Guzman, 1932-33, vol. 2, p. 66). The "one-crop system" was well rooted.

The big decline in cacao apparently came about the beginning of the 19th century, the result of South American competition, notably around Caracas, according to Juarros (Baily trans., 1823, p. 22). Cotton and *sapuyul* were supplementary products, but of minor significance, so that the great dependence was still on cacao.

With cacao production already on the wane, and cotton and cochineal destined to go the same road, upon the advent of imported aniline-dyed thread, the stage was set for some rejuvenation in the old plantation region of the Pacific slope. It came with the mid- 19th century agricultural revolution, and the new crop was coffee, known in Central America since the middle of the 18th century, but never before produced on a large scale in Guatemala (see p. 92).

The belt of major coffee production lies immediately between the overlapping zones of cacao, below, and nopal (for cochineal), above, the latter having had its greatest concentration between Amatitlan and Chimaltenango. The mushroom growth of coffee fincas that took place mainly between 1850 and 1925, drew on the population from both Highlands and Lowlands. Coffee filled in primarily the zone between 350 and 1,550 m. (1,148 and 5,085 ft.) (map 12); intensive cacao extended up only to 650 m. (2,132 ft.) (map 11); while nopal culture was mostly above 1,200 m. (3,937 ft.).

The establishment by Highland Indians of many Lowland colonies all along the Pacific piedmont primarily for the planting of cacao, and also maize, is discussed elsewhere (p. 93). The 1574 Vera Paz *Relacidsn* gives a due to the climatic requirements of cacao as reflected in its distribution, and the modern linguistic map of Guatemala showing language areas extending into the Coastal Plain from the Highlands can undoubtedly be explained largely upon this basis. It is pointed out, for example, that

Vera Paz lacked cacao (Anon., Ms. 1574 b, p. 6, f. 94), and that the Indians in order to get it had to go to the coasts of Sonsonate (modern El Salvador), Soconusco, Chiquimula, and Zapotitlan, all on the Pacific versant, where they worked on cacao plantations. Evidently, the climate was too humid and the rainfall too prolonged on the Atlantic side for successful cultivation; there was also the element of flood hazard.

The linguistic map (Sapper, 1897, map 5) indicates how Highlanders have colonized the Pacific piedmont. The southwestern areas of Mam, Quiche, Zutuhil, and Cakchiquel speech all extend into the Lowlands. Though much Spanish is spoken here by the Indians, many of them still retain their native dialects. In 1936 Quiche was being spoken by a number of Indian residents of Santo Domingo Suchitepequez, which is at about the lower limit of indigenous culture. In the Vera Paz area, on the other hand, it may be seen that the higher and lower areas are characterized by different tongues of the Mayan language speech-group (Pokonchi and Kekchi, respectively, south and north of Coban). The former language is virtually all above the elevation limit of cacao; only Kekchi includes much territory both above and below this limit. It is evident from the 16th-century report (Anon., Ms. 1574 b, p. 10, f. 96) that yet another entirely unintelligible language (probably Carib) was spoken in the low coastal region around the Golfo Dulce, with which the Highlanders had "no communication."

The expansion of railroads as a result of increased coffee production in the late 19th century had directly detrimental effects upon cacao growth, because of the clearing of forests for construction timber. At Santo Domingo Suchitepequez, it was said that not only this cutting out of construction woods, including several trees especially valued also as cacao shade, but the thinning of shade trees in order to suit the needs of the coffee interplanted with cacao, had resulted in excessive light conditions for the latter, with a consequent decline in yield. The shade and wind shelter requirements of cacao are much stricter than those of coffee.

Cacao is today a retrograde product of the Pacific Lowlands, not only insofar as quantity is concerned, but grade and quality as well. For flavor, natives invariably prefer *criollo*. My chief informant in this matter, Don Zenon Posadas, pointed out that the superior *criollo* variety, probably native to the region, had nearly all disappeared, having been re-

placed primarily by two inferior introduced types. These were "Costa Rica," with a broader pod, and "Nicaragua," having a longer, narrower one, as compared with the *criollo*. The pod of the latter is said to be reddish when ripe, and that of the others, light green, ripeness being determined by the feel of the pod and the sound made by tapping it.

The preference for planting the inferior cacaos was explained by the same informant as resulting from the quicker yield (3 years after planting) as compared with the *criollo*, which requires 7 to 8 years, even 9 for a good harvest. Also, the later cacaos⁴⁹ bear a much heavier annual crop, it was said, and have far less exacting shade requirements. There are two crops annually, one on the limbs (said in the region of San Bernardino to be the heavier of the two, and to be harvested from February to April), and the other on the trunk (November-January).

The planting, as explained at San Bernardino, involves first the seed, then the seedling, which is transplanted at from 1 to 1½ years, when it is usually about 2 feet high. At San Pedro Cutzan the presprouted seeds were planted at a shallow depth (not over ½ to 1 in.), separated from each other by an interval of about a foot. Transplanting took place at 1 year, when the seedlings were about 15 inches high. Shade trees included *pataxte* (*Theobroma bicolor*), *cuxin* (*Inga* sp.); and *madra de cacao* (*Gliricidia sepium*).

COFFEE

Whereas cacao is generally grown in small plots, coffee is planted over a large territory, the whole monsoon versant between elevations of about 500 and 1,400 m. (1,640 and 4,593 ft.) being nearly covered with fincas (pi. 5, b, c, d). Aside from varietal differences, coffee quality is largely a matter of elevation, that from the highest regions, as with most cultivated plants, being of the best grade. The two commonest varieties grown are *Arabigo* (or *Arabica*) *Comun* (*Coffea arabica* var. *cotun*) in higher elevations and *Bourbon* (*C. arabica* var. *Bourbon*; see Salvador, Ministerio de Instrucción Pública, 1926, vol. 1, pp. 90, 91), an earlier maturing variety, at lower levels, where Maragogip is another common type.

The shade required, particularly for the seedlings, is prepared from brushwood and shade plants (pl. 19,6).

⁴⁹ Said by Posadas to have been introduced at San Antonio Suchitepequez about 1917.

Sources of labor consist primarily of Indians of the Highlands, permanent finca residents (*colonos* or *rancheros*) on the one hand, and temporary migrants (*temporadistas*, *cuadrilleros*, or *jornaleros*)⁵⁰ on the other, the latter generally accounting for the larger number of finca hands (map 12). Their labor is measured in terms of clearing by the *cuerda* (about 1/5 acre) and picking by the *quintal* (101 lb.) being paid in 1936 usually 12 to 15 cents a day (25 cents for skilled labor). The harvest is mainly between October and December. During the rest of the year, constant clearing of weeds and second growth is required. The municipio of Chicacao (p. 92) is illustrative of the manner in which Highlanders have settled in the coffee belt, and from this, as from map 12, some idea may be had as to the provenience of coffee laborers, and the distances to which they migrate.

Coffee fincas are owned principally by foreign planters (Germans, English, and some Americans, who control most of the larger ones, such as Moca, Chocola, and Pacayal) and native non-Indian Guatemaltecos. Indian *finqueros* are to be found in certain sections, as near Pueblo Nuevo, where one Indian *alcalde* is said (1936) to own a plantation of 2 *caballerías* (2,000 *cuerdas*, or about 400 acres), and several others have, on an average, 25-30 *cuerdas*. The coffee produced on all these is sold to larger fincas for processing and resale as *café en oro* (unroasted "bean").

Landscape transformations resulting from coffee plantations.—Just as cacao cultivation has brought about changes in the composition of natural vegetation in the Lowlands (p. 34), so in the piedmont, coffee culture, despite its relative recency, has resulted in a distinct alteration of the original plant cover. There can be little doubt that, long before the Conquest, occupation by agricultural man transformed in some measure the nature of nearly all the forested regions of Central America, so that truly virgin forests no longer exist.⁶¹ Such tem-

porary fields of maize, beans, and squash were eventually abandoned, allowing the forest clearings to go back to their natural vegetation cover, after a "few years of "mining" the superficial wealth of the rich humus layer and destroying the forest litter through continued burnings. But not so in the planting of cacao and coffee. These plantations demand not only permanent clearings around the trees, but shade, especially in the case of cacao, which must be protected also from winds. This has involved the establishment of certain special shade plants, as well as the elimination of less desirable types. The best-suited and most widely known tree for cacao shade is the "*madre de cacao*" (lit., "mother of cacao," *Gliricidia septum*), sometimes called also "*madera negra*."⁵² *Pataxte* and *cuxin* (see pp. 34, 148) have a significance for cacao shade, however, that is secondary to the *madre*. The latter is of some value for coffee as well, though *cuxin* and *chalum* (*Inga* sp.) seem to be the most widely planted shade trees throughout the coffee belt of the Pacific versant. The abundance of these trees has accordingly been artificially increased. All of the above-mentioned, except *pataxte*, are of the family Leguminosae,⁵³ probably not tall enough to meet the competition of the high monsoon forest without the aid of man.

The result has been, then, in the coffee lands of the *boca costa*, extensive areas of thin, artificial woodlands covering the ridges between numerous, heavily forested ravines and steep stream courses (pl. 5,0-

Another important shade tree in the higher coffee fincas, particularly those on the shores of Lake Atitlán, is the *gravilea* (silk oak, *Grevillea robusta*; pl. 19, b); having the disadvantage of extreme brittleness and vulnerability to strong winds. When coffee seedlings are first set out, each is usually sheltered by a small banana plant, which shoots up rapidly and affords protection from the sun until the slower growing, permanent shade trees, such as the *madre* and *cuxin*, reach an appreciable size, usually a matter of several years. Hence, the aspect of the plant cover in a coffee grove depends largely upon the stage of maturity of the coffee plants.

BANANAS

Following the disastrous hurricane and flood of October 1935, which destroyed great areas of banana

⁵⁰ On some fincas, e.g. Moca, there are more permanent than migrant laborers (683, mostly from Chichicastenango, as against 317); at Chocolathere are, on the other hand, more *temporadistas* (880 as compared with 633).

⁶¹ Nomadic hoe culturists have undoubtedly penetrated every forested area at some time, burning and planting, then shifting to burn and plant again. Cook (1909, p. 20) cites as evidence of a "secondary character of supposedly primeval forests" in eastern Guatemala, the digging up by Indians of pitchy roots of pines, for use as torches from the floor of luxuriant tropical forests which have long since overshadowed the pioneer conifers and driven them out. I have also seen this done on a number of occasions in some of the highest and most remote forests of Chiapas, including the great, uninhabited Tzendales.

⁵² It was reported at San Antonio Suchitepequez that candles and soap are made from this tree and the flowers are eaten.

⁵³ The genus *Inga* is mimosaceous; *Gliricidia*, is fabaceous.

plantations on the east coast of Guatemala and spread the Panama disease (banana wilt) there, export production of the fruit on the Guatemala west coast attained considerable importance (pi. 5, e, /). From this reemphasis upon bananas along the west coast, it is not to be assumed that bananas are recent on the Pacific side. Bananas are mentioned in the Cakchiquel Annals (Brinton, 1885, p. 107), and some varieties seem to have grown in America prior to the Conquest. They were characterized in 1579 as "trees of great utility . . . for the fruit called 'plantanos*' [bananas] and they bear at all seasons to the benefit of the poor as well as the rich" (Anon., Ms. 1579, p. 17, f. 113); and Ponce was feted with bananas and honey along the Pacific piedmont of Guatemala during his journey of 1586 (Ponce, 1873, pp. 429, 431, and others). Fuentes y Guzman mentions the importance of bananas here in about 1690, relating that the leaves are used for many medicinal purposes, especially for fevers, and that, according to Acosta, the fruit supplemented maize as a food, being used also to make a fine wine (Fuentes y Guzman, 1932-33, vol. 2, p. 67).

Oviedo (1851-55, vol. 1, pp. 291-292) places the American introduction of the Old World banana (said by traders of that period to be a native of India) in 1516, from Grand Canary, brought by a friar, and first planted in the New World at Santo Domingo. Fuentes y Guzman wrote of *plantanos dotinicos* that they were "so called from being of the same species as those from Hispaniola." "Guineos" he referred to as "those from Guinea." "Guineo" today in Southwest Guatemala usually means banana, edible raw, while *platano* means plantain, which must be cooked. Apparently, *hen, some, bananas were pre-Columbian in America, while others, probably the most desirable varieties, were introduced from the Old World.

Many *finqueros* who had previously planted bananas as preliminary coffee shade (and who had allowed their mozos to help themselves, even to sell the fruit in the market; p. 84) began trucking out the fruit to the railroad, where it was loaded onto trains and shipped to the Atlantic port of Barrios (pi. 5, /). Indian laborers employed in the handling of bananas sometimes used the tumpline (*mecapal*) in carrying the "stems" (bunches) to the railroad. This is a trait seldom seen on the Atlantic slope, where the stems are carried on the shoulder, usually by Negroes. The latter method is also common on the Pacific side.

At Pueblo Nuevo, the following banana varieties were recognized: *Platano* (plantain), *platano dominico* (Santo Domingo var.), *platano guineo* (large banana), *banano morado ingerto* ("red hybrid"), *guineo blanco* (*fino* and *ordinario*), *guineo pina*, *guineo mansana*, *guineo jocote* (said to have flavor of jocote corona), *guineo perulcro* (fruit stem reaches ground, for the tree is only about 6-8 feet high). Bananas are even more important than maize (which is usually costlier) for fattening pigs in this region.

The 10 varieties of bananas and plantains described in table 2 were growing in an experimental section of the Armas finca at Panajachel.

TABLE 2.—Ten varieties of bananas and plantains grown in the Armas finca at Panajachel

Common name	Description of fruit	Leaf length	Approximate height and diameter of stalk of plant
Guineo de miniatura..	eter.		9 ft. X 6 in.
Guineo de ora.....	4 in. long X 1 in. diameter.	8 ft.-9 ft. (Narrow.)	
Guineo de coche.....	5 in. long X 1 in. diameter.	9 ft.-10 ft.	
Guineo banano.....	8 in. long X 1 1/2 in. diameter.	10 ft.	
Guineo blanco (or "de pijaro").....	5 in. long X 2 in. diameter, pinkish flesh.	10 ft.	
Guineo de manzana...	6 in. long X 2 in. diameter.	8 ft.-9 ft.	
Guineo de m3junche...	6 in. long X 2 1/2 in. diameter, pink flesh.	7 ft.-8 ft.	
Platanito.....	8 in.-9 in. long X 1 1/2 in. diameter, pink; coarse flesh.		10 ft.; thm (8 in diameter base).
Platano.....	6 in. long X 1 1/2 in. diameter.		12 ft.; thin (9-10 in. diameter base).
Guineo injertado (hybrid, morado X de coche).....	6 in. long X 2 in. diameter.		14 ft.

CINNAMON AND SESAME

Two Old World crops that are increasing somewhat in importance in the Lowlands are cinnamon and sesame, particularly the latter. Both give promise of great economic potentialities.

Cinnamon was said to have been introduced as a plantation crop during the rule of Barillas (1885-91). A large grove of cinnamon on the finca San Antonio Palajunoj, near Palmar, was reportedly destroyed by the 1902 eruption of Santa Maria Volcano. The plant is grown on a small scale today at Pueblo Nuevo

(Finca San Nicolas), where there is (1936) a grove of 70 trees. It has been planted only 10 years, and has been bearing during the last 3. The bark is marketed at Mazatenango; local production is insignificant, however, in comparison with the amount imported to meet the great native demand.

Sesame seed is now being widely cultivated along the piedmont. It is produced in some quantity at Santo Domingo Suchitepequez, whence it is taken and sold in Mazatenango, especially to the "Florida" mill, where it is reportedly made into oil.

DOMESTICATED ANIMALS

Before the Conquest, the Indians of Central America had no regular meat supply. Turkeys were raised mainly for feathers for decoration, and a mute dog is the only animal mentioned as a common domesticated source of meat. It was called "xulo" in Nicaragua, and was said to be raised on a very large scale for food. Oviedo wrote that the meat was very good and not unlike goat (Oviedo, 1851-55, vol. 1, p. 390).

CATTLE

The early introduction of cattle into the mainland of Central America is by now well known, mainly from the reference in Juarros' history (1810, vol. 2, p. 354) to one of the earliest cattle ranches in Guatemala, in the valley (just east of the present capital) called "Valle de las Vacas" to commemorate it. This reference is cited by Dollfus and Mont-Serrat and other later writers. The animals were brought from Cuba by Hector de la Barreda, apparently before 1530.

The drier eastern Departments are still the principal regions of cattle breeding and raising (map 13). These include especially the Departments of Guatemala (Vacas and Palencia), Jalapa, Jutiapa, and Santa Rosa, from all of which cattle (mainly young bulls) are driven by Atitecos to the Chicacao market. Not only from these provinces, but also from the dry valleys of the Baja Vera Paz, cattle are brought to the markets of southwestern Guatemala. Cubulco seems to be the chief center, with Rabinal and Salama secondary. Quiche and Chinique Indians commonly are the middlemen, buying the cattle in the dry interior pastures and driving them to markets. The largest and most consistent sales of cattle in the southwestern region are made along the piedmont, especially in the Sunday plazas of Chicacao, San Antonio, Santo Tomas la Union, and on

the lower fincas. The savanna lands of the Pacific Lowlands afford good grazing, so that it is common for inhabitants of the Coastal Plain to purchase half-grown cattle to raise and resell—bulls to butchers of the piedmont and Highlands, to which many of them are driven, and cows for milk. It was said at San Antonio that on a good Sunday as many as 80 head of cattle, mostly from the valleys of Baja Vera Paz, would be sold, primarily to Ladinos. The Xankatales (of Nahuala-Santa Catarina Ixtanuacan) in particular engage in the industry of raising bulls for flesh, and their chief market for purchase is Santo Tomas la Union (pi. 4, d), the cattle there coming in part from the Quiche-Baja Vera Paz area and in part from the more distant eastern Departments. From the latter region come most of the cattle sold in the Chicacao market; they are driven primarily by Atitecos.

In the Highlands, cattle and other large animals are sold in most markets on a large scale only during the big religious or national fairs, a few times each year, and seldom in the ordinary, weekly market. Usually there is a special place, somewhat removed from the main plaza, where the so-called *feria*, or animal market, convenes (pis. 28; 35, c, d). At Solola, for example, this is at the "Temple of Minerva," one-quarter mile east of the regular market. There are a few centers, however, such as Chiche, where cattle are regularly sold in a plot adjacent to the central plaza once each week, in this case Saturday.⁴ In the Highlands, milk cows, though not numerous, seem to predominate over beef animals, which are generally driven up from the Lowlands and promptly slaughtered by butchers.

BEASTS OF BURDEN

Small, hardy mules (pi. 12, a) are the commonest carriers of the region—pack animals sometimes trained here, as elsewhere in Central America, to follow a mare (usually white, to be easily seen in the dusk) with a bell. Mules not infrequently bring a higher price than horses, both animals being commonly ridden. Donkeys are the least numerous of the three.

In parts of the Lowlands, and even in the high country where roads permit, oxen with carts (pi. 3, a) are fairly numerous, though not nearly so abundant as in El Salvador (pi. 44, e).

⁴ Here I have observed Lake Atitlan Indians, Cruccfios and Solo latecos, purchasing cattle.

SHEEP AND GOATS

The Highland habitat of sheep has already been mentioned (pp. 6, 7). Goats, mostly raised in the same regions as sheep, are far less common and economically important. Both animals are kept at high elevations, rarely below 2,000 m. (6,562 ft.) (pi. 32). The absence of sheep in the Lowlands is evidently owing to the greater abundance of insect pests and diseases in the warmer zones. The greater warmth alone would not be a deterrent, as is evidenced by the production of sheep in many tropical lowland regions. The heavy wool coat may act as an insulator against the hot sun.

The slow acclimatization of sheep in Guatemala after the Conquest is attested to by several early sources. The paucity of sheep in 1571, and the large-scale importation of them to Guatemala from Oaxaca, may be seen in the following statement. "Few sheep are raised fin Guatemala], so over 3,000 sheep are brought in annually from the valley of Oaxaca, and they are not worth more than six reales . . ." (Velasco, 1894, p. 285). Wool has been since early Colonial times the most important and valuable product of sheep. Ponce's companion cites the scarcity of sheep in El Salvador, and reports (Ponce, 1873, vol. 1, p. 384) that mutton was brought by the Spaniards from the Valley of Mexico to Sonsonate. In the same volume (p. 439), the anonymous author reports sheep raising as "just beginning" in the Highlands near Quezaltenango, where pasturage was reported to be good.

The sources of supply of raw wool for the weaving centers are plotted on map 16. Important sheep markets in the southwest Highlands are as follows: San Francisco el Alto, Chichic, San Juan Ostuncalco, and Cantel (map 15). There are usually a few sheep for sale in the Friday plaza of Solola, but this is a secondary center. Sheep and goats are not sold in Lowland markets. (For the description of sheep, and the sale and uses of wool, see p. 63).

PIGS

Early references to pigs are fewer and less specific than those of other domesticated animals. In the latter half of the 16th century, according to Pineda (1908, p. 431), Spanish merchants along the coast of Guazacapan sold, in addition to native and imported articles of wearing apparel, also "bread, biscuit, bacon, and viscera of pig for eating . . ." The Indian buyers paid for these pork products in cacao.

A study of the pig traffic in Southwestern Guatemala today reveals a transhumance based upon a division of labor arising from regional contrasts. The buying and raising of young pigs is a widespread activity which may have considerable local importance. It can be most successfully practiced in the Lowlands, where there are two harvests of maize. In addition to the abundant grain (poorer and cheaper than Highland varieties) there are many palms and other trees which supply fruits, nuts, and seeds. Breadfruit and *quiamol* are said to be important sources of pig feed, as are bananas, mentioned (with maize) particularly at Pueblo Nuevo. The feeding of whey as a byproduct of cheese at San Bernardino has been pointed out. Maize and whey were said to be the chief pig foods in this community.

With only one harvest of maize in the Highlands, and a dearth of suitable fruits and seeds, cultivated or wild, there is an altitudinal exchange of pigs in different stages of maturity, comparable with that of cattle. In both cases, it is usually the young animals, little affected by the great altitude change, which move into the lower, tropical levels where they are raised, while maturer, usually full-grown ones, difficult to acclimatize, are driven in quantity to the higher regions for slaughter. Illustrations of the former process are evident in the two chief pig markets of the Southwest, namely, San Francisco el Alto and Chiche. Herds of small pigs,¹⁵⁵ each attached to a string, may be seen any Friday squealing through the streets as they are driven from the high-perched animal market of San Francisco el Alto (pi. 13, c). Special merchants who engage in this activity, said to be primarily men of San Francisco la Union (4 miles west of San Francisco el Alto), drive the animals along the road to Lowland markets. In 1936 there were four men who regularly herded some 20 to 30 pigs each (when they left San Francisco on Friday) first to San Felipe for the Sunday market, then next day to Cuyotenango and Retalhuleu, two vendors going to each of these towns (see map 13). Other Lowland centers, such as Mazatenango and San Francisco Zapotitlan, are supplied with pigs from San Francisco el Alto. That they are not sold exclusively in the Lowlands, however, is evidenced by the appearance of the small animals in the markets of Quezaltenango, San Juan Ostuncalco, and Cantel,

¹⁵⁵ These come to San Francisco from various parts of the Highlands, I was told, even from as far as Huehuetenango, but most were said to be from San Francisco and municipios immediately to the north.

for occasional purchases by Indians from neighboring villages.

Chiche is probably the most important weekly livestock market of the entire Southwest, not only for smaller animals as at San Francisco, but also for cattle, horses, and mules. Of all these, little pigs are most numerous, and are sold by more individuals. Great numbers of them are driven from the Chiche market to and beyond the Lake Atitlan region. Many are sold in Chichicastenango, Solola, Santiago, and as far as Santo Tomas la Union and Chocoma, in the piedmont. To Santiago go Indian men of Quiche, usually two at a time, driving about 50 pigs, mostly young ones, and Ladinos of Chinique also in two's, with a comparable number of pigs. Trips are made at intervals of 2 weeks or so, and the animals, being much in demand, are generally all sold in 2 days.

Full-grown, fattened pigs are driven in various parts of the region, generally from lower to higher elevations. From Santiago to Solola, for slaughter, they are driven up the trail in little herds of 10 or so, after they have been transported across the lake in dugout canoes manned by Atitecos. Medium-sized to large pigs, generally not very fat (at least when they reach their destinations), are brought into the Quezaltenango animal market (La Democracia) every few days, from such distant places, I was told, as Jacalcnango, Soloma, and Huehuetenango, in the Department of the latter name, and from Cotzamal and Chajul, in the Department of Quiche. In most of these instances, unlike those of the Solola region, there is little altitudinal difference between the places where the pigs were raised and their destination, Quezaltenango. The long-distance trade is apparently a result merely of the greater size and importance of the latter market. On one occasion I saw 35 large pigs on the road between Olinpeque and Quezaltenango, headed for the latter town. Most of them, especially the larger ones, were equipped with rawhide sandals to protect their feet from the wear of 8 days of walking on mountain trails. They had come from Soloma, about 70 miles (113 km.) to the north, across the high Cuchumatanes Mountains, and were driven by two men of that municipio.

FOWLS

Chickens and a few ducks and turkeys are commonly kept, mostly for eggs and for home consumption, with a small surplus for the market. Whitish and light brownish turkeys are more often seen than the usual darker brown North American types (pi. 13, b). Most chickens are degenerate crosses. Native

Muscovy ducks (*Cairina moschata*) are the common type.

UNDOMESTICATED FOOD ANIMALS IGUANAS

Hunting, fishing, and crabbing activities at Lake Atitlan will be described in later sections (pp. 120, 124). The Lenten importance of non-"flesh" animal foods is so great in this Roman Catholic region that every source of the desired goods is fully exploited. Foremost among these (except for fish) is the iguana, a large fierce-looking, but quite shy and innocuous, terrestrial-arboreal lizard.

A great number of early colonial chronicles and natural histories dwell upon the iguana at considerable length, many of them including quaint, but realistic illustrations. To the early Spaniards this reptile was new, and his fierce mien arrested their attention; more important, he provided a source of animal food during Lent, a fare approved by the Church. That the non-"flesh" classification of iguanas was early may be seen from the account of Ponce's late 16th-century travels, wherein (Ponce, 1873, vol. 1, p. 379-380) it is stated that since the Conquest of Yucatan, "iguana, though they live on land, are eaten on Friday, during Lent, and on other days when meat is not eaten." The same author (p. 378) characterized iguana as "tender and good to eat," and such comments regarding it were frequently made in the early literature of New Spain.

Iguanas are extensively caught for food along the Pacific Coastal Lowlands. The reptiles appear in greatest numbers in the outer part of the plain, but behind the littoral. They are captured by dwellers of the piedmont towns and villages, who go out on trips of several days' duration into the wooded, uninhabited sections of the outer Lowlands during the laying season. This is between the middle of January and the middle of March and generally includes much of the Lenten period. When iguanas are laying they are easily captured, partly because they seek sandy tracts, often removed from the protection of their high tree refuges, and partly because the egg-laden females are incapable of rapid movement. Consequently, many of the iguanas sold in the markets are bulging with eggs, a condition which makes them more in demand, for the eggs (*iguaxtcs*) are regarded as special delicacies.

Ordinarily the reptiles are sold in the markets alive. Hundreds of them are to be seen in the plazas of the larger centers along the piedmont, such as Mazatenango and Escuintla, and they are sold on a

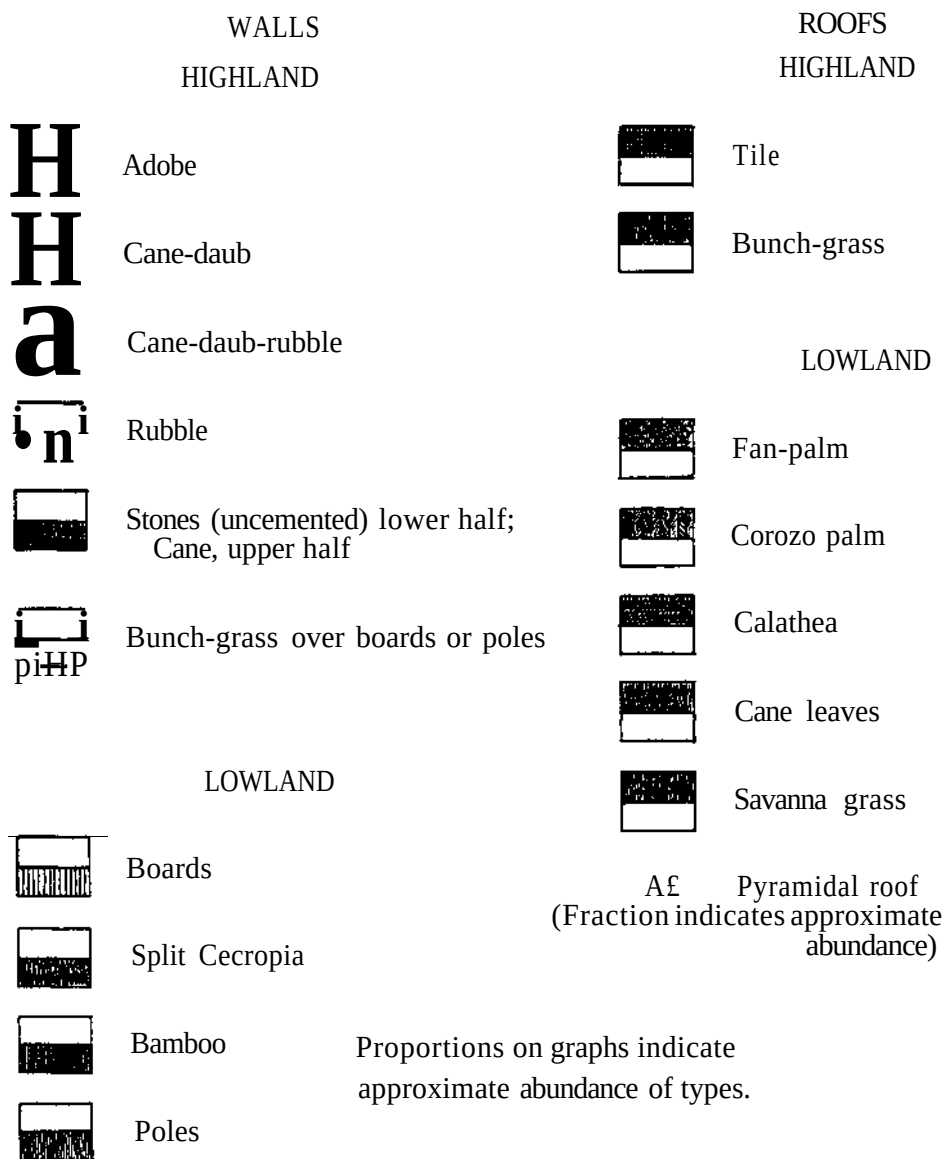


FIGURE 2.—Explanation of symbols used in map 14.

somewhat smaller scale at San Antonio, Cuyotenango, Chicacao, and other less populous towns. Sometimes the great lizards are carried in trade up into the Highlands (pis. 12, e; 13, a). The markets of El Salvador are generally well supplied with live iguanas during the Lenten season.

CAYMANS

(*Caiman* sp., a close relative of the North American alligator)

It was said all through the Lowlands that until recent years cayman hunting had been a major industry, carried on mainly at night with torches and gigs. The year 1932 or 1933 was suggested as about the time when hunting laws went into effect to protect caymans in the Department of Suchitepequez.

Roast cayman still appears not uncommonly in the markets, however, at times reaching the Highlands.⁸⁶ There seems to be a great demand for it at the present time, especially during Lent. Mrs. Maudslay wrote of this fondness for cayman meat on the part of Zaragoza Indians, quoting a probably exaggerated local report to the effect that vendors had "to be locked up in the 'career for protection and sell the meat through the prison .bars" (Maudslay, 1899, p. 41).

Smoked garfish impaled upon large sections of cane are commonly sold in Lowland markets. At Santa Lucia Cotzumalguapa, in January 1941, I saw eight Indian women in the market selling smoked venison, wild boar, and tepeizcuinte (probably *Cuniculus paca*). Three others were selling live iguanas.

HOUSES

(Map 14)

HOUSE PLANS: DWELLINGS

No attempt was made to undertake any but the simplest observations regarding house construction and architecture. These aspects of habitations were carefully studied in 1934 by Wauchope, whose detailed descriptions and excellent illustrations appeared in print in 1938.⁸⁷ Since his purpose was manifestly "to facilitate interpretation of ancient dwelling sites," however, the scope of his observation was of necessity somewhat limited. In view of this fact, and of the difference in viewpoint between the geographer and the archeologist, it seemed expedient to attempt a broader survey, emphasizing the highly variable and often environmentally conditioned factor of materials of construction, especially for walls and roof, noting at the same time characteristic floor plans, thatch crests, and other outstanding features.

House types in Southwest Guatemala vary primarily in terms of materials of construction, dependent essentially upon the environment. There is little fundamental difference in form, or even in floor plan, for nearly all are rectangular (the A-frame type being possibly of European introduction). There are two types of rectangular houses: the A-frame type and the king-post variety, which Wauchope (1938, p. 26) has suggested as being the

older of the two. The apparently older-style, square houses, with pot-capped, pyramidal, grass-thatched roofs, are seen only in the more primitive, isolated Lake Atitlan villages and certain of their Lowland colonial offshoots (map 14).

Wauchope concluded that, in Guatemala—

The square house may be older than the rectangular. An informant at San Lucas Tolimán said that the square house and the rectangular house with its ridgepole supported by a single king-rod at each end (pi. 7, d) are both older forms than the rectangular house with its ridge-piece carried by A-frames or rafters. He said that the last-named type came in about thirty years ago, in imitation of rectangular houses on plantations of the West Coast. If this is true, the occurrence of the square house could be used as a measure of the relative primitiveness of towns in Guatemala."

A comparison of the present-day aspect of San Antonio Palopo with its 1894 characteristics, as shown in the photographs published by the Maudslays (1889, pp. 52, 53), affords some confirmation of Wauchope's report; for square houses, apparently the "primitive" type, actually predominated in 1894.⁸⁹ Even the rectangular houses were not very elongated. In 1936 the latter type was prevalent, with pyramid roofs extremely rare, and there were even a consid-

⁸⁶ In Soloá (1932) I have seen smoked cayman for sale in the plaza (i't. 14, d), and was told that it came from near Tahuesco. The chief source of the delicacy in Quezaltenango (1936) was said to be the lagoons and marshes in the vicinity of Coatanco (?).

⁸⁷ Wauchope, 1938. This is the only detailed study of modern Guatemalan houses thus far undertaken, for other than a very restricted area (e.g., Kekchi, Sapper, 1905).

⁸⁸ Wauchope, 1938, p. 26. The appearance of the pyramid roof and round or square types in the various codices may be cited as evidence of their antiquity in Mexico. (See Mendoza Codex, reproduced in Wauchope, 1938, p. 170; and, for pyramid roof, Codices Nuttall and Borgia, reproduced in Linné, 1938, p. 19.)

⁸⁹ Besides the photographs there is the statement of Mrs. Maudslay (1899, p. 51): "The walls of the queer-looking square houses are built of rough stones, held together by a framework of undressed sticks . . . none of the Indian houses are plastered or white-washed . . ."

arable number of tile roofs and whitewashed walls built of rectangular adobes (pi. 23, *a, b*).

On the basis of various bits of evidence presented by several writers on house types, it seems that the square or round house was the commoner aboriginal type in Mexico and Central America. The gable-roofed, rectangular type apparently represents a later introduction.

One 16th-century author, whose writings are almost unknown in America, states, "In these cold regions [Highlands] the Indians' houses are little round grass huts . . ." Oviedo (1851-55, vol. 3, p. 131) states regarding the early 16th-century round, cane-walled, thatch-roofed huts of Castillo de Oro, that round walls presented less wind resistance than square and rectangular ones, and were therefore desirable, especially in view of the frequent strong winds. Elsewhere (ibid., p. 163) he describes two types of houses: "*canay*," round, commoners' huts; and "*buhio*," rectangular, the larger houses used by chiefs, thatched with grass, *bihao* (*Calathca* sp.), or palm.

CONSTRUCTION FRAMES AND WALLS

In the mesothermal region (generally above 1,500 til. or 4,921 ft. elevation) adobe is the usual wall material (pi. 10, *b, f*); below, in the coastal Lowlands, except for better houses and buildings of adobe or wood, walls are generally made of vertical poles, canes, or boards with open spaces between them for air circulation (pis. 2, *b, d, g*; 3, *c*). There are two possible explanations for this: (1) nights are cool* in the Highlands, and walls must be well sealed for warmth; (2) upland, eluvial soils tend to be colloidal and almost always suitable for adobe, whereas in the Lowlands, except near the sea, in the swampy lagoon region behind the barrier beaches, sandier, alluvial material predominates, much of it unsuited to adobe construction; timber and poles, on the other hand, are abundant in the Lowlands, and often scarce in the Highlands.

Details of distribution of materials used in construction are shown diagrammatically on map 9, based upon estimated percentage frequencies as observed in the field. In the text, these plottings are merely summarized.

I took detailed construction notes (table 3), with special emphasis on kinds of wood used in the frame-

work, in only one Lowland locality, namely, Santo Domingo Suchitepequez, in an area not visited by Wauchope. Most of the wall and roof materials are of sorts not mentioned by him.

TABLE 3.—House-frame materials used at Santo Domingo Suchitepequez

[A hard, durable wood is selected for mainposts: for other elements, various straight poles are used. The common trees listed are by no means the only ones used for the purposes indicated.]

Element of house frame		Material commonly used in construction (identifications from Standley)	
Spanish name	English name	Common name	Scientific name
Horcón ...		Guachiplitín	<i>Diphysa robtntoides</i> , <i>Glinclidia septum</i> . ²
Do.	do.	Madre de cacao..	<i>Sweetga panamen-</i> <i>sts</i> , <i>AspidoiPerma me-</i> <i>galocarponi</i>
Do.	do.		
TendaP ...			
Calsonte s ...	Common rafter..	Laurel, canoj (ne-	<i>Cordia allodora</i> , <i>Aspxdosperma me-</i> <i>galocarpon</i> (?)
Madre (viga) B ...	fWall plate	gro y blanco)..	
Tijera" ...	A-frame (princi-		<i>Cordia allodora</i> *
	pal rafters)...		
Cumbrera (viga) ...		do.	Do.
Cotahera ...		do.	Do.
Vanilla	Roof purlin	Cafia brava (otate)	<i>Gynenum</i> 'sagittatum' (?)

¹ This ranks as one of the most valuable and widespread hard construction woods. Though Wauchope (1938, p. 33) expresses uncertainty as to the identity of the "guachiplitín" used for mainposts at San Cns-t6bal (Alta Vera Paz), it is probably the same tree as that mentioned in Standley's works, and referred to by natives in many parts of Guatemala. (See Standley, 1920-26, p. 479; 1930, p. 295; 1936, p. 183; Standley and Calderón, 1925, p. 110; Salvador, Mmterio de Instrucción Pubhea, 1926, vol. 4, p. 33.) Guachiplitín is reported by Standley (1930, p. 295) as having the local names "tsutsuc" and "xbabalche," and Maya "sucuc," in Yucatan, and similar names in British Honduras. Redfield (1934, p. 35) mentions the use of a "cbudzuc," among other trees, for mainposts in the Yucatan area. The name "u'kui," applied to guachiplitín at San Lucas Tollman, where it is used for mainposts, is rather similar to "sucuc," and the same use of this tree at San Pedro la Laguna also is mentioned by Wauchope (idem). From my own observations, I can add Santo Domingo Suchitepequez and San Pedro Cutzan.

² Identification of this famous cacao-shade tree is from Standley (1920-26, p. 492). In the "Lista Preliminar" of Salvador plants (Standley and Calderón, 1925, p. 112), it is described as a hardwood, much used in railway construction. An intelligent informant at Santo Domingo Suchitepequez explained that the railroad company had cut out great numbers of the *madre de cacao*, *Palo amarillo* (*guachiplitín*), and other hardwood timber trees, for cross ties, removing much valuable cacao shade, and contributing toward the final decline of cacao cultivation (q v., p. 33).

³ Standley and Calderón (1925, p. 183) state that the wood is used in the construction of houses, railways, etc. In his Mexican flora, Standley says of this tree: "The wood is highly valued for carpenter and cabinet work, and is used for beams, flooring, ceiling, and finer work" (Standley, 1920-26, p. 1219).

⁴ Chichipate is described by Standley and Calderón as a fine construction wood of many uses.

⁵ Correctness of doubtful terminology verified from Wauchope, 1938.

⁶ Standley, 1920-26, p. 1157. This tree is "apparently rare" in the Lancetilla Valley region, and in all Central America only one species of *Aspxdosperma* is known, though "the genus is represented in South America by many species, some of which furnish valuable wood" (Standley, 1931, p. 321).

⁷ Standley, 1920-26, pp. 65-66; 1931, p. 92; Standley and Calderón, 1925, p. 31.

⁶⁰Medel, Ms., 1550-60, p. 195, f. 217. This mid-16th-century Oidor of Guatemala and New Granada was, insofar as the past may be judged in the light of the present, a very careful observer.

Adobe walls.—The finest adobe walls are those made of rectangular adobes (McBryde, 1933, p. 104). These large sun-dried blocks,⁸¹ fashioned of local dirt and straw usually available near building sites throughout the Highlands, require no high degree of skill in their manufacture, and every community of any importance where they are used has inhabitants who can mold them (pi. 10, /). No framework is necessary in adobe brick walls, only the roof requiring timbers and poles. Principal buildings and houses in the centers of the larger towns usually are of adobe plastered and whitewashed, and not infrequently tinted pale shades of pink and blue on the sides facing the street. The better Ladino houses have barred windows and floors of coarse fired brick, but both are lacking in most Indian dwellings, wherein floors are of dirt, sometimes hardened with adobe, the door is usually the only opening (there may be a very small window, especially in the Cuchumatanes region), and smoke seeps out through the roof. There are no chimneys even in the best of native houses.

Wattle-and-daub and stone walls.—In certain sections, notably in the more remote communities, walls may be of adobe daubed on a cane framework, and occasionally reinforced with rubble. This type is generally called *bajareque*. It is particularly in evidence around Lake Atitlan, where also (Santiago Atitlan) the only unplastered stone walls in the entire region are to be found. These walls, of readily accessible lava blocks, usually are built so as to enclose only the lower half of the house, with the upper half "fenced" by upright canes (probably *Arundo donax*, as identified by W. W. JVFackie from a photograph).

Board walls.—The outlying settlement of Pie de Volcan, near Quezaltenango, has walls of upright boards, and, in a few cases, of grass. Two factors that here discourage the use of adobe are the sandy, pumice-nodular soil, and the bunchgrass cover (pi. 38, d), but these do not entirely explain the phenomenon. Shepherders' huts commonly have grass-covered walls as well as roofs in the alpine-meadow summit country. *Muhlenbergia* (bunchgrass) occurs here in abundance; is easier to put up than adobe (not always suitable in the highest regions because of raw humus and excessive clay), and just as warm. Though ephemeral, the dwellings are well suited to the shifting occupation of herding.

⁸¹ Usually about 25" by 15" by 5". Wauchope (1938, p. 82) quotes Stephens (1841, vol. 1, pp. 383-384) to the effect that in Costa Rica they were "two feet long and one broad."

Pole walls.—Tax (unpublished Chichicastenango Ms.) reports from native informants a total absence of adobe houses in 14 cantons along the southern margin of the Chichicastenango municipio because "no adobe-earth is available," so that walls are made of poles. This may be in part due to excess of raw humus and clay, as stated above.

Upright poles of various kinds of wood, bamboo, and boards or split tree trunks are the three principal types of Lowland house-wall materials. Their use depends upon their local availability. Along the ocean shore and the lagoons of the littoral, the bordering mangrove thickets provide ideal poles, which are straight, durable, hard, and plentiful in convenient sizes.⁸²

Back in the inner Coastal Plain and piedmont, dense thickets of bamboo ("tarro") furnish excellent light wall material. This giant cane may either be set up entire, as a pole (ph 3, c), or split longitudinally along one side and opened flat, forming a "board" in exactly the manner described by Ponce's companion.⁸³ If bamboo and cane (*Arundo* spp. and/or *Gynerium* sp.) are respectively Asiatic and Mediterranean origin, they must have been introduced very early to have served as native house walls almost from the time of Spanish occupation.

Popular in several sections of the piedmont for wall boards is the *guarumo*,⁸⁴ the straight, white, hollow trunk of which is readily split.

Exceedingly large boards and poles, which may be quite crude and rough, are sometimes used for walls, as at San Sebastian Ketalhuleu, Samayac, and other piedmont centers.

Grass and leaf walls.—On Lake Ilopango in El Salvador, at the village of Dolores Apulo in 1936, most houses were covered on walls as well as roof with grass and palm leaves. Wauchope mentions

⁸³ "Mangle" (*Rhizophora mangle*), as the tree is called in most of Central America, is mentioned by Oviedo early in the 16th century as the best in the West Indies for wall poles and door and window frames (Oviedo, 1851-55, vol. 1, p. 338; see also Standley, 1920-26, p. 1028, and Wauchope, 1938, p. 36).

⁸⁴ This anonymous companion of Alonso Ponce wrote in 1586 concerning the houses of the little village of San Pedro (now disappeared) just west of Zambó, Suchitepeque, that they "had walls of thick cane, split open lengthwise and flattened out to form wide boards" (Ponce, 1873, vol. 1, pp. 435-436).

⁸⁵ *Cecropia* sp. Standley points out that the several species* are so much alike as to make identification difficult even with herbarium specimens. Though in some of his works Standley mentions numerous uses (never including house construction, however) for which *Cecropia* is valued, he states that in British Honduras it is "not utilized" (Standley, 1936, p. 111). Oviedo (1851-55, vol. 1, p. 300) cites "yaruma" only for its medicinal uses.

The hostile ants which always inhabit *Cecropia*, and of which Standley often writes, impress the identity of this tree upon the tenderfoot the first time he carelessly sinks a machete into its tempting trunk.

this type in Yucatan. It probably is to be found in parts of the Pacific Lowlands of Guatemala.

ROOFS

SHAPE

Wauchope (1938, p. 40) has described as follows the two common types of roofs in the area:

(1) Hip roof, which is pitched back from all four sides . . . (2) Gable roof, in which the pitch falls in two directions from the center of the building . . . There is also a single-pitch or shed roof, but its use is limited to temporary lean-to shelters and penthouses attached to the main house.

Into the first of the two above-described types fall the smaller, apparently more primitive square (pyramid roof) houses, and nearly square ones. The square house is usually crowned with an inverted clay bowl (pi. 29). The only material which I have seen used on this pointed roof is grass, which seems to lend itself especially well to this purpose. Certainly tile would not be suitable, as its overlapping elements would not easily be adjusted to the rapid taper of the peak.

PITCH

According to Wauchope (1938, p. 41)—

practically all Indian roofs fall within the same general class of "quarter pitch." The pitch of Indian roofs throughout Central America is very uniform, varying between 42 and 60 degrees. (Note: end slopes are not included . . .) . . . Newer, non-Indian houses (*ranchitos*) . . . have a pitch much less steep. Example: Roof angle of a house at Zacapa was only 11 degrees.

He found the steepest roofs in Guatemala to have a" pitch of 50 degrees (San Sebastian, Retalhuleu, and San Lucas Toliman) and the lowest angle (42°) at San Pedro la Laguna and Coban. San Lucas and San Pedro are both on Lake Atitlan, and they have very similar climates.

Though the Zacapa low-pitched roof is in a dry area, the others show remarkable indifference to rainfall. Of the four localities mentioned by Wauchope, the first and last (higher and lower pitched, respectively) are in areas of high annual rainfall (330 and 242 cm., or 129 and 95 in., respectively), whereas the ones on the Lake get about 150 cm. (59 in.) or less. The steepest pitch he recorded in the entire Maya area was at Lerma, Campeche (50° and 60°). Annual rainfall here is about 95 cm., or 37 in. (Ward and Brooks, 1936, pt. J, p. 50). All of this evidence supports Wauchope's suggestion (1938, p. 41) that "there is apparently little correlation between roof

pitch and amount of rainfall," despite Sapper's note to the contrary.

The effect of wind is probably one of considerable significance in determining roof pitch. Western Guatemala is a region which for the most part is subject to rather frequent high winds, especially in the Highlands and during the dry (winter) months.

MATERIALS

Roofs above an elevation of about 1,500 m. (4,921 m.) in the region are of two major materials, grass and tile. The latter is a distinct mark of a more advanced type, more so than the adobe wall, with which tile is frequently, though not necessarily, associated. Adobe-walled houses may be roofed with grass or any other kind of cover (pi. 10, b). Sometimes, as at Solola, a house may be roofed with tile on the front slope and grass on the rear slope. Minor roofing materials include gasoline tins, corrugated iron, boards, and maguey leaves. (Various supplements of thatch, especially crests, will be mentioned later.)

Tile.—The making of tiles is a skilled art, and a few specialized tilemakers (*tejeros*) are distributed throughout most of the Republic, chiefly in the larger centers and in the Highlands. The tiles are the red, semicylindrical Mediterranean type, of Spanish introduction. Though the investment is a more permanent one, the cost of tiles (800 to 1,000 required to roof the average house) considerably exceeds that of other roof materials. Installing them is also more expensive, calling for special builders, whereas grass, like all the Lowland thatch (which includes grass), is generally put on through the communal, neighborly efforts of a large number (often between 20 and 40) of friends and relatives of the builder, who makes a merry party of it by serving rum and food. (Pis. 3, b; 25, a; 39, b. See also Redfield, 1934, pp: 77-78, regarding communal labor in house-building in Yucatan; Wisdom, 1940, p. 130; La Farge and Byers, 1931, p. 40.)

From Zunil to San Cristobal, from Quezaltenango to Totonicapan, a great "X" may be drawn to mark tile roofs to the virtual exclusion of other forms. Around the periphery, grass appears with increasing frequency, predominating in San Martin and Sigüila, for example, along the more remote western margin (map 14).

Thatch.—*Grass.*—the most widespread use of grass for thatch is found among the isolated communities of the Lake Atitlan Basin, where (except for

Solola, a departmental capital with a high proportion of tile-roofed dwellings) every settlement has a preponderance of grass roofs, in keeping with more primitive architectural forms.

The only thatching material common to both Highlands and Lowlands is grass (*paja* or *pajon*); the tough, coarse bunchgrass (*Muhlenbergia* sp.) in the mountains; the high savanna grass in the Coastal Plain and piedmont.⁶⁵ Such grass-thatched roofs are generally called by the Spanish, *pajiso*. Though most of the giant bunchgrass of the summit lands grows above about 2,500 m. (8,202 ft.) elevation, in places it is abundant at 2,400 m. (7,874 ft.), especially where the soil is poor, as around Pie de Volcan (pi. 38, d; see also pis. 30, 32).

Grass is cut off at the base, gathered in sheaves usually from 6 to 10 inches (15 to 25 cm.) in diameter (pis. 10, b; 39, b), and tied, with bunches slightly overlapping laterally, to the horizontal roof rods, with the leaves pointing downward.⁶⁶ In the Highlands the usual binder is unspun agave fiber, whereas in the coastal Lowlands and *boca costa*, rubbery *bcjucos* (vines) are generally employed, as they are abundant while agave is scarce or unavailable. It is necessary for Highland builders below the *Muhlenbergia* sp. zone to purchase *pajon* or else to climb up into the high mountains and get it. In Panajachel it is bought, and the chief source of supply was said to be the elevated country around Concepcion. Wauchope's Panajachel informant "had to 'go higher up' to get it." He reported 150 sheaves necessary to roof a small kitchen (Wauchope, 1938, p. 108).

The widespread distribution of grass thatch may be seen in map 14, the maximum concentration being around Lake Atitlan. High, alpine shepherders' huts are usually walled as well as roofed with *Muhlenbergia* sp.

Palm.—That the choice of house materials used, especially in the Lowlands, is largely a matter of availability of suitable plants in the local environment, is well illustrated in the use of palms for thatch. Near the sea, *I nodes* sp. (*palma del mar*) seems to rank first in importance; *Orbignya cohune* (*coroso*), occurring mainly somewhat farther inland, is secondary. The latter, however, is the chief roof thatch in the zone of its maximum abundance, for the most part

below about 100 or 150 m. (328-492 ft.) and exclusive of the littoral. It is usually called *mmaco* through this section. In the higher ground approaching the piedmont, *coroso* is little used, and gives way to other more readily available leaves. The highest elevation at which I have seen *coroso* thatch is at San Sebastian Retalhuleu (350 m. or 1,148 ft.), where it is an important economic plant used in making rain-capes (*suyacales*) and fire fans (*sopladores*). Other palms are sometimes used to a limited extent for thatching.

Wauchope names four main areas of palm "thatch in Guatemala: (1) The dry eastern area (especially Zacapa-Chiquimula); (2) southern Vera Paz (Alta and Baja); (3) west coast below 250 m. (820 ft.); (4) Peten (Wauchope, 1938, p. 106). Sapper mentions a large fan palm used for thatch in the Kekchi area of northern Alta Vera Paz. He emphasizes, however, the fact that it is employed only on temporary shelters (Wetterschirmen).

The early use of *coroso* for thatch is attested to by Oviedo, who mentions it in this connection shortly after the Conquest (1851-55, vol. 1, p. 333).

Caiathea spp.—In the independent Lowland village section (from Santo Domingo Suchitepequez to Santo Tomas la Union) of the *boca costa* and Coastal Plain, between about 200 and 800 m. (656 and 2,625 ft.) elevation, these broad-leaved plants are employed almost exclusively for thatch (pi. 3, h, c). There are two species, the *hoja de sal*, commoner (occurring even in pure stands, and often planted) in lower, open savanna patches, and *hoja maxdn*⁶⁷ apparently a shade-tolerant species of higher, more wooded levels (also planted). As to the use of the latter for thatch, it is certainly less common than *hoja de sal*, for it was reported only at Santo Tomas, and I did not verify the statement. The larger *hoja de sal* is much used, being the only thatch apparent in Samayac, San Pablo Jocopilas, and San Bernardino (at the latter, roof eaves are unusually low).

At Mazatenango a man with an oxcart load of *hoja de sal* (12 bunches, each of 700 leaves, worth 10 cents a bunch) said that 12 or 13 bunches are enough to roof a house 4 by 5 *varas* (1 vara = 33 in.), and that the roof lasts about 5 years (pi. 3, a). This agreed with the estimate of an informant at San Pablo Jocopilas, who said that 30 bunches of 700 leaves were needed for a house of 5 by 10 *varas*.

⁶⁵ For the main buildings and larger Ladmo houses in the Lowlands, tile is also used, and in some sections corrugated iron is even more common.

⁶⁶ In all thatching I have seen, grass, palm, *Caiathea*, cane, etc., the leaf is invariably pointed downward. Wauchope also reports this (1938).

⁶⁷ My identification of these two, based upon Standley's "Flora of Lanceti Ila Valley," is given in Appendix 3, p. 148, along with a discussion of uses, differences, and nomenclature.

Sapper mentions the use of *platanitto* (*Heliconia* sp.) as temporary rain shelters, such as those erected along the trails as overnight lodgings for Indians, but makes no reference to any permanent thatching with these leaves (Sapper, 1905, p. 24).

Ponce's companions write in 1586 that the bamboo-walled house they describe, just west of Santiago Zambo, had a roof of "*bijaw*": "... the roofs of the houses are of leaves like those of banana, which in that language are called '*bilbao*,' and with the canes above-mentioned, unsplit, the houses are walled." As the term "*bijao*" is applied to various of the Musaceae, Cannaceae, and Marantaceae, positive identification from the common name is impossible. In all probability, it was a species of *Calathea*.

Oviedo writes of "*bihao*" that the leaves "are much used by the Indians, especially on the mainland. . . . With these leaves they cover certain houses, and it is a good roofing and cleaner than grass and more beautiful from the inside of the house" (Oviedo, 1851-55, vol. J, p. 276).

Minor materials.—Cane leaves of various sorts (sugarcane and possibly wild cane) are used in some localities, as at Pueblo Nuevo and San Sebastian, but they were invariably said to be inferior. Corn leaves for thatch were mentioned but once, and the report was vague and unconfirmed. Both the above are included also in Wauchope's study (1938, p. 110), which cites Stephens (1841) for corn-leaf thatch.

Maguey leaves are sometimes seen as partial roofing in the Highlands where the agave is abundant. They are used to cover holes in thatch, or cracks between boards or other covering, or to roof temporary shelters. Wauchope (1938) cites two early references to maguey thatch (Larrainzar, 1878, vol. 5, p. 72, and Clavigero, 1780, vol. 2, p. 232). Maguey and yucca leaves are much used for thatch in Mexico, especially in the central valley.

Banana leaves, though often erroneously said to be used in the Lowlands for thatch (undoubtedly confused with *Calathea*), are unsuited to roofing, for they rapidly shred. The only definite reference to this leaf for thatch is, to my knowledge, that of Blom and LaFarge (1926-27, p. 335).

A Ladino at Santo Domingo Suchitepequez said that three houses in San Gabriel had a "new kind of roof" made of the split stalk of the banana plant, but I did not verify this.

Durability of thatch materials.—Grass seems to be the preferred thatch material, and is everywhere said to last longer than other types. Commonly,

Highland natives stated that it was good for 20 or 25 years, with annual patching-up at the start of the rainy season. Sixteenth century estimates were more conservative. In the Lowlands the durability of grass is undoubtedly less, though at San Pedro Cutzan, 25 years was given for grass, and 10 years for cane leaves (not used there). *Palma del mar* at Tahuesco is reputedly good for 20 to 25 years, though the estimate seems high, despite relatively low rainfall (about 140 cm., or 55 in., annual). *Hoja de sal* at Santo Domingo is said to last only 5 years. Standley states that it serves only occasionally, as "temporary thatching," in the Lancetilla Valley of Honduras. This is probably because of the higher rainfall and more prolonged wet season in that area, accelerating disintegration more rapidly than in the Guatemala Pacific Lowlands, where it is an important "permanent" thatch.

CRESTS

Varied in the extreme are devices for sealing the ridge or apex of a thatched roof. In the case of pyramidal roofs, the peak is almost invariably capped by a large, inverted bowl called "*cucuruch*" (usually Totonicapan or San Cristobal Totonicapan pottery, coarse glazed ware) ; no special pottery is made for the purpose, regular cooking utensils being used (pi. 2, g). It is a simple and logical solution to the problem of closing a vulnerable point, and, as Linne has shown, an ancient and widespread one.⁶⁸ This author reproduces elaborate types used at the time of the Conquest, including Oviedo's sketch, redrawn by Lothrop (Linne, 1938, p. 27), and, refuting Norden-skiold, he suggests an American origin for this trait. In Southwest Guatemala (1936) the distribution of apex pots is almost coincident with that of the square house.

In those villages where square, pot-capped dwellings are built, the rectangular houses usually are sealed along the ridge pole by a continuous, overlapping row of large potsherds, commonly seen both in Santiago Atitlan and San Pedro (pi. 26, b). There are more of these in Santiago, which has a higher percentage of square houses, probably the highest of all Guatemalan settlements. There are also some of this type in San Lucas Tollman. That the use of potsherds is not restricted to villages having both square and rectangular houses is evident from the rectangular dwellings at Santa Cruz la Laguna. There, though

⁶⁸ Of the settlements visited by me, only Santa Catarina Palopé houses (1936) had pyramidal roofs and no ceramic caps.

cane strips are laid longitudinally, one on each side of the crest, the sealing is made more effective by pieces of tile and sherds cupped over the ridge, and additional bunches of grass bound down by vines (*bejutos*).

At Santa Catarina Palopo many, though not all, of the houses exhibit a type of crest wherein the topmost bunches of thatch (*fajon* grass) are gathered up into a conical and bound to cane strips placed longitudinally along each side. (Pyramidal roofs here are also bound at the top, without a bowl, as has been stated.) The conical type of crest also occurs at Zaragoza. A unique roof crest at Santa Amilón is "encased in a lime mortar."⁶⁹ This represents a reflection of a local industry based upon the environment, for there is a limestone outcrop near Santa Apokmia and town is one of the major time-producing centers of Southwest Guatemala.²⁰ Gasoline tins, sometimes are used to patch a roof or help seal the crest.

HOUSEHOLD FURNISHINGS

The inside of an Indian house consists ordinarily of the bare essentials. The fireplace is a rough circle of smooth stones, normally three, laid at one end or corner on the dirt floor. Everything is permeated with the smell of smoke, which generally fills the house, for as a rule there are neither chimneys nor windows. This fumigation affords some protection against insects (p. 44, 1).

Generally stacked near the hearth is a quantity of crusty, sooty pottery of various sizes and shapes (p. 41, 42), and other utensils. These include several deep jars for boiling corn, beans, soup, etc.; deep water jars (*tinajas*): colander jars for rinsing softened corn (*nixtamal*); a wide, shallow, circular griddle (*comal*) for baking tortillas (corn cakes), which in some sections is being replaced by iron gasoline-drum tops; dishes and cups, which are giving way rapidly to brightly-colored imported enamel ware; a tin coffee pot; spoons and ladles of wood and gourd (p. 43, c), and wooden four-blade churn sticks (*molinitos*) for whipping chocolate by spinning the handle vertically between open palms. Wauchoppe (1938, p. 120) reports more pottery in Guatemala houses than in those of Yucatan. Gasoline tins are much prized.⁷¹ There is always at least one tripod

lava metate. The metate, called locally *pitda de mater*, is an essential element in every household. Much of a woman's day is spent grinding softened corn, coffee, cacao, and other things on it. Ordinarily, square metates are used for each. There are usually one or two fire fans, made either of curled leaf segments or of reed (rush) pith, called *sirac*, which is less common. Gourds, baskets, and nets serve a number of purposes, and many containing food are hung from the ceiling to avoid insects and animals.

Furniture includes one or more wooden chests (as a rule, the Totonicapán variety, ornately but crudely decorated with red and yellow paint, and sometimes carved in the shape of a gasoline pump) serving a variety of purposes; several racks of shelves, often of cane; one or more low tables; a few small, quite low stools, and a miniature (p. 33, d) or a henchlike chair; and usually a platform of planks or planks with mats or rush mats (p. 33, e) and often also blankets to cushion them. Many persons sleep in hammocks, especially in the Lowlands. There may be a screen of some sort, such as a large reed mat, to afford a measure of privacy, for ordinarily the house consists merely of a single big room, one used for cooking and eating and the other for sleeping. Some of the more modern town Indians, e.g., at San Cristóbal Totonicapán and Totonicapán, have much more elaborate furnishings, including beds, benches, and tables of European design. Generally, there is a small altar, consisting of a wooden table with crosses, images and pictures, of saints, incense burners, and decorations of ribbon, pine boughs, and flowers; and a carpet of pine needles to kneel upon.

Ladino furniture is more elaborate, as a rule, than Indian. Beds are of straw ticks on a full wooden frame, or there may be large canvas cots, (chairs are of full reed rather than the little Indian models (p. 33, d), and there are stone or brick stoves in the kitchens.

Spanish influence on native household furnishings at the Conquest is brought out by Medel.⁷²

STRUCTURES OTHER THAN DWELLINGS

Among other structures in Southwest Guatemala are sweat houses (*temascales*), usually of stone with thatched roofs. These are used for steam and

* Wanesse 1918, p. 112 (65 41. opposite p 112 d) "typical of reed" * 1
 "****mi% Apatutua" * also an wnjw ****po/tutty C*M*, but. doasleM
 *. 1!!! mortar * * a nmt **u%tevery *im* west, being relatively
 **trrHCBt and easily %C-Wt

* For some of the m*ny urn* to which a%oJmt m* juvl the packing
 teacs fat Aipit* Own mrt jwl* * H<r, it. m\ p. 120. ft) if.

to Among India "ruforros" m drew, furniture, and other than, it is
 carries that the Indian got tables and beds from the Spaniards; that
 Were the Congress "the ground was the native table and bed"
 through commercialism and that the new such more or price of
 leaves Model Ms 1550-60 (2), p. 194-195, t. 217).

warm-water baths.⁷⁸ They are particularly numerous at Santiago and Solola, though found in a number of other villages around the Lake, in the high valley of Quezaltenango-Totonicapan and the Cuchumatanes, and common throughout Highland Guatemala. They are more rarely seen in the Lowlands, though there are a few at San Pedro Cutzan, a Lake village colony, and I have observed them at Santo Tomas la Union and Chicacao. There are also cane-walled thatch-roofed corncribs and chicken coops. The latter often have the floor above ground; at Santa Cruz la Laguna, the floor is 2 feet off the ground. At San Pedro Laguna they were made mostly of split maguey stems. (I was told there that a law, effective January 5, 1936, made chicken coops mandatory, but this was not verified.) At Santa Catarina Palopo, several corncribs had been made with maguey flower stalks for ridge poles. Adjacent to almost every house in San Bartolome Aguascalientes there was a pole-enclosed chicken coop, about 3 feet (90 cm.) cubed, elevated 10 or 12 feet (3-3.7 m.) above the ground.

Other minor structures include enclosures made for *gilisquil* (*chayote* or vegetable pear)⁷⁴ occasional adobe beehive-shaped ovens, and, in the Lowlands, platform seedbeds (usually for tomatoes), built on posts, some 5 feet (1.5 m.) off the ground. At San Pedro Cutzan, many are identical with those illustrated by Wauchope at Xocenpich, Yucatan (1938, fig. 49 d., p. 131). This latter is apparently a Lowland trait.

INDIAN COSTUMES

EARLY TYPES

The pre-Columbian appearance and garb of Guatemalan aborigenes is none too clearly described in the literature. In writing of the peoples of Central America in general, Oviedo refers to the practice of tattooing with flint knives and black powder of pitch soot (?),⁷⁵ and to professional *maestros* for the pur-

pose. Each chief had a certain design, which was adopted by his followers (Oviedo, 1851-55, vol. 4, p. 38). Men wore, according to Oviedo (writing about 1527), corselets without sleeves, made of "exquisite cotton," woven, and of many colors, and girdles (*cemderos*) made up of thin white cotton belts, a "hand" wide, twisted to cord the thickness of the thumb, and bound around the trunk "from breast to hips." A loose end served as a loincloth and was gathered under a fold in the corselet. Men wore double-soled deerskin sandals also, called *gutaras*, tied on with cotton cords or thongs. The same author stated that plebeian women wore skirts reaching nearly to the knees; noblewomen (*principales*), skirts of thinner material and ankle length, and neckcloths that covered the breasts. Women also wore numerous strings of beads and necklaces of many types (Oviedo, 1851-55, vol. 4, p. 38).

Medei (Ms. 1550-60, p. 194, f. 217) described costumes of various sorts. In certain sections of the Lowlands men "spent their entire lives as naked as when they were born, without clothing from head to foot," whereas the women showed more modesty and wore a short cotton apron. Spanish influence moderated this, he said, and the Indians were baptized and "reformed." A "second sort of Indians," while not entirely without clothes, wore so little "that we would feel very naked if we went around that way." They wore merely a locally woven cotton cloth 48 inches square; women wore them longer, to the feet. Men and women wore nothing above the waist. Not only Indians of *tierra caliente* and *tierra teniplqda* dressed this way, "but even in quite cold and rigorous regions."

The *Eapotitlan* report (Anon., Ms. 1579, pp. 12, 13, ff. 110, 111) shows that by 1579 "a shirt and breeches with wide bottoms like those of sailors" had been adopted by the Indians. This "reformed" costume included also a cape 48 inches (122 cm.) square, made of the "cotton which was called *ayate*" (maguey fiber). The knot formed by tying two corners together was worn usually on the right shoulder (this was probably so as to permit greater freedom for the right arm), though by some it was worn in front of the neck, and by others, over the left shoulder; there were many variations in the wearing of it. A similar garment is worn in the same ways in this region today. (PI. 3, d.) Chiefs and commoners for the most part were barefoot and without hats. Some of the more original individuals wore jackets of "linen"

⁷² Bathing in Lake Atitlan is almost entirely confined to Ladinos, for the Indians dislike the cold water, which they regard as unhealthful, apparently both for drinking and bathing, and this is one reason why most Indians who inhabit the shores of Lake Atitlan cannot swim. In the Lowlands, bathing in rivers is customary; in the Highlands, outdoor bathing is largely restricted to warm springs and streams, as at San Cristobal Totonicapan and Momostenango. At the latter village, nude bathing in the warm springs by both sexes together, at all ages, is customary (pi. 34, a). Women bathe separately in the thermal springs at Sacapulas.

⁷⁴ These are made of maguey flower stalks at San Pedro Laguna.

⁷⁵ Oviedo in one place (1851-55, vol. 1, p. 204) calls this "*tile*," in another (1851-55, vol. 4, p. 38) "*til*." In the first reference it was said to be sold in the markets, wrapped in *biahos* (Woo) leaves, and used for branding slaves.

(probably fine-woven cotton), breeches of light woolen cloth, shoes or boots, hat, and cloak of colored cloth.

MODERN COSTUMES

MEN'S DRESS

Lake Atitlan region.—In certain sections of Guatemala today, notably the region of Lake Atitlan, men's dress is picturesque and varied, inhabitants of each district being readily identifiable at a glance (pis. 6, 7, 8). In nearly all of the Lake villages they wear short, full trousers, of white cotton, usually decorated with bright-colored stripes or embroidery or both, knee-length or slightly longer,⁷⁶ and held up by means of a long, broad, tasseled belt of colored cotton (there may be a leather belt in addition), with no buttons of any sort. These are hand-woven, ordinarily by the wearer's wife, on a native stick loom (pi. 9). In many instances slip-over blouses with long, full sleeves are worn, in which the same material is used (at least in part) that goes into the trousers, the sleeves often being red; the material is gathered at neck and wrists. These are typical in Solola, San Antonio Palopo, and to some extent, Santa Catarina. As in most of the others, however, in the latter municipio hand-woven blouses are being replaced by machine-stitched shirts, often grey-striped. Colored ones, with blue dash lines (jaspe threads), are often worn by Atecos and particularly Pedranos, of whom they are most characteristic. In general, however, among the Lake villages as a whole, white, sometimes lightly striped, is the commonest shirt color.

Rodilleras.—A peculiar feature of Guatemala Indian men's dress is the *rodillera* (from *rodilla*, knee) a fringed, knee-length, wrap-around skirt of light wool, having small black and white (or, more recently, blue and white) checks (pi. 7, a, b, d, e, o). About 2 by 3 feet, this garment is usually wrapped to reach to or below the knees, the fringed ends meeting at one side in front (Solola, Santa Cruz, Panajachel) or at the rear (Solola, San Antonio Palopo, Nahuala-Santa Catarina Ixtahuacan; pi. 4, d). There are different methods of wrapping and gathering them, sometimes even within the same municipio (as in Solola; pi. 7, a, b). Generally, they are secured by a leather belt. Often an extra one is carried, as in Solola and Panajachel, folded and slung over the black-and-white knit wool bag (Solola) or

maguey-fiber string-bag (Panajachel, Santa Catarina Palopo). Men knit wool bags, generally with geometric designs, especially depicting animals, at Solola and Chichicastenango. In Santa Catarina Palopo the *rodillera* is no longer worn as a wrap, but is carried, as explained above, over the bag or folded over the shoulder. At San Andres Semetabaj, Patzum, and other sections even as far from the Lake area as San Juan Ostuncalco, the *rodillera* (later style) is worn over long white trousers, as in Panajachel. In some cases it is merely folded in front, like an apron (Tecpan; pi. 12, a).

Rodilleras are worn or carried only in the villages along the north and east shores (or sides) of the Lake, excepting in San Pablo and Santa Lucia Utatlan. From south and west they are totally lacking. The old-style *rodillera* has heavy black and white checks (pi. 13, b). Newer ones have smaller checks, usually blue and white (pi. 7, d, e).

In many cases, the wrap covers the short trousers. **Rodilleras** do not cover trousers at Solola (or at Concepcion and San Jose Chacaya; see pi. 6) and Panajachel (many of the younger men here wear ankle-length white trousers), and those municipios where the *rodillera* is worn like an apron over long pants.

Coats.—Coats of European cut, made of dark-blue wool, have been adopted within relatively recent years by natives of a number of the Lake municipios (San tiago, San Pedro, San Juan, San Marcos, Santa Cruz, Panajachel, and occasionally San Antonio). The common old style was the *capixai*, a natural black wool jacket which reaches to the knees or below. Usually it is longer behind than in front, and the sides and inner sleeves are open, for free arm movement.⁷⁷ These are worn at Santa Cruz la Laguna (pi. 27, e). A shorter black wool jacket ("*gaban*") is worn at Panajachel.⁷⁸ At San Antonio Palopo the long one is also worn when it is cold, but more often it is laid on the back as a pack cushion, with the sleeves thrown forward across the shoulders (pi. 7, o), and it is worn ceremonially.

Sololatescos still adhere to an old-style short wool coat, black and white striped and ornately trimmed, with a characteristic winged figure (pi. 17, a) em-

⁷⁷ This garment is probably an imitation of early priests' robes. Most of them are woven in the sheep country of the Altos Cuchumatana. Many are also worn there (especially at San Juan A'itan) and farther south (San Martin Sacatepeque). The word *capixai* apparently derives from the Spanish *capa*, "mantle" and *soya*, "tunic" or "robe."

⁷⁸ Those of the Lake region are made from material woven in Nabual and Chichicastenango, and sold chiefly at Solola. (For similar coats worn in the Cuchumatanes region, see pi. 37, b, d, t.)

⁷⁶ It has been suggested several times (La Farge and Byers, 1931, P. 34, e, g.) that the short cotton pants are derived from early Spanish underwear.

broidered on the back, having the appearance of a butterfly, or, what is more likely, a bat, which was an ancient symbol of the ruling family of the Cakchiquels.⁷⁹ Atitecos said they formerly wore the striped coat (without the bat) before blue ones became the preferred style, "more than 25 years ago" (about 1910). A picture in Maudslay's book (1899, pp. 43, 60) shows the old striped coats in about the year 1894. Atitlan municipal officials always wear or carry a *capixai*, when away from headquarters.

Hats.—A palm hat, usually high-crowned (narrow and tapering) and fairly broad-brimmed, is commonly worn by men of the Lake villages. In some of the villages a white or, more commonly, colored (usually red), cotton *sute*, or square cloth, is wrapped around as a hatband (Solola, Panajachel, "old style; Santa Cruz, some; San Pablo; Santa Catarina Palopo, some; San Antonio Palopo, occasional). Many inhabitants of certain municipios wear dark felt hats, usually black (San Pedro, Santiago, Nahu-ala-Santa Catarina Ixtahuacan). In the latter two villages, the men also wear a bowl-like hat covered with beeswax (?) for waterproofing. Hat styles vary somewhat with municipios, and often, as at Solola, they differ greatly within them. The older hats seem to have had wider crowns, and they were more cylindrical and flat-topped than modern ones. (See pis. 6, 7.)

Sandals.—Most Indian men, especially when on the trail, wear sandals, having simple leather soles, single heel thong and toe thong attached between the great toe and second toe (pi. 7; for rubber-tiro sandals, see pi. 42, *d*). Some more elaborate models have broad, plain or serrate-edged guards over the instep (Santiago Atitlan, 1894, 1936; Chichicastenango). An old Atiteco disparaged the wearing of sandals, saying that they were uncommon in his youth (about 1900-1910). Many of Maudslay's pictures (1899, pp. 21, 43, opposite p. 48) show sandals of the same type as those worn now, however, though they appear to have been less common then than today, and appear to have been worn almost exclusively by Indians on the trail. Shoes are rarely worn, and then primarily by men of the Quezaltenango-Totonicapan region.

Santo Tomas Chichicastenango.—One of the most uniform and distinctive men's costumes is that

of Santo Tomas Chichicastenango and Chiche (pis. 8, *b*; 14, *e*). It is strikingly like certain early types worn in the Spanish provinces of Leon, New Castile, and Old Castile. The outer garments are of natural black wool, a short slip-over jacket and knee pants with characteristic lateral flanges, which like many other points on the suit, are elaborately embroidered (men's work) with bright-colored silk thread. The sun design with radiating, variegated lines, is particularly common. A white, buttoned shirt and bright red sash are also worn. When on the trail, especially if the destination is Lowland, Maxenos frequently discard this warm garment in favor of light cotton ankle-length trousers and shirt (pis. 13, *c*; 14, *b*).

Todos Santos Cuchumatán.⁸⁰—The dress of Todos Santos Cuchumatán men is equally distinctive (pi. 31, *a*). Long, wide-bottom cotton trousers and large-collared shirt are striped or checked with broad red bands on white. Over this is worn a short jacket of natural black wool (rapidly being replaced by modern blue or gray coat) and trousers that are cut away for the full length in front. A broad-brimmed, low-crowned straw hat, often with a factory-made red bandana under it, tied around the head; and sandals that look like shoes with the top of the entire toe area removed, complete this distinctive attire. With the blue coats adopted in recent years, they have been appropriately nicknamed "Uncle Sam boys" by tourists from the United States. The material in the coats is woven in Momostenango.

San Martín Sacatepéquez ("Chile Verde").—Men of San Martín wear long monklike white cotton robes which reach nearly to the ankles and are fringed at the bottom (pi. 39, *c*). These garments are generally red-striped with red and yellow embossed sleeves and elaborate wide red sash (ends hang at the back, center), upon which are woven figures of many geometric designs and colors (especially yellow and lavender). Over this at times is worn a black wool *capixai*. Hats are of felt, usually black, or of straw, high-crowned. Frequently, only large *sutes* are worn on the head, loosely knotted or merely draped, and flowing behind, Arab-fashion. Sandals have several straps and buckles. The entire effect is extremely similar to the dress of the Patzún men of 1894, illustrated and described by Mrs. Maudslay (1899, p. 42). No vestige of this costume

⁷⁹Brinton (1885, pp. 39-40) states that "according to the *PoPol Vuh*, 'the chief god of the Cakchiquels was *Chamalcan*, and his image was a bat.' (*PoPol Vuh*, p. 224) . . ." The bat, *ZoUti*, was the totem of the *Zotzils*, the ruling family of the Cakchiquels.

⁸⁰Though living in the Cuchumatanes Mountains, outside the area covered in this monograph, Todos Santos men and women frequently appear in southwestern markets.

remains today in Patzún, though a dark blue *capixai* is worn at San Antonio Aguascalientes (pi. 44, c), not far away. It is likely that this was a widespread costume through much of the Highlands until relatively recent time. Many somewhat similar types may be seen today in the remote Cuchumatanes Mountain region (San Juan Atitán, e. g., where sandals like those of Todos Santos are worn; pi. 31, b).

Ceremonial dress.—Ceremonial and official dress brings into consideration a number of additional elements. A square, embroidered cloth with tasseled corners (*sute*; see pi. 8, b) is usually worn by such Indian dignitaries as village chiefs (*intendentes*) and elders in the religious brotherhoods (*cofrades*), either with or without a hat. The latter is most elaborate at Solola, where it is of shiny black "straw," with cylindrical flat-topped crown, and band of bright-colored, figured Japanese silk ribbon. Indian officials carry stout canes, often of fine wood and capped with engraved silver (throughout Highland Guatemala and Chiapas). These must be carried at all times while on duty, but must be kept in the municipal office when not in use. Ceremonial dress also includes full-cut outer black loin pants worn over the ordinary cotton trousers.

Costumes in areas of little differentiation.—Other than in the regions described above, the men's costume in Southwest Guatemala consists of light cotton (usually blue denim) pants, full and gathered by a colored sash at the waist, and small at the bottom, reaching to just above the ankles; plain, white-buttoned shirt, and tight-fitting, blue coat that is intended to match the trousers. Such is the appearance of the men of the high Valley region of Quezaltenango and Totonicapán (pis. 34, d, e; 38, b). They are practically indistinguishable, and determination of their provenience is usually a matter of conjecture, unless a special sash or some characteristic trade cargo might label them.

Lowlands.—In the Lowlands, distinctive men's dress is to be found only in colonies or recently separated groups from the Highlands. Clothing is usually scanty along the Coastal Plain, consisting of white (or blue) cotton trousers, often rolled above the knee, or loincloth. Shirts are sometimes worn, but men are generally nude above the waist (pis. 1, d; 3, b, c). A light, square cloth (pi. 3, d) most frequently red with blue-white dashed (*jaspe*) stripes and V marks, about 4 feet square, may be thrown

over the shoulders and tied in front (or with the **knot** over the right shoulder). This is strikingly similar to the 1579 Qapottitlán description (q. v., p. 48). An intelligent informant at Santo Domingo Suchitepequez said that until about 1890, Indian men in that region wore only loincloths, and women only skirts from their own stick looms, dyed with indigo.

Costume changes.—Certain transformations that are taking place in men's costume styles, some of those mentioned in the above discussion, are illustrated in pl. 7, d, e, j, k, l, m. More changes, not always "modernizations," seem to have taken place during the past generation than during many years previous; the date most frequently given was about 1910 ("25 years ago"). Roughly the chronology checks with facts apparent from Maudslay's photographs. Old Indians, for example, at Santiago Atitán in 1936 were wearing costumes identical with those depicted by the English archeologist (Maudslay, 1899, p. 43).

WOMEN'S COSTUMES

The two essential garments of Indian women in Southwest Guatemala are, unlike many elements of the men's modern dress, pre-Columbian. They consist of the huipil (Aztec derivation), or loose-fitting upper garment having no true sleeves, and the *enagua*, or skirt, which is generally wrapped several times around the body and tucked in, and usually is supported further with a tightly woven, stiff cloth belt, of cotton, wool, or silk, often reinforced with maguey fiber. Some skirts are full and pleated, with a drawstring (Quezaltenango, Chinautla).

Huipils.—Huipil types, like certain features of men's dress, are somewhat a matter of climate. In the warm Palín and Cobán areas they are short and gauzy. In the still warmer Pacific Lowlands (except in certain Highland colonies) light-weight blouses of manufactured cloth are worn. At home these are usually discarded (pi. 2, d). Even on the street, women of certain villages of the Lowlands, such as San Bernardino Suchitepequez and San Sebastián Retalhuleu, wear only skirts, or they may keep within the law by draping a blouse loosely over their shoulders. They are, nevertheless, modest and careful in the extreme when it comes to bathing in the rivers or otherwise exposing themselves. Mrs. Osborne records having seen women "on roads near Retalhuleu" (probably natives of San Sebastián)

remove their single garments (skirts) during a heavy rain, and put them under a banana leaf to keep them dry until the storm was over.⁸¹

In Highland Quezaltenango, huipils are so long that they serve as petticoats.

Most Highland huipils are of cotton, woven on stick looms by the wearers and, in villages where men wear home-woven clothes, they are made of the same cloth that goes into a man's suit. Intricacy and elaborateness of design and color are varied in the extreme (pis. 7, 8). Some have birds, animals, men, and geometric patterns worked in on the loom. Others are decorated with brocade, as at Chichicastenango. Coins or silk-covered disks are commonly attached by chain stitching, often the work of men. Ordinarily huipils are made up of two pieces^{8a} with an opening for the head, and the sides are sewn up, leaving large, free spaces for the arms. Sometimes shirts with true sleeves are worn by the women as well as the men (Solola; pi. 7, c).

In the area of the Quezaltenango-Totonicapan Valleys, where stick-loom weaving is absent, electric-loom or foot-loom cotton cloth is made into huipils (p. 127). The factory-made material, usually plain white, is often embellished with an embroidered collar (Cantel, San Francisco el Alto, San Andres Xecul, San Cristóbal Totonicapan) whereas the foot-loom cotton is variously striped and figured (Quezaltenango, Olinpeque, Totonicapan). See frontspiece; pis. 39, a; 40, b, c).

Skirts.—Skirts generally have one thing at least in common; they are almost never woven by the wearers, but are the products of foot looms operated by men (Indian and more often Ladinos) in the larger towns. They are woven in lengths sufficient for three or four skirts (15 or 16 ft., as a rule), often being called *cortes*. Looms are narrow, so that *cortes* usually range between 25 and 28 inches wide. Color, length, and pattern, as well as style of wearing, are highly varied, depending upon municipio custom (pis. 6, 7, 8, 9). Blue predominates, as a result of the abundance of indigo, which is still used for dyeing the thread that goes into them. Red is next in importance, but its use is not nearly so widespread as formerly, when the dye source was cochineal. This scale insect is no longer used in dyeing cotton.

Yellow, least common color for skirts, was formerly obtained from certain dyewoods such as *aliso*

and *pah cmarillo*, which are still used in dyeing wool. Aniline dyes have replaced natural ones for cotton and silk of this color, however.

In villages of the north and east shores of Lake Atitlan, women wear solid blue skirts of heavy cotton (some with light lines), usually of two pieces joined with colored silk embroidery. They are woven by Solola Ladinos (pis. 7, c, g; 9, a, c). Indians in all of the south-shore villages wear skirts from the Quezaltenango area, usually blue and pink (and some green) jaspe patterns, except in Santiago, where red is the rule. Skirts for these villages are occasionally made in Huehuetenango. The common old-style skirt in Santiago was a large blue check (pi. 7, k). The modern red one is a 20th-century innovation, having come in with the broad, red and variegated halolike bands which replaced the narrow and less ornate ones formerly worn. Jaspe patterns are common not only in the other three south shore villages, but also in the Quezaltenango-Totonicapan region, where they are made (chiefly at Salcaja, San Cristóbal Totonicapan, and Quezaltenango; pi. 40, a, d, e; p. 63). Farther west, from San Martin to Huitan, dark-blue skirts with various lighter lines or checks are worn (pis. 39, c; 41, e). Ladino vendors (these are often the makers) said all are made on foot looms in the western portion of the town of Quezaltenango. Reds and some yellows appear in the Huehuetenango region. Yellows and some reds (also greens and oranges, these shades produced on the loom by combining threads of different primary colors) predominate in the San Marcos (La Union) area. Silk skirts are not uncommon even in everyday wear in the latter vicinity, as along much of the piedmont, where gaudy combinations of bright greens, pinks, purples, and blues, often appear (San Sebastian Retalhuleu, e.g., pi. 2, d).

The shortest skirts, which are worn in Zunil and Chichicastenango (pi. 8, c), do not reach the knee, and are dark blue; the longest, touching or almost touching the ground, are the bright red skirts of Santiago Atitlan (pi. 7, k, m). Obviously here is an instance where the climatic factor gives way to custom, for the first two of the above-mentioned townships are in much colder regions than the latter. Atitecas take pride in their regal appearance, and the contrast between them and the short-skirted women is marked, for the latter often appear gnarled and ugly, their knees great bumps owing to the frequent

⁷⁷ Osborne, 1935, p. 33. This is the only such report that has come to my attention, however.

^{8a} There may be three, as at Coban.

weaving and washing activities performed while kneeling.⁸⁸ Long, full, pleated skirts held up with drawstrings are the usual type worn in Quezaltenango and to some extent also in the Guatemala City region (pis. 38, c, 42, c).

Oviedo in the 16th century wrote that most women wore skirts reaching nearly to the knees, but that the noblewomen (*principales*) wore thinner ones, of ankle length (seep. 48).

In Santiago Sacatepequez many women wear men's wool, checked *rodilleras*, several sewn together to make enough material for a skirt. These are bought at the August fair in Patzicia. Usually the men's *rodillera*, if worn by women at all, serves as a skirt only for young, unmarried girls (under about 12 to 14 years) as at Solola and Chichicastenango (pis. 8, e/U,a).

Sandals.—Sandals are sometimes worn by women, especially at Totonicapan, and, to a lesser degree, Olindepeque; mainly by women who use the tumpline (*mecapal*) in bearing burdens. In the municipios mentioned, it is not at all uncommon for women to carry heavy loads of pottery or fodder by this method. Many semi-Ladinized women of Quezaltenango wear shoes and stockings, nearly concealed under long, full, pleated skirts.

Hats.—Hats are seldom worn by Indian women, and it is a rarity even among Ladinas. The former fold up large *sutes* and place them upon their heads, especially if they are seated in the open market place in the sun. Or they may put an inverted basket or a *com-al* (tortilla griddle) or other object upon their heads (frontispiece). Young girls and women of the municipios of Santa Lucia Utatlan and Totonicapan provide some of the few exceptions, in wearing men's palm hats.⁸⁴ Ladinas cover their heads and shoulders with long, manufactured shawls, often of black cotton or silk.

There are probably two reasons at least for the lack of hats among these people. First, the Spanish women who followed the Conquest did not wear hats, so there was no trait which may have been borrowed by the Indians (though the women probably would

not have adopted it, anyway);⁸⁵ secondly, when Indian women go to market, they return with their purchases, which are often heavy, in wide baskets balanced on their heads, so they could not wear hats at the same time. In those villages where Indian women wear straw hats, goods are carried by them in cloth slings on their backs, the cloth ends being passed around the shoulders and tied in front.

Headdress.—Many of the varied headdress styles in the region are unusual and beautiful. One of the most striking is the "halo" of the Atiteca, consisting of an inch-wide, tightly woven cotton band, mainly red, but with sections of yellow, purple, and green, wound around a dozen times or so, until a disklike ring extending out from the head like a halo, is formed. This head band is over 25 feet (7.6 m.) long⁸⁶ (pis. 7, k, m\ 42, b). Other distinctive coiffures are employed by women of Santa Maria Chiquimula, who braid and twist a black wool cord around their hair so that the tassels form a spray at one side of the forehead. The San Juan Ixcay head-dress is similar to this, without the tassels (pi. 39, g). In certain parts of the Alta Vera Paz, great rolls of ribbon are wound around the head. (See Osborne, 1935, fig. 3, p. 23.) Such styles are not characteristic of the majority of the villages of Guatemala. Most women wear nothing so prominent, and a simple, narrow pink ribbon of cotton braided into the hair, with the braid passed around the head, is common (San Juan Ostuncalco, San Pedro la Laguna, Panajachel, Santa Catarina Palopo, San Andres Semetabaj, etc.). Often the hair is plaited, sometimes with ribbon intertwined, into one or two braids, which hang down the back (Solola, San Pedro Sacatepequez, Chichicastenango, Tecpan, Cerro de Oro, Olindepeque, etc.; pi. 7).

Ceremonial dress.—Many women's ceremonial costumes are extremely elaborate and beautiful. A great amount of silk is employed in embroidering and weaving designs of great intricacy. Special head-dress, as well as huipils and skirts, are worn on certain festive occasions. Often these are entirely different from everyday dress (Osborne, 1935).

** It has been pointed out that Indian women have taken few European traits of dress.

⁸⁶ The Santiago "halo" has been made larger and more brightly colored within the past 30 or 40 years. Informants pointed out a narrow, inconspicuous band worn by old women as the type formerly used by all (before about 1910). A picture in Maudslay's book (1899, opposite p. 62) substantiates this.

** Atitecas ordinarily weave seated, with legs extended forward, a restriction imposed by the skirt, yet also an advantage in preserving leg beauty. They usually wash standing in the Lake near shore, and not on their knees. There are plenty of good lava rocks for washboards, at all desirable heights above the water.

⁸⁴ Except for the hats, the similarity existing between Santa Lucia dress and that of San Cristobal Totonicapan is striking, and some cultural connection may be thereby indicated.

CRAFTS AND INDUSTRIES

POTTERY

Ceramic ware produced today by the Indians in Guatemala is more utilitarian than artistic, or even finely finished, with the exception of the graceful, well-made and durable water jars (*tinajas*) of Chinautla, just north of Guatemala City (pis. 21, c; 42, b, c). Virtually all of the pottery used in Southwest Guatemala is produced in 15 centers (map 15), widely distributed throughout the Highlands, where suitable clay is locally available. Thirteen of these are in the Southwest, and two, Chinautla and Antigua, are in south central Guatemala. The apparent dearth or unavailability of good clay in the alluvial Lowlands and in the region of lava and ash in the young volcanic range seems to be a determining factor in accounting for the absence of pottery making from these regions (map 5). Fine clay is abundant throughout the eluvial surfaces of the old volcanic and ancient igneous provinces, and it is in these that the pottery centers are distributed. At San Cristobal it was said that most pottery clay was bought in nearby San Francisco el Alto, at about 30 cents per *vara* (32 X 32 in.), the best clay being between about 5 and 10 inches below the surface. Communal clay pits were reported at Santa Maria Chiquimula.

Pottery makers obtain clay from pits dug into the subsoil to a depth of 1 to 3 feet (30 to 90 cm.), usually within a radius of a few miles of their homes. Dried balls of clay are ground on a metate to render the particles finer. When needed, a mass of it is moistened to the desired consistency and small flat pieces are worked bit by bit into the sides of a vessel, as in the following example. The base of a Chinautla water jar is made from a disk of clay 1/2 inches thick and 10 inches in diameter; this is fashioned into a thick saucer which is allowed to dry for one day, then is scraped out with a piece of round tree calabash (*tnorro*). Small slabs of clay are added to build up the sides of the jar, and neck and handles are affixed after the rest is dry. Six or eight jars are worked through the same stages together. This technique is used also at San Cristobal Totonicapan and elsewhere. The only implements ordinarily used by Indian potters are a piece of leather or cloth for rubbing smooth the sides and edges of the vessel, which is doused freely with water before the clay has hardened, and a piece of sharp metal, split cane, or flat polished

stone for smoothing pottery after it has dried. The final polishing of pottery at San Pedro Jocopilas, before setting it to dry in the shade, is often performed by rubbing it with a large, smooth quartz pebble.

The potter's wheel is used for finer, glazed ware of European design, such as cups and saucers made by Ladinos in Totonicapan, Antigua, Huehuetenango (pi. 41, b), and other craft centers, but apparently the wheel is little utilized by Indians (a number of Totonicapan Indian men use it). At San Pedro Jocopilas, I saw the antithesis of the potter's wheel when a woman smoothed the still wet mouth of a heavy dye jar 2 feet (60 cm.) high by walking round and round while pressing a piece of cloth against the brim to smooth and shape it. The large vessel remained stationary while the potter herself rotated around it.

As in the molding, so in the low-temperature firing, only the simplest techniques are employed. A large number of pots which have been allowed to dry in the shade (often requiring several days) are stacked up and burned with bunchgrass and firewood.⁸⁷ At San Cristobal Totonicapan I saw this done in every instance in open yards next to the potter's dwelling (pi. 41, c). Pottery was fired continuously through one full day. Chinautla women usually fire only about a dozen jars at once, for a half hour with a hot fire. Women are the chief workers in clay throughout the region, though some men also participate. At Totonicapan the percentage of male potters seems to be higher, but men generally employ the wheel (ordinarily Ladinos).

The chief producing area, as well as the approximate geographical center of pottery making in Southwest Guatemala, is that of the municipio of Totonicapan (map 15). The adjoining municipio of San Cristobal Totonicapan⁸⁸ is also important, but to a lesser degree.

In both communities the emphasis is upon large, coarse, heavy ware, having an average size of perhaps a foot in diameter, usually with globular base and cylindrical neck. Mostly open-mouthed jars used as cooking utensils, pots and vats for dyeing, washing, and storage, they include also water jars, pitchers, platters, stewing-dishes, and comales (broad, shallow

⁸⁷ «Dried cattle dung is used as fuel for firing frequently in some sections, such as Chinautla and parts of the Cuchumatanes region. Pine bark is also important at Chinautla and elsewhere when available.

⁸⁸ Local estimates put the number of potters' families in San Cristobal as between 40 and 50, mostly in the northeast section of the town.

tortilla-baking plates) (pi. 41). Colander pots, called *pichachas* in the Cuchumatanes region, are widely used for rinsing *nixtamal* (corn boiled in lime-water) before grinding it; and at San Andres Xecul, where soapmaking is a major industry, these pots may be seen supported on posts, and used for filtering water through lime and ash. The dominant colors are yellowish, greenish yellow, and light orange, underrated except for simple serrations, often made along the brim or shoulder of a vessel by pressing the straight or folded edge of a piece of leather (used otherwise for smoothing the brim) into the soft clay.

Generally, this ware is glazed on the inside and the upper half of the outside (pi. 41, *a*). Lead from Huehuetenango and sulfur from Zunil were said to be mixed together, along with fine white clay, and ground on the mortar stone by women of San Cristobal.³⁰

On the basis of a number of local reports, it seems that San Cristobal potters sometimes buy dull ceramic ware made elsewhere, put a glaze on it, and resell it at a higher price. Water jars (*tinajas*), for example, made unglazed in Santa Maria Chiquimula, often appeared in the San Francisco el Alto market with the high lead glaze characteristic of San Cristobal ware. This refinement was said to have been applied by potters of the latter community, who bought and resold the ware in the San Francisco market. Though this reported industry was not verified by any first-hand observations, the idea is plausible in view of the admitted inferiority of Santa Maria water jars, especially in comparison with the fine (though unglazed), higher-priced products of Chianautla, prized throughout the region and sold in most of the markets.

Besides being the center of pottery production in terms of volume and of geography, Totonicapan is also the center of diversity of technique and style in ceramics. This is due partly to the fact that Ladinos as well as Indians engage in the art, and is in keeping with the high degree of skill in various crafts which characterizes the natives of this municipio.

The high-grade, modern ware made on the wheel, and sometimes given a bright bronze glaze, is one product of Ladino potters, who also make good glazed, yellowish pitchers, cups, bowls, and the like,

mainly for Indian consumption. A particularly notable example of this kind of ware is a small cup or pitcher bearing an owl design (regarded as an emblem of good luck), the beak of the bird suggesting a spout. It is one of the most widely sold and popular clay drinking vessels. Simple, crude, geometric or floral designs are commonly painted upon yellowish and reddish bowls, plates, and cups (pi. 41, /).

My most detailed observations of the use of the potter's wheel were made in the town of Huehuetenango in 1940. At that time there were not over 10 or 12 potters in the entire community, and it may be presumed that the same is true today. Though minor individual and regional differences in pottery-making techniques may be observed, the Huehuetenango potters' work is described here as typical of the method.

Approximately half of the dozen or so potters of Huehuetenango, 4 men and 2 women, are in one family, that of Ricardo Rivas Cardona, living on the north edge of town. They dig their clay from a 3-foot layer of subsoil, the upper edge of which is about 3 feet below the surface. The areal extent of suitable material here is said to be about 50 square yards. When dry, the clay is yellowish brown, and when wet it is a dark coffee color. Dry lumps are pounded with a pole 6 inches in diameter, on a hard-packed dirt surface in the patio of the house. The clay is then sifted through a very fine screen and stored, moist, in a pit. A minimum of a half day of soaking and 3 minutes of kneading with the hands is performed before it is ready for molding.

The wheel employed has a 40-inch vertical spindle made of hardwood (*cedro*, or preferably *gaachipilin* or *chicharro*). The wooden disk on which the clay is worked is about 8 inches in diameter, attached to the top of the spindle. Just below it the spindle is narrowed where it passes through the hole in the table top, and is covered with a piece of greased leather serving as a bushing. A larger wooden disk, 28 inches in diameter, with two counterbalanced wooden blocks fastened beneath it, is attached to the lower end of the spindle, so that it rotates horizontally. It is kicked around directly with the foot, which provides the only motive power (pi. 41, *b*).

Clay is built up on the top disk to form a truncated cone about 15 inches high, with a basal diameter of about 10 inches. From this a dozen or more average-sized pieces of pottery are made. Only a few simple implements are used in fashioning the clay. These consist of a piece of tree calabash or a small clay cup.

³⁰ According to Gutierrez, a leading storekeeper of San Cristobal, these elements were commonly mixed in the following proportions: Potter's lead, 18 pounds; sulfur, 4 pounds; fine white clay (*fixate*), 4 Pounds; melted with firewood into a mass which is ground together on the stone, then.

³¹PPed. It is t {

the vessel is

in the form of a hollow quarter-sphere, for shaping the clay as it spins; a section of wild cane, split in half, 3 inches long with a $\frac{3}{4}$ -inch diameter, for the first smoothing of the vessels after they are molded; and a leather hat lining for final smoothing, with water doused on the moist clay. After a vessel has been made at the top of the clay cone, it is cut from the solid mass below it by means of a tight-stretched piece of string, drawn through as the wheel is rotated.

After being dried in the sun for 8 days, vessels are baked for 4 hours, 80 to 100 dozen at a time, in an oven fueled with firewood. Then they are cooled overnight before the glaze is added. For this purpose a solution of copper and tin is supplied, followed by a bath in a solution made from potter's lead (galena or alquifou), 2 parts, and potter's quartz (sand), 1 part. (The galena has previously been washed in a small oven for 14 hours, and reduced to a yellow, resinous-looking powder.) A normal lead-bath is prepared with 25 l. of water, 100 pounds of galena, and 50 pounds of locally obtained sand, very fine and white. These ingredients are mixed in a cylindrical vat 4 feet across and 3 feet deep, and are stirred all day by means of a simple wooden mill built into the vat, operated by a man walking around pushing a beam. Pottery dipped into this bath is given a second firing for 6 hours. Bowls 7 inches in diameter and 3 inches deep are the pieces produced here in greatest quantity.

Totonican Indian potters make a great variety of small clay pieces for uses other than those connected with foods and liquids. For example, there are small, green toy whistles, shaped like ducks and fish, and diminutive saucers which serve as measures for high-priced bulk goods (as seeds, spices, and the like). Somewhat larger are the ornate censers, in demand particularly at Chichicastenango; and candlesticks, usually built upon a base representing a beast of burden, freely embellished from the creator's imagination, and the best medium of expression in the ceramic field. These miscellaneous items are nearly always highly glazed, and they range in color from dark browns through yellows to greens (pi. 41, f; see also Lemos, 1941, p. 29).

Antigua is the only other important center of production of such varied types of pottery, and this town produces some of the finest ceramic ware made in Guatemala. Grays, yellows, and greens, blended in pleasing combinations, are characteristic colors of the glazed Antigua pottery. Crude, unglazed, brightly colored figurines and candlesticks are made at Rabinal and Mixco.

In addition to the municipios already mentioned, there are several centers in which utensils are made on a considerable scale. In each there is a distinctiveness of type, and certain specialties, e.g. the large, heavy dye pots and vats of San Bartolome* Aguascalientes, for purchase and use mostly at nearby Momostenango, the chief wool-weaving center; small, rough, light-colored or sooty black pitchers of San Miguel Ixtahuacan, and the large, unglazed, reddish-orange ware of San Pedro Jocopilas, mainly smooth, globular jars and broad, flat *comoles* (pis. 29, c; 42, a). Certain markets are notable for the abundance of ceramic ware sold; for example, Chichicastenango, Quezaltenango, San Cristobal Totonicapan, San Francisco el Alto, to the last of which come goods from at least five producing areas. (See map 15 and pis. 41, 42.)

Pottery moves on a large scale to the Lowlands and to the national capital, from the Totonicapan region, where there are many merchants as well as workers in clay (pis. 14, a; 24, d, /).

The pre-Columbian importance of pottery in Central America is attested by the great number of sherds associated with ruin sites throughout the region.

BASKETRY

Like pottery, basketry is the product of certain centers having a specialty in this work. Most of the baskets used in Southwest Guatemala are produced in no more than eight municipios (map 17).

Two basic materials are used, split wild cane and osier. These are reflected in the two principal types of baskets made; the deep, globular, handled type (*canasta*), made of split cane, and the open flat ones (*canasto*) without handles, made of either cane or osier. Though no attempt was made to study the ethnographical or technical aspects of basketmaking, it is apparent that both Ladinos and Indians engage in the industry. In some municipios, as Aguacatan (handled baskets, pi. 3, e), it is the work of Ladinos; in Santa Catarina Ixtahuacan (open baskets), of Indians; and in Santa Clara it was said that both groups make baskets (handled), Ladinos being credited with having introduced the craft here.

The deep, handled baskets are carried to market by Ladinas, whereas Indian women employ the flat ones, not only for displaying goods in the plaza, but also for carrying things on their heads and for storage at home. Indian men, when selling on a small scale in an open market, occasionally display their goods in shallow baskets, though they seldom carry

anything in them, employing cargo frames and sacks for this purpose. Usually, they spread their wares on the ground, on a cloth or mat (pis. 4, e; 14). Open baskets are also used as measures in the market, as balance scales, and for fishing (small fish driven into baskets). Since most Indian women do not wear hats, they sometimes invert open baskets on their heads to shelter them from the high midday sun (frontispiece).

TREE CALABASHES (JICARAS)

The round or oblong, hard-shelled fruits of the calabash tree or *jicaro* (*Crescentia cujete*) and *morro* (*C. data*) have been prized since ancient times as drinking vessels, especially for chocolate (modern Span, *jicara* = "chocolate cup"). Oviedo described fine cups of *higueras* in Darien that had handles of gold, "fit to offer to any mighty king to drink out of without reproach." They had come in trade, largely from Nicaragua, which was a producing area of great importance (op. cit, vol. 1, p. 296). Though Oviedo describes tree calabashes holding a gallon, the average size of those used today in Guatemala is of a capacity between one-half and 1 pint.

The distribution of *Crescentia* in Guatemala is determined primarily by climatic conditions. The tree thrives best in a hot, dry or semidry climate, such as the tropical savanna of the Pacific Coastal Plain, from southern Mexico through Central America. It is abundant also in deep, interior valleys and basins, like those of Rabinal, Cubulco, and Salama (maps 6, 7).

The elaboration of *jicaras* is a specialty of Rabinal, which is probably the only place where they are made in Guatemala. Izalco, an Indian community near Guatemala, in El Salvador, is the center of manufacture in that country. There the tree is called *guacal*.

The preparation of the common type of black *jicara* consists ordinarily in (1) polishing the calabash by wetting it and scouring it, usually with a rough leaf, such as an alder; (2) smearing it with a yellowish waxy substance obtained by boiling a scale insect (*Llaveia axin*); (3) applying soot, from smudges of pitch pine, and polishing the surface with a cloth; and (4) decorating the receptacle with incised designs made by rotating the *jicara* in one hand and pressing a metal carving tool against it with the other (pi-43). These tracteries often include conventionalized flowers, birds, and animals, and they may be colored or left as white lines. (For fuller discussion of

this topic, see McBryde, 1943.) *Jicaras* may be carved without being blackened, and most of those sold in the markets are uncolored and uncarved. In addition to the larger sizes, smaller receptacles, toys, and rattles are fashioned of *jicaras*, usually dyed, elaborately incised, and colored.

Ordinarily, it is the oblong calabashes which are dyed, one end having been cut off so as to form a very deep vessel. The large, round or ovoid *morros* are cut in half and used as bowls. Sometimes these are painted inside and out with crude figures and designs. This work was said to be done chiefly in Antigua for the tourist trade (1936).

For an exhaustive treatise on *jicaras*, especially the etymology of the word, see Kiddle (1944).

FOODSTUFFS

Bread.—Since wheat is an introduced crop, all types of bread made from it may be considered as exotic, having been brought in by the Spaniards. As pointed out earlier, locally grown wheat is milled in the principal towns of the Highlands, and sold as flour to stores and bakeries. In the Lowlands, bread is made in the larger towns, mostly by Ladino bakers. Bread, as an Indian product commonly sold in the markets, is made in important quantities (for export to other municipios) in the following centers: Santa Lucia Utatlan, Nahuala, Argueta, Totonicapan, San Cristobal Totonicapan, San Francisco el Alto, Santa Maria Chiquimula, Santo Tomas Chichicastenango, Quezaltenango, San Pedro Sacatepequez (La Union, San Marcos) (map 9). It is usually baked in the form of buns of several sorts: *pan Francis* (4-inch, oblong) without eggs; *pan duke* (4-inch, round, flat) with eggs, often slightly sweetened; small (1-2 inch), ring-shaped *panes dukes* called "*rosquitos*," commonly sold by itinerant *Maxenos*; and occasionally a larger loaf, *Xaca*, flat and round, said to be made of whole wheat, and very dark owing to the *panela* (brown sugar) used. It is a specialty of Santa Maria Chiquimula (some made also in San Francisco el Alto) and sold in markets of that region. Bread is a luxury item among the Indians, however, consumed mostly during fiestas.

Cheese.—Outside of the capital, and a few other large towns, the only cheese extensively manufactured is a rather dry, unseasoned white variety made of cow's milk, in much the same manner that cottage cheese is prepared. Sour milk to which hot water has been added is strained in a cloth until most of the whey has dripped off. Then the curd is molded

in a shallow, circular container, and sold in sections, wrapped in cotton cloth. Most of it is peddled to town-dwelling Ladinos.

Though cheese is made in many localities where a few dairy cattle may be kept, there are certain municipalities which specialize in this product. In the Highlands, considerable quantities go to Solola from San Jose Chacaya, and according to Tax (Ms., 1935), to Chichicastenango from San Sebastian Lemoa. Cattle are especially abundant in the savanna lands of the Coastal Plain, and cheese is a common product. Even here, certain centers stand out, as San Bernardino, which has long been noted for its cheese. It is marketed along the piedmont in both directions, mainly between Cuyotenango and San Antonio. A subsidiary to cheese making in San Bernardino is the raising of pigs, which are fed upon the whey (seep. 38; map 13).

Popcorn confections.—Patzum has developed an unusual specialty in confections of popcorn, coated with a sticky sirup prepared from panela. It is sold in bulk in the neighboring markets under the term *bocoles*. Small, rectangular cakes are made also of fine white roundish seeds (probably one of the goose-foot family, *Chenopodiaceae*).

Candies.—In addition to the common pink and white rock candies and taffy sold in markets and stores, there often appear, particularly during fairs, special types of candies that have characteristic names and are peculiar to certain localities. One of these, called *chupete*, is said to be prepared from honey, variously flavored and appropriately colored artificially, as with lemon (yellow), mint (green), cinnamon (red), etc. The candies are wrapped in small wax-paper cones, and each is attached to a wooden stick, the over-all length being about 6 inches. These are made chiefly in Quezaltenango and are marketed by merchants from there.

Another special type of candy which represents an important localized industry is that of *alienique*. It is made in Sacapulas (and only there, apparently) of squash seeds and locally obtained sugarcane juice boiled down. *Alienique* is made up into flat, brownish rings 2 to 3 inches in diameter. They are generally sold in markets by Sacapulas men, who also sell *mecapales* (tumplines), which they make on a large scale of rawhide with the hair left on the side to go against the forehead. These products are frequently sold as far away as Solola⁹⁰ and other even more distant plazas, being particularly in evidence

during fairs. Often the men sit in the plaza and braid tumpline ends.

Salt.—By far the greater part of the salt consumed in Southwest Guatemala comes from various centers along the shores of the Pacific (map 18). There are two major types, a coarse grayish "cooked" (fire-evaporated) salt, derived through leaching lagoon deposits near the sea and boiling the brine (pi. 1, *d*), and a fine white "*sal de sol*" obtained by evaporating sea water in basins exposed to the sun (pi. 1, *e*). Both kinds are sold in bulk, as granular salt. There are minor salt-producing centers in and marginal to the Cuchumatanes Mountains, such as San Mateo Ixtatan⁹⁰ and, especially, Sacapulas. This inland salt, like most of that made along the ocean, is produced by cooking brine leached from earthy deposits of sodium chloride, which probably were laid down in geologic time in marine embayments adjacent to the great limestone deposits of the Cuchumatanes Mountains. Sacapulas salt is generally sold in flat ($\wedge$ -inch), round cakes,⁹¹ 2 or 3 inches in diameter (pi. 42, *e*, *l*). The cooked salt of the Pacific coast is usually brownish or grayish and dirty-looking. The Indians seem to prefer it, however, explaining that it has "more flavor" than the sun-evaporated *sal de sol*. The report is widespread that some makers of sun-evaporated salt sprinkle small quantities of *playa* dirt into their pure white product to make it simulate the cooked salt with its inevitable ingredient of silt. This was unverified, however.

Pacific coast salt.—My study of saltmaking on the Pacific coast was confined to Tahuesco, a village on the barrier beach about 25 miles southeast of the port of Champerico (pi. 1). Though the present description of the process is, then, strictly applicable only to Tahuesco, many informants asserted that the method of cooking salt in all the shore centers is practically identical. It will be shown later (p. 59) that saltmaking at Xicalapa as described in a 16th-century manuscript was the same in nearly every detail as that of Tahuesco today.

There are many *salinas* along the lagoon shore behind Tahuesco—over 100, I was told—and each is owned by an individual or family. Each is named and consists of a plot of ground which is periodically

⁹⁰Name possibly derived from *atdm* ("salt" in most of the Maya dialects, according to Stoll, 1884, and Sapper, 1897).

⁹¹Mendizabal cites the distinction between sun-evaporated and "artificially evaporated" salt in Mexico, but makes an assumption that is not applicable in coastal Guatemala, namely, that unless otherwise known, granular salt is sun-evaporated and block salt is "cooked" (Mendizabal⁹¹ 1929, p. 186, fn. 1).

flooded by sea water. There is thus a natural deposition of salt by evaporation, especially during the dry season, with an admixture of silt brought down by the swollen streams of the Coastal Plain during the rainy season.

There seems commonly to be a division of labor in saltmaking, as follows. A *playero* digs out the saline soil with a broad hoe. A silt cover may have to be stripped off first, and for this process a 12-foot pole, with a flat, wooden blade at the end, is employed. The salty earth which is dug out is taken by the *playeros* to palm shelters built on strips of higher ground, not flooded during the rainy season, and there it is piled up and stored. It is then supplied as needed in sackfuls to the *cocineros*, who extract the salt from the *playa* material. The apparatus employed is crude and simple, but effective. On each *salina* there are two old canoes of the type used in lagoon navigation. These are placed horizontally upon racks built of poles, one directly above the other. The lower, called the *recibidora*, is usually about 3 or 4 feet above the ground. The upper, the *coladera* (colander), is a little more than a foot higher; its bottom is perforated and covered with palm mats. A thick layer of sand is put in it as a filter, with *playa* salt crust spread over that. Water is carried to it, up a small ladder or ramp in a brace of buckets attached to a pole placed across the shoulders (pi. 1, d).

When the lower canoe has been filled with water that is high in dissolved salt, leached from the *coladera*, the saline solution is transferred by buckets to an adjacent iron vat, about $A\frac{1}{2}$ feet wide, 7 feet long, and 2 feet deep. Fixed by mortar between two stone walls, this vessel is usually about 2 feet above the ground, so that firewood may be piled in under it. The brine in the vat is kept constantly boiling all day, at the end of which time a large amount of salt is deposited.

A 16th-century manuscript describing Qapotitlan (Anon, Ms. 1579, p. 21, f. 115) includes a passage on saltmaking at Xicalapa which might well have been written yesterday but for the small scale production. Jars were used (as at Sacapulas) instead of the large iron vats for cooking the brine. Otherwise, the 16th-century method is practically identical with present-day practice along the Pacific. That this boiling of brine may be a pre-Columbian technique, at least in fundamental principle, may be concluded from certain comments made by early Spanish writers. Many of them described the process in

minute detail, and remarked that the salt obtained in this manner was "more trouble than it was worth." Not only is this seen in the 16th-century manuscript cited above but it may also be noted in Palacio's *Relacdn* of 1576, wherein the "*costa de Guazacapari*" is described (Mendizabal, 1929, pp. 149-150).

Alonso Ponce's companion describes the cooking of salt in Mexico (Atoyaque), and the molding of figurines of salt (Ponce, vol. 2, p. 121; Mendizabal, 1929, p. 137).

Apparently, both methods of evaporating salt, by sun-drying and by cooking, were known in pre-Conquest time. Oviedo mentions cooked salt early in the 16th century (op. cit. vol. 1, p. 173). Mendizabal (1929, p. 188) concludes that the fire-evaporation technique was a later introduction by migrating agricultural peoples from the north, especially the Nahua. It is his belief that the "archaic" cultures knew only sun-evaporation of salt. I see no reason for doubting, however, that any culture which knew cooking and had clay vessels may have evaporated salt with the aid of fire. Mendizabal discounts the possibility of any "constant relationship" between geographical possibilities and the systems of making salt, and attributes the general distribution of the two methods to cultural factors alone, except for such local environmental variables as firewood supply, amount of rainfall, etc. He fails to point out the big climatic factor of low annual rainfall along the west coast and in the interior of Mexico, also on the northwest tip of Yucatan, in all of which regions salt production was concentrated in pre-Columbian time, as compared with the greater humidity of east coasts, along which there was a dearth of *salinas*. Any salt which is made in such regions of high rainfall must be cooked out. The reason why sun-evaporated salt as well as cooked salt is made along the west coast may well be that the relative humidity is not so high, local winds are well developed, and sunshine is relatively abundant and temperatures high; all of these are climatic factors conducive to evaporation of sea water, especially during the dry season (November-April, inclusive). (For sun-dried-salt producing centers, see map 18.)

Interior: Sacapulas.—The production of salt at Sacapulas was perhaps first described in detail by Dollfus and Mont-Serrat in 1866 (1868, pp. 229-230), as follows: Briny water was collected in salt springs, artificially enlarged into circular basins about $1\frac{1}{2}$ in diameter. These were scattered irregularly over a plain next to the Chixoy River. By means of ditches

the water was spread over the flat surface to impregnate the soil with salt. The sun and dry air of this desiccated valley rapidly evaporated the water from the brine (especially during the dry season) and salt was crystallized, coating the soil as with snow. The saline surface crust was scraped up and put upon a clay filter, and fresh water leached through, several times if necessary. Then the brine was boiled "in series of small terra cotta vessels," with fire burning continuously through the day. The salt, which was scraped from the vessels by hand, was characterized as "dirty and impure," and the method as a primitive one which probably dates to pre-Conquest time. The French authors saw no possibility of improving the method, despite the many efforts made, because of the "backwardness of the Indians."

Modern Sacapulas salt is sold in clean-looking white cakes. There has apparently been little change in the method of making it. The salt-encrusted surface of the same little river plain (pi. 42, *e*) mentioned by Dollfus and Mont-Serrat is scraped with broad hoes into little mounds of saline earth, which is carried in deep baskets on human backs to vats where water is poured over it and filtered through a layer of fine clay laid on palm mats. The brine is boiled in the same "small terra cotta vessels." When quite thick, it is poured into flat, circular molds about 3 inches in diameter, to dry into white cakes (pi. 42, *f*). The saltmakers said that plots of the salt *playa* were privately owned.

Salt has played an important role in Central America since pre-Columbian times as a medium of exchange for small-scale purchases, a significance which has persisted almost until the present time. Ponce's companion wrote (vol. 2, p. 120) "... Spaniards come from many regions to buy I salt], and for this there is in Atoyaque a market every five days, and the chief article sold in it is salt." Mendizabal (1929, p. 190) quotes from the *Relation de Mezitlân*: "Salt is small currency for minor purchases among the Indians" (see also Blom, 1932). Numerous reports of old residents in Guatemala today concur in the use of salt for small currency until as recently as about 1890 (McBryde, 1933, p. 124).

LIME

The distribution of limestone outcrops and lime-burning centers is considered in a later section (p. 73 and map 18). San Francisco el Alto was the only locality in which field notes were ob-

tained regarding lime production. These were not from first-hand observation, however, but from an intelligent Indian informant (Adrian Chavez). Lime burning in this municipio is the special industry of the canton Paxixil, where almost all residents are engaged in this activity. The limestone, much of which has a greenish cast, outcrops near the Continental Divide just north of the village. It is quarried by means of picks, and broken up with 5-pound sledges. The quarry is communally owned. About one-half of the residents of canton Paxixil own kilns, adjacent to their dwellings. Built of stone slabs about 10 inches thick, the structures are hemispherical, about 6 feet high and 8 feet in diameter, with a smoke hole in the top, 2 feet or more wide, and an opening of about the same size at the side, for putting in limestone and firewood (chiefly oak). Burning is continuous for 4 days and nights, various workers taking shifts at a kiln.

There were also said to be six or eight communal kilns, like the privately owned ones, but larger (about 12 ft. in diameter). A group of four or five families, often related, uses one kiln, each family bringing a share of the raw materials and taking out a proportional share of the finished product.

The vendors of lime, according to my informant, are poorer residents of the same canton, a distinct group; on rare occasions a maker of lime sells it direct to the consumer, by special order. San Francisco lime, like that made in other Guatemala centers, is sold by weight, in lump form. In the Cuchumatanes region, granular lime (air-slaked?) and spherical balls of lime are sometimes sold (p. 73).

The most widespread use of lime, for which the greater part of it is sold, is in making an aqueous solution (limewater) in which corn is boiled and softened. The hominy thus obtained, called *nixtamal*, an Aztec name, is then easily ground on the stone for making tortillas, tamales, posole, or other derivatives of *masa* (ground maize paste). In mortar, whitewash, and plaster a great amount of lime is also consumed, and sometimes excessively acid soils are treated with it. On one occasion, just south of Chichicastenango, in 1932, I saw a field which had been generously sprinkled with lime.

METATES (GRINDING STONES)

Essential in every Guatemala household is at least one set of stones for grinding corn.⁹² The basal

⁹² Most towns now have at least one motor-driven mill where manjir Indians bring corn to be ground, on the days when they come to market. Town dwellers visit them more frequently.

stone, or metate (here called *piedra de moler*), is flat on top when new (becoming concave with use) and rectangular, an average size being, perhaps, 12 by 15 inches. It rests upon three legs, the single one being somewhat larger, so as to tilt the stone downward at the end opposite the person grinding. The stones are always used by women, who press down and forward with the long (15 in.), slightly fusiform *mono* stone held in both hands like a rolling pin, but scraped rather than rolled.

The most important center of metate production in southwestern Guatemala is Nahuala (map 18). Dark gray andesite is available in abundance, and the Xankatales work it skillfully with small sharp-pointed iron sledges. Stone working is one of their best developed arts, so much so that they are often called upon to do any such work that may be required in other municipios throughout the region. They peddle their stones, a few at a time because of the great weight, among villages and towns, at dwellings and in large plazas. The Quezaltenango market is perhaps the principal one, though stones are sold in the Lowlands and as far north as Momostenango.

The producing center in the Huehuetenango region is the district south of Malacatancito, which also supplies metates to Quezaltenango. Here it is apparently an industry of Ladinos, many of them rural, living quite far out in the wooded mountains. Several with whom I talked demonstrated how they work the lavas of the region into grinding stones, using smooth granite hammer stones instead of iron picks; this was especially common practice there.

At San Marcos, it was said that the chief producing center for that western region is Tajumulco, where iron hammers are employed.

TEXTILES

In Indian Guatemala there are two kinds of weaving, according to the type of loom used: (1) stick (back-strap) loom and (2) foot (treadle) loom. Goods produced on both may be designated as "hand-woven."

STICK-LOOM WEAVING

The native, pre-Columbian method of making cloth, by using a few simple sticks, straps, and cords, is illustrated in plate 9. In this type of loom the essential sticks are generally as follows: A pair of sticks serving as the cloth beam, upon which the woven goods are rolled, and to one of which a loop is attached, brought from around the weaver's waist or

hips (a broad *mecapal*, or tumpline, prevents cutting), a swordlike batten, with which the weft is packed down tightly, a heddle, a shed roll of wood or bamboo, two reeds to maintain the warpcross, and a head stick, at the far end from the weaver. From each end of the latter stick two ropes extend, to be looped over a solid object, for drawing taut the warp.⁰⁸ The yarn employed is of cotton for the warp, and generally of cotton, but occasionally of imported silk, for the weft. Silk thread, already dyed, has been imported, chiefly from China and Japan, for at least 50 years, according to local storekeepers; and it has probably come in since Colonial times. In a letter from the Bishop of Oaxaca to the King, dated 1544, it is stated that the Indians of one town collected 2,000 pounds of silk, probably one year's harvest (Anon., Ms., 1544, p. 9, f. 150). If such silk production was possible then, it is hard to understand why the culture was not continued.

The stick loom is almost always operated by Indian women, and it is employed in greatest numbers in regions where native cultural survivals are strongest.⁰⁴ For the most part, products of the stick loom are used by the weaver and members of her immediate family for various elements of their dress. In some areas, however, commercial weaving by this method is practiced on a considerable scale, as map 16 shows. Merchants far and wide sell the colorful, brocaded *sutes*, belts, huipils, figured *servilletas*, and other goods that come from the looms of Chichicastenango women. San Pedro Soatepequez (La Union, San Marcos) huipils, San Francisco el Alto *zutes*, worn as head-cloths and shawls, San Pedro la Laguna trousers, and other textile pieces are produced on commercial scale by women. Indian men sometimes weave belts on small stick looms.

White, blue, and jaspe (tie-dye alternating blue and white) cotton yarns are all locally produced in Guatemala, the undyed white for the most part being

⁰⁸ See La Farge and Byers, 1931, p. 52, fig. 17; Osborne, 1935, p. 49, fig. 10d. Weaving techniques were studied in detail by Dr. Lila M. CNeale, of the University of California, for the Carnegie Institution of Washington, in 1936 (see O'Neal, 1945, especially pp. 31-35). I am indebted to Dr. O'Neal for numerous technical terms and explanations of processes in dyeing and weaving, as many of our excursions and observations were made jointly. Her book is the most authoritative and complete available to date concerning Guatemala weaving and textiles. Page references, except those given above, have not been made in the present monograph because the O'Neal volume was still in press when my manuscript went to the printer.

* On map 16 note the virtual absence of stick-loom weaving from the valley of Quezaltenango—Totomacapan north to Momostenango, and from the Lowlands, up as high as Santa Maria, where today (1936) only one woman weaves; most Santa Maria women of the last generation did beautiful stick-loom weaving, according to their descendants.

made on the electric looms of the Cantel mill. Because of the cheapness of indigo dye (chiefly from El Salvador) and of *sacatinta*, with which it is mixed, much blue, green; and jaspe dyeing is done, the Salcaja-San Crist6bal Totonicapán area being most important in this regard (pi. 40, *a, d, e*). Much colored yarn, especially yellows, reds, and purples,⁹⁵ is imported (English, American, and German, for the most part) and sold in markets by itinerant merchants. Home dyeing is almost nonexistent, so far as I know, except in the case of the foot-loom weavers. For stick-loom work, women buy imported colored yarn, and white yarn from the Cantel mill. Some indigo blues and tie-dyes of the Salcaja area are used in those municipios where such colors are in demand, e. g., San Pedro la Laguna. In many sections, spinning is still practiced, but it is a disappearing art. In the Lake Atitlán villages, notably San Pedro (pi. 9, *d*) and Santiago, it is fairly common, and in the Cuchumatanes both white and *ixcaco* brown⁹⁶ cotton are spun. Sometimes home-grown cotton is twisted together with Cantel yarn,⁹⁷ the former to furnish superior whiteness and the latter superior tensile strength. Wool is rarely used on stick looms except in Chiapas (common at Chamula); some San Sebastian Huehuetenango women weave wool skirts on stick looms.

In areas where stick-loom weaving is practiced, which includes most of the Highlands, with the major exception of the Quezaltenango-Totonicapán-Momostenango region (map 16), women ordinarily weave their own huipils and *sutes* (general utility cloths). In the Lake Atitlán area and other isolated sections, men's trousers, and in some cases their shirts, are made of the same goods as the women's huipils (pi. 7). Geometric designs and conventionalized animals, trees, and the like are often skillfully and beautifully worked into textiles on the loom. The tree of life, Hapsburg double eagle, peacock, and many other common symbols, came in with the Spaniards (pi. 42, *g*).

In some cases, merely stripes are woven, or the cloth may be plain, and later embroidered or brocaded by the weaver, as in Chichicastenango.

⁹⁵ Generally the shade which simulates the native mollusk purple, once a great product of the Gulf of Nicoya region, Nicaragua, but now seldom used, because of its greater cost (said to be \$8 per pound, as compared with \$1 for German yarn) and inferior durability.

⁹⁶ Because of its short staple, *ixcaco* does not spin into a yarn of great tensile strength, and where used it is generally in the weft, the warp being plain white, or dyed brown to simulate *ixcaco*.

⁹⁷ Observed at San Pedro Cutxan, and said to be practiced also at San Pedro de Laguna.

EXPLANATION OF SYMBOLS FOR MAP 16

-  MAJOR WOOL-WEAVING CENTER
-  MINOR WOOL-WEAVING CENTER
-  MAJOR COTTON-WEAVING CENTER
-  MINOR COTTON-WEAVING CENTER
-  COMMERCIAL STICK-LOOM WEAVING
- COTTON MARKET
- ® WOOL MARKET
- B BELTS (WB= WOOL BELTS)
- BB BELTS AND HEAD BANDS
- CO COTTON CLOTH GOODS
- S SKIRTS (Foot loom; rarely stick loom, as at Ohalohitan (blye oot-ton) and San Sebastian Huehuetenango—also Chiapas, notably Chamula—(natural black wool)),
- 13 LADINO SKIRT WEAVERS
- f TAILOR-MADE SUITS
- Z ZUTES
- ELECTRIC COTTON MILL
- STICK LOOM ABSENT OR RARE THIS SIDE OF LINE
- TRADE STREAM, COTTON GOODS
- TRADE STREAM, WOOLEN GOODS
- MAIN DYE-WOODS MARKET: MOMOSTENANQO

TREADLE-LOOM WEAVING

Manufacture of cloth on the large loom of Colonial Spanish introduction, on which the heddles are raised and lowered by treadles, is a commercial-scale industry. It differs from stick-loom work not only in this respect but in being carried on almost entirely by men, often Ladinos, and in employing wool yarn on a scale comparable with that of cotton.

COTTON

From the standpoint of native garments, the most important cotton cloths woven on foot looms are skirt-lengths (*cortes*). These are made according to a standard, specified length, width, weight, and pat-

tern, depending upon the usage in the municipio where they are worn. In general, however, more skirts are dark blue than any other color;⁹⁸ the average width of the material is about 30 inches, and the length of the material is 6 to 7 *varas* (about 18 ft.). The cloth beam on a skirt loom generally has a capacity of 30 skirt-lengths (about 500 ft.)—

The chief skirt-weaving region in Southwest Guatemala is that of Quezaltenango-Totonicapan, including not only those two major centers but also Salcája (relative to size, perhaps, the most important single producer), San Cristóbal, and Olintepeque. Other major skirt centers which supply a large territory around them are La Unión (San Marcos), Huehuetenango, Chichicastenango, and Solola (map 16). Indians and Ladinos both produce large quantities of skirts at San Cristóbal, Totonicapan, Quezaltenango, and La Unión. Elsewhere the skirt-makers are primarily Ladinos.⁹⁹

At Salcája, a Ladino town, a great amount of yarn is dyed, probably more than at any other center. Dark blue, particularly in jaspes, is the chief color, being used in perhaps 95 percent of all yarn dyed. Indigo in cakes from El Salvador is blended with cheaper German aniline dyes, then this mixture is added to about 8 or 10 times (by weight) the amount of *sacatinta* leaves (see p. 143). A mordant is prepared by leaching water through a mixture of wood ashes (3 parts) from Cajola and lime (1 part) from San Francisco el Alto; then adding this solution to 20 parts of water, in large cement bins.¹⁰⁰ The majority of the Salcája weavers also dye, apparently, but many who do not, buy dyed thread from others.

Some weavers even tie up strands of yarn to get their own desired jasje patterns, then pay a dyer for dipping them into his color vat. The jasje technique is practiced almost exclusively at Salcája, though it is probably done on a small scale at Huehuetenango, San Cristóbal, and a few other centers. Strands of yarn, in which the threads are counted, are bound up at intervals with cotton string, so tightly wound that the dye does not penetrate to the yarn, provided it is not left too long in the vat.

⁹⁸ Probably a result of the greater cheapness and abundance of indigo than of other dyes, so much so that for other colors the yarn is bought already dyed.

⁹⁹ It was reported that Ladino weavers in Chichicastenango are some times hired by Indian textile merchants to make skirts. The Indians were said to buy the thread and pay for the work by the *corte*. Weavers and their families often retail the skirts they make, sometimes taking them to distant markets and fairs.

¹⁰⁰ *Sacatinta* leaves (usually 150 lb.) are put to soak in the 400 gallons of water in the vat; then the dyes (about 20 lb.) are added the next day. After 2 weeks, the solution becomes quite green and odoriferous, with bubbles of carbon dioxide rising to the surface. It is then ready for use.

By prearranging the spacings between the bindings, and the widths of them, the intervals of alternating blue and white are made to form various patterns when the yarn is set up on the loom (pi. 40, e). Characteristic of the Salcája street scene are the great lengths of jasje yarn warp strands, stretched over a space of a hundred yards or more, and hung to dry on pegs projecting from holes made in the adobe walls that border the sidewalks (pi. 40, a). Jasje patterns are more often worked into the warp thread than the weft, but they not infrequently appear in both. Other textile pieces, especially scarves, are made from jasje threads, and are given patterns of striking white dashes upon a dark blue field.

Because of the custom of resetting a loom with new warp thread by tying it on to the remaining ends of the old, the basic pattern of the warp is generally preserved on any given loom. This tends to encourage, on a mechanical basis, the strong conservatism which is so characteristic of these people, Ladinos as well as Indians.

Huipil cloth is woven on a large scale on foot looms in those regions from which stick-loom weaving has almost disappeared. This is particularly true of the Quezaltenango-Totonicapan-Momostenango region. All three of those towns are important producers of huipil cloth. The first two mentioned are noted for intricate all-over patterns, with various figures and colors, obtained from draw looms having great numbers of heddles. Dr. Lila O'Neale and I counted over 100 on one in Quezaltenango. In such cases, younger members of a weaving family generally assist by drawing up the complex groups of heddles, which have long strings attached to them for the purpose.

Foot-loom cotton textiles other than skirts and huipils include belts, head bands, aprons, napkins, *sutes*, and sheets of cloth having miscellaneous uses. (For distribution of these manufactures, see map 16.) Small foot looms are employed in weaving belts and head bands, and these are sometimes operated by women as well as men (pi. 40, c).

The chief vendors of cotton textiles of all sorts are the itinerant Chichicastenango merchants. In the Quezaltenango-Totonicapan region there are also many vendors, especially in Quezaltenango, Totonicapan, San Cristóbal, and San Francisco.

WOOL

Nearly all weaving of wool yarn is done on foot looms, of the type employed in weaving skirts, and,

like the latter, large enough to occupy the major portion of a room of average size. For these looms special houses or shelters are constructed, or else separate rooms or sections of rooms. Sometimes looms are unsheltered, as in parts of the Cuchumatanes region (pi. 37). They are operated by men, usually Indians, and they are more often rural than urban, except for the Huehuetenango Ladinos. Generally, weavers and members of their families card and spin wool which they buy in bulk (pis. 33, *a, b, d*; 35, *d*). Foot-loom weaving of cotton goods differs, then, from wool weaving in that the latter is generally the work of rural Indian men using yarn spun by themselves or their families. Solid wooden spinning wheels are generally used, but spindle sticks are sometimes employed, especially when the weavers are away from home (pis. 19, *d*; 33, 34, *b*; 37, *b, d, e*).

Sources of raw wool are shown on map 16. Sheep are confined to the cool alpine meadows (especially in the fog belt), above an elevation of about 2,000 m. (p. 38 and pis. 32; 37, *a*), and more flocks are predominantly "black" (dark brown) than otherwise. This is due to the heavy demand for the natural dark brown wool, which is widely used undyed.

The greatest single center of foot-loom wool weaving in Central America is that of Momostenango. The extremely leached soil and badly eroded surfaces of this region have been alluded to earlier (pis. 29, *c*; 30, *e, j*), with the suggestion that this may in part account for the emphasis upon weaving, for want of self-support from agriculture. The occurrence of hot springs is also an environmental advantage, important to the felting process. This consists in alternately soaking a blanket in hot water, (natural or artificial heat, with or without soap) and treading it, slapping it vigorously on a rock, pulling, "snapping," and wringing it, there generally being two men involved in the process (pi. 34, *a, d, e*), which usually requires 2 hours or more.

Other important wool-weaving municipios are Nahuala-Santa Catarina Ixtahuacan, Chichicastenango, San Francisco el Alto, Comitancillo, and numerous communities in and near the Cuchumatanes, including Huehuetenango, Santa Barbara, Chiantla, and Aguacatan, along the southern margin of that massif (see map 16, and note the central location of Momostenango—an advantage in obtaining raw wool).

The most important and best-known products of Momostenango are blankets, made by sewing together (with wool thread) two widths of cloth,

ranging between 24 and 33 inches, the latter being usually a maximum for the standard-sized loom. Sometimes one-piece blankets are woven, as wide as 5 or 6 feet. An average blanket length is about 80 inches, and they are generally fringed with tassels 4 or 5 inches in length, formed by the loose, twisted ends of the warp (pi. 33, *e*). Checked and striped patterns predominate, with many blankets resembling Scotch plaids (pi. 35, *a*). Creative genius appears in some of the strange men and beasts that are sometimes worked into a textile piece, which may depict ethnographic scenes. I once purchased a Momostenango blanket which was decorated with deer-dancers (Indians performing a ceremonial dance, wearing deer masks, as is commonly done in the Cuchumatanes region; see pi. 34, *g*, inset figures). It was said that the technique of weaving "doll" (*muneca*) and animal designs was an innovation, in practice only since about 1925. Dr. Q'Neale observed a strong resemblance in this to modern Peruvian wool weaving, and suggested that the ideas may have stemmed from a clever Momosteco who probably saw one of these imported pieces in a Guatemala City store. Local informants said doll blanket weaving began in the late 1920's, starting with one Indian who was regarded as "queer" and who is credited with having originated the idea. A "diamond" center commonly employed suggests Mexican influence. Some of the "doll" blankets are beautifully made, and are very heavy and finely felted (pi. 34, *g*). They are the most expensive pieces woven in Momostenango, and they bring a high price. Virtually all of these are sold to tourists, who pay (1936) as much as \$25 for them in the more extravagant shops of Guatemala City. From the makers they could be bought for as low as \$5, which is still high when compared with the price range of ordinary blankets (\$1.50—\$3).

Lengths of suit cloth (usually 26 in. wide and 19 ft. long) are made on a large scale at Momostenango (pi. 34, *f*), as are scarves (especially "bufanta," with cotton warp, wool weft, an industry said to have begun in 1934) and *rodilleras*; the latter are black-and-white checked knee-length skirts worn by men in many parts of the Highlands. They are sold in quantity as far away as Tecpan. Heavy felt saddle blankets are made on a small scale.

A "schedule" as given by a Momostenango family of blanket weavers follows: Sunday—(morning) market, sell cloth, buy wool and perhaps yarn, (afternoon) card and spin the wool and skein the

warp yarn (pi. 33, *a*, *b*, *c*), (night) wash the yarn, cutting the natural oil by boiling it in a solution of potassium bichromate (2 oz. in 5 gal. of water), and dye; Monday—dry dyed yarn, set up creel and wrap drum, tie warp on loom (pi. 33, *d*); Tuesday—begin to weave, and, if necessary, continue spinning, carding, and dyeing of weft yarn (pi. 34, *b*); Wednesday—weaving, and possibly more carding and spinning of weft; Thursday—(morning) finish weaving ordinary blankets by noon ("*muneca*" blankets require 2 weeks), (afternoon) take blanket (or blankets) off loom and felt them (see note above and pi. 34); Friday—sell blankets at San Francisco el Alto market (attended by most Momostecos; pi. 35), or continue weaving, if no blankets are ready; Saturday—prepare any unfinished blankets for Sunday market at Momostenango. Washing, carding and spinning activities are performed by both men and women.

Most of the wool consumed by the weaving industry of Momostenango comes from the great massifs to the north (especially from the Chiantla area of the Cuchumatanes) and west (largely from the Sierra Madre, near Tejutla). It is said that white wool is preferred by Momostenango weavers, for there are more possibilities in dyeing it than in the case of the "black," which is very dark brown to start with.

Each wool-weaving center tends to have specialties, and such characteristic products as the black blankets, bordered with red and white checks, typical of Chichicastenango, or the heavy-checked natural black-and-white *rodilleras* of Nahaula. Both these centers produce also natural black woolen goods used for *capixais* and jackets in certain villages, and sold on a large scale at Solola. Many types of wool cloth are woven by Huehuetenango Ladinos.

Peyones.—These shaggy wool rugs are so called probably from their resemblance to a sheepskin (old Spanish *vellon*). The manufacture of *peyones* is confined to the Aldea Oboton, at about 2,600 m. (8,530 ft.) elevation in the municipio of San Sebastian Coatan (pi. 37). Here, on top of a high, grassy ridge, usually shrouded in wind-driven mountain fog, three brothers and their families engage in this work. To my knowledge there are no other weavers of *peyones* in Guatemala. Miguel Sebastian B., aided by his younger brother, uncle, and father, is the chief producer, turning out 12 *peyones* per month in addition to a few blankets and *capixais*. Their three treadle looms are like those of Momostenango, Hue-

huetenango, and other wool-weaving centers. One loom is under a porchlike shelter adjacent to the largest of the three dwellings; the other two are out in the open near the house (pi. 37, *a*). Their wool comes mainly from Santa Eulalia, though they have some sheep of their own. Miguel, about 24 years old, was taught by his father to make *peyones*, and recalls that his grandfather also made them.

Peyones are woven in the same manner as any other wool cloth, except that the third weft thread is pulled out with the fingers into a loop about 6 inches long, between every 3 warp threads, as in terry cloth. These loops are gathered and twisted in bunches of 10 or 12, then later, after the rug is all woven, the bunches are cut, one at a time with a pocket knife, so that loose ends, about 3 inches long, are left (pi. 37, *b*, *d*). Solid whites, solid black (natural brown), and other large patterns combining the two, are the usual colors. Elements of the simple designs are usually not under 1 foot square.

The two other brothers of Miguel produce usually about 6 *peyones* per month. All three households are within about a quarter-mile of each other.

WOOL DYEING

"Black" (dark blue).—The most important black dye is logwood *palo de campeche* (or *palo de tinte*, *Haematoxylum campechianum*) which comes mainly from the Peten and British Honduras, generally bought by itinerant Momostenango blanket merchants in the market of San Pedro Carcha, near Coban, and often resold in the Momostenango plaza, along with other dyes (pi. 34, *c*). The wood, which becomes dark red upon exposure to air, is sold by the pound. Splintered and boiled in water to produce the dye, it is used chiefly on white wool, and sometimes also on natural black. Standley (1920-26, p. 419) states that it is "one of the few natural dye woods which has not yet been replaced satisfactorily by synthetic dyes."¹⁰¹

Copper sulfate, 1 ounce to 5 pounds of wool (5 pounds avoirdupois = 1 wool "pound"), is sometimes added to the solution in order to fix the color, and, according to some informants, to darken it. Sometimes, campeche and brasil wood are added in equal proportions; or campeche may be mixed with indigo.

¹⁰¹ The heartwood of "campeche" is, according to Standley, the commercial logwood, which, with mahogany, was a major basis for British settlements in Central America. Standley (1930, p. 280).

Light blue.—For lighter shades of blue, indigo is used, brought from El Salvador, in the form of irregular cakes, by Momostenango merchants, who sell blankets there. There are said to be nine different grades of Salvador indigo, four or five of which come to Momostenango. Reported to have been used formerly unadulterated, it is now generally mixed with *sacatinta* (*Jacobinia spicigera*; see p. 143), as is done by skirtweavers who dye cotton.¹⁰²

Red.—Cochineal was used almost solely for red dye until about 1920,¹⁰⁵ according to several informants. Most of it came from Antigua. Since then, aniline dyes have been largely substituted or mixed with cochineal. *Chinche negra*, or *cinco nigritos*, (*Lantana camara*), a small shrub growing in the woods in the Momostenango region, is gathered, and leaves, twigs, and flowers are boiled in water, along with cochineal. Limes, which act as a mordant, are cut in half or crushed and added to the dye mixture in the proportion of 40 or 50 limes to a wool "pound" (80 oz. avoirdupois, or, actually, 5 lb.).^{10*} German aniline dyes were being used to a large extent before 1940 for red, as for other colors, though it was invariably said that these were not so fast as "natural" dye-stuffs. Some weavers mixed aniline and cochineal, half and half, getting a deeper red than with the insect alone.

Yellow.—*Palo amarillo* (*Chlorophora tinctoria*) is a fairly common tree throughout Central America, and supplies of the yellowish wood, from which a similar color is obtained by boiling it in water, come from the Mexican border region of Huehuetenango and from the Peten-Vera Paz territory.

Purple.—Brasileño (*Haematoxylum brasiletto*) is a well-known dyewood, which, when variously treated, may be made a source of different shades of reds and purples (see Standley, 1920-26, p. 419). It is for the latter color that it is most used in Momostenango.

^{10*} A wool weaver of Momostenango, José Barrera (p. 33), explained that *sacatinta* is put in the water first, then, 2 days later, indigo, powdered on a metate, is added. It is left to stand, usually a week, sometimes 2, until it becomes dark green and odoriferous, giving off bubbles of carbon dioxide.

¹⁰⁵ The price of cochineal was said to have decreased since about 1920, from 17-25 cents an ounce to 10 or 12 cents for second-grade, and 20 cents for first-grade (whole insects). According to Ernesto Lang, prior to 1920, approximately 2,000 pounds was sold annually in the Momostenango market; now not over 100 pounds. Cochineal is still called "grana," the name applied by the Spaniards after the Conquest, from the inferior predecessor, a related oak scale, *kerraes* (hence, "crimson") originally thought to be seeds of plants. Dried cochineal (female scale insects) also resemble small grains or seeds.

¹⁰⁶ Mrs. Osborne (1935, p. 54) gives 30 as the number used, but she refers to limes as "lemons," and a wool "pound" as an avoirdupois pound. (Limes are called *Noumea* in Guatemala and most of Latin America).

The low-growing tree is common from Mexico to Colombia, apparently having its major abundance along the Pacific side. It is from Huehuetenango that Momostecos said they obtained their greatest supply.

Green.—A mixture of *cempeche* (6 or 7 oz.) and *palo amarillo* (4-7 oz. for 5 lb. of yarn) is the usual formula for green, with indigo occasionally added to lighten the blue.

Brown.—Bark of alders (*aliso*, *Alnus* spp.) which grow in the Momostenango region serves to dye yarn a deep reddish brown.

Tie dyeing.—Jaspe effects are not uncommonly obtained on wool yarns in Momostenango, the bindings being made with tightly wrapped cotton cord (see p. 63).

CANTEL ELECTRIC COTTON MILL

Because of its importance to Indians and Ladinos throughout Southwest Guatemala, in supplying great quantities of cotton cloth, thread, and yarn, certain basic data regarding this textile factory will be given here, although it is not a hand industry.

The mill was established in 1885, with 15 water-power looms. At the time of my visit (July 1936) there were about 500 laborers employed, most of them Indian women of Cantel, operating looms driven by hydroelectric power developed from the nearby Samala River (p. 39, d). The machinery was all of English make, and the foreman of the mill was from Manchester. Of the raw cotton used in the mill, about 50 percent was said to be of local origin, mainly from the Pacific Lowlands between Mazatenango and the Mexican border; 15 percent from the United States; and approximately 35 percent from Nicaragua, a source which had become important only within the previous 3 years. Most of the cotton used was white, but some was the natural brown, employed only in the weft, brown-dyed white cotton being substituted for it in the warp. (See p. 62, fn. 96.)

In those municipios where no characteristic costumes are worn, practically all the basic white huipil cloth is Cantel material. Sometimes it is worn plain, sometimes elaborately embroidered, as at San Andres Xecul and San Cristobal. Striped material is also produced on the Cantel looms, however. The manufacturers have made a careful study of native weaving patterns, and have imitated many of them with such success that much of their manufactured cloth was being sold to Indians in such municipios as Solola, to be made into costumes virtually in-

distinguishable from the native hand-woven ones. The only Cantel yarn sold was said to be unbleached white. The total production of the mill, all goods being sold within the country, was estimated to be only 10 percent of the total Guatemala consumption of manufactured cotton yarn and cloth goods.

PALM-LEAF RAINCAPES (SUYACALES)

All *suyacales* (palm-leaf raincoats) used in Southwest Guatemala with the exception of the Cuchumatanes margin and possibly parts of the Department of San Marcos, are supplied by the municipio of San Sebastian Retalhuleu, which specializes in this industry, almost to the exclusion of anything else. The habitat, distribution, and utility of the corozo palm are treated elsewhere in this study (see p. 145). Here, only the fabrication of *suyacales* will be described. The process is as follows. Segments of the immense pinnate leaves of the corozo palm are stripped from the midrib and boiled for a half hour in large kettles of water to which a small amount of salt has been added. Then they are carefully spread out to dry and bleach in the sun for about 2 days, at the end of which time they are nearly white, and quite tough and pliant. They are sewn together with strong twine, locally spun from *pitafoja* fibers which are bought at stores,¹⁰⁵ the leaf segments being overlapped and joined by four rows of close transverse stitches, about 5 inches apart. Generally this is women's work (pi. 2, b). There are two types of *suyacales*, one in which the ends of the leaf segments are trimmed so that the edges of the cape are straight and parallel with one side hemmed; the other, fringed along one side, where the pointed ends of the leaf segments are left free and uncut. There is usually a difference in the wearing of the two, in that the first is thrown longitudinally over a man's head so that it falls back over his shoulders and protects his cargo, if he has any, as well as his body; whereas the fringed one is wrapped around, with the loose ends down, and the straight edge up about the shoulders. The latter is best suited to a man without a pack on his back. Generally, Indians on the trail, when caught in a heavy rain, are more interested in keeping their cargoes dry than in avoiding the water themselves. In a market place during a downpour, wares are protected by *suyacales* more often than by canvas or rubber sheets, for only wealthier merchants can afford the latter.

¹⁰⁵The price quoted in 1936 was 8 cents per pound, enough for 8 dozen *uyacales*.

Adult-size *suyacales* are about 2 by 5 feet, and they sell for 10 to 15 cents. Children's sizes are also made and marketed. The rush season for these garments corresponds to the time of greatest rainfall, from April through October, in most of the Highlands. Merchants on trade journeys to the piedmont carry their *suyacales*, rolled and attached vertically to the cargo packs, all the year round (pi. 13, a). In the mountains, however, where rains are confined to the summer half year, they usually carry them only during that season, and *suyacales* do not begin to appear in the Highland plazas until April (pi. 2, c). A woman seldom carries one, and when she does, it is rolled up and placed on top of her head basket to protect whatever goods there are in it. The *suyacal* is strictly an Indian garment, though Ladinos, who generally wear rubber ponchos when it rains, may help cover pack-animal cargoes with palm capes.

It was reported in Chicacao (1936) that some *suyacales* are made in San Miguel Panan, but this was not verified. (See Sapper, 1905, pp. 24-25.)

PALM HATS

(Map 17)

The center of hat production is Santa Cruz Quiche, which, with nearby San Sebastian Lemoa, supplies virtually all the hats worn in Southwest Guatemala, though some are made also in cantones of Chichicastenango, according to Sol Tax. The source of most of the palm leaves,¹⁰⁶ vendors of them say, is a place called Palmar, near San Miguel Uspantan, far to the northeast. Strips of the leaves are sold on a large scale in the plazas of Chiche, Quiche, and Lemoa, most of them to Indian men who sew the strands into hats on sewing machines. Some few men are said to do this work by hand, but the machine-sewn product is preferred.

The chief hat merchants of the western region are the men of San Francisco el Alto, who, after buying them in their home market, retail them as far west as La Union, San Marcos. The Maxenos sell most of the Quiche hats in the region to the south, including the piedmont plazas of Chicacao and Patulul, and eastward as far as Guatemala City.¹⁰⁷

¹⁰⁶ A fan palm, the identification of which I was unable to ascertain.

¹⁰⁷ Most hats sold in the Guatemala market, however, apparently come from Honduras (Santa Barbara was named as a major supply center), brought largely by itinerant merchants, particularly Quezaltecos. One of these, on one occasion, sold 10 dozen hats from Santa Barbara to a Ladino stall vendor. He had taken 500 pairs of Momostenango blankets, bought there, to Honduras, through El Salvador, and sold them for \$2 each (100 percent profit, reduced by duties, he said, to 50 percent).

MATS

(Map 17)

There are three major fibers of which mats (*petates*) are made, namely, palm (probably of the type used in making hats), rush (*tul*), and alpine bunchgrass (*Muhlenbergia* sp.), in descending order of importance.

The main center of production of palm mats was always stated to be San Andres Sajcabaja, and they were said to come also from Rabinal, and occasionally from Nenton, near the Mexican border. Mats are made in various sizes, from 2 feet square up to 8 by 6 and 13 by 4 feet or more. They always seem to sell rapidly, even in areas where other types of mats are made, as at Solola, near the rush-mat supply center of Lake Atitlan. The uses of them are manifold, not only in the household, as floor covering, bed cushions, and screens, but also in providing itinerant merchants' accoutrements, especially outer coverings for *cacastes* (cargo frames) among the Maxenos and Totonicapenos, and beds, for which purpose one is usually carried rolled on top of each cargo pack, to spread upon the ground for sleeping beside the trail.

The rush mat (*petate tul*) is an item of commerce that is made generally in lake-shore villages, or those situated near water bodies or marshes where rushes grow. Of the Lake Atitlan villages, Santa Catarina Palopo is the chief producing center, though the industry has been retarded since 1932, owing to the rising lake level (see pp. 123, 132). Rushes are gathered near the village (many being bought, in 1936, from San Antonio), dried, then soaked in water again indoors to avoid the drying effects of sun and wind, before being worked into mats. Mats of various sizes are made, up to 4 by 6 feet or more. It was said that 200 rushes would suffice for three mats of the size mentioned. Other Lake Atitlan villages where some of the inhabitants make *petates* are Cerro de Oro, Santiago, San Marcos, and Santa Cruz. Solola is their principal market. An important producing center in the Antigua region is San Antonio Aguascalientes.

Mats made of tough bunchgrass, generally about 3 feet square, are sometimes woven by shepherds in the lofty alpine meadows of the Totonicapan-San Francisco region, and perhaps in others as well. They are occasionally to be seen for sale in the markets, especially those of San Francisco el Alto and Quezaltenango.

SANDALS AND OTHER LEATHERWORK

Sandalmakers (*caiteros*) are most abundant in Totonicapan, and are strongly in evidence in many of the settlements which have been peopled by Totonicapeños, such as Argueta and Patanatic. There are also some in Chichicastenango and Quezaltenango, who operate mainly within their local orbits. The Totonicapenos, on the other hand, cover a wide area. Some of them are itinerants who attend various distant markets, working at their trade in the plaza. Surrounded by belts, straps, and sandals, they cut and hammer under canvas shelters lined up in the space allotted to them. On most Fridays about 20 sandal makers from Argueta (Totonicapan) may be seen in the Solola market (map 22). They separate at that point, and head for Sunday markets in the Lowlands, about half going to Chicacao and the other half to Patulul. On one occasion I saw a Quezaltenango sandalmaker at work in the Olintepeque market; in this case a woman, a rarity in such work.

Sandals and leather belts are the chief items sold, though there is usually a good stock of muleteers' (*arriceros*) supplies, especially plaited whips and *tapaos* (heavy leather straps for blindfolding mules during loading), as well as sheaths for machetes, knives, and the like.

Leather sandals are in some measure being replaced by those made from sections of discarded automobile tires (see McBryde, 1933, p. 120, fn. 57), as is done in many other parts of the world having economies similar to that of Indian Guatemala. I noted a particular abundance of tire sandals in the market of San Salvador, much more so than in Guatemala City (p. 42, d). Though cheaper, they are heavier and hotter on the feet than leather, so that they are little worn in the Guatemala Lowlands.

Mecapales (rawhide forehead straps, or tumplines) are a specialty of Sacapulas men, who plait them while sitting in the market (p. 58).

DANCE REGALIA

Gaudy and elaborate be jeweled silk, satin, and velvet costumes for men, designed after the finest raiment of the conquistadors, and wigs and masks, usually depicting bearded Spaniards, are made in Totonicapan and owned by a single Indian dealer. There is another small-scale costumemaker in San Cristobal Totonicapan and one in Chichicastenango. These costumes are not ordinarily sold, but are rented at good prices to members of certain village *cofradias*

(religious societies) or other esoteric Indian organizations, for the dances which form a vital part of their fiesta celebrations (pi. 17, /). The conquistador dance, in which the participants dress like the Spanish conquerors and dance in the open, to the accompaniment of drum, fife, and marimba, is the most widespread and best-known ceremonial (pi. 17, g). Since the fiestas come at different times for the various villages (the *fiesta titular*, for example, on the day of the patron saint after whom the settlement is named), the costumes and masks are taken to various parts of the country at different seasons, constituting colorful cargoes on the trail, and bringing a handsome revenue to their owners.

LUMBER

(Map 18)

It is common to see as many as 25 Totonicapeños and 8 Nahualenos¹⁰⁸ in small groups on the road to Quezaltenango, carrying six white pine boards, usually about 1 by 10 inches and 8 feet long, or four beams, 3 by 3 inches and 12 feet long. Always loaded crosswise on the back, they make an unwieldy burden. Many of the Totonicapeños also have mules (often 15 or 20 in all) loaded with six boards on each side. This hewn lumber is sold mainly to Quezaltenango carpenters, who depend upon these sources for their construction wood. Good stands of large white pine are still to be found in the high mountains between Totonicapan and Nahuala.

FURNITURE

(Map 18)

Carpenters of Totonicapan (Argueta in particular) fashion chests, chairs, tables, beds, carrying frames (*cacastes*) and other articles of furniture from the soft pine which abounds at those high altitudes. The chests are generally painted red and yellow (sometimes black), and they may be covered with geometric designs made by scraping the wet red paint off the dried yellow surface underneath. (For diagram illustrating this negative technique, see Lemos, 1941, p. 35). They appear in many markets throughout Southwestern Guatemala, especially during fiestas, and are essential to most Indian households. Textiles and clothing in particular are stored in them. Various items of furniture are generally to be seen for sale by Totonicapan merchants in Quezaltenango, San Francisco el Alto, and often Solola and Chichicastenango.

The most widely disseminated articles are chairs, which are taken periodically by Totonicapan (especially Argueta) merchants going as far as Guatemala City. Mules are frequently used to transport them, but men generally carry large loads themselves.

ROPES

(Map 17)

The four principal sources of supply of maguey (agave or *Furcraea* sp.) fiber goods to Southwest Guatemala are, in order of importance, the Coban area (San Cristobal), the western shores of Lake Atitlan (San Pedro-San Juan-Pablo), Comitancillo, and Colotenango (map 17). Though ropes are the most important and widely sold sisal products, cargo nets (especially for corn ears), cinches, halters, hammocks, carrying-bags (*morrales*), and other articles are also sold by rope workers. In San Juan, relatively more of these seem to be made. Merchants in the markets may sell rope work alone or combined with hats, baskets, or miscellaneous goods.

My study of the rope industry was confined to San Pedro la Laguna, which may be taken as illustrative of Lake Atitlan techniques in general, though the notes here refer strictly only to San Pedro.¹⁰⁹ The large-sized ropes (*sogas*, usually about $1\frac{5}{8}$ of an inch in diameter and 22 ft. long) sold in great quantities, especially in grazing areas, for leading horses and cattle, are made in the following manner. Maguey leaves are cut from the abundant plants growing on the lava slopes and put to soak along the edge of the lake, weighted by large stones and protected from wave disturbance by stake enclosures. After 2 weeks in the water to soften the flesh, they are taken out, laid on a board, and one at a time rasped with flat, oarlike paddles, pressed down and forward (pi. 26, d). Sometimes the scraping process is preceded by pounding with a heavy wooden implement used like a pestle. The fleshy part of the leaf is thus removed, leaving only the tough, white fiber. Sometimes freshly cut leaves are scraped, but as a rule they are soaked first.

The apparatus used in making ropes consists of a simple wooden spinner (usually of oak) made in two parts: (1) The flat rotary piece about 10 by $\frac{1}{2}$ by $\frac{1}{2}$ inch, tapered and notched at one end for attachment of the fiber, with a hole not over an inch in from the notch; and (2) a stick handle, about 10 inches long and one-half inch in diameter, which

¹⁰⁸ Counts were made for most days between July 25 and August 15, 1936.

¹⁰⁹ For a brief description of ropemaking at San Pablo, see also Lothrop, 1929, p. 2.

passes like an axle through the hole in the rotator (pi. 26, c, e). The great eccentricity of this device provides strong leverage, and makes it possible to spin even heavy rope with little effort. After the first simple strand is twisted (bits of hemp being fed gradually by a helper to the growing line as the spinner backs away; pi. 26, b), it is then doubled, and three double strands, each pair attached to a spinner, are spun with the ends of the rope attached to a large Y-post, driven into the ground so that the crotch projects upward to a height of 3 or 4 feet.¹¹⁰ When the double strands are tightly twisted, the Y-post serves to keep a steady tension upon the main rope, which is then spun by another person at the other end, spinning in the opposite direction from that of the three strandspinners. The strands are drawn so that the two prongs of the fork keep them apart until the rope is* tightly spun.

Men and women both participate in most of the steps involved in ropemaking, with the exception of cutting and scraping the leaves, which is generally men's work.

As will be pointed out later (p. 95), the Pedranos have taken the ropemaking industry with them to their Lowland colony of Cutzan. Ordinarily, like most of the industries described in this chapter, maguey working is almost always a Highland trait.

BROOMS

(Map 17)

The three principal types of brooms used in Southwest Guatemala are: (1) Those resembling manufactured types and made, according to informants, of giant bunchgrass roots, mainly at Quezaltenango; (2) fan-palm leaves with the tips trimmed off, said to come primarily from the Rabinal area; and (3) bunches of *corozo-Xtzi* veins, made in the Lowlands. The three are listed here in descending order of quality and abundance in the market. The first go periodically in considerable quantity to the capital, usually being taken in large loads of 30 or 35, by groups of four or five Quezaltecos, while brooms of *corozo-lcai* veins are seldom seen in markets, and often are made by people for their own use. Tax (Ms. 1935) reported a fine grade of broom made in San Andres Sajcabaja and occasionally sold in Chichicastenango.

¹¹⁰ In the western Lake villages where ropemaking is an important industry, these forked posts may be seen adjacent to many of the houses (pi. 26, b, c).

SOAP

(Map 13)

Certain municipios specialize in soapmaking, in the Lowlands as well as in the Highlands. Important Highland producing centers include Quezaltenango, Totonicapan, San Andres Xecitl, Santa Lucia Utatlan, San Pedro la Laguna, and Solola (map 13).

At San Andres Xecitl, suet, especially that of beef, is the basic ingredient. It is treated with water which has been leached through a mixture of lime and ashes. The fat is heated in one pot, the alkali solution in another; then the two are mixed. The leaching is done in colander pots, which may be seen supported on three-prong forked sticks beside many houses of San Andres. The little plaza of this village is usually well supplied with these vessels, brought for sale from Totonicapan, especially to meet the usual demands of soapmaking. About half of the families of San Andres were reported to be engaged in the soap industry, their suet supply being drawn from the meat markets of the Quezaltenango Valley, upon the edge of which their village is situated. Pork fat is an important soap ingredient in the Lake Atitlan region, especially at Santa Lucia and Solola, where pork vendors also sell soap.

Samayac is perhaps the principal soap-producing center of the southwestern piedmont. The inhabitants of this village depend largely upon pig fat for their industry, the chief source being nearby San Bernardino, where pig raising is a specialty, in conjunction with cheese making (the whey being fed to pigs).

The characteristic form of Indian soap in Guatemala is spherical, with a diameter ranging from $\frac{1}{2}$ inches to nearly 3 inches, and color dark brownish with a blue-gray cast (pi. 39, a).

CANDLES

The material employed most widely in candlemaking in Southwest Guatemala is paraffin. Tallow is much used at such villages as San Andres Xecul where suet is handled on a large scale for soapmaking. San Cristobal Totonicapan, a few miles away, produces mainly paraffin candles.¹¹¹ Beeswax candles, much used in the churches in earlier days, seem now to be a rarity. The only municipio where I found

¹¹¹ax (Ms., 1935) reports that several natives of San Cristobal now residing in Chichicastenango make candles for sale. They probably settled there for that special purpose, since there is a great demand for candles in religious ceremonies at Chichicastenango.

them being made on a fairly large scale was Pueblo Nuevo.

Hand-dipped candles, white and yellow, hanging in graceful clusters around the vendor, are commonly seen near the entrances to market places. Probably because the small Ladino storekeepers sell candles, only a few Indian merchants sell them in the plaza, except at Chichicastenango, where the Maxefios use great numbers of them. Inside their main church, lines of candles along aisles carpeted with rose petals are kept burning continuously (pi. 35, b). Outside, on the large, circular stone steps and along each side of the street leading to it, 15 or 20 candle vendors do a thriving business on market days (Thursdays and Sundays). Candles are used in great quantity not only in churches, but also for all sorts of magical rites, conducted by medicine men at crude altars hidden back in the pine-covered hills. (These practices are common throughout most of Indian Guatemala.)

CHARCOAL

(Map 18)

In the municipios of San Jose Chacaya (Solola area) and Cajola, in the Quezaltenango region, charcoal making is an important industry. Truckloads of charcoal from Tecpan may be seen en route to Guatemala City, and there are probably other centers about which no information was obtained.

At Cajola it was said that charcoal was made by Indians living back in the cantons of the mountain slopes behind the village. Oak trees are purchased, informants said, in the municipios of San Carlos Sija and Sibilia. Thin, straight sections of select wood are cut out, the remainder being used or sold for firewood or for construction material.¹¹² The burning of charcoal at Cajola is done in pits, bunchgrass and twigs serving as fuel, and air is excluded by dirt piled up in a big mound above each pit. Holes, usually four, are driven through to carry off the smoke. Burning is continuous for 3 days, at the end of which time the oak is charred and ready for the market. Some charcoal is made in the neighboring municipios of San Juan Ostuncalco and San Miguel Sigüila.

INCENSE

(Map 18)

Incense (*copal*, *incienso*) usually appears in the market in three forms, the commonest and least

expensive being granular *estoraque*, sold in several grades of quality and coarseness. *Pom* is the name of the disk form, consisting of wafers about 1½ inches in diameter and usually put up in a cylindrical banana-fiber package 15 inches long containing about 2 dozen pieces. The finest grade is the so-called Cuilco, packed in small, circular loaves, two to a package. The last was said to come, prior to about 1930, only from Cuilco, and was regarded as the most fragrant of all incense, and of unique quality. More recently, however, it has come from Santa Maria Chiquimula, almost exclusively, according to several merchants. Men from that municipio sell most of the incense, in all forms, throughout the Quezaltenango-Totonicapan Valley area. Copal in the Solola-Chichicastenango region is brought mainly from Sacapulas. Chichicastenango is an especially good market for incense, because of the continual burning of it by Indians, who may be seen at almost any time swinging censers as they kneel on the circular stone steps of the church (pi. 29, a).

Resin of trees (*Idea* spp., *Elaphrium* spp., and others) (Standley, 1920-26, p. 543) is used in making the various forms of incense, but no first-hand information was obtained regarding manufacture or identity of the tree.

COMMERCE AND MARKETS

(Map 19)

ANCIENT TRADE

The great significance of trade among the inhabitants of Central America, especially the Maya, dates from pre-Columbian time (Blom, 1932; McBryde, 1933, pp. 110-112). A well-developed commerce, the channels of which extended for long distances over the area and were even linked remotely with North and South America, is indicated by a wealth of archeological and historical evidence. Turquoise at Chichen Itza¹¹³ is thought to have come from Veracruz, the central Mexican highlands, or even New Mexico; beaten gold objects found in Guatemala (Rossbach collection, Chichicastenango) have been tentatively identified as Peruvian. It is probable that they reached the Maya area through a series of exchanges, involving several different Indian groups.

Ceramic pieces from numerous archeological sites throughout the Central American region include

¹¹² See Morris, Chariot, and Morris, 1931, vol. 1, p. 196; Thompson, 1945, p. 16.

V* Shingles are also a product of Cajola.

quantities of exotic pottery, which is generally regarded as having come in by trade from outside areas.¹¹⁴

The ancient commercial significance of salt and cacao has been pointed out earlier. Another commodity which was formerly of great value was feathers of the quetzal, which today, however, is protected, being Guatemala's national emblem. The importance of the long, graceful green plumes of this trogon impressed most of the early chroniclers, who often referred to the methods of capturing the birds, as well as to the quantities of feathers handled by Aztec merchants. Of this industry in Vera Paz, Medel wrote, about the middle of the 16th century: "There is a kind of bird having very long and beautiful feathers, and adorned with many marvelous colors; which the native Indians of that province painstakingly capture alive with some little nets and other devices which they have for the purpose. They pull out three or four of the prettiest tail feathers and release the birds so that they may bear more of the same fruit the following year."¹¹⁵ According to this author, traders from Mexico came to buy quetzal feathers in great quantities, to take them back that they might adorn idols worshipped by the Aztec.

In addition to cacao, salt, pottery, turquoise, and feathers, the ancient Maya widely traded such things as foodstuffs, corn, beans, chile, honey, clothing, particularly cotton textiles, and minerals, principally jade and obsidian. To a lesser extent they dealt in gold in

the form of dust (in quills) and figurines, and copper cast into small bells and ax blades. From rock quarries they produced lime and metates.

LOCAL SPECIALIZATION

Great diversity of small adjacent areas in Central America has led to regional specialization, which has stimulated trade development to a high degree since ancient times. The immense ranges of altitude in the high, dissected mountains and plateaus are reflected in marked climatic contrasts (map 6). In addition to this, there are extreme slope, soil, and hydrographic differences that determine natural vegetation forms, flora and agricultural products. The geologic structure is likewise highly varied, there being granites and limestones in sharp contact, in places buried by superimposed ejecta of recent volcanism (map 5).

MINERAL AND FOREST PRODUCTS

(Map 18)

The scattered distribution of essential trade articles based upon products of mines and forests is evident from map 18.

Metates.—Metates are made in only three centers: (1) Nahuala (and its sister municipio of Santa Catarina Ixtahuacan, culturally almost indistinguish-

EXPLANATION OF SYMBOLS FOR MAP 16

	OBSIDIAN		FURNITURE
○	"Λ	OCOTE	PITCH PINE
rn	SALT (C = Cooked; (Ss Sun-evaporated)	CC	CHARCOAL
«	TRIPOD GRINDING STONE (Metate)	PB	LEAD
ΛJJJJSP'	LIMESTONE OUTCROPS	S	SULFUR
	LUMBER		

Arrows with cross bars Indicate volume of trade, as in map 10 (bars same interval as bars).

able from it), which supplies the eastern and south-eastern two-thirds of Southwest Guatemala; (2) Malacantancito, which supplies the Cuchumatanes Mountain villages and the region from Huehuetenango southward through the town of Quezaltenango (where Nahuala stones are also sold) and into the Lowlands as far east as Nuevo San Carlos; and (3) Tajumulco, which supplies the San Marcos region, some metates reaching the town of Quezalten-

¹¹⁴ Sec Lothrop, 1933, pp. 29, 45, 47, 57. Joyce summarizes Seler's conclusions on this question as follows: "Seler has attempted to trace to some extent the wanderings of pottery from certain centers of manufacture; he calls attention to the finding in Guatemala of ware of Tarascan type; concludes that the ware of Huehuetenango and Chiquimula spread over the whole of south-western Guatemala and south-eastern Chiapas, while that of Jilotepec in the Guatemalan province of Jalapa was carried to south-eastern Guatemala and western El Salvador" (Joyce, 1914, p. 308).

¹¹⁵ Medel, Ms., p. 36, f. 138. A somewhat later description of Vera Paz, anonymous and undated (probably written about 1575) gives a remarkably detailed account of the quetzal traffic, as follows: "... the long [quetzal] feathers sell very well, and there are obtained in this province annually more than 10,000. From here they are taken to other provinces, and they are very much in demand. The manner of hunting them is by means of sticks or strings with birdlime which is put on the drinking-places or in the trees where the birds feed, on small fruit well known to the Indians. These trees and watering places are privately owned by Indians, and may be sold or managed by them. Sometimes they catch the birds on the nest and pluck the feathers. . . . The birds make their nests in the highest trees, in holes in the trunk. . . . It is impossible to raise them. This collecting of feathers is very arduous and difficult, even dangerous for the Indians, because in addition to spending many days on the trail and waiting during the hunt, they often fall from the trees and may break legs and arms, or be killed. . . . but these natives despoil one saint to adorn another which is no saint. . . ." (Anon., Ms. IS74a, pp. 16-17, f. 83).

Pineda writes (about 1570) of the *quetzales* of Vera Paz, [the Indians] catch them at a certain season of the year, take off the feathers and turn them loose to grow more" (Pineda, 1908, p. 448).

nango, and southward into the Pacific coastal lowlands. It will be noted that all of these centers are in the volcanic highlands where there are abundant supplies of fresh andesite and other types of volcanic lava of which metates are made. Because of the difficulties involved in quarrying and working the rock and in carrying the heavy stones long distances to sell them (generally from house to house and less frequently in markets, where the purchaser would be burdened by their great weight), very few communities have specialized in this work. Nahuala men take usually 2 metates and 6 *memos* (handstones) at a time, a load of about 100 pounds. During July and August 1936 I saw six or eight of them daily going to Quezaltenango.

Lime.—Map 18 also indicates the lime-producing centers, all in the Highlands near limestone outcrops. In the volcanic mountains there are six, most important of which are Santa Apolonia, supplying the Lake Atitlan area; Santa Maria Chiquimula, producing for the Quiche district; San Francisco el Alto, for the Quezaltenango-Totonicapan region, with some lime going as far as Solola; San Carlos Sija, for Quezaltenango and Lowland towns; and Cabrican, for Quezaltenango, Momostenango, San Marcos, and parts of the Lowlands.

In the Cuchumatanes Mountains, where limestone is extensive, lime is burned in many centers. Usually it is locally peddled from house to house and it may not appear in markets at all, or it may be taken short distances, as from Soloma to Santa Eulalia, to supplement lime which is locally produced. The main sources along the edge of the Cuchumatanes, as shown on map 18, are Ixil, Torlon, and Chinaca. Lime from this region is generally handled in the form of spherical blocks, instead of irregular lumps or grains (sometimes this is slaked or air-slaked), as in the volcanic mountain centers.

Sometimes, as at Santa Maria Chiquimula, the makers of lime also take it to sell in other markets. In San Francisco el Alto (see p. 60)/a separate group living in the same canton as the makers (Paxixil) sell lime in the markets. Chichicastenango Indians (canton Panimache) sell Santa Apolonia lime at the plazas of Panajachel, Patzum, Tecpan, and Solola (pl. 14, e). Often lime is sold partly at houses, as in the Cuchumatanes, and partly in the market (Santa Cruz del Quiche about half each way). Santiago Atitlan men buy Santa Apolonia lime when they go to the nearby Tecpan market to sell lowland fruit from Chicacao (pi. 23, d). They return to

Santiago with lime, some of which is retailed in small lots by the women who sell only locally. Men, who are the long-distance merchants, dispose of most of the rest of the lime in the Chicacao market, where they again buy tropical fruit for the return trip to the Highlands. Sijenos, tall, thin Ladinos of San Carlos Sija, take large mule-train loads of lime from their Sija kilns to Quezaltenango and into the Lowlands as far as Mazatenango and Retalhuleu, after returning with maize, coffee, or other Lowland products. Mule-shippers like those of Sija market some of the Santa Apolonia lime, especially in the Lowlands, at Patulul, and on the fincas. Lime is carefully packed for transport in skins inside of nets. Rain is avoided wherever possible, as the quicklime burns the skin when wet.

Salt.—Salt, made at various points along the Pacific coast (pp. 58, 59), especially Champerico, Tahuesco (pi. 1, d), Sipacate, and San Jose* (pi. 1, e), and along the southern margin of the Cuchumatanes Mountains, notably at Sacapulas (pi. 42, e, /), is now handled in large quantities by trucks. This is particularly true of granular salt moving from the Pacific shore to piedmont towns, such as Escuintla, Mazatenango, Retalhuleu, and Coatepeque, for redistribution to the fincas and to Highland villages. Much of it is trucked into the Highlands also, as in the case of the Gutierrez store at San Cristobal Totonicapan. Indians buy it there and resell it in San Francisco el Alto and Momostenango. There are usually 35 vendors with 50 pounds each in the San Francisco market every Friday, and almost as many in Momostenango every Sunday.

The salt sold in most of the Indian markets of the Lake Atitlan region is handled by itinerant Chichicastenango Indian merchants, who buy it in the Lowlands, chiefly at Mazatenango, and sell it along with many other Lowland products, such as spices, coffee, rice, sugar, dried chile, peanuts, and cotton.

Though Sacapulas salt occasionally appears in distant markets at times of fiestas, it seems to be sold for the most part locally and in nearby markets, such as that of Aguacatan, where more Pacific than Sacapulas salt is handled. In the Sacapulas market during 1940, I estimated an average of 75 vendors a week each selling about 25 or 50 pounds of the little disk-shaped cakes of local salt.

San Mateo Ixtatan supplies salt to the northern Cuchumatanes villages, and it is sold by San Mateo men and local merchants who go there to buy it. Ladino mule-shippers of Chiantla, much like the

Sijenos, take Pacific salt to sell in most of the western Cuchumatanes villages.

Lumber and furniture.—Boards and beams of good size (see p. 69) are hewn from large white pine trunks in the high mountains between the village of Nahuala and the town of Totonicapan. Indians from the two municipios carry this lumber on their backs to Quezaltenango, where they sell it largely to carpenters, though some is sold in the street in front of the entrance to the big enclosed market place (pi. 38, c). Totonicapan (mostly Argueta) Indians make simple unpainted pine furniture, especially chairs and tables, and decorated chests. These go to markets from Quezaltenango to Guatemala City, and are much in demand.

Pitch pine (ocote).—Pitch pines, probably chiefly *Pinus teocote*, which is rich in resin, are the source of the *ocote* (pitch pine splints) collected and sold by Indians of certain Highland municipios where suitable trees grow. Split to about ½-1 inch by ½-¾ inch by 10-12 inches, pitch pine splints are usually taken only in small quantities from any one tree without cutting it down or killing it at once. *Ocote* is valued most for torches, though it is also much used for starting fires. Because of the limited distribution of pitch pine trees and the demand for torches, *ocote* is an important market commodity. The chief producing centers are: Momostenango (canton Xicamaya) -Santa Maria Chiquimula {*ocote* sold at San Francisco el Alto by about 10 or 15 vendors from each place every Friday, and resold in San Andres Xecul, Salcája, Olinstepeque, and Quezaltenango, often in combination with Xicamaya *limas*}; Nahuala, selling mainly in the Cantel market; Chichicastenango, especially canton Panimache, which supplies the Panajachel market, where at one time *ocote* was essential to the Santa Catarina Palopo crabbers {*ocote* in the Panajachel market is taxed in kind rather than by cash}; and Chinique, where turpentine is also made (see map 18).

Incense and charcoal.—Incense made from resin is a specialty of Indians of Santa Maria Chiquimula, who supply chiefly the Quezaltenango-Totonicapan region and Sacapulas, reaching the markets of the Lake Atitlan-Chichicastenango region. The village of Chichicastenango is one of the best markets for incense, owing to the active religious life there (pis. 28; 29, a, b). Santa Maria Chiquimula incense is sold on a large scale (by 20 men every Friday) at the San Francisco el Alto market (pis. 35, c; 36), where

it is bought for resale by Indians of Huitan, Cabrican, and especially Cajola. The latter sell the incense again at San Juan Ostuncalco, where there are 10 vendors every Sunday. For the distribution of charcoal, which is usually sold from house to house, see map 18 and page 71.

Firewood.—Because so many parts of the Highlands have been cleared of forests in gathering firewood, construction materials, and boughs (especially pine, the needles of which are widely used on floors) for decoration, and in preparing the lands for planting, firewood is now at a premium. Usually it is sold from house to house, as at Solola (pi. 10, d), where much of it comes from San Jose Chacaya. The basin in which the town of Quezaltenango is situated is so bare of tree growth that firewood must be brought from a considerable distance (pis. 36; 38, a, d, /). Indians of Totonicapan and San Cristobal Totonicapan get a supply from the wooded slopes south and southeast of them and take it to Quezaltenango. During July and August 1936 there were about 50 men and women (evenly divided) and over half as many mules on the road to Quezaltenango to sell firewood there. The other main source is the little Indian village of Pie de Volcan, just southwest of Quezaltenango, and at the base of Santa Maria volcano (pi. 38, c), as the name implies. The slopes of the volcano are wooded if one goes up far enough. Women from this village, usually 15 or 20 a day, sit in the street outside the entrance to the main enclosed market of Quezaltenango and sell large bundles of sticks (pi. 38, c). Quezaltenango and nearby Salcája are among the few places in Guatemala where firewood is sold in the plaza.

AGRICULTURAL PRODUCTS AND ASSOCIATED GOODS

(Maps 9-13)

Maize.—Maize, the most important food in Guatemala, is one of the main market commodities (pi. 14, c). Relatively few individuals or even communities are self-sufficient, however, with respect to this essential staple. The limited harvest period and the differences in growing seasons at various elevations, as well as the insufficiency of acreages planted, account for the big movements of maize in trade. Highland milpas yield their greatest volume between December and February. Lowland maize is harvested first from August to October, the heaviest crop; then secondarily in February and March (see

p. 22 and map 9). The grain moves in quantity between Highlands and Lowlands during periods of shortage in one zone and plenty in the other (see p. 23).

Certain areas, where there is not enough arable land, or where climate or soil may be unfavorable, are notably deficient in maize; Momostenango, a wool-weaving center, is an illustration (see p. 64 and pi. 30, /). Much of the grain is trucked from the Lowlands. Six Todos Santos men were selling maize from large sacks, brought on muleback, in April 1936. Whether from the Lowlands or from Todos Santos, it was transported a great distance. Much maize is taken to Momostenango from Quiche. The Highlands just east of Lake Atitlan, around Tecpan, Patzún, and Patzún, are especially important for maize. Ladino mule-shippers take quantities of it from these regions into the Lowlands, and to Chichicastenango, Solola, and other parts of the Highlands, as far east as Guatemala City. At San Francisco el Alto during July two or three truckloads of Tecpan maize are sold in the market every Friday.

Santiago Atitlan is the main corn-producing municipio on the shores of Lake Atitlan (see p. 100). Indians from many of the other Lake-shore villages go there to buy maize, especially from August to December. During that period about one-fourth of the women in the Santiago market sell maize. San Pedro la Laguna Indians buy corn at Santiago from August through October, but sell it there from May through July. About 150 out of a total of 1,500 vendors at Colimba (Pacific piedmont) in February 1941 were selling maize, much of it from the Highlands. Chiche is an important market of the inner Highlands, north of the Lake. At one Saturday market there during August 1936, approximately one-tenth of the vendors, or about 100 men, from Chiche and Chichicastenango, were selling corn in grain by the *almud* (wooden box measure, about 12½ lb. of grain), as is commonly done in that region. The average sold by each was about 80 pounds. Much of this grain was said to have been produced on rented finca lands a few miles to the east. Huehuetenango, the biggest market in the Cuchumatanes region, is a most important maize center. As in the case of many other commodities, maize is sold there in very large quantities, in wholesale as well as retail lots. Early in January 1941 approximately 8 tons of corn was brought to the main Sunday market by a total of about 65 men

(some 14 percent of all vendors), most of whom carried 80 to 100 pounds each on their backs, and 75 or 80 mules, with average loads of 150 to 180 pounds each. Besides the 6 regular daily Ladinos, each with 200 to 300 pounds in a stall, there were the following vendors from Cuchumatanes Mountain villages: A dozen Todos Santos Indians, with 4 or 5 mules each (total 7,000 pounds of corn); 10 Indian men from San Juan Atitlan; 10 from San Juan Ixcay; 5 from Santa Eulalia; and 4 from Barillas, across the Cuchumatanes. From the Trapichillo Valley region to the west there were 4 San Pedro Necta men, 4 from San Ildefonso Ixtahuacán, and 7, each with 2 or 3 mules, from La Democracia, a finca only a few miles from the Mexican border.

Beans.—Beans are sold in quantity in many markets, being probably second in importance to maize in most of the region. The best altitude zone for common kidney beans (mostly black) is between about 1,500 and 2,000 m. Lake Atitlan villages, especially San Pedro, San Antonio Palopo, and San Andrés Semetabaj, produce fine black beans which are sold in most of the neighboring markets, and in the Lowlands as well. Atecos take Lake beans as far as Mazatenango (see p. 104). San Cruz del Quiche and Chiche black beans are sold in the San Francisco el Alto market in quantity from December through February. Maxefio merchants stock up with black beans at Chiche. The Quiche region is the major source of small black beans in the Quezaltenango market also, since the Quezaltenango-Totonicapán Valley is too high and cold for any but the big multi-colored butter beans (*piley*, *Phaseolus coccineus*) and broadbeans (vetch). All three of these legumes are taken from La Unión (San Marcos), Concepción, and San Juan Ostuncalco to Lowland markets, particularly Coatqueque, and they go from Quezaltenango to Lowland Mazatenango, Retalhuleu, Colimba, San Felipe, and other plazas. Farther east, these beans are taken in quantity to piedmont Santa Lucía Cotzumalguapa from the Highlands by men of San Pedro Yepocapa. Though beans are produced to some extent throughout the regions within their climatic limits, the centers mentioned above are the only ones that supply them in such quantity and quality. Usually beans are sold in local markets on a small scale by many vendors selling their own surplus. An Indian woman may have an open, shallow basket containing 10 or 15 pounds of beans with a few eggs on top, and perhaps

a chicken and a squash along with it. Much maize is sold locally in the same manner.

Most kinds of beans may be grown in the Lowlands, but the quality is poor and insect pests are numerous. Lima beans, most of which are red and black, and may be flat or round, are rare in any market, usually being confined to the Lowlands where they are grown. I have seen two or three vendors in the smaller markets of Guatemala City with 20 to 50 pounds of lima beans from San Raimundo and San Pedro Ayampuc; generally they are kept in baskets behind the counter in an obscure place. Green beans like most perishable green plant foods, are generally sold in local markets only.

Large, colored butter beans and broadbeans are grown in quantity in the zone above the ordinary kidney beans, between 2,000 and 3,000 m. The main producing area for broadbeans is the Quezaltenango-Totonicapan Valley, which supplies most of the western Lowlands. Broadbeans are generally sold toasted in small quantities, along with other produce, especially eggs. In one Friday market at Solola, in May 1936, there were 50 Totonicapan (mostly Argueta) women selling more toasted broadbeans than anything else. An almost identical observation had been made there in 1932 (see map 22).

Chickpeas.—Chickpeas (garbanzos) are of extremely limited seasonal as well as regional distribution in trade. The only places where they are grown in quantity is San Pedro la Laguna and San Juan (see pp. 28, 101). The harvest is from January through March. Pedranos, seldom over 10 at a time, take, quantities of chickpeas on mules to many markets, from February through May. March and April are peak months, for garbanzos are made into special Lenten fare. They are in greatest demand during Holy Week, when they are used for festive sweets. San Pedro men in their distinctive dress (pi. 7, i) station themselves separately to sell chickpeas at prominent corners of the plaza in Quezaltenango, Totonicapan, San Cristobal Totonicapan, and other Highland towns, and in Mazatenango, Retalhuleu, Cuyotenango, and elsewhere in the Lowlands.

Potatoes.—Potatoes are a specialty of certain Highland regions, mostly above about 2,000 m. (6,562 ft.) (map 9). Large white and red "Irish" potatoes of imported stock (North American) are produced in Totonicapan, Chiantla, Concepcion Chiquirichapa, San Martin Sacatepequez, and are sold in markets of Highlands and Lowlands. Some of these localities also produce for the market small red

"native" potatoes (probably originally South American, possibly of pre-Conquest introduction; see p. 140). The small potatoes are grown for local consumption in many Highland municipios. Todos Santos is the only community which produces them in quantity, however, for distant markets. Though little red potatoes, ranging in size from that of marbles to that of walnuts, are seldom eaten by Ladinos, they are much in demand by Indians, owing in part to their low price. Packed in large grass-lined cargo nets, about 75 pounds in each, they are transported on mules. Crowds of Indian women gather round the Todos Santos with their large netloads of potatoes, so that they become the center of attention, and sometimes police have to maintain order (see p. 140). From April through June and November, Todos Santos men, usually 10 every Friday, sell potatoes at San Francisco el Alto. A few of them also sell in the other markets of that vicinity. Huehuetenango is a potato market of special importance. Mostly from November to March, potatoes are handled there in wholesale quantities. On Sunday there may be over 200 vendors, 40 or 50 of whom come from Chiantla and 10 or 15 from Todos Santos, bringing 400 to 600 pounds each on mules. Local merchants of Huehuetenango buy most of these potatoes to resell elsewhere. Truckloads of them are shipped to Guatemala City, Quezaltenango, and Lowland markets.

Wheat.—Wheat, producing best above 2,000 m., is generally sold to flour mills, in the larger towns (see p. 28), and reaches the plazas in the form of bread (for Highland baking centers, see p. 57, map 9). Occasionally it is sold in markets for the making of large wheat tortillas, as in Aguacatan, San Francisco el Alto, and elsewhere in the western Highlands.

Anise.—Aniseed, a specialty of San Andres Semetabaj Ladinos and San Antonio Palopo Indians, reaches the markets almost solely from those two municipios.

Fruits.—Apples and peaches are exotic Highland fruits grown in abundance in Argueta and Chichicastenango (map 9). Important native fruits which enter the markets in quantity from special centers are avocados and *jocotes* (pi. 19, c). Though varieties of both of these grow also in the Lowlands, they are of inferior quality. Optimum elevations for these fruits range between 1,500 and 2,000 m. (4,921 and 6,562 ft.). Lake Atitlan villages, especially those of the north shore, supply the markets with both, Lake avocados going into the Lowlands as far as Mazatenango. Concepcion, east of Solola, is especially

noted for avocados. Momostenango is the chief source of this fruit in the markets of the Quezaltenango-Totonicapan Valley region. The best citrus fruits are grown between about 1,500 and 1,800 m. (4,921 and 5,905 ft.) elevations, near the upper limits of their yield. The Lake Atitlan region, especially Tzununa and Santa Catarina Ixtahuacan, produces a surplus of fine oranges and other citrus fruits, which go in trade both to Highland and Lowland markets (pi. 27, /). (For types of fruit, centers of production, environmental requirements, and movement in trade, see pp. 144, 146, 147.)

Vegetables.—Vegetables, early introduced from Europe, illustrate particularly well a high degree of specialization. Only three areas in the entire region produce vegetables in large quantities. These are Solola, Almolonga, and Aguacatan. Solola (2,150 m. or 7,054 ft.) and Almolonga (2,200 m. or 7,218 ft.) produce more onions than anything else; no garlic at all is grown, as these elevations are too high and cold. In Aguacatan (1,700 m. or 5,577 ft.) with a warmer climate, garlic is dominant, and in Panajachel (1,550 m. or 5,085 ft.) garlic and onions, equally important, are the two leading crops. (For lists of crops and their production, see pp. 30, 31, 32; for trade movement, see map 10.) Unlike those of other garden municipios, Aguacatan Indians transport most of their vegetables and flowers by truck. Since Ladinos are the principal consumers of these goods, they are sold primarily in the larger towns, where Ladinos are most numerous.

Lowland products to Highlands.—The outstanding Lowland and piedmont commodities sold in Highland markets are coffee *en oro* (raw "bean"), panela (unrefined sugar blocks), salt, and dried chile. These are transported in large quantities by truck. In San Francisco el Alto as many as three trucks loaded with panela from the Colomba and San Felipe areas appeared in the market during 1936 (pi. 36). This was said to be the first year panela was sold in the market from a truck, but most of it was still handled by the 50 to 60 individual Indian vendors who appear every Friday. Mules are also used to transport much of the panela and coffee. Though panela is generally marketed separately, a lesser amount of coffee is often sold with it, as in the case of the San Jorge (Solola municipio) Indians, who sell the coffee ground and roasted, mainly at Solola (pi. 12, d). Coffee is generally handled in small amounts, along with dried chile (especially *Cohan* and *chocolate*), salt,

panela, cotton (white and brown), rice, garlic, anotto, ginger root and other spices, cacao, incense, cigars, cigarettes, trinkets, small buns, candles, peanuts, hats, ropes, threads, seeds, sewing accessories, medicinal herbs, occasionally onions, and other miscellaneous items (pi. 14, b). Though few vendors (mostly itinerant Totonicapan and Chichicastenango merchants) try to carry all of these, many of them will sell over half, while they usually specialize in from two to five, with very little of anything else. Totonicapan men, and some from San Cristobal, Quezaltenango, and neighboring towns, cover the western section, and Chichicastenango men operate in the eastern section of Southwest Guatemala. In the larger markets many Lowland products are handled separately in quantity. Besides panela, mentioned above, coffee is sold in hundred-pound sacks at San Francisco el Alto by 35 to 40 men (San Francisco and Totonicapan); chile, by 25 men of Santa Maria Chiquimula; salt, by 35 to 40 women and men, local and from neighboring towns. In the large daily markets such as Quezaltenango and Huehuetenango these products are offered for sale in almost comparable quantities (pi. 38, b).

Lowland fruits, especially bananas of various sorts, and also plantains, coconuts, pineapples, nances, oranges, and papayas, along with manioc, edible pacayas (palm flowers; see p. 146), sugarcane, and cacao, are sold in much the same manner as the mixed Lowland commodities described in the preceding paragraphs. They are carried up from the Lowlands commonly on the backs of individual Indian merchants rather than in trucks. Men of Chichicastenango, Totonicapan, and the Quezaltenango area handle them, too, but more important by far in this trade are the Atitecos, visiting markets north and east of Lake Atitlan (pi. 23, d), and the Xankatales (Nahuala-Santa Catarina), northwest of the Lake.

The Highland-Lowland exchange of maize has been treated in earlier sections (pp. 23 and 74).

Livestock (map 13).—The livestock trade is in large measure interregional, especially in the case of cattle and pigs. Sheep and relatively few goats are raised in the higher mountain regions and sold in neighboring Highland markets, so that they remain mostly above 2,000 m.

Sheep.—San Francisco el Alto is an important sheep market (pi. 35, c, d), as are San Juan Ostuncalco, Cantel, and Quezaltenango in the high valley region, and Chiche farther east. Usually

brought from within the *municipios* or the near vicinity, sheep are sold to Indians who come from a somewhat greater distance in the same region. To the San Juan Ostuncalco market, for example, sheep come mainly from San Martín, Concepción, Sigüila, and other neighboring *municipios*, as well as from the higher cantons of San Juan itself. They rarely are brought from as far as San Francisco el Alto, and almost as rarely are sold to Francisqueños. Most of them are brought by men from Quezaltenango and Olindepeque. Not over 30 or 40 are sold every Sunday. Usually only 2 to 4 sheep are either bought or sold by an individual. At Chiché, one of the most important livestock markets in the Highlands, about 50 vendors with an average of 5 or 6 sheep each from the neighboring mountains, usually appear every Saturday. Occasionally sheep are brought to market from a considerable distance, as the few sometimes driven from Chiantla, at the edge of the Cuchumatanes, to San Francisco el Alto.

Pigs.—Most of the pigs sold in the Highlands are very young and small (about 18 or 20 in. long). They are brought by local Indians to certain markets, notably San Francisco el Alto and Chiché, which are major assembling points and redistribution centers. Here special pig merchants buy most of them, and drive them away in little herds of 20 to 30, each tied to a separate string, and the strings twisted into a loose, thick rope (pi. 13, c, insert). San Francisco la Unión men (also a few from Cajola and Sigüila) handle the San Francisco el Alto pigs, many of which also are bought at the market, one or two at a time, by women of Quezaltenango, Totonicapán, and other parts of the region, about 50 per week. Some are resold by the women in their home markets. The squeals of pigs driven through the streets of San Francisco is one of the typical sounds to be heard there every Friday. The merchants drive their pigs to other markets: at San Juan Ostuncalco 5 or 6 vendors sell about 200 animals to Indians of San Juan and all the *municipios* adjoining it. As many as 50 men (only a few of them San Francisco la Unión merchants) sell little pigs, 5 or 6 each, from San Francisco in the Cantel market every Sunday. San Francisco la Unión men, 2 or 3 together, drive herds of 20 or 30 pigs into the Lowlands. About 6 or 8 vendors go weekly to Colombia and Coatepeque; and as many others to San Felipe, where they separate, some continuing to Retalhuleu, some to Cuyotenango; still others go to Mazatenango via Palmar. Little pigs are bought and raised in the

Lowlands, where there are more roots, seeds, grains, and other foods (see p. 38). Half-grown pigs, hundreds a week, as well as smaller ones, are driven to the Quezaltenango market from villages in the Cuchumatanes Mountains, such as Jacaltenango and Soloma (see p. 39). Some little pigs come from Cotzal and Chajul as well (map 13). Huehuetenango is a minor pig market (p. 79).

Pigs from Chiché are herded to the Lake Atitlán area (pi. 13, c), to adjacent *municipios* north and east of it, and to the Lowlands south and southwest of the Lake. Usually over 500 little pigs and over 100 large ones are sold in Chiché every Saturday, by about 100 vendors. Ladinos of Chinique, two at a time, regularly drive 50 or 60 small pigs to Santiago Atitlán every 2 weeks, crossing the lake in a motor launch. They sell them rapidly there, usually all in a day or slightly more. Quiché and Chinique pig merchants go also to Chichicastenango, Solola, Tecpan, and Patzún, in the Highlands, and Santo Tomás la Unión, Chicacao, San Antonio Suchitepequez, and the fincas, especially Chocoma, in the Lowlands. Most pigs are sold to raise in the Lowlands here, just as they are farther west. Mature pigs may be slaughtered where they are raised or they may be driven back into the Highlands again. Solola butchers go to Santiago and buy large pigs, take them across the lake in dugout canoes, and drive them up the road to Solola for slaughtering.

Cattle.—Cattle for Southwest Guatemala markets are bred chiefly in the dry eastern Departments, especially Santa Rosa (around San Martín Jilotepeque), Jalapa, Jutiapa, Chiquimula, and Guatemala (Sanarate and Palencia). Indians, mostly Aritecos, buy young cattle here and drive them to piedmont markets sometimes as far west as Santo Tomás la Unión. Five or six men at a time herd about 10 animals each. Santa Lucía Utatlán Indians usually sell cattle in Santo Tomás, brought from Santa Rosa in particular. The average number sold is about 30 a week, about the same as at Chicacao. Xankatales come from nearby Santa Catarina Ixtahuacán to buy cattle and raise them. This is one of their chief occupations (pi. 4, d).

Chiché is probably the most important year-round cattle market. It was established recently (reportedly 1930). Every Saturday about 100 animals, mainly young bulls, are sold by 40 or 50 vendors. Many of the cattle here are driven from the dry interior valleys of the Baja Vera Paz, particularly those

of Ciibulco, Rabinal, and Salama. Some of these cattle are taken by Quichelenos from Chiche to Santo Tomas la Union and other piedmont markets. Indians from as far away as the Lake villages and occasionally the Lowlands go to Chiche to buy cattle, usually not over 1 or 2 at a time. A few cows, bulls, and oxen are sold at San Francisco every Friday.

Horses and mules.—Horses and mules are even rarer than cattle in the regular weekly markets. At Chiche they are as numerous as cattle, about 100 per week being sold by 40 or 50 vendors. At San Francisco el Alto only a few appear in the market, coming mostly from Huehuetenango. Until about 1925, I was told, horses and mules were brought from Chiapas, Mexico, especially the Comitán area.

The "Feria."—The livestock market, usually referred to as the "*jeria*," is almost always separate from the rest of the plaza, often as much as 100 * yards away, in a fenced or walled enclosure. Except for those in the towns mentioned above, most of the markets have no weekly *jeria* for large animals. Solola has no Friday *jeria* at all, for example, while Huehuetenango, with a big daily market, has a *jeria* only on Sunday, at the Temple of Minerva, classical relic of the Estrada Cabrera regime. Not over 100 little pigs and 25 large ones are sold there weekly. At San Juan Ostuncalco, chickens and turkeys are also sold in the Sunday *jeria*, by 75 to 100 women, local and from all the adjoining municipios. At most markets, fowl are scattered through the produce section, sold by local women, who have one or two each, as at Solola (pi. 13, b). At Chichicastenango there is a row of about 2 dozen women selling chickens and turkeys in the regular market (map 25). At Chiche there is a similar row, but the women come from Patzite.

Fairs.—Livestock are sold mostly at special fairs which occur once, twice, or three times a year at any one place. Besides the celebration for the patron saint, there are big fairs lasting several days during Passion Week (preceding Palm Sunday), and again August 15-19, accompanying the Feast of the Assumption. There is a national fair at Guatemala City held in November. All commercial activity during fairs is increased twofold or threefold per day above a normal weekly market day, and the livestock *jeria* shows a more extraordinary development than almost any other section. Solola, for example, has a *jeria* during the pre-Easter fair, at the Temple

of Minerva, where hundreds of animals of all types mentioned above, large and small, are sold (pi. 13, c). Many of them are brought from distant regions, especially the cattle from eastern Guatemala (see McBryde, 1933, pp. 119-123). At the weekly Solola market, only a few pigs, sheep, and goats are **sold**.

Sheep are most important for wool, black and white, and are relatively little used for meat. Pigs provide meat in many forms, and also fat for most of the soap. Cattle are raised primarily for beef, little milk being consumed. The fat is used for soap and candles (see p. 70). In addition to the little butcher shops scattered through the villages and towns, there are a number of meat stalls also in the markets. Here butchers, generally local men, handle only beef, while local women with screened boxes sell beef, sometimes combined with pork or mutton (see map 24). Sausage and crackling are sold separately. Meat vendors may travel some distance to market, especially during fairs. Nearly all meat consumed in the region is fresh, with very little • salted or jerked. Butchering is no fine art, and meat is generally cut into irregular chunks with little thought of the animal's anatomy. At Panajachel in 1936, when three butchers rotated, slaughtering a bull only when another had sold out, all cuts of meat were the same price, 6 cents a pound.

FISH, REPTILES, AND WILD GAME

(Map 13)

Besides livestock and poultry, the only live animals generally sold in the markets are iguanas, large, fierce-looking lizards, which are considered a delicacy (see p. 39; pis. 12, e; 13, a) and lake crabs (pp. 120, 124). During Lent there is a great demand for iguanas, which are caught only during their laying season, about January 15 to March 15, and salt fish, which is brought mostly from Tapachula, Mexico, and is sold in great quantities throughout Highland markets during the Lenten season. As many as 40 or 50 men, mostly from Totonicapan and Quezaltenango some also from Chichicastenango, sell large stacks of salt fish daily in Solola during the pre-Easter fair. Throughout the Lenten season, 6 to 10 or more such vendors may be seen in almost any of the larger Highland markets, with salt fish brought on mules from Tapachula. For the rest of the year, salt fish is scarcely ever to be seen in the Highlands.

Smoked venison, gars impaled upon sections of cane, and other large smoked fish, besides salt fish, are

also commonly sold in Lowland markets. Fresh fish is sometimes brought from the ocean to piedmont markets, as from Champerico to Mazatenango.

POTTERY (Map 15)

Nearly all the pottery used in Southwest Guatemala is made in 15 centers scattered through the Highlands, especially in the west (see map 15 and pp. 54-56). Most important of these by far is Totonicapan. Among the major wholesale pottery markets are San Francisco el Alto (to which ceramic ware comes from 5 centers), Quezaltenango, Totonicapan, San Cristobal Totonicapan, and Santo Tomas Chichicastenango (100 Totonicapenos sell here weekly; see map 25; pi. 29, a). Totonicapan and Chichicastenango pottery merchants buy stock at the potters' houses and in the markets, and take cargoes to other markets, especially those of the Lowlands, often many miles away (pi. 41). Some go to sell in Guatemala City and return with fine Chinaulta water jars, which are sold throughout the Southwest (pis. 2, d; 14, a; 21, c; 42, b). The Lake Atitlan villages, depending as they do upon Lake water, provide an excellent market. Chichicastenango pottery merchants buy San Pedro Jocopilas ware in their own market and load up each with 10 jars of the type tamales are cooked in and 10 large clay griddles (comales) for baking tortillas. This is an average load of the pottery most commonly sold by these men, who leave their own Thursday market to sell in Solola on Friday, reach Santiago (crossing the Lake by motor launch; pi. 24, d, f) on Saturday, and continue to Moca and other fincas for Saturday night and Sunday markets. This is done also on other days of the week, especially Sunday (Chichicastenango) to reach Thursday Lowland markets. About 20 to 25 Maxenos per week go via Santiago and an equal number go by San Lucas and on to Patulul and Pochuta. Totonicapan men, usually less than half as many as Chichicastenango, follow these same routes with the same cargo. They nearly all return with tropical fruit, rice, coffee, and other Lowland products. Relatively few Totonicapenos thus buy pottery in Chichicastenango. More of these merchants buy pottery in the markets in or near their own town, especially the Friday plaza of San Francisco el Alto. Here a typical cargo would include 18 Santa Maria Chiquimula water jars (*Hnajas*), neatly tied in threes, mainly on top and along the sides of the carrying frame (*cacaste*) and 25 small, rough blackish pitchers

from San Miguel Ixtahuacan, 10 inside and 15 outside of the frame (pi. 41, d, e, g). These are taken by about 12 to 15 men per week, to the Sunday markets of Mazatenango, Retalhuleu, San Felipe, and other western Lowland towns. They return with Lowland cargoes, especially tropical fruit and coffee. Four or five Totonicapenos daily pass through Quezaltenango with loads of Totonicapan and San Cristobal tortilla griddles on their backs, headed for Lowland markets.

Besides the rhythmical Highland-Lowland trips by pottery merchants, there are circuits within smaller areas, as illustrated by five Orintepeque women in 1936. They would buy pottery at San Francisco el Alto on Friday, load it into large rope nets and carry it on their backs across the valley to San Juan Ostuncalco, where they would sell it on Sunday. A typical cargo consisted of about 6 large, unglazed Totonicapan tamale jars, 15 or 20 small glazed pitchers and other San Cristobal pieces, and 5 or 6 Santa Maria Chiquimula water jars.

That there are seasonal fluctuations in the volume of pottery in the markets was evident in Quezaltenango during 1936. In April there were only about 10 or 12 San Miguel Ixtahuacan pottery merchants in the San Juan Ostuncalco Sunday market. This increased during May to 20, and on August 9 there were 40. They sold mostly crude, yellowish unglazed bean jars, water jars, tortilla griddles, colander pots, and a few small pitchers (pi. 41, e). Such periodic variations in numbers of vendors seemed to be influenced by the amount of seasonal work needed on the coffee fincas, men being least numerous in Highland markets during the harvest, when many of them were working in the Lowlands.

TEXTILES (Map 16)

Centers of cloth production of various types are shown on map 16 (see also pp. 61-67). In stick-loom weaving areas women usually make their own huipil (blouse) and head-cloth material (pi. 9, a, b, c), employing cotton almost entirely, sometimes silk or rayon, and rarely wool. Relatively little commercial stick-loom weaving is practiced, as at San Pedro la Laguna. Indians' skirts are generally bought in markets from special cloth merchants, often Ladino weavers who make them (pi. 40). Women of each community (or area, such as Solola and San Juan Ostuncalco) throughout the Highlands tend to wear

characteristic skirts, often differing slightly from those of neighboring municipios or areas. Skirt vendors generally take the material in quantity to the nearest plazas. In the market of San Juan Ostuncalco, men from Quezaltenango appeared regularly (1936) with quantities of skirt cloth for San Juan and the six immediately adjacent municipios, in all of which the same plain dark blue is worn. Usually six men came and sold about 3 dozen skirts every Sunday. Salcája Ladinos specialize in skirts and scarves, which they sell mostly at San Francisco el Alto and other neighboring markets, but many go as far as Solola and into the Lowlands. Totonicapán, San Cristóbal, and Quezaltenango, where huipil cloth is woven on treadle looms, are major skirt-weaving centers which supply most of Southwest Guatemala. They specialize in blue patterns of checks and dashes; La Unión (San Marcos) produces mainly yellow, orange, and yellowish green, with much silk; Huehuetenango, red and yellow; Chichicastenango and Solola, blue. The plain heavy dark-blue skirts made in Solola are worn in most of the Lake region, except for the south shore villages (pis. 6, 7, 8, 9).

Quezaltenango, Totonicapán, and Chichicastenango cloth merchants are the leading vendors of cotton cloth, peddling to stores and houses as well as in the plazas. Other men from these localities, especially Totonicapeños, sell colored cotton yarn, nearly all of it imported from England and Germany (before 1940). By 1941 there was an acute shortage, especially of red thread, which weavers hoped to obtain from the United States.

Wool textiles, most of which are woven in Momostenango, are sold mainly by Momostecos and Quezaltecós, who were going by bus as far as El Salvador and sometimes Honduras, and returning with indigo. Outside of Momostenango itself, San Francisco el Alto is the main producers' outlet for woolen goods, there being on an average about 100 Momostecos selling blankets, *rodilleras*, and bolts of cloth (generally dark blue, for men's suits) there every Friday (pi. 35). Quezaltenango is the main center for textiles of all kinds sold by middlemen as well as by the makers themselves. Huehuetenango is the chief market for the northern part of this region and for the Cuchumatanes villages. A shaggy rug (*peyon*) is made in San Sebastián Coatán by three brothers living close together; nowhere else in Guatemala is this type of weaving done (pi. 37 and p. 65). More raw wool than thread is bought by Wool weavers, most of whom spin and dye their own

thread (pis. 33; 34; 35, c). Momostenango is the main market for dyewoods, which generally come from great distances (pi. 34, c; pp. 65, 66).

COARSE FIBER GOODS

(Map 17)

The production and distribution of fiber goods other than textiles, such as baskets, palm-leaf rain-capes, hats and mats, ropes, and brooms, are shown on map 17 and described on pages 67, 68, 69, 70. Specialization based upon sources of fibers is particularly marked in the case of these crafts, nearly all of which are scattered through the Highlands.

Other products are similarly localized, some even more so. Decorated tree calabashes (see *jicarás*, p. 57), which are sold throughout Guatemala by Maxenos and other merchant groups, are produced only in Rabinal (pi. 43). Foodstuffs, such as bread and cheese (see p. 57), are made in certain centers and go regularly to different markets. A popcorn confection called *bocoles*, sold in the plazas of the region, is made only at Patzún.

MISCELLANEOUS PRODUCTS

Sandals and other leather goods are made especially by men of Totonicapán and some from Quezaltenango and other towns in this region (p. 68). Santa Cruz Quiché men have a unique specialty in the making of sandals out of old automobile tires.

Soapmaking and candlemaking are not so localized, occurring both in the Highlands and the Lowlands. They are associated with livestock raising—soap primarily with pigs and candles with cattle.

There are other minor occupations which show localizations, but the ones mentioned above suffice to present the complex picture of diversification which characterizes the region.

MARKETS

(Map 19)

Many sources in the literature dealing with native life in Central America refer to the size, importance, and complexity of the markets, which have impressed travelers and writers since the time of the Conquest. According to Joyce:

... the great market in Tlatelolco [near the present-day Mexico City] moved the wonder of the conquerors; it is described as being three times as large as that of Salamanca, and one estimate places the daily attendance at twenty or twenty-five thousand persons. . . . Special magistrates held

courts in the market-places to settle disputes on the spot, and there were market officials similar to our inspectors of weights and measures. Falsification of the latter was visited with severe punishment. [Joyce, 1914, p. 130.]

That this summary may be regarded as applicable to markets in populous districts throughout Central America is evident from numerous original sources, such as Oviedo:

... each generation has its plazas or markets ... in every major town; but only those speaking the same language are admitted at these fairs or plazas, and if anyone else goes, it is to sell edibles to the others or serve them as slaves [Oviedo, 1851-55, vol. 4, p. 37; see also Ximenes, 192—31, vol. 1, p. 94, and Cervantes de Salazar, 1914, pp. 303-308].

The present-day distribution of markets in South-west Guatemala, the approximate relative importance of each in terms of numbers of vendors per week, and the frequency of convening, may be seen on map 19. It will be noted at the present time, just as it was when Oviedo wrote over 400 years ago, that each "principal town" has a market. Some are larger than others, and not all of the major ones convene daily. In certain cases strategically located villages, such as San Francisco el Alto, may have larger markets, even though held only once a week, than those of many towns that are larger and more populous.

FACTORS UNDERLYING MARKETS

On the whole, though most Ladinos buy in the plaza, relatively few of them sell there, for they prefer to operate stores or stalls in the large markets, and more Ladinos than Indians can afford them. For this reason they are numerous only in the more populous and elaborate market places, such as those of Guatemala City, Quezaltenango, Mazatenango, Huehuetenango, and Retalhuleu. These markets are large and fairly well attended every day, though some days are more important than others (map 19). More like concentrations of stores than periodic Indian trade gatherings, they reflect Ladinization and hence a certain degree of urbanization and small-scale industrialization.

Towns may be well developed even where Ladinos are numerically unimportant, if the Indians are town-dwelling craftsmen, as at Totonicapan. The daily market depends upon a large number of buyers living close within the orbit of attraction of the trade

center. Only in a populous town or village¹¹⁶ where the inhabitants are well nucleated are there enough consumers to support a sizable daily market, in which most goods are retailed in small quantities.

The three most important factors favoring a strongly developed market seem to be as follows: (1) A high population density in the tributary area, (2) situation on major trade routes, and (3) an intermediary location between contrasted areas of production. Though no single market depends solely on any one of these factors, the first is of primary importance in such a metropolis as Quezaltenango; the second is well exemplified in Santo Tomas la Union; and the third accounts largely for the extraordinary weekly market of San Francisco el Alto (see pp. 127-128). All three factors contribute somewhat to every important market. The general relationship between markets and areas of dense population may be seen by comparing maps 8 and 19, which show that most of the large plazas are in the well settled portions of the Highlands, such as the Quezaltenango-Totonicapan Valley. The alinement of market towns along trade routes is particularly notable in the natural, transverse passageways formed by the gorges and passes between volcanoes, as, for example, along the Quezaltenango-Retalhuleu and Nahuala-Mazatenango routes. The line of piedmont markets, centering along and above the railroads, is equally prominent (maps 2 and 19). The greatest single basis for the contrast between producing regions is the sharp altitudinal difference between Highlands and Lowlands. The products of both are found in variety and abundance in all plazas.

Wholesaling of goods to itinerant merchants may be observed in many of the large trade centers. San Francisco el Alto is preeminent in this regard (p. 36). Some of the more important items sold wholesale in that market are blankets, cotton textiles, ropes, garlic, pottery, incense, hats, chile, panela, Lowland fruit, and young pigs. Except for the first and last, none of these is produced locally. Pottery comes to San Francisco from at least five sources (p. 127).

Most of the middlemen's wares are not bought from wholesalers in the market, however. It seems generally true, especially of such manufactured goods

¹¹⁶ Santiago Atitlan is the only strictly Indian market which convenes daily; and in Santiago, *plaaa* is held twice daily. There are in this village such contributing factors as large population; crowding of houses into a small nucleus; dearth of Ladinos, hence stores, in Santiago; and diversity of essential products retailed by women, but many of them brought in by men, who are the long-distance traders, on their way to other markets (see pp. 97-101).

as pottery, that dealers who specialize in merchandizing buy up loads of such articles from the makers at their homes (p. 41, c).

VENDORS AND THE MARKET PLACE

Women are prominent in most markets, not only as buyers, but as vendors of goods (pis. 13, b; 21, a; 42, b). In some markets, such as that of Santiago Atitlan, the plaza is made up almost exclusively of women, buying as well as selling. Women usually predominate in the small daily markets of such centers as Solola, having the principal plaza on Fridays and Tuesdays and minor activity on the days in between. On the chief *dia de plaza* about half of the vendors and over half of the buyers are women in most of the big markets. They are shrewd in transactions, and generally handle goods in retail rather than wholesale quantities, since only men carry large, heavy cargoes. Some professional itinerant merchants (*comerciantes*) are women, more often in the Quezaltenango-Totonicapan region than in the municipios around Lake Atitlan. Most male itinerant merchants are inhabitants of the Quezaltenango-Totonicapan Valley, Chichicastenango, and Santiago Atitlan (pis. 14, b; 23, d; 24, f; 41, d; 42, b).

The seating arrangement of vendors in the market is generally well ordered, with regular lines in which the grouping is primarily according to type of goods and secondarily on the basis of provenience. This varies considerably with the individual settlements. The Atitecos, for example, usually sit together in any market, while the Cruxenos and Indians of Totonicapan, except for homogeneous groups, like sandal-makers, are often widely sprinkled through the crowd, even though they may be selling the same goods. A number of women, usually local, serve hot food cooked over open fires.

The general plan of the market in terms of goods and provenience of vendors is remarkably conservative, changing little from week to week, and even from year to year. A close survey of the Solola plaza in 1936 brought out only minor variations in comparison with the arrangement of 4 years earlier, when I had made a detailed diagram of it (map 22). Though vendors do not necessarily occupy the identical spot every week in an open market, they usually go back to the same general section. Stalls in an enclosed market are rented and usually occupied repeatedly for long periods of time.

As a rule, only the larger towns have market buildings, except in the more Ladinized and rainier pied-

mont (map 19). In many large towns the market place has been shifted from the central square to an area nearby, in some cases removed as much as half a mile (e.g., Mazatenango), the original plaza having been gardened and variously "beautified." It is then called "*parque central*," the market still being the "plaza/*

MARKET DAYS

Though certain towns, such as Quezaltenango, Huehuetenango, Totonicapan, Mazatenango, and others, have enclosed markets that are attended daily, with no striking variation through the week, most markets have 1 big day each week. In many cases there is also a secondary market day, with little or no activity during the remainder of the week. Sunday is the chief market day more commonly than any other in the Highlands, yet many plazas throughout this region are at their best on other days, especially Thursday (Tecpan), Friday (San Lucas, Solola, San Francisco el Alto), and Saturday (Chiche); in fact, all days are represented (see map 19). As a result, the inhabitants of more populous parts of the Highlands may attend several different markets each week without going far from their homes, and itinerant merchants may go from one plaza to the next on successive days through the week. On the big market day, whether or not it is Sunday, more people attend Mass, as a rule, than on any other day, for the population of the community is then at its weekly peak.

In parts of the Cuchumatanes Mountains markets are held every fifth day, in accordance with the ancient Maya calendar that is still used there (see also p. 60). At San Sebastian Coatan those are the only market days; at San Miguel Acatan there is a regular Sunday market in addition to the fifth-day plaza (days in 1940 fell on December 12, 17, 22, etc.).

In the Lowlands the chief day for all markets is Sunday, when laborers, who are by far the most numerous element of the population, are free to attend. On many of the fincas there is a small market Saturday night; at certain Lowland towns, notably Coatepeque, this is also seen. The secondary day, where there is one, is Thursday, and the big towns such as Mazatenango, have daily markets. The *quincena* (literally, "15-day") market, held every other week, was said to be more active because it followed Indians' pay days.

SELLING AND TAXATION

Market transactions are ordinarily made on a cash basis. Though payment in goods rather than money

is not uncommon in the Cuchumatanes region, where ears of maize are media of exchange, and in Chiapas, there seems to be none on a large scale in Southwest Guatemala. The only money now in use is modern Guatemalan currency, based upon the quetzal and fractions down to one-half cent. Indians nevertheless often quote prices in pesos, reales, and other former monetary units which were discontinued years ago.¹¹⁷

In pre-Columbian times in Central America, cacao "beans," copper bells and blades, gold, seashells, beads (especially those of jade and obsidian), colored feathers, chile, and salt were variously employed as money (see McBryde, 1933, p. 110). Usually, some sort of medium of exchange seemed to be used rather than barter, though the latter apparently was also engaged in to some extent. Older residents of Guatemala report the use of salt (Solola), chile (Solola), and cacao (Solola and Santo Domingo Suchitepequez) for "small change." This practice lasted until about 1900, according to a number of reliable informants. One of these told also of barter in the western municipios of Lake Atitlan, where, as at San Pablo, local "Spanish plums" (*jocotes*) were paid to Maxefios in return for pots or jars. The quantity of the fruit was determined by the capacity of the vessel: a bowlful of fruit was paid for the bowl which they filled (p. 102, fn. 158). Cacao beans were said to have been used for money in Mazatenango as late as 1914. A cigar or drink of rum cost 5 or 6 beans. In 19401 was told at Aguacatan that dried chiles, bought by merchants at Asuncion Mita on returning from Salvador to sell garlic, were used even then as money: 12 Mita chiles being worth 4 or 5 onions or a "pinch" (defined as $\frac{1}{2}$ oz.) of salt. The bargainings and bickerings that are so constantly in evidence in the markets serve more than the social functions which are stressed by so many writers; through repeated tests, both buyers and sellers are able to arrive at price norms where no other standards (on many items) exist, and the only constant is fluctuation.

Most grains, small bulbous vegetable foods, lime, meats, and many other goods are sold by weight, hand balances of tin, basketry, or brass (rare) being employed by vendors (pis. 14, c; 39, g). Corn is usually sold by the pound, but commonly, especially in Chichicastenango, it is measured by the *almud*, a shallow wooden box that holds about $12\frac{3}{4}$ pounds. Selling by weight instead of measure was said to

have been widespread only since about 1917 (McBryde, 1933, p. 124). Brass cup-weights are generally used for measurement, though sometimes stones and even potatoes, illegal though such substitutes are, serve the purpose in the balance. Fluid foods and certain small fruits, vegetables, and spices are sold by the measure. Most articles, however, especially larger ones, are sold by the piece or bunch.

Vendors in most of the Guatemala markets, particularly the larger ones, pay a tax (*piso de plaza*) for their space, even if it is in the open street. The amount imposed depends upon the nature, bulk, and value of the goods, and this leads to frequent arguments between vendors and tax collectors, who generally pass through the plaza for the purpose. At San Juan Ostuncalco vendors pay on leaving the market. At Solola in 1932 an average tax was about 3 cents, the minimum being 2 cents, maximum 8 cents (livestock tax). Small tickets were given as receipts. It was said in Chicacao in 1936 the cloth merchants were taxed as much as 20 cents; average market tax was about 5 cents, minimum 3 cents. Bananas are untaxed in most Lowland markets, where they seldom appear (Indian merchants get them gratis or for almost nothing on the fincas for sale in the Highlands; p. 36). Fruits and vegetables are not taxed in the San Sebastian Huehuetenango market.

The tax is generally paid in cash. The only exception to this which I have observed was at Panajachel, in 1936, in the case of pitch pine (*ocote*) splints, the tax on which was exacted in kind, usually four small bunches, worth 1 cent, for an average cargo. Pitch pine, which does not grow in the vicinity of Panajachel, is of great importance for supplying torchlight to official messengers on dark mountain trails at night, and was formerly essential to the Santa Catarina Palop6 crabbers' operations.

FAIRS AND PILGRIMAGES

One characteristic feature of interregional trade in Guatemala is the periodic occurrence of fiestas which often attract double or more the usual numbers of vendors and buyers in a market. In addition to the *fiesta titular* held in celebration of the patron saint after which a town is named,¹¹⁸ there are also other important fairs held on certain religious and national holidays. An outstanding example is the Passion Week (*Semana de Dolores*) fair at Solola, when

¹¹⁷ The quetzal is on a par with the U. S. dollar. For earlier moneys, as debased pesos and reales used until 1933, see McBryde, 1933, pp. 123-124; also Jones, 1940, pp. 234-239.

¹¹⁸ Even small villages which have no regular market may have a lively fair, attended by great commercial activity, on the patron saint's day.

here are several days of extraordinary commercial activity immediately preceding Holy Week.¹¹⁹ The appearance of unusual trade goods from distant enters and in large quantities is a striking commercial feature of such fairs. Cattle from eastern departments, salt fish from the Mexican coast, honey from Lowland fincas, especially those around Antigua, chile from Asuncion Mita, and woollens from Momostenango are some of the things that reach Solola in unusual volume during the big fairs.¹²⁰ Lowland palm leaves and bright-colored fruits for decorations are brought to Highland markets in great quantities for Palm Sunday (pis. 12, 13, 14).

The great fair of Momostenango, the *uajxaquip batz* ("8 monkeys") occurs every 260 days (May 4, '940, e.g.), according to the Maya calendar.

The most famous pilgrimage in Guatemala has long been that of the Black Christ of Esquipulas.

¹¹⁹Holy Week (*Semana Santa*) itself is celebrated only by religious occasions (pi. 15), church and *cofradia* meetings, and other ceremonies, there being no market at all during this period.

¹²⁰For a detailed description of the *Semana de Dolores* fair, see VlcBryde, 1933, pp. 119-121.

Mrs. Maudslay wrote (1899, p. 49) of it as follows:

The great festival of the year is held in January, and then for a week or more the usually half-deserted little town of Esquipulas swarms with pilgrims. In old days its fame was so great that it attracted worshippers all the way from Mexico and Panama and the fair which was carried on at the same time was the great commercial event of the year. Thither the English merchants from Belize brought their wares and carried on what was practically the whole of the foreign business of Honduras, Salvador, and Guatemala, taking in exchange the native-grown indigo . . . now steamships and railways have so changed the course of trade that the fair is of not more than local importance.

If this statement is accurate, there has been a re-emphasis upon Esquipulas since the Maudslays' visit. Pilgrims going to and from the great fair are still to be seen on trails far distant from the mecca wearing their traditional hat ornaments of Spanish moss and bright yellow pods. Annually, hundreds of Salvadoreños visit Esquipulas, as do many Indians from the western Guatemala Highlands, and Ladinos from Guatemala City and elsewhere.¹²¹

¹²¹For a good modern description of the Esquipulas fair, see Fergusson, 1937, ch. 5.

SETTLEMENTS AND SETTLEMENT PATTERNS

SIZE AND COMPOSITION

Ladinos are ordinarily the town-building element. With a fairly large Ladino nucleus, a sizable center of population generally assumes the character of a town, even though Indians may greatly predominate. Without many Ladinos, a much larger center of population may be a big agricultural village. Santiago Atitlan, for example, with a population of over 5,000, is a village despite the fact that it is twice as populous as the town of Solola, with 2,600 in 1930. Santiago village is predominantly Indian, with probably not over 100 Ladinos,¹²² whereas in Solola over half, or nearly 1,500, are Ladinos. Solola has not only much European blood, but other European features, such as the various administrative offices of the Departamento, a theatre, a public library, two "hotels," several stores of general merchandise, artisans of many sorts (mostly migrants from the towns of Quezaltenango and Totonicapan), and whitewashed adobe and red-tile-roofed buildings and dwellings. There are several

good cobbled streets in Solola, and the plan is rectangular (pi. 10, a, b, d, f; maps 20, 21). Santiago, on the other hand, has a compact mass of stone-and-cane-walled, grass-thatched houses, many of them of the primitive, square type with pyramidal roof, clustered for security upon a low, fairly level lava terrace of about three-quarters of a sq. km. (its density is about 8,000 per sq. km. or 20,000 per sq. mile), and built along a network of narrow, zigzag, stone-walled alleys that seldom approach a straight line (pis. 24, b; 25; 47; map 20). There are (1936) hardly more than a half dozen Indian butcher shops and about as many small home-stores (*tiendas*), the latter usually owned and operated by Ladinos, selling matches, pitch pine (*ocote*), candles, cloth goods, staple foods such as rice and sugar, and other items, all in small quantities. Santiago is a merchant-agricultural community, depending upon the crops planted on the ample, fertile slopes of the volcanoes and upon returns from the trade voyages of the middlemen who penetrate far into Highland and Lowland alike. Only local trade is carried on by the women, who congregate twice daily in the plaza, at noon and at sundown (pi. 25, e). Women also do most of the fishing.

¹²²One would not learn this from the official published census, which is based upon the entire municipio, for there are a number of Ladinos on the several fincas.

Santiago is strictly a village, despite its numbers; virtually a homogeneous settlement, probably preserving something of its pre-Columbian "street" pattern. Solola, on the other hand, though only about half as populous, is a town.¹²⁸ Both are built upon extremely limited terraces, the latter being slightly larger.

We may say that in the first instance the Santiago settlement concentration is conditioned by a natural advantage of site, which is superior to any other in the municipio; this fact depends also upon an apparent gregarious tendency of the Santiago Atitecos, for they could very well settle along the shores north of their village. In the case of Solola, cool climate and abundance of streams favor their intensive garden culture, and the administrative center affords employment to many, in addition to the fact that the site is ideally suited for a town. Were it not for the first two factors, however, namely, vegetable production and Government employment, both of which came in with the Spaniards, the concentration would undoubtedly be highly reduced, though there was a pre-Columbian town (called by the Nahuatl "Tecpanatitlan," and so designated at first by the Spaniards; see McBryde, 1933, p. 112). Solola was described as a "big town" as early as 1586 (Ponce, 1873, vol. 1, p. 442). The population about this time was given as 1,300 in the *Epapotitlan* manuscript (Anon., Ms. 1579, p. 10, f. 109).

From the classification presented in the present study, a "town" has a total population of more than 1,000, with over 500 Ladinos (p. 16). The figures are arbitrary, but this definition appears to be generally applicable. Even if further study should find the average number to be different, the principle would still hold. Indians in thousands will not make a town, but rather a large village, which may or may not be closely knit; e. g., Santiago Atitlan, San Pedro la Laguna, San Francisco el Alto, or San Andres Xecul. Given a nucleus of Ladinos, there

is, with a large total population, a good-sized Indian community having town characteristics, such as Totonicapan, and Momostenango.¹²⁴ Their industrial pursuits here account in large measure for this phenomenon, however. Crafts and trades of various sorts, particularly pottery making, wood and leather working, and cotton weaving in the former, and wool weaving in the latter, involving marketing as well as manufacture, encourage the growth of towns.

THE SPANISH TOWN PATTERN

The rectangular settlement pattern introduced by the Spaniards is almost universal, especially in the larger centers of population (maps 20, 21). Garcia Pelaez quotes Remesal who writes that pre-Columbian villages and towns "are not arranged by streets and wards as in Europe" and are widely dispersed, a village of 500 or less, which was small, occupying a "league of ground" (Garcia Pelaez, 1851-52, vol. 1, pp. 171-172). By 1579, in Lowland towns "care was taken to orient the streets north-south and east-west, although the houses were interspersed irregularly," according to an early account (Anon., Ms. 1579, p. 13, f. 111). If this was correct, errors were made in determining north, or else street alignments have changed considerably. Towns today are generally rectangular, but true orientation of the streets is exceptional. It is mainly in the more favorable sites of the piedmont that a common approach is made to orientation.¹²⁵ Site limitations often determine alignment. The main streets of Solola, for example, follow the axis of the shallow trough in the terrace upon which it is built. Low ridges both east and west of the town have thus far checked lateral expansion to a great extent; the more thickly settled portion of the town coincides perfectly with the gently sloping central terrace. (See map 21 for cultural and physical details of the town of Solola, and pi. 10, a.) Other towns, like Solola, have been built to conform to

¹²⁸ Some interesting variations have appeared in the representation of towns on maps of Guatemala; e.g., the American Geographical Society Millionth Map (*Ciudad Guatemala* sheet), compared with the standard Urrutia map of Guatemala. Both were apparently based upon the preceding census (1921). But Urrutia, a native Guatemalteco, seems to have followed the Government classification of centers, as *aldeas, pueblo, villa, ciudad*. The Americans followed the usual system (the only one possible without exhaustive study of population composition), basing their size distinction upon total published population figures. Consequently, a large village such as Santiago Atitlan is represented as a larger "town" than Solola, a distinction being made with symbols, however, between their administrative importance. Urrutia calls the former a *Pueblo*, like all the other Lake villages, and classes Solola as a *villa* (it was officially promoted to a *ciudad* rank on August 7, 1924, the year after his map was published, for no apparent reason, except perhaps the installation of an electric light plant that year).

¹²⁴ The 1921 census gives an Indian "urban population" in Momostenango of 9,685, which is probably too high. Tax reduces the figure to 300 actually "in town," yet with some 8,000 clustered about the center. According to my estimate, there are over 5,000 living in what might be called the "town," if the limits are drawn to include all of the settlement nucleus. The concept of "town," difficult to define in Guatemala, is not comparable with that in the United States. Perhaps the only criteria distinguishing a town from a village would be the presence of some well-prepared streets and sidewalks, stores with varied stocks, and one or more hotels.

¹²⁵ There is usually a strong deviation toward magnetic north (NNE.). The "true-north" arrow is incorrectly drawn on the original edition of my 1932 traverse map of Sololi (McBryde, 1933, opposite p. 152) so that it indicates almost true orientation, whereas the north-south streets run approximately N. 4° W. to S. 4° E. This is corrected in the present edition (map 21).

their physical settings. Thus Patzum is elongated northwest-southeast, Chicacao northeast-southwest, and San Antonio Suchitepequez nearly east and west (map 20). The streets of Quezaltenango trend variously in different sections. The large northwest section of town, apparently built later, has an alignment coincident with magnetic north,¹²⁶ as does the eastern point of Salcaja.

Smaller villages are usually highly irregular in form. There is generally a central square, or even several blocks laid out in rectangular fashion, with the rest taking devious curved or zigzag courses. Santiago Atitlan illustrates this type, in contrast with the regular pattern of Solola, Tecpan, etc. (map 21). The greater number of its pathlike streets may well be pre-Columbian in origin (see p. 86).

The ethnic pattern in Southwest Guatemala is as constant as the rectangular aspect of the towns. In the central portion of a mixed settlement, Ladinos and a few foreigners are dominant economically and politically as well as numerically, whereas the Indians are generally poor, and live on the outskirts.¹²⁷ Among the foreign elements on coffee fincas, as well as in the towns of the Highlands, Germans are most numerous (1940). Commonly they are hotel proprietors and storekeepers.

Each town has a central square, usually called "*parque central*" or merely "*parque*" to distinguish it from the market, which is called "*plaza*" more often than it is "*mercado*." Sometimes the two coincide, but in most towns the market has been moved from the central square to make way for modern beautifications, and with it has gone the word "*plaza*" (examples: Quezaltenango, Monostenango, Solola, Panajachel; maps 21, 22, 23, 24; p. 83).

The central square in a large town has the church on one side, the Government building perhaps on another, and stores, shops, garrison, and very often schools around it. In the smaller Indian villages there may be only the church and a municipalidad (municipal building for meetings of local chiefs and justices, jail, etc.), and frequently the only Ladinos are the *secretario*, who can read and write official records and messages, and the *maestro*, or school teacher; in some cases there are a few Ladino storekeepers and minor political or military officials of various sorts; usually also, the several manufacturers and handlers of liquor, as at Santiago Atitlan, are Ladinos.

The church is in most cases the striking landmark of any community; usually a large whitewashed stone structure, with ornate facades and bell towers, dating back to Colonial times. There may be but a few scattered huts around it, making the time-honored place of worship even the more impressive by contrast (pis. 22, a, b; 23, b; 27, b; 38, a; 46, d; 47). As a result of severe earthquakes,¹²⁸ many of these picturesque relics are in ruins; the most famous being those of Antigua Guatemala, the capital of the Republic from 1543 until 1773 (pi. 44, a, d). Large numbers of churches which are still intact are no longer constantly ministered by resident clergy, who come from the nearest parish to conduct Mass on certain special occasions, such as the *fiesta titular*, or day of the patron saint of the village.

There is no uniformity in the arrangement and facing of the church and other major structures. The church may be on the south side, the *jeatura* ("governor's" office and residence) and national police (not on the plaza) to the north, with the barracks on the west, as in the case of Solola (map 21); or the church on the east side may face the Government buildings to the west, the barracks and national police being along the south, as in Quezaltenango. In Chichicastenango the main church is on the southeast corner, facing west toward the smaller Calvario church (a common feature of Guatemala towns) directly opposite (pi. 28), with the municipalidad offices on the east, just north of the principal church. Most of the settlements visited by me have the church on the southeast, east, or south side (in descending order of frequency), and the commonest direction of facing seemed to be toward the northwest, west, or north (Solola and San Cristobal Totonicapan churches face almost true north). Churches in the Cuchumatanes villages commonly face west-northwest.

Often the positions of the market and central square have been shifted. In Momostenango, for example, where the church faces west toward a large, open square (of packed dirt, which is covered, on market days, with blankets spread to dry), the "*parque*" is removed to the south, and the market square is adjacent to the church on the north side. The square upon which the church faces may have been the main one when the town center was built, though there is no evidence of other large buildings ever having

¹²⁶ Often, where church bells have been dislodged by earthquakes, these have been hung in low shelters at ground level instead of having been replaced in their original belfries, even though the church building may still be intact. Many illustrations may be seen in villages around Lake Atitlan, where crude thatch shelters generally have been put up for the bells (San Antonio and San Pablo, for example).

¹²⁷ 1891 declination of 6° 42' east.

¹²⁸ A few exceptions to this may be found, as in Quezaltenango, where there are some relatively wealthy Indians.

fronted upon it. It is now secondary; besides being used for drying blankets, it is occupied by vendors during fiestas, and by dancers and celebrants. Otherwise, it is merely a vacant, bare space.

In the Lake Atitlan villages the church often faces out over the water, as in San Jorge (a later church), toward the south-southwest; San Antonio, west; Santiago Atitlan (the oldest church on the lake), west-northwest, toward the bay. As often, however, the long church buildings are alined with their sides parallel to the shore, as in San Pedro, facing northwest; Santa Cruz, southwest; Panajachel west-northwest; Santa Catarina, northwest.

TOWN NAMES

Acculturation extends beyond town pattern, both geographic and ethnic; it even affects the name of the town. As Spanish-descended Ladinos occupy the foremost part of the town, so also the first part of the town name is frequently of European origin—the Spanish name of a Roman Catholic saint. This is very general, as in Santiago Atitlan, San José¹ Chacaya, etc., the full names being employed in conversation only when two towns having the same saint may be confused. More often than not, the first appellation above is used, even by the Indians, though frequently the reverse is true, as in the case of Atitlan (one seldom hears "Santiago" except academically). This village also illustrates the Mexican influence so commonly seen in place names of Guatemala, such as Atitlan, Quezaltenango, Escuintla, and hundreds of others. Through the mercenary Indian troops accompanying Alvarado, these Mexican names came in with the Spanish.

THE MUNICIPIO

GENERAL FEATURES

No one who devotes much time to ethnographic research in Guatemala could fail to see the fallacy of assuming that any cultural unity other than that of similar language exists within the bounds of linguistic areas. Tax has justly criticized Shultze-Jena, who "assumed that Quiche culture is enough of a unit to allow him to use data from both Chichicastenango and Momostenango without distinguishing their sources" (Tax, 1937, pp. 423-424). Local diversities are too numerous and significant for any such broad application of language terms unaccompanied by specific locality. Ethnography in Highland Guatemala, in fact, must be treated "microscopically." It is likely that such local variations existed also among the so-called "nations" of pre-Columbian Guatemala, which were very loosely organized, possibly owing in part to these differences.

The municipio¹²⁹ is the smallest administrative unit in the political structure of modern Guatemala. In a sense it is a sort of township. Though in certain sections of Guatemala the municipio is larger than the American "standard township" (36 sq. miles, or about 90 sq. km.), in the Highlands of Southwest Guatemala some are much smaller. The latter are particularly characteristic of the rugged, dissected young volcanic region (V, map 5). "Plateau" (mainly V, map 5) and Lowland municipios are larger, as shown in table 4.

¹²⁹Adoption of this term appears to be relatively recent; I have not seen it used earlier than the 19th century.

TABLE A.—Average size of municipios in selected Guatemala Departamentos (in square kilometers, approximate)

Political division	Mainly above 1,500 m. elevation		Mainly below 1,500 m. elevation		Physical provinces, indicated in order of importance (see map 5)
	Area	Population per sq. km.	Area	Population per sq. km.	
Departamento de Chimaltenango	20 123 125 45	90 42 76 108			V, V. V, V. V. V. V. V, A1, V. V, V.
Departamento de Suchitepequez (annexed from Solola)	41.8	85.6	217	49.5	V, A1, V. V, V. V, A1, V. V, A1, V. V, A1, V. V, A1, (V.) V.
			272 193.5 115 215	31.5 64.5 32.5 21.5	
	355	73	2,900	.25	
	Average area (above and below 1,500 m.)		Average population density per sq. km. (above and below 1,500 m.)		
	450		15		Ls., Cr., V.

* This refers to that part of Suchitepequez which antedates the annexation of Lowland Solola.

CULTURAL UNITY OF MUNICIPIOS

The grouping of people in Latin America (originating in the Spanish *reducciones*, *encomiendas*, and *repartimientos*) in small areas, often naturally defined, has inevitably led to cultural integration on a "township" basis. To a large extent the municipios are the fundamental cultural units of Guatemala. Evidence of this fact is seen when one crosses the boundaries of these administrative units and observes, as is so frequently the case, quite different costumes, crafts, religious group affiliations, sometime physical distinctiveness, and even certain elements of vocabulary. Usually these traits do not differ appreciably between two settlements within a municipio, but they ordinarily do vary from one municipio to another, unless they are related as explained below. The little Lake community of Tzununa, for example, is nearly 3 miles (5 km., over an hour's walk or canoe trip) removed from its high-perched *cabecera* (seat of the municipio), Santa Cruz, with rugged terrain intervening (pi. 45, d, e); yet the costumes and economies are practically identical, with more of the old type prevailing in the former, a small, more isolated community (see p. 121, pi. 27). The other half dozen scattered hamlets (*caserios*) in this municipio, such as Jaibalito, have the same characteristics, which have been maintained, apparently since the Conquest, through contacts within the "township" area.

That the original delimitation of these municipios by the Spaniards was based upon certain pre-existing ethnic unity is quite likely, though it is probable that many of these lines were entirely arbitrary. The villages on the shores of Lake Atitlan, with houses clustered around a colonial Spanish Church—villages which were generally smaller concentrations of population prior to the Conquest (judging both from early literature and from archeology¹⁸⁰)—are good illustrations of settlements which undoubtedly began as *reducciones*.¹⁸¹

¹⁸⁰ See p. 101, fn. 153; Brinton, 1885, p. 191; also, García Pelaez, 1851, p. 171.

¹⁸¹ One approach to the question of early post-Conquest groupings seems to lie in the matter of native designations for municipio inhabitants. For example, though inhabitants of the twin municipios of Nahuala and Santa Catarina Ixtahuacan are generally called "Nahuales" in the Highlands, they are termed "Xankatales" (from "Santa Catalina") in the Lowlands, and Tax (1937, pp. 433-434) points out that the Atecos refer to one of them as "ax-catalina" (or "man of Catalina"). This immediately reflects two facts, in the history of the joint and culturally unified municipios: First, that they were united until the secession of Nahuala in 1865 (see McBryde, 1933, p. 103, fn. 52); second, that the single name which they bore until that time was, as late as the latter 18th century, spelled by the old form "Santa

Any attempt at treating the municipios as distinct cultural units must be undertaken with caution, for exceptions to such individuality are numerous. They may be summarized as follows:

(A) In some instances two or more adjoining municipios are more or less similar, owing to the division of a larger unit of population into smaller ones. The municipios in such cases were formerly combined, politically and in some measure culturally as well. The following list of municipios was prepared in the field in 1935-36. In some cases, the only known similarity lies in Indians' costumes, which serve therefore as a basis for grouping them together. A considerable degree of language similarity is known to exist also, and it is felt that these two traits are sufficient to merit tentatively indicating such adjoining municipios as being related culturally. Of the list presented here, three groups (Nos. 1, 3, and 4) have also been noted by Tax (as the exceptions to the general rule of municipio individuality), who writes of them as follows: ". . . in each case the people of both municipios speak the same dialect, different from those of others, have the same patron saint and a common tradition of origin, have the same costume, and apply to themselves the same name" (Tax, 1937, p. 433). Though we cannot speak with certainty concerning all of the municipios with regard to all-round cultural similarity, it is safe to assume in the case of most of them more traits in common than meet the eye and ear of the casual observer. The following municipios show similarities in dress, and probably are alike in other respects as well.

Municipios in which costumes are similar
(see also pi. 6)

1. Santa Catarina Ixtahuacan—Nahuall; latter seceded, 1865.
2. Santiago Atitlan—Chicacao; latter founded March 5, 1889, separated from Santiago.
3. Santa Maria Chiquimula—Patzite.
4. Santo Tomas Chichicastenango—Chichi.
5. Solola—San Jose' Chacaya—Concepcion.
6. San Cristóbal Totonicapán—San Andrés Xecul—San Francisco el Alto (and possibly Cantel); strong similarity, but some minor distinctions.
7. Huitan—Cajola—San Miguel Sigüila—San Juan Ostuncalco—Concepcion Chiquirichapa—San Martín Sacatepéquez; same women's skirts and belts, huipils vary within certain

Catalina" (see Anon., Ms. 1778, p. 17, f. 236, which describes the town of Santa Catalina as "the richest town" of the "Provincia de Atitlan, o Solola"). In calling an Antoftero "ax-Palop6," adherence to the old place name is also in evidence, for in early colonial times Palopo was the name of the village which today is San Antonio Palop6.

fundamental, basic pattern; San Martin men's costume distinctive.

8. San Pedro la Laguna—San Juan la Laguna (women's dress slightly different).

9. Quezaltenango—San Mateo.

10. Momostenango—San Bartolome Aguascalientes.

(B) **Similar municipios or parts of municipios due to recent migrations are given in the following list.** In the instances listed, independent "cultural colonies" have been established in which costumes, language, and many customs of the mother municipio are still largely preserved by the migrants and their descendants. In some cases Highland groups have settled in the Lowlands; elsewhere they have moved to other parts of the Highlands. This list is by no means complete even for the area covered, but provides a representative sampling.

Municipios or parts of municipios with costume similarities due to recent migrations

From municipio of:	To municipio of:	Remarks and dates of changes:
<i>Highland</i>	<i>Lowland</i>	
1. Zunil	Pueblo Nuevo	Town renamed (was formerly Pecul) and reestablished by Ladinos about 1880.
2. Zunil	Santo Tomas la Uni6n	Depto. Suchitepequez to Quezaltenango about 1900 (changed name, 1920; was Santo Tomas Perdido); Depto. Suchitepequez to Quezaltenango in 1933. Classified as pueblo, 1933.
3. Zunil	Zunilito (Municipio of San Francisco Zapotitlan?).	
4. Momostenango	Palmar	Common landowners in both.
5. San Pedro la Laguna	San Pedro Cutzin (Municipio of Chicacao).	Common landowners in both. (About 1880?).
	<i>Highland</i>	
6. Totonicapan	Patanatic (Municipio of Pana j achel).	1890. Probably originally lumber workers.
7. Totonicapan	Panebar (Municipio of San Juan la Laguna).	(?).
8. Patzicia	Cerro de Oro (Municipio of Santiago Atitlan).	About 1880 (?). Costumes have assumed some modifications in detail, figures woven on huipil, e.g., as at Santiago,
	"	
9. Santa Lucia Utatlan	Xepec (Municipio of Sta. Catarina Palopo).	About 1910 (?).

(C) **Labor colonies as extraneous units within a municipio.** Throughout the coffee belt of the Pacific piedmont, groups of plantation laborers who have come from Highland Indian communities have settled permanently on fincas. Though many of these have lost much of their identity, large numbers of them continue to wear their distinctive costumes and otherwise to preserve their backgrounds for

years after migrating to the Lowlands. Some of the larger piedmont municipios in the populous coffee belt have units of many Highland municipios represented as permanent labor colonists. A few illustrations from among hundreds are as follows.

Highland Indian groups which migrated as Permanent labor colonists

From municipio of:	To municipio of:
1. Solola	San Lucas Tollman (coffee finca laborers).
2. Totonicapan	San Pablo Jocopilas (Finca Chocola).
3. Santo Tomas Chichicastenango	Santa Barbara Suchitepequez (fincas, especially Mocd)—was Dept. Solola till 1934.

It is possible that some of the adjoining municipios under (A) above, may have been large ethnic units at the time of the Conquest, though further evidence of relationship is necessary before we can draw such a conclusion. In some cases several groups may have previously been one, subsequently split up by the Spaniards. Subdivision has continued to the present time, with special impetus provided by the

agricultural revolution which accompanied the expansion of coffee beginning about 1850.¹⁸²

We may assume that many modern municipios represent areas each of which had a considerable degree of cultural uniformity within itself about 100 years ago (1830-40). The early 19th century perhaps was (the period of greatest homogeneity of municipios or preexisting ethnic groups that has ever been seen. Before the Conquest they did not exist as they are today; the *reduccioncs* tended to throw together settlements, the ethnic uniformity of which probably became strengthened by years of living in small, more or less isolated areal units. Then came the break-up of cultural entities by the agricultural revolution. Railway and road-building operations¹⁸³ simultaneously tended to increase intercommunication and to cause some shift of population. There were numerous migrations of peoples during the period of the coffee boom which had no direct connection with that industry (e.g., Patanatic and Xepec, see p. 90, B, Nos. 6 and 9) and which may have been stimulated by the general restlessness of the period. Cerro de Oro, an *aldea* of Santiago (p. 90, B, No. 8, and map .20) was peopled by the Patzicia settlers during the coffee boom period, and, though the lava apron in this area is stony and rough, the high grade of the coffee may have offset this disadvantage. Coffee must have reached Lake Atitlan relatively late, for Dollfus and Mont-Serrat (1868, p. 521) say of San Lucas Toliman (where good coffee in considerable quantity is grown today): "... absolutely unproductive country; the Indians plant a little corn, and catch fish in Lake Atitlan for their own consumption." Nor do they mention coffee in Panajachel, where it is a major crop today (map 23). It probably came in during the last decade of the 19th century. Brigham in 1887, though he calls Panajachel the "garden of Solola" (op. cit., pp. 155-156), says nothing of coffee; yet Mrs. Maudslay mentions it as an important crop in 1899 (op. cit., p. 57). , ,

SANTIAGO ATITLAN: MUNICIPIO BOUNDARY CHANGES

Before appraising the significance of present municipio boundaries as cultural lines, it is well to examine the evolution of a municipio which is fairly well

known historically, such as Santiago Atitlan, site of the ancient capital of the Zutuhiles.¹³⁴ At the time of the Conquest the southern shore of Lake Atitlan was occupied by the Zutuhiles, whose lands extended into the Lowlands, where they had rich cacao plantations (map 11). Shortly after 1850, coffee was planted on a very large scale all along the piedmont, on slopes higher than the cacao lands (map 12). Coffee succeeded cacao as the major crop, and there was such a boom in coffee plantations that piedmont municipios developed on colonial lands of Highland municipios, and finally became independent of them, as Chicacao did in breaking off from Santiago Atitlan. The Indians in the two municipios, having stemmed from the same stock, are still closely related by blood.

Zutuhil Lands.—Historical records indicate that the areal extent of the Zutuhil "kingdom" before the Conquest included the south shore (and originally probably the north shore as well; see p. 103, fn. 159) of Lake Atitlan, and a center of settlement ("capital") which corresponded in some measure with the present village of Santiago, though archeological evidence indicates a somewhat greater dispersion to the north of the modern site (map 20; pl. 47). There were also extensive Lowland territories, commonly held by Highland Indians primarily for the planting of cacao and some supplementary corn.

Brinton's English translation (1885) of the Xahila manuscript¹³⁵ reveals that the Zutuhil "originally" occupied the shores of the Lake, and divided it with the newly arrived Cakchiquels, who even married their women, "neither their mothers nor sisters having accompanied them" (Brinton, 1885, p. 107).

According to Fuentes y Guzman, "the kingdom of the Zutugiles comprised the territories of Atitlan and Suchitepequez" (Lowlands) (Fuentes y Guzman, 1882-83, vol. 2, p. 172).

Juan de Pineda (1908, p. 438), writing between 1560 and 1580, says of "Atytlan": "they all have horses on which they take to the Zapotitlan lowlands, a day's ride down below, all the things they produce, and they trade in cacao and cotton; furthermore,

¹⁸³ Dollfus and Mont-Serrat (1868, p. 521) wrote of Chimaltenango (1865-66): "Village of 1200-1500 inhabitants. . . . Most of the inhabitants, like those of the following villages, left their homes to go to work in the plantations of nopal and coffee, so that this region [High* lands around Chimaltenango] is on the verge of depopulation."

¹⁸⁴ The importance of roads was stressed during the rule of President Carrera (1844-65). For railway data, see p. 92, fn. 141.

¹³⁴ Described briefly or mentioned by the following: Lothrop, 1928, 1933; Tax, 1937, pp. 431, 434-435; Wauchope, 1938. The name "Atitlan" does not appear in the Cakchiquel history, even though the account brings their story up to 1600. The entire name of the village probably came in with the Spaniards, though definite mention of Aztecs ("Yaquis") is made as early as 1503, when they were executed for taking sides in a Cakchiquel (Akahal) revolt (Brinton, 1885, p. 161). There have been numerous spellings of Zutuhil as is often the case with Guatemala place names. A few of these have been as follows: Zutujil, Zutuhil, Zutuhil, Sotuhil, Sotujil, and Zutijil.

¹³⁵ Various titles (Brinton, "Annals of the Cakchiquels;" Brasseur "Memorial del Tecpan-Atitlan").

almost all the inhabitants of this town have groves [myllpas'] of cacao in those Lowlands, in four plantations which they have, called San Bernardino,¹⁸⁸ which is large, San Francisco and Santandres and Santa Barbara. They harvest quantities of cacao from their lands, and anotto, chile, large shrimp [in streams], and many of the fruits in which the region abounds. . . . Pineda was prone to exaggerate the wealth of the Indians, in order to justify high tribute requirements by the Crown (see Relaciones, etc., 1908, pp. 75-76).

In a letter from several Atitlan chiefs to the King of Spain, written in 1571, it was said of their "nation" that ". . . their chief was named Atziquinilai, and along with him, the sub-chiefs were called Amactzuthule . . . [who own] . . . plantations named Sant Bartholme and Sant Andres and Sant Francisco and Sancta Barbola, and likewise they had servants and animals, and things given in tribute, such as precious stones . . . gold, cacao, and feathers, chickens, honey, and many plantations of corn and cacao."¹⁸⁹

The Capotitlan description states that Atitlan "has annexes at the towns of San Bartolome and San Francisco and Toliman the lower, called San Lucas, and the towns of San Pedro and San Pablo" (Anon., Ms. 1579, p. 23, f. 116). A hamlet of San Cristobal is also mentioned, probably being near the site of modern Chicacao (it was 2 leagues east of San Antonio Suchitepequez), and it was evidently also a colony of Atitlan.¹⁸⁸

Cacao plantations.—The richness of the cacao, plantations of the entire piedmont is frequently referred to by early writers. In the Epotitlan manuscript (Anon., Ms. 1597, p. 17, f. 113) the term "cacao mines" is used. It was the Lowland cacao groves (*cacaotales*) which Alvarado threatened to destroy, and he thereby brought the Zutuhils to terms (Diaz del Castillo, 1837, p. 415). On the

basis of the present Highland territory of Santiago Atitlan, without knowledge of their former Lowland plantations, this passage would appear confusing, for all the territory of the present-day municipio of Santiago is well above the limits of cacao growth.

The domain of the Zutuhils at the time of the Conquest probably included the southern Lake shore from San Pablo to San Lucas, inclusive, and the Lowlands, extending east-west from Santa Barbara to San Bartolome Aguacatepeque.¹³⁹ (The southern limit is nowhere indicated.) This was precisely the parochial *visita* and *guardiania* of Ponce's time (1586), and as defined in the 1579 (Japotitlan report.

Immediately east of the Lowland Atitlan colonies, there were probably plantations of Solola.

Pineda writes of the Indians of Tecpanatitlan (Solola): "... they go to the Lowlands of Qapotitlan, one day's ride away, and all these things [Highland products] they take on horses, everyone having two or three for cargo and others which they ride. They exchange their goods for cacao and cotton by barter, and sell cacao to the Spaniards for money. Of the cotton they weave more clothes to sell . . . and these Indians are intermarried with those of the Epotitlan Lowlands." (For an appraisal of Pineda's comments, see above.)

Coffee replaces cacao.—The production of coffee on a large scale revolutionized the agriculture of the piedmont, for cacao had declined and coffee became the one big money crop.

As early as 1783 coffee is mentioned quite casually as a minor plant in Soconusco.¹⁴⁰

The unpublished Solola "Monograph of the Department" (September 1926) relates that in Patulul (about 12 miles east of Chicacao) coffee planting began between 1855 and 1860, reaching its peak in 1895. Coffee brought with it a wave of prosperity for Guatemala, reflected, among other things, in expansion of railroads.¹⁴¹

Chicacao, a coffee colony.—The unpublished 1930 census report states that Chicacao was founded in 1889 (March 5), before which time it was an

¹³⁸ This probably should be San Bartolotni, for the apparently more accurate description of "Cjapotitlin" in 1579 speaks of "San Vernaldino [of the town of] St. Antonio su Chetepequez. . . ." (Anon., Ms. 1579, p. 23, f. 116). This is more likely, for San Bernardino is west of San Antonio. (See also p. 15, fn. 8.)

¹³⁹ Anon., Ms. 1571. A portion of the above is translated in Brinton (1885, p. 38), who refers also to Ternaux-Compans, Recueil, etc. (1840, p. 419).

¹⁴⁰ Ibid., p. 9, f. 109. It has been possible for me to locate these long-disappeared Lowland settlements of Atitlan (map 11) by identifying certain of the numerous streams mentioned by the companions of Alonso Ponce (who meticulously counted and recorded them all; Ponce 1873, vol. 1, pp. 431-434), then comparing them with those on the detailed Railway Survey map (Intercontinental Railway Commission, 1898, map 2). With the exception of Santa Barbara, which still exists, I have found no reference to any of these villages later than the 16th century.

¹³⁹ The agnomen "Aguacatepeque" appears in the Qapotitlan manuscript (Anon., Ms. 1579, p. 10, f. 109).

¹⁴⁰ (Anon., Ms. 1783, p. 49) "... achiete abounds without being cultivated, and coffee, little consumed, produces on the same lands as cacao."

¹⁴¹ It was coffee export that occasioned the Intercontinental Railway Commission survey (1891-92); the road went through to Cocales (station 3 miles below Patulul) in 1897. This was the western terminal from Guatemala City until the opening of the Mazatenango extension, in 1903, which was a "memorable occasion" (Libro Ajtal, 1915, p. 87) that joined the Ferrocarril Central with the Occidental line <in operation since 1883 between Matatenango and Champerico).

aldea of Santiago Atitlan. (Here were the ancient colonial cacao lands of the Zutuhils.) Local residents verify this, explaining further that the area was a "high forest" before an Atiteco named Francisco Chicajau (hence the name Chicacau, according to natives) came in with a small band of some 30 of his fellow villagers. They cleared a limited area to graze their cattle. Then, on the date mentioned above, the land was "traded" from Chicajau, whose house stood on the corner of the present square of Chicacau. No reason was given for the acquisition of this land; but one has only to glance at the list of "rural districts" included in the 1930 census under Chicacau, and between the lines the story unfolds. There were 99 settlements listed; 83 for which dates are given were founded between 1880 and 1900. The lowest of these is Roselia, 250 m., the highest, Baja Vista, 1,150 m. This was a part of a "mushroom" growth which occurred all along the piedmont, a development which separated ancestral colonial lands from Highland municipios; which brought thousands of Indian laborers out of the Highlands, many destined for permanent Lowland residence; and which sounded the death-knell to many already declining cacao groves. Juarros (1823, p. 22) states that Guatemala cacao was beginning (early 19th century) to lose its prominent place in world trade, owing to South American competition. Railway construction, which called for cross-ties of trees also used as cacao shade, was said to have furthered the collapse of this culture. Much of the ancient "cacao mines of the coast" thus went back to woodland and secondary savanna.

The last step in the political fortunes of colonial Atitlan (Chicacau) came with its absorption by the Lowland Departamento of Suchitepequez. Until 1934 Chicacau had remained in the Departamento of Solola (the old *corregimiento de Atitlan*).¹⁴² Then, along with Santa Barbara, San Juan Bautista, and Patulul, it was shifted bodily, so that now its *cabecera*, or "state capital," is Mazatenango, in the piedmont, instead of Solola, high in the mountains. This was a logical (though late) and practicable shifting of boundaries as an adjustment to the new plantation growth, facilitating communications between the many piedmont coffee fincas and their piedmont territorial "seat."

By the series of changes outlined above, then, the cacao lands of the Zutuhils have not only been shifted into a new municipio, but have become incorporated within another departamento, the old Provincia de Suchitepequez, or Zapotitlan. Yet, the dominant, native costume of Chicacau is still that of the modern Atiteco; bright-red skirts and variegated head band "halos," unmistakable raiment of the women of Santiago, fill the Chicacau plaza. These women, local inhabitants, are among the few large permanent groups in the Lowlands who preserve their original dress. And the Zutuhil language prevails, though there are certain variations from the Atitlan dialect, and there is more Spanish spoken—characteristic of the Lowlands. These generalizations cannot be made for the municipio as a whole. They must be confined to the environs of Chicacau and other settlements where former Atitecos predominate. Though this includes a majority of the coffee fincas of the municipio, there are many others of different provenience, so that an ethnic melting pot has been one of the results of the coffee boom.

To cite a few illustrations: The fincas of La Indian (population 100, 1930) and Nanzales (established 1890; population 66, 1930) are peopled almost entirely by Cakchiquel-speaking Solola *colonos* or *rancheros* (permanent colonists); Colima, owned by a Totonicanpan Ladino (founded 1885, population 79, 1930), is occupied almost solely by Quiche-speaking Totonicapenos, both *rancheros* and *temporadistas* (those who come down only for the harvest); at Los Angeles (founded 1900) there are 125 (1930 census) *rancheros* from Santa Maria Chiquimula (Quiche speech); Filadelfia (population 100, 1930) has colonists from Totonicanpan, Nahuala, and several of the Lake villages, El Manatíal (founded 1887, population 300, 1930), La Estelina, and Las Esperanzas, are occupied mostly by Indians of San Juan, San Marcos, and San Pablo; others, such as Los Horizontes, Bolivia, and El Brasil, have mostly colonists from Santa Clara, Santa Lucia Utatlan, and Nahuala (all Quiche speech); La Abundancia has become almost a labor colony of San Juan la Laguna Indians. A large percentage of the former Juaneros have gone to the finca to live as laborers, with land (about 4-5 *cuerdas* each) and house provided, and wages of 12-15 cents a day. (For labor data on fincas, I am indebted to Don Jaime Pensarena, a labor-promoter of Chichicastenango.)

¹⁴² The map by Fuentes y Guzman (1932-33, vol. 2, opposite p. 60) shows this *corregimiento* to have formerly embraced (late 17th century) not only all of Solola (before 1934) but much of southern Quiche as well, almost to the Cuchumatanes, for it included San Andres Sajcabaja.

Cutzan.—San Pedro Cutzan is unique in being a modern Lowland colony of Highland Indians who own lands both in the mountains and in the Lowlands, as in pre-Conquest times. It is peopled by Indians of San Pedro la Laguna, though it is included within the Chicacao municipio. Here, at an elevation of 400 m., an hour's walk south of the pueblo of Chicacao, a group of Indians from San Pedro la Laguna have established a colony of about 850 inhabitants (local estimate, 1936), the second largest center in the municipio. The 1930 census indicates a population of 100, but this was probably for only a portion of the settlement. Cutzan appears on the Intercontinental Railway Commission map made in 1891, and it was probably established after 1850.

Houses, identical with those of the mother village, except for the split-cecropia board walls instead of adobe brick, are widely dispersed along more than a mile of road, beside a meandering stream fed by many winding tributaries. The village has an area of $2^{1/2}$ sq. km. (nearly 1 sq. mile). Here the alluvial piedmont is dissected into rolling inter-stream ridges 50 m. (164 ft.) high, covered with smooth grassy slopes and scattered trees (pi. 2, /, g). Each homestead, with the dwelling usually about 50 to 100 m. from the nearest neighbor, includes from $\frac{1}{2}$ to 1 *manzana* (about 10,000 sq. m., equivalent of a city block) of land planted to clumps of coffee and cacao¹⁴³ trees, and sometimes interspersed are *jicaró* (calabash tree), achiote, bananas, papayas, oranges, coconuts, guavas, and a few breadfruits serving mainly for shade and ornament. There are small gardens of squash, several varieties of beans and chiles, tomatoes, pineapples, sweet manioc, sugarcane, and certain edible and medicinal herbs, notably *ruda* (rue, *Ruta* sp., see Standley, 1931, pp. 326-327; Standley and Calderon, 1925, p. 123), *pito* (*Erythrina fubrinervia*, a remedy for insomnia, see Standley and Calderon 1925, p. 111), and *kixtan* (?). *Guisquiiles* (*chayotes*) are planted in little enclosures, as in the Highlands. There are maguey in small quantity (made locally into rope) and cotton, which is spun here, some being taken also to San Pedro.

The planting is done, however, chiefly on land that is rented from fincas to the south, below the coffee belt, in the vicinity of Nahualate and eastward along

the railroad to Santa Elena. This takes them into another municipio, that of Santa Barbara. These lands, according to local inhabitants, are generally paid for in maize¹⁴⁴ to which they are primarily planted. There are also some rice and perhaps a few *cuerdas* of tomatoes, beans, sweetpotatoes, cassava, and cotton.

Most families have one or two horses or mules (the latter are much fewer) and three or four head of cattle, for all of which there is ample good grazing land. There is only one local meat market, most of the cattle being bought by Highland butchers, who come down from Solola, Atitlan, Panajachel, Santa Lucia Utatlan, and a few from Chicacao and San Pedro la Laguna.

Some engage in fishing, particularly in the rapid rocky Rio Cutzan, flowing along the western limit of the settlement, and the Tarro¹⁴⁵ Creek on the east, which is joined by the Siete Vueltas, winding eastward among the scattered houses. Small fish, shrimp, and crabs are caught, with the aid of hand nets 20 inches in diameter, for the rapids (pi. 4, b), and some cast-nets for pool fishing. Occasionally seines are used, but never fish poison as in Eastern Guatemala. For the large shrimp¹⁴⁶ split-bamboo funnels are set out in a row, mouth upstream, during the night. They are made much like those used for fishing in Lake Atitlan villages and resemble those similarly used for catching fresh-water shrimp along the coast of Peru. About a yard long by 10 inches in diameter, they are placed, mouth upstream, in a row of 8 or 10 attached to a horizontal pole, with a vertical pole fence across the stream around them. These are set out all night, and the shrimp are taken out in the morning.

The inhabitants of Cutzan are indistinguishable from the Lake Pedranos. They are closely related by blood and marriage to the Indians of San Pedro on the Lake; in fact, many said that they had houses in both places and spent some time in each. The products of the two are in large measure complementary, corn being harvested at different seasons

¹⁴⁴ Half a netload or about 40 pounds of maize ears for a *cuerda* (about 1/5 acre) of land per season. This is equivalent to about one-fifth of the harvest.

¹⁴⁵ This stream is named "Toros" on the Intercontinental Railway Commission map (1898, Corps I, map 2).

¹⁴⁶ These are fresh-water shrimp of the genus *Macrobrachium* that are caught in greatest abundance during the first torrents of the rainy season. They apparently are found all along the Pacific slope of Central America, as Indians in El Salvador (Dolores Apulo, a village on Lake Ilopango) said they also caught them, here again, mainly in swollen stream*. Shrimp of this genus are known to attain an over-all length of well over a foot.

¹⁴⁸ Squirrel* were said to be very destructive to cacao here; they were blamed for destroying about half the cacao and *potaxte*, usually eating only half or more of the beans of each pod, after gnawing a hole in it.

(though more appeared to go up than down); superior beans, avocados, jocotes, and maguey come down; cotton, rice, cassava, and tropical fruits go up. Soap and candles are reportedly made (1936) in Cutzan as in San Pedro la Laguna. Costumes and language are the same in both places. The spinning of cotton thread as well as of rope, stick-loom weav-

permission obtained from the local authorities, for cutting firewood, grazing livestock, and for cultivation if additional acreage is needed.

The amount of land owned or available for tillage by resident Indians varies with different sections. Some rough estimates by random informants are given in table 5.

TABLE 5.—Amount of land owned or available for tillage by resident Indians, as estimated by residents

Municipio	Number of cuerdas* of milpa per Indian family			Number of cuerdas, according to crops grown (average and maximum range).
	Maximum	Average	Minimum	
Pacific Lowlands:	2200	25 75-150	5	
Lake Atitlan Basin:				
San Pedro ¹	100 +	50-100 50-60	5	/ 1 Coffee, 20-30; 80-100. Milpa, 50-80; 200-300.
Quezaltenango Valley:				
		10 2-3 2-3		
	15			

¹A cuerda is about 1/5 acre.

²1 finca has more than 1,000 cuerdas.

ing, distinctive men's dress, and the few *temescales* (stone sweat baths) all are Highland traits, rare in the Lowlands, where they apparently are almost always indicative of recent introduction.

LAND TENURE

The lands within a municipio are generally owned in large part by the municipal government (*municipalidad*), except in the regions of great plantations. Land may be sold to those who have enough capital to purchase it and pay taxes on it, and much land is privately owned by Indians throughout the Highlands. But the usual procedure in the case of much of the population—Indian peasants and others without estates—is for the local government to grant residence and tillage rights to men reaching the age of 18 years. Title is given for plots of land, proportional to the size of the family, and this is tantamount to ownership during the life of the individual tenant. Land so granted is not transferable, nor is it inheritable property. Home lots are generally owned by individuals or families, and are inheritable. In some municipios, such as certain ones on Lake Atitlan, *milpa* land is granted for the period of its fertility, usually 8 to 10 years. Upon the death of the tenant, the land reverts to the municipio. No accurate data on land ownership are available.

Many municipios have large amounts of communal land which may be used by the inhabitants, through

The estimates in table 5, though not based upon any actual measurements, are not incompatible with population densities. Apparently, large landholders are to be found mainly in the high basins and valleys and in the Lowlands, with the Lake villagers having land more evenly divided among them. In some cases, notably the south-shore municipios, Santiago and San Pedro in particular, a number of Indian landholders have local Indian laborers who work for them. In the piedmont, especially around Pueblo Nuevo, Indian *finqueros* are said to own tracts as large as 2,000 cuerdas (about 400 acres), which are planted mainly to coffee and are cultivated by Indian laborers. Indian owners of large plantations are rare, however.

The natives of Guatemala generally have not expressed such great demands for land as the Mexican peasants have. Large finca owners, who depend upon cheap Indian labor, have discouraged the Government from granting land to the Indians on the grounds that it would reduce commercial production, and hence the national income, because of the Indians' indifference to the development of plantations. The fincas appeal economically to the Indians, both temporary and permanent colonists, largely through the loan to them of land for corn, beans, and other subsistence crops. Formerly, through money, liquor, and goods, indebtedness of the Indians was encouraged, to hold them in "debt bondage," but this was abolished by law in 1934.

A little over one-fifth of the total territory of Guatemala (approximately 48,000 sq. miles, or 120,000 sq. km.) is privately owned, by only about one-fifteenth of the total population. This amounts roughly to one-eighth of a square kilometer, or about 32 acres for each landowner; but not over one-seventh of all privately owned land is under cultivation (Jones, 1940, pp. 176-177). These estimates are for the period preceding the declaration of war on Germany by Guatemala in 1941. Over one-third of the privately owned land under cultivation was then in the hands of foreigners, especially Germans in the coffee regions of Alta Vera Paz and the western Pacific Lowlands and volcanic slopes. German lands were confiscated by the Guatemalan Government after war was declared.

A number of attempts have been made, since shortly after Guatemala gained its independence, to distribute lands for improvement and development. Appeals were made to foreign colonists, and also to native Indians, but with indifferent success. Foreigners encountered great difficulties in tropical agriculture, and the Indians seemed content to go on as they were, eking out a bare existence through primitive methods, many of them on municipal lands.

Surveys.—The four-fifths of Guatemala that is government-owned land is very imperfectly known as to extent and location. This is due partly to incomplete and poorly kept records of titles and partly to inaccurate mapping of the country. Urrutia carefully surveyed most of the privately owned coffee fincas of the Pacific versant, especially, and the German plantations of the Alta Vera Paz have also been fairly well mapped. The eastern boundaries of Guatemala have been surveyed in recent years by aerial photography, under the direction of Sidney Birdseye for the Guatemala-Honduras Boundary Survey Commission (see *Informe detallado de la Comision, etc.*, 1937). Aerial surveys have also been made in parts of the Peten by the Shell Oil Company. Elsewhere, most of the country has been very inadequately mapped. Municipio and even Department boundaries are often indefinite, but where they consist of streams and drainage divides, as is often the case (map 20), good maps would entirely clarify boundary questions.

CLUSTERED AND DISPERSED SETTLEMENTS

A distinction may be made between (1) municipios in which settlements are clustered, most of the inhabitants living in one or more hamlets, villages, or towns and going out into the surrounding country to plant their fields, and (2) dispersed settlements in

which the greater proportion of the Indians of the municipio are scattered rural dwellers who only occasionally come into their town or village, usually to trade or conduct some official business. The former is illustrated by Santiago Atitlan and other lakeside villages built on limited favorable sites (see pp. 97-126 and map 20). Since agricultural activity must be conducted chiefly upon steep surrounding slopes and people must go out from the center where they live, such settlements are centrifugal insofar as economic activity is concerned. Men of Santiago even sell their goods almost entirely in outside markets. The second type, illustrated to some degree by Solola, but much better by Chichicastenango, tends to be centripetal, in that trade and religious activities bring the scattered inhabitants into the village at frequent intervals. They take up their temporary residence often in town houses that may otherwise be unoccupied. Though few in Solola, these houses are numerous in Chichicastenango.

Tax has classified municipios in the midwestern highlands of Guatemala "according to ecological type and the composition of population" as follows: (1) "Town-nucleus" type, dispersed and close-knit varieties (corresponding with my "clustered" type), and (2) "vacant-town" type (ordinarily equivalent to what I call "dispersed"), with small-town and large-town varieties (Tax, 1937, pp. 427-429). The "vacant-town" center is defined as having "practically no permanent Indian residents," since many of them own both town and country houses, and occupy the former only on certain market and fiesta days. Those who have no town houses stay with friends on these occasions, so that there are few permanent Indian residents other than officials, who remain in town only during their terms of office.

Chichicastenango, where Tax studied intensively over a period of years, is cited by him as a typical illustration of the "vacant-town" type, with which he includes also many of the larger towns of the Highlands, even Quezaltenango. Though these towns do have many houses which are left unoccupied when the owners are tending their fields, working on Lowland fincas, or engaged in other activities that may even keep them away much of the time, there are nevertheless enough permanent Indian inhabitants (even local ones, to whom he refers) to make the "vacant-town" classification seem unsuited to them.

The phenomenon of the "vacant-town" in almost a literal sense, is well exemplified by Tenejapa, in Chiapas, a bordering Mexican State which is cul-

turally very similar to Guatemala. Except on market days, when it teems with life, this village resembles a "ghost town," having rows of vacant houses with grass even on the walks between them. Great fluctuations in town populations are very general in the Maya Indian regions of Guatemala and Mexico, especially in market towns.

Though Indians may live near the center of a town or village, more often they are to be found on the outskirts (map 21) and scattered over the surrounding country where the terrain permits. Such dispersed settlements are common in the Quezaltenango-Totonicapan region. As a general rule, Indians are more dependent upon agriculture than are Ladinos, and even traders, craftsmen, and artisans among them plant cornfields.

NUCLEATING FACTORS IN SETTLEMENTS AROUND LAKE ATITLAN

Certain salient geographical as well as purely cultural¹⁴⁷ factors encourage the agglomeration of Indians into villages and towns, some of them extremely compact, such as Santiago Atitlan (map 20; pi. 47). Site limitations, in terms of water supply as well as steepness of slope in such rugged regions as the Lake Atitlan Basin, are chiefly responsible for condensed settlements which have little "rural" population (outside of the villages).

On the other hand, in an area like the open valley between the towns of Quezaltenango and Totonicapan, or the dissected plateau region around Santa Cruz del Quiche and Chichicastenango, there are many Indian dwellings scattered widely over the countryside. These people, being agriculturists primarily, and needing space for cornfields, pastures, and woodlots, tend to spread out widely, if possible, in establishing their dwellings or minor groups of dwellings near their fields (pi. 38, a, f). Small administrative and commercial villages and towns, surrounded by far-flung rural habitations, wherein live the majority of the municipio population, represent much the commonest type of settlement in Indian Guatemala. These are the "dispersed-settlement" municipios mentioned earlier in this section.

The principal nucleating factors are: (1) Permanent water supply; (2) site or surface features

which limit settlement possibilities; (3) situation, including nearness to arable lands, markets, trade routes, and sources of supply of goods of all sorts, as well as general climatic and edaphic conditions; (4) specialized occupations, commercial, industrial or agricultural, which are supplementary to the basic milpa economy, and which may depend in turn upon certain specific advantages in the natural environment; (5) availability of remunerative employment; (6) historical precedent.

SANTIAGO ATITLAN

Santiago, the largest village (map 20; pi. 47) on Lake Atitlan, is an excellent example of a clustered-settlement municipio and illustrates the operation of the six nucleating factors.

Water supply.—The Lake is the only source of permanent water in the higher, more desirable portion of the municipio; that is, the part which is at Lake level or above, rather than in the warmer lower levels. Streams on the slopes of the three volcanic cones are intermittent, flowing only during the rainy half year, except on the lower, coastal versant, where abundant springs, many of them percolating through from the Lake, irrigate the coffee fincas. The peninsula of Santiago has a full kilometer of water frontage, greater than that of any other equal area along the shore, so that no Atiteca has far to go to fill her *tinaja*, or water jar (pi. 25, f). This availability of Lake water, then, is a critical factor in limiting the location of settlements to within a short distance from the shore.

Surface features.—The lava terrace town site, which has been described in a previous section (p. 86), presents the largest area of moderately level surface adjacent to the water, and is safe from flooding by streams or by the fluctuating Lake. This hazard of inundation exerts a major influence upon the choice of sites for the location of settlements.

Situation.—Lying in the gap between volcanoes Toliman-Atitlan and San Pedro on a natural corridor connecting the Highlands with the Pacific Lowlands, Santiago is on a major ancient trade route.¹⁴⁸

¹⁴⁷ No attempt was made to study and analyze such cultural factors as addition to alcohol and religious fiestas. Overemphasis upon these two traits by Indians of Santa Catarina Palopel was pointed out by Sol Tax (1937, p. 443) as a major reason for the small amount of land owned by the Catarinecos, since they have sold much of it to pay for their expensive indulgences. (Had their lands been abundant and productive to begin with, perhaps they would not have had to sell them.)

¹⁴⁸ One branch of the colonial Camino Real passed through Santiago, and this was an important dry-season alternate route to Mexico from Guatemala, via Lowland Soconusco. It was followed by Alonso Ponce, who found, however, that it was often impassable in rainy weather, because of swollen rivers and swamps: "One cannot go to Guatemala by that road during the rainy season, when you must go by the province of Chiapas" (op. cit., vol. 1, p. 294). The other branch, from the junction at Godines, went by Panajachel, Solola, Argueta, Totonicapan, Huehuetenango, and Chiapas, keeping to the Highlands. I had reports of remains of an old stone "highway" near Argueta, and the same year (1932) saw five well-preserved old stone bridges while mapping the ancient trail just south of Solola.

Statistical Data on Selected Municipios and Departamentos in Southwest Guatemala
(see map 20)

Departamento de Solola				Departamento de Quezaltenango (Highland: above 2,000 m.)			
Municipio	Popula- tion ¹	Area (sq. km.) ¹	Dominant language spoken by Indians *	Municipio	Popula- tion ¹	Area (sq. km.) ¹	Dominant language spoken by Indians *
Santiago Atitlán	5,775 7,675	70.9 106	Z		4,326 6,657	11 62	Q
	2,226 1,228	24.5 18.9	Z C Z		4,450 546 3,067 30,125	40 10 16 130	Q Q 0 *
	1,428 389	20.3 8			2,940 3,066 967 1,680	40 27 22.8 13.2	M M M M
Nahuala and Santa Catarina	24,525 4,368	270 32		San Miguel Sigulla			
	1,000 489	8 3.3	Z/C?	San Juan Ostuncalco (formerly			
San Pablo	1,197 944	9.5 17.5	C		10,353 3,192 3,738 1,765	100.3 23 52 51.1	M M 9 Q
loioii ?.....*	11,319 1,071	112 7.5	8	San Carlos Sija (probably one-half			
Panajachel (some territory dis- puted with Chichicastenango) ...	1,450 944	15.67 4.2	C C	San Francisco la Unión (W. of	6,100	99.3	Q
Xepec			8	Huitan (N. of Sibilia)	1,743 1,764	20.9 12.3	8
San Antonio Palopm	1,600 1,963	53 25.5	8	Cabrican	2,625	21.3	M
Total	69,401	806.7 98	C	Total	88,389	815.0	
Departamento de Totonicapán				Other areas for comparison			
Municipio	Popula- tion ¹	Area (sq. km.) ¹	Dominant language spoken by Indians *	Area	Popula- tion ¹	Area (sq. km.) ¹	Dominant language spoken by Indians *
San Cristóbal	29,970 11,448 5,271 10,654 8,043 25,704 1,197	277 40.2 13.7 130 111.6 345.7 25		Santo Tomás Chichicastenango	25,000	355	Q
				Chicacao (Depto. Suchitepequez)	12,499	193.4	Z (mostly). Q and Sp. (mostly).
				Lower			
Santa Lucía (E. of San Bar-)	1,583	49.6	Q	Upper (San Sebastián and	37,145	1,719	
Total	94,080	992.8		Lower coast (mostly Ladi-)			
				Lowland Quezaltenango (under 2,000 m.)	75,000	1,520	Sp.
				Western piedmont, Coa-			Q and Sp.
				Lower half (mostly Ladinos)			M Sp.

* Population figures are from the 1921 census.

¹ Areas of municipios computed with graph paper, from municipio plottings made in the field on maps 20 and 3, respectively.

² Linguistic data from Stoll, Sapper, Andrade, and local sources. Language symbols: C = Cakchiquel; M = Mam; Q = Quiché; Z = Zutuhii; Sp. = Spanish.

³ Included in the area for Quezaltenango.

It is a crossroad location where Lake routes and land routes converge,¹⁴⁰ giving accessibility to a great variety of products. To the north are elevated fields of wheat, vetch, beans, apples, peaches, and potatoes in abundance; gardens of onions and cold-land vegetables; wool and cotton looms; limekilns; products of potter and carpenter. To the south are Lowland sugar and coffee plantations (the Lake coffee is limited in amount, though of high quality); tropical fruits of every description, especially pineapples, zapotes, and nances; rice, cotton, cacao, salt, chile, achiote (anotto), palm flowers and leaves, fish, shrimp, caymans, and iguanas. The Lake shores furnish superior avocados, beans, oranges, limes, tomatoes, *matasanos*, sugarcane, garlic, jocotes (*Spondias* sp.), crabs, small fish, ropes, anise, and chickpeas.

In such a setting it is understandable that the Atitecos should have become middlemen and professional translake navigators on a small scale. They have fine timber in the mountains on their west, a partly shallow, sheltered bay, with numerous minor indentations, and corn lands beyond,¹⁵⁰ which most men visit only by canoe. Under these conditions, skill in handling boats is readily acquired from boyhood. The fleet of fine dugout canoes in Santiago numbered about 250 in 1936, more than 10 times those of the Santa Catarina fishermen, whereas nearly all the other villages have but 4 or 5 each. Most of the Lake canoes are made in Santiago, and a few in San Pedro, the only other place on the Lake. Twenty or 30, and during peak harvest even 80, dugouts daily break the early morning stillness of Santiago Bay, with one, sometimes two or four, white-shirted Atitecos in each, paddling briskly across from Santiago southwestward to the opposite shore a mile or so away. They arrive in about 20 minutes, and walk to their milpas on the slopes of San Pedro volcano.

For crossing the bay they employ small canoes, whose average length is $4\frac{1}{2}$ varas (12 ft.). Much larger ones are used in going across the Lake, a

9-mile trip from Santiago to Panajachel, made in about 4 hours. The gunwales of the canoes are built higher with heavy 12- to 15-inch boards that are nailed on (hence, probably a Spanish rather than pre-Columbian trait) as a protection against waves. The Lake crossing is made early in the morning (usually 4 to 8 a.m.) to avoid the heavy waves that come with the south wind, beginning about 8:30 a.m. Two large pegs extending from the stern of a canoe (part of the original log) serve as handles for lifting the boat in beaching it. There is often a handle at the prow also (pi. 24, a-e; see also Lothrop, 1929 a). The mail carriers (called *Pescadores*) of Santiago are municipal paddlers, usually four to six, who provide a daily crossing for passengers, landing in Panajachel and walking to Solola. Men, women, and children with cargoes of every description, including pigs, are thus ferried across.¹⁸¹ Their largest canoe, "La Capoj Tzutuhil," is owned by the municipio, and is the pride of the fleet; it is 33 feet long by $3\frac{1}{2}$ feet wide, and carries usually 16 passengers, in addition to 4 *Pescadores*, who were getting 8 cents (asking 10) for the crossing. The Atitecos are expert boatmen, usually the best on the Lake, and they invariably win the annual Lake Atitlan regatta. The Santa Catarina fishermen are possibly as expert as Atitecos at maneuvering small canoes, such as the ones in which they have spent so much of their time in fishing and crabbing.

Santiago village is almost in the geographic center of the best milpa lands of the upper municipio, rarely over a league and a half (though much may be steep climbing) from any of them. The largest nearly level plain, and the only such area of milpa close to Lake elevation, is that composed of alluvium from the eastern volcanoes, in the canton called "El Plan," over 4 sq. km. in extent, just south of the village. It is little over a league from the center of Santiago to the main firewood supply, across the south ridge (caldera escarpment) on the timbered Pacific slope. There is another source somewhat farther away, west of the village, across the bay, on the slopes of San Pedro volcano, and on the north face of the scarp (see map 20 and pi. 47).

"Main land routes: Trail from San Pedro and San Juan in the west; trail from Cerro de Oro, San Lucas, Patzum, Tecpin in the east; chief water route, for launches and canoes (mostly of Santiago) from Panajachel in the north, transporting some 200-300 merchants per week (especially on Saturday for Sunday coastal markets), mainly from Sololi and Chichicastenango, going to Chicacao and the fincas.

¹⁴⁰ is the combination of the last two factors which may explain why the Atitecos, and not the Luqueños (San Lucas natives), became the chief navigators and carriers, hence, the merchants of the Lake; for San Lucas, on an even easier pass route, is without the large bay and has less extensive arable lands (map 20; pi 46, i, e).

¹⁸¹ Like all the Lake dwellers except Santa Catarina men and some Pedranos, few Atitecos can swim, and the occasional upsets of small canoes in the heavy waves usually result in drownings. The American engineers (Intercontinental Railway Commission Survey, 1898, p. 81) tell of a terrific battle with a norther, which their Atitlan paddlers weathered successfully.

Explanation of Symbols and Numbers for Map of Solold (map 21)

A, Large dry goods and notions store.
 B, Bakery.
 C, Carpenter's shop.
 Cs, Coppersmith and brazier shop.
 Ba, Blacksmith shop.
 BT, Brick and tile kita
 Cf, Coffin maker's shop.
 D, Drugstore.
 Dr, Doctor's office.
 Fl, Flower store.
 G, Small home store; groceries and a few staples.
 G, Home store licensed to sell liquor (national rum).
 H, Hotel.
 Hd, Hardware store.
 L, Lawyer's office.
 M, Butcher shop.
 MC, Mill, (gasoline-driven) for grinding maize (every day but Saturday) and coffee (only on Saturday).
 MR, Marimba players' shop
 P, Barber shop.
 PA, Panela agency.
 R, Rooming house and meals.
 RI, Rooming house for Indians (floor space in corridor).
 S, Shoemaker.
 Sn, Saloon, or liquor bar.
 T, Tailor.
 TI, Ladino foot-loom weavers, of cotton textiles (especially dark-blue skirts) for Indian wear.
 T.O., Telephone and telegraph (Government) office.

1, Church of Calvario.
 2, Church of San Antonio.
 3, Municipal brick and tile kiln and storage shed.
 4, Internal Revenue office; liquor distillery.
 5, Boys' school
 6, Municipal printing shop.
 7, Boys' kindergarten (under 6 years).
 8, Public Library.
 9, Municipal floor-tile shop.
 10, Indian *municipalidad* (municipal court).
 11, Highway office.
 12, National police headquarters.
 13, Primary court.
 14, Red Cross office.
 15, Department headquarters (*Jefatura politico*) ; office of Governor (*jefe politico*), residence in inner court.
 16, Adventist (Protestant) hall.
 17, Women's prison.
 18, *Mimicipalidad* (municipal court and headquarters).
 19, Justice of the peace.
 20, Central American tower.
 21, Municipal theater.
 22, Electric power substation.
 23, Municipal square (park).
 24, Temple of Minerva.
 25, Municipal slaughter oen.
 26, Girls' school.
 27, Principal church.
 28, Church of San Bartolo.

Specialized occupations.—Chiefly for reasons outlined above, the Atitecos have become the great merchants of the Lake; their industries include rush, mat making and fishing (favored by the shallow water, warm in places, and a good growth of rushes) as well as canoe building; their agriculture is especially successful on the rich volcanic soil, with the wide altitude range prolonging the harvest period (August-January), and dry-farming methods starting it early, all of which gives them about 3 months' lead over other upland towns on the corn market. Then in particular it becomes the granary for all the west end of the Lake. I have seen canoeloads of Indians (pi. 24, c) from every village on the north-west shore, between San Pedro volcano and the Rio Quixcap, and once even from as far as Argueta, arriving daily at Santiago for the chief purpose of buying corn (this was in September and October). The growing of tomatoes and some cabbages in gardens with Lake-water irrigation is supplementary to the milpa, and a good source of income, especially

during the rainy season,¹⁵² when tomatoes are expensive.

Available employment.—Santiago is only 2 or 3 hours' walk from the heart of the coffee belt, where many Atitecos work during the harvest (September-December).

Historical precedent.—There is much archeological evidence to indicate a pre-Columbian concentration of population along the shore north and east of Santiago (Lothrop, 1933, pp. 17-71; see also map 20). It is probable that the present village site was then included in the land occupied, though perhaps it was not as densely settled as it is at present. Lothrop suggests that "their populations [San Lucas, Cerro de Oro, and Santiago] have been augmented owing to the concentration of suburban residents under missionary influence" (*ibid.*, p. 18). There is no vestige today of the old colonial governmental and religious forces of the *reducciones* through which,

¹⁵²They may be as high as 10 cents a pound during the late rainy season (September-October), and drop to 1/5 cent during Holy Week (March or April).

after the Conquest, the Indians were gathered into towns.¹⁸⁸ The fine old church at Santiago is even without a resident priest; he comes from Solola to minister during fiestas. The settlements of San Lucas and Cerro de Oro (in the municipio of Santiago) are much smaller and more scattered than the village of Santiago. Natural advantages in setting as described above probably account for the greater growth and development of the latter village.

The Atitecos are the most impressive cultural unit on the Lake. Their municipio and village are the largest among the Lake-shore settlements, having the only big daily market¹⁵⁴ in the region, and it is the only one regularly attended by Indians from seven shore communities (western half of the Lake, including Cerro de Oro). Santiago merchants are almost without competition in their particular line; the men carrying special products in quantity between Highland and Lowland markets, the women dealing in local produce, on a small scale, in their own market (see p. 82, fn. 116). Their leadership in navigation, their significance as a corn-producing center, and their industries, though relatively minor, have already been mentioned.

It is for these reasons, as well as for obvious environmental relationships, that I have taken up the physical analysis of this community in more detail than any of the others.

¹⁸⁸The Cakchiquel historian (Xahila) wrote: "One hundred and six days after they had really begun to teach us the word of God, then they commenced to gather together the houses in groups, by order of the ruler, Juan Roser, and the people came forth from their caves and ravines" (Brinton, 1885, p. 191).

One of the best discussions of the *reducciones* and town-building activities brought about by the Conquest is to be found in the *Memorias* of García Pelaez, drawing upon the earlier writings of Remesal, Las Casas, Herrera, Vazquez, and others. "By decree of June 10, [1540], sent to the governor and to the bishop of Guatemala, they took charge of the consolidation of small communities into towns, at the same time exempting the Indians from tribute for a year or more. . . . the towns of Comalapa, Solola, Alotenango, Quezaltenango, Totonicapán, and others, [like] San Antonio, San Bartolomé, San Miguel, Chalcucua, San Pedro Xocopila, and Cunen, all . . . were formed from many small towns, and where most were brought together was in San Andrea. . . .

"The procedure followed in moving the towns was this. First, the chiefs and elders looked over and evaluated the new site, and if any of the elders cared to group others with him, this was done. To begin with, the milpas were planted next to the new town-site. While the corn grew and matured, they built their houses; the grain dried, and when the fields were ready for harvesting, on an appointed day every one moved to the new place, with much dancing and festivals which lasted several days in order to make it the home for the people forget their old homes" (García Pelaez, 1851-52, vol. 1, pp. 173-174).

¹⁵⁴It expands on Saturdays and Mondays as it feels the pulse of trade between the Highlands (Solola, Friday and Tuesday) and the Lowlands (towns and fincas, Saturday night, Sunday and Thursday; see p. 82, fn. 116, and map 19).

SAN LUCAS, SAN PEDRO, AND SAN JUAN

Of the other south shore villages with settings somewhat similar to that of Santiago (map 20; pis. 45, a; 46, d, e, f), the following generalizations with regard to nucleating factors may be made.

Water Supply.—All of them lack permanent streams and depend upon Lake water; hence all of necessity have a littoral location.

Surface features*—They are built upon small lava-flow terrace sites, for the most part 10 to 40 m. (33 to 131 ft.) above the Lake (to escape inundation by rising Lake water as well as by swollen streams; p. 120), and from one-fourth to three-fourths of a square kilometer in area, these being in some cases, as at San Pedro, the largest available in the vicinity. Alluvial surfaces are generally avoided for home sites, not, I think, to keep them clear for crops, as suggested by both Atwood (1933, p. 66) and Lothrop (1933, pp. 17, 70), whose studies were made in the dry season, but rather for the more compelling reason of escaping the rain-flood hazard. During my September-October stay in Santiago, I saw such small gullies as Xechiboy (south edge of Santiago) fill and overflow quickly after a hard shower. Such rains, common from May through October, endanger much of the alluvial land either through flooding or isolating it from the villages.

Situation.—They are located on or near trade-route nodes or intersections (San Lucas is favored most in this regard, and San Pedro¹⁵⁵ and San Juan least) and almost equidistant from Solola and from Lowland markets (the two western centers are favored least also in the latter respect).

Specialized occupations.—San Pedro and fewer San Juan inhabitants are active traders, though they have no home market; they make rope, soap, and some stick-loom textiles, while they engage also in diversified agriculture, with a specialty in chickpeas (see pp. 28, 76), whereas San Lucas depends more upon its coffee (pi. 46, e).

Available employment.—Though Pedranos and Juaneros seldom seek employment on coffee plantations (San Pedro has its own Lowland colony of Cutzan), many San Lucas Indians work part of the year on Lowland fincas.

¹⁵⁵Though they use canoe* in traveling to Santiago and Solola (as far as Jaibal), Pedranos depend more upon land travel than do Atitecos. It is probably for this reason that so many of the Pedranos employ mules in trade journeys, while the latter use them almost solely for local burden bearing. The "Ladino" tendencies of the Pedranos, reported to have much white blood, and looking as if they did, may have something to do with this also, however.

Historical precedent.—All are said by Lothrop (1933, p. 100) to be pre-Conquest towns, including San Pedro and San Juan, but if this is so the last two named were probably not situated as they are today. Vazquez in the 18th century refers to the former as "San Pedro de la Laguna,"¹⁵⁶ Neither one has an Indian name. No mention of San Juan appears in the several 16th-century tribute lists and manuscripts which I have examined, and the earliest reference to San Pedro which has come to my attention is the 1579 account of (Japolitlan (Anon., Ms. 1579, p. 23, f. 116). San Juan is cited by Fuentesy Guzman (1932-33, vol. 2, opposite p. 60), whose map of the Lake (ca. 1685) shows them both.

Cerro de Oro (pi. 46, /), a small *aldea* of Santiago, which has been omitted from much of this discussion, is made up largely of recent immigrants from Patzicia. They retain most of the cultural characteristics of their former home locality, and their costume includes elements typical of both places (pi. -7, «).

NORTH SHORE VILLAGES

Just as there is an environmental similarity among the south shore villages, so those of the north side have many common elements in the physical setting (map 20; pis. 45, *b c, d, e, f*; 46, *a, b, c*). In several respects there is a marked contrast between the two shores: the southern villages generally have an abundance of fertile land, but not of running water, because of the volcanic cones, down which streams flow only during the rainy season; the northern ones are very poor in arable land, but numerous mountain streams tumble from the cliffs at their backs, and flow by the villages to the Lake.

There is a physical division and distinction between the northeastern and northwestern Lake settlements; Panajachel, lying between the two groups, is fundamentally different from them all, and falls mainly into the garden-culture area of Solola. Though all but San Antonio have very little agricultural land, and all but Santa Catarina get their water from streams piped to *pilas*,¹⁵⁷ there is a major

difference in the matter of isolation. This factor is seen in the northwest shore villages to a degree not exceeded anywhere in Guatemala, if their horizontal proximity to neighboring settlements is also considered. Often they are only a league ($2\frac{1}{2}$ miles, or 4 km.) removed, on the map, from a market town (e.g., Santa Cruz to Solola, San Marcos and San Pablo to Santa Clara and Santa Lucia, etc.). Yet high, precipitous ridges rise as much as 800 to 1,000 m. in between. This does not prevent the Indians from attending those plazas weekly and in considerable numbers, but it does tend to discourage free intercommunication.¹⁵⁸ High promontories separate the shore villages one from the other, each secluded in its own arroyo (pi. 45, *b-e*).

East of Santa Cruz, cliffs are especially high, where it appears that fault blocks slumped into the caldera. The ridge of Santa Cruz village itself is probably a fault block of this sort (pi. 45, *e*). Farther east, the deep gorge of the Rio Quixcap (pi. 45, *f*), which floods during the rainy season, presents such a barrier that the land route between Santa Cruz and Panajachel goes by way of Solola, following the road from San Jose. Southeast of San Pedro village the trail ends on the steep slopes of volcano San Pedro. Those, then, are the two big interruptions in land communication. A circuitous trail or path connects Santiago with Panajachel, around the south and east shores of the Lake (pi. 23, *a*), and another path connects San Pedro with Santa Cruz along the west and northwest shores (see map * 20). The trail around the Lake never dips below the level which I estimated as the late 19th-century high-water line, though it frequently runs just at that level.

The northeast shore villages are shut in by equally precipitous, though generally less elevated walls (pi. 46, *b, c*). Certain linguistic variations here, probably due in part to seclusion, have been cited. I noted little difference in this regard between northeast and northwest, despite the greater isolation of the latter. Ladinos are virtually absent from all

¹⁵⁶ Iquez, 1937-38, p. 171; see also p. 104, fn. 162.

¹⁵⁷ A *pila* is a watering place (pi. 38, *e*), usually supplied through an iron pipe, which is directed, in the more advanced settlements, into a cement tank, frequently ornamented with more or less artistic statuary. The most primitive system of all I saw was at San Marcos (la Laguna), where the conduit consists of maguey (agave) flower stalks, cut in half and bound end to end. I was told there were some 900 of these stalks, making a 2-kilometer watercourse, which must be renewed annually. The old *pita* and iron pipe were assertedly stopped up 4 years previously. A spring was diverted through a pipe of bamboo, in the Lowland village of San Pedro Cutxan. (For discussion of the Solola water-supply system, see McBryde, 1933, pp. 65-66; also map 21.)

¹⁵⁸ Though these villages have no markets, buyers come occasionally, nevertheless. While in San Pablo, in October 1936, I saw four men from San Andres Xecul, there to buy ropes, nets, and other maguey products. I was told that traders come rather often from San Andres, and from Totonicapan and elsewhere in that region, for cordage, since Pablefios do not go there to sell. Rope goes to the Quezaltenango-Totonicapan region from the Cohan area, however. An old resident of Chichicastenango told me that he saw, in 1896, Indians from the latter town and from Totonicapan trading pottery for much-prized jocotes (for which the north shore is noted), giving • clay jar in exchange for the fruit it would hold. This kept both in proportion to their value, a larger jar being worth more jocotes.

north, shore villages except Panajachel (the only one on a much-used road). From all except Panajachel, men go in considerable numbers to the coffee fincas for seasonal labor, often getting corn as part payment; many native north shore Indians have permanently settled in the Lowlands. The only north shore village which is known to be of pre-Columbian origin is San Antonio. Even the site is in all likelihood pre-Spanish, for Fuentes y Guzman's late 17th-century map (1932-33, vol. 2, opposite page 60) shows "Polopo"; Santa Catarina Laguna (not Palopo) is the next village north on this map.¹⁵⁹ It is probable that all the rest, with the possible exception of San Pablo,¹⁶⁰ were concerned, after the Conquest, though apparently there were scattered settlements of some sort along the shores. There is historical evidence regarding the establishment, of at least three of these. The *Cakchiquel Annals* (Brinton, 1885, pp. 113, 175), in pre-Spanish sections, refers to Tzununa, Tzolola, Ahachel, Pacaval, and Xepoyom as Lake Atitlan centers.

These may have corresponded, respectively, to the modern Tzununa, Solola (Brinton, 1885, p. 54, erroneously identifies Tzolola as Santiago Atitlan), Panajachel, Pacavaj, and Chupiom (see map 20; cf. also Brasseur de Bourbourg, 1858, vol. 2, p. 172). Lothrop (1933, p. 71) suggests that the present Pavocol was Pacaval, but as there is a Pacavaj (Lothrop, 1933, map, p. 17, records it as Pachinak, but "Pacavaj" is indicated on the official municipio map) just north of Santiago, this is where I think the ancient Pacaval was situated.

ROPEMAKING CENTERS: SAN PEDRO AND SAN PABLO

Economic pursuits of the northwestern Lake villages, in the small, rugged municipios of San Pablo, San Marcos, and Santa Cruz, reflect environmental conditions. At San Pablo, for example, as at San Pedro, across the Lake to the south, ropemaking is an important industry (pi. 26, b-e, and p. 69). It is

more significant in the economy of the former, however, and is conducted on a relatively larger scale there, apparently because of a greater need for supplementing deficient returns from agriculture.

San Pedro has extensive milpa land on the volcano slopes, and furthermore has bought or rented some two-thirds, I was told, of adjacent San Juan's territory (pi. 45, a). San Pablo, on the other hand, is hemmed in by mountain walls (pi. 45, b), and Pablenos must even buy corn from the villages across the Lake (Santiago and San Pedro). At first glance it seems quite paradoxical that, though San Pablo is the village most dependent upon the making of ropes, the finest maguey (agave) grows in luxuriant abundance around San Pedro.¹⁶¹ It was said that the natural supply had been supplemented by planting during the past 50 years, and much agave is now planted. There were repeated statements that Pablenos have made every effort to get such results on their own lands by transplanting shoots from San Pedro. But for some reason, perhaps a deficiency in the soil, which undoubtedly is less fertile than the volcanic lands of the latter municipio, results have never been satisfactory, and their home-grown products never so large. I have seen men from San Pablo almost daily load their canoes with maguey leaves that they had purchased from Pedranos, 50 or 100 at a time. i

San Pablo has 8 sq. km., largely cliff and flood-swept arroyo, less than one-third of San Pedro's 24.5 sq. km., mostly fertile volcanic slopes, which have such an altitude range as to permit maize harvests from December to March. San Pedro, furthermore, has only 2.2 times the population of San Pablo (2,226 as compared with 1,000) in spite of having over 3 times its area, not including, extensive San Juan lands used by Pedranos. San Pedro also has its colony of Cutzan, where corn and other crops are grown, and ropes are made.

That the Pedranos have a maize surplus was brought home to me when, in 1936, I saw Indians of San Marcos, in canoes and on foot, buying the grain in quantity at San Pedro, and they told me such visits were frequent. This was early in January, and probably preceded the general harvest. Otherwise, that this should occur during the main harvest month indicates, indeed, a shortage at San Marcos, smallest in area of all the Lake municipios. How much of this

¹⁵⁹ A frontier outpost of the Zutuhiles, and one of the three lake towns frequently mentioned in the earliest literature; the others were Tuliman (there were Tollman alto and Tollman vaxo, according to Anon., Ms. 1579, f. 109) and the "capital of the Tzutuhiles" Atitlan or Atitan, as the Mexicans with Alvarado called it. This may have been Atziquinihai (Lothrop, 1933, p. 14, ftn. 6, and Fuentes y Guzman, 1882-83, vol. 1, p. 21), though usually this name was applied to the "king" or chief of the Zutuhiles (Anon., Ms. 1571, f. 115, or Brinton, 1885, pp. 119, 123, ff.).

¹⁶⁰ Mentioned as early as 1579 in Capotitun manuscript (1579, p. 23, * 116). That it was already back from the Lake about 1700 is implied by Vazquez: "From San Pablo, taking a turn to the lake, one begins there to go towards the east . . ." (Vazquez, 1937-38, p. 171).

¹⁶¹ I have measured *pengas* (leaves) 9 feet long, the longest I saw anywhere in Guatemala. These large leaves provide excellent long fibers for ropes (pi. 26, d).

maize was local and how much bought at Santiago for resale, I could not determine. One Friday in April 1932, I saw a dozen Pedranos selling maize in the Solola market. They also buy maize, however, at Santiago, mainly when their supply runs low, just preceding the harvest at San Pedro. Their lean months are from August to November, during which time, while I was there in 1936, they were coming to Santiago at the rate of from 50 to 75 a week, and though some sold black beans and a few ropes, their main interest, as in the case of all the west Lake villagers, seemed to be in buying corn. I was told that the Pedranos resold much of it at a profit (price increased from 1 cent per pound to 1% cents).

Canoes are made at San Pedro; though not on a scale comparable with Santiago's production; they have a good soap industry, based upon fat from pigs of Lowland Cutzan (there were four or five San Pedro soap vendors every Friday in the Solola market during the summer of 1936) and their income is augmented handsomely from March to May, particularly during Lent, when far and wide they market their chickpeas, in which they have long specialized.¹⁶² I have seen them in Retalhuleu (two men with six mules on one occasion), in Quezaltenango (nine men one day), in Totonicapan and other equally distant plazas, their product much in demand for making *dukes* (especially jelly and preserves). They are widely noted also for their black beans^{es} which, together with a few avocados, they sell in quantity along the piedmont. Pedranos burn castor oil on the altar. The castor plant, which is widely found as a weed in Guatemala, is especially abundant at San Pedro, where it is sometimes planted.

Two other minor money crops are tomatoes, watered with jars carried from the Lake (I have seen San Pedro tomatoes sold in Solola and as far away as Quezaltenango), and peanuts, selling in quantity in Santiago, October 1936. The latter crop was said to be an innovation, started in 1926. The Pedranos are credited with introducing the *jaspe* (tie-dye) style among the Lake villages, men of San Juan taking it up (in trousers), and, to a lesser extent, San Pablo also. Weaving "*jaspeado*" cloth for sale to Indians and tourists is a profitable occupation among the women. They even weave Santiago costume

** "Produces . . . the best chickpeas of the Kingdom in the town of la Laguna and its dependencies . . ." (Anon., Ms. 1778, p. 16, f. 235).

¹²⁵The lame of Lake beans is traditional. Vieques (1937-38, p. 172) mentions sale of them in many markets, especially on the coast, "provincia de Suchitepeques."

EXPLANATION OF SYMBOLS FOR SOLOLA FRIDAY MARKET DIAGRAM
(MAP 28)

Provenience of vendors	Probable average number of vendors at vendors in ordinary Friday market
T Aguasta	100-125
A Atitlán (Santiago)	10-25
Ⓐ Cerro de Oro	Under 10
C Chichicastenango (Santo Tomás)	200-250
N Nebulá	10-25
P Panajachel	50-100
Q Quetzaltenango	Under 10
+ Sacapulas	Under 10
▽ San Andrés Semetabaj	10-25
◊ San Antonio Palopó	10-25
◇ San Francisco el Alto	Under 10
< San Jorge	50-100
(San Marcos la Laguna	Under 10)
⊗ San Pablo la Laguna	Under 10
△ San Pedro la Laguna	Under 10
□ Santa Catarina Palopó	10-25
(Santa Clara la Laguna	Under 10)
✕ Santa Cruz la Laguna (including Totunna)	50-100
■ Santa Lucía Atitlán	50-100
(Santa María Chiquimula	Under 10)
S Sololá	300-350
San José Chacará	100-125
Unconquered	100-125
T Totonicapán	10-25

Note: The total number of vendors was approximately 1,325 (about 1,000 from other municipios and 325 local). The numbers given in the tabulation are higher than those on the actual diagram, which required 3 hours to make, during the peak of the market (10:30 a. m.-1:30 p. m.); during this interval some new vendors came and some left (usually beginning 1 p. m.). A square drawn around a letter means vendor is under canvas shelter. Towns in parentheses not represented on this Friday; occasional, "w" by a symbol indicates vendor is a woman. Always read facing vendors. Read "maize" for "corn," "rush" for "reed," and "*limas*" (sweet limes) for "limes."

material and sell it to Atitecos in the Santiago market. This particular type of enterprise is probably unique in Guatemala.

Pedranos often take their goods to markets on mules, of which they have several hundred in the municipio. Ropemaking to the Pedranos is but one of a number of diversified economic pursuits, and is engaged in probably only because of the unusually fine agave which is readily available. To the Pableños, on the other hand, with so little opportunity in agriculture or industry, this craft is important enough for them to go to San Pedro and buy agave leaves. In the Solola and Santiago markets there are almost

ITEMIZED LIST OF VENDORS AND GOODS IN SOLOLA MARKET¹

FRIDAY MARKET, APRIL IS, 1932

(See map 22)

oe 1 (E.-W.):

3, Solola	Corn leaves (fodder)
1 w, Totonicapan	Small pottery
2, Totonicapan	Large pottery
1, San Antonio Palopo	Pig (live)
1, Quezaltenango	Candles
8 w, Solola	Pork (all parts of pig)
2, Solola (Ladinos)	Do.
1 w, Solola	<i>Limas</i>
1, Solola	Handkerchiefs, cloths, shirts, cups, mirrors, seeds, spices, herb medicines, cigars, tinware, machetes, axheads, etc.
2, Totonicapan	Furniture, especially chairs, tables, beds, and decorated chests.
4, San Pedro	Maize"
4, Solola	Maize
3 w, Solola	Maize, spinach, turnips, eggs
2, Argueta	Maize
1 w, Argueta	Do.
2, San Andres Semetabaj	Do.
1, Chichicastenango	Do.
1, Solola	Red beans (kidney)
1, San Antonio	Maize
1, Solola	<i>Piloy</i> (large kidney beans)
1 w, Solola	Maize
1, and 1 w, Chichicastenango	Do.
2 w, Solola	Do.
1, and 1 w, Chichicastenango	Do.
2 w, Solola	Do.
3 w, Solola	Black beans (kidney)
2 w, Solola	Maize
1 w, Santa Lucia Utatlan	Do.
1, Solola	Do.
1, San Pedro	Do.
1, Solola	Maize and black beans (kidney)
1, San Pedro	Maize
1 w, San Andres	White beans (kidney)
1 w, Panajachel	Maize
1, Panajachel	Do.
1, Solola	White beans (kidney)
1, San Andres	Maize
1, Chichicastenango	Do.
1, Solola	Do.
1, and 1 w, San Andres	Do.
1, San Antonio	Do.
1, Solola	Do.
2 w, Solola	Maize, eggs, turkeys (4)
1 w, Solola	Black beans (kidney) and eggs
1 w, Argueta	Toasted <i>kabas</i> and hen
1 w, Solola	Squash seeds
Do	Maize
1 w, Santa Lucia	Maize, eggs, black beans
1 w, Solola	Maize, carina(?) leaves (for wrapping), turnips
3 w, Solola	Maize

¹ w ss woman; Sololi = Soldi, San Joe' Chacayi, or ConcepcuSn.

•All maize in market sold as grain, by the pound; mostly white and yellow, colors separated.

Line 1 (E.-W.)—Continued

1 w, Sololi	Black beans
Do	Red beans
Do	Maize
Do	Black and red beans, hens
1 w, San Andres	Maize
1 w, Solola	Eggs (about 2 dozen)
Do	Hens (5)
Do	Eggs
Do	Marigolds
Do	Hens
Do	Greens (Chipilin), turkey
Do	Flowers and corn
Do	Turkeys and hens
3 w, Solola	Hens
1, Argueta	Roundish leaves (<i>canac</i>) for wrapping
1, Chichicastenango	Small pigs (15)

Line 2:

3 Chichicastenango, 1 Solold, 1 San Andres	Maize

line 3 (E.-W.):

2, San Pedro	Maize
2, San Andres	Do.
1, Solola	Do.
3, San Pedro	Do.
1 w, Solola	Eggs
1, Solola	Maize
1, Chichicastenango	Do.
1, Solola	<i>Canac</i> leaves for wrapping
1, San Andres	Maize
1, Solola	Do.
1, Chichicastenango	Do.
1, and 1 w, Solold	Do.
2, Chichicastenango	Do.
3 w, Solola	Maize and eggs
1, Solola	Maize
1, Chichicastenango	!3o.
2 w, Chichicastenango	Maize, eggs, <i>ocote</i>
1 w, Sololi	Maize and maize fodder
Do	Maize
1, Solola	Maize and black beans
1 w, Solola	Maize, <i>granadillas</i> , maize husks (for tamales), greens.
9, San Francisco el Alto	Quicklime
7, Chichicastenango	Do.
14 w, Solola	Hens and eggs
2 w, Panajachel	Tomatoes
1, Nahuala	Chickens
1, Chichicastenango	Turkeys
1 w, Chichicastenango	Hens
3, Chichicastenango	Small pigs (40, total)
3, Totonicapan	(Barbers)

line 4 (E.-W.):

1 w, Solola	Radishes
1, Solola	Maize
1 w, Solola	Coffee (unroasted), red flowers, peas
3 w, Solola	<i>Atol</i>
1 w, Solola	Flowers (white and red), eggs
4, Argueta	Maize (10 sacks), mostly white

Line 4 (E.-W.)—Continued

1 w,	Solola	Atol
1 w, Argueta		Ocote
2 w, and 3, Chichicastenango		Maize (white, yellow, black), eggs, white beans.
1, Chichicastenango		Maize (yellow and black), bread
2, Chichicastenango		Maize
1 w, Solola		Habas (toasted), eggs
Do		Black beans
Do		Maize
Do		Habas (toasted), eggs
Do		Coffee (unroasted), eggs
Do		Maize
2, San Antonio		Maize, black beans
1, Solola		Maize
Do		Piloy (butter beans), eggs, maize
Do		Maize and cabbages
1, Chichicastenango (itinerant merchant)		Dried shrimp, spices, cigars, incense, threads, needles, matches, herb medicines, etc.
1, Solola		Ocote, large cargo (80 lb. ?)
1 w, Solola		Maize and ocote
2, Chichicastenango		Bread
1, and 1 w, Chichicastenango		Maize
1 w, Solola		Bananas, eggs, maize
Do		Limas
1 w, Argueta		Potatoes
1 w, Solola		Onions and Bananas
Do		Bananas*
Do		Maize, black beans
Do		Maize, ocote
Do		Peaches, eggs
Do		Maize
Do		Onions
1 w, Argueta ;		Black beans
Do		Habas (toasted)
1, Chichicastenango		Maize and black beans
2 w, Argueta		Black beans, squash seeds
1, Argueta		Black beans
1 w, Argueta		Ocote
2 w, Argueta		Habas (green), squash seeds, eggs
1, Chichicastenango		Maize
1 w, Argueta		Piloy (large kidney beans), red beans, eggs.
Do		Black and white beans, eggs, squash seeds
Do		Black beans and eggs
1 w, Solola		Squashes
1 w, Argueta		Habas (green), black beans
1, Argueta		Maize, red beans
1 w, Argueta		Beets, cabbages
2 w, Argueta		Small, thin-wood boxes with rounded ends, like U. S. fruit boxes; bright colored designs.
1 w, Argueta		Black and red beans, green habas
Do		Small pigs (4), pinol, black beans
1 w, Solola		Atol and 1 hen
1, Solola		Ocote

Line 5 (E.-W.):

1 w, Solola	Eggs, black beans, squash seeds
2 w, Solola	Maize
2 w, Argueta	Black beans, peas, habas (toasted)
1 w, Solola	Maize
Do	Maize, black beans

* Lowland products are sold by women in families of Solola vegetable merchants who sell in Lowland markets.

Line 5 (E.-W.)—Continued

1, Chicfaicattenango	Maize <i>piloy</i> (large kidney beans)
1 w, Argueta	Maize, peas, black beans
1, Argueta	Potatoes, toasted <i>habas</i>
4, Chichicastenango	Maize

Line 6 (E.-W.):

13, and 15 w, Santa Lucia	Bread
1, Solola (Ladlna)	Candy and soft drinks (sweetened, colored water), table.
1 w, Solola	Boiled potatoes
1 w, Solola	Black beans and bananas
1, Argueta	Potatoes
1, Solola	Black beans
1 w, and 1, Solola	Potatoes
2, Argueta	Do.
1 w, Argueta	<i>Habas</i> (green)
Do	Potatoes
2 w, Solola	<i>Guisquies</i> , eggs, mint leaves
1 w, Panajachel	Oranges
1 w, Solola	Oranges, bananas, <i>limas</i>
Do	Pepinos, <i>ocote</i>
Do	<i>Mamanilla</i> (camomile?), a medicinal asteraceous herb.
1, Solola	Potatoes
1, Argueta	Soap and avocados
1 w, Solola	<i>Matasanos</i> , <i>guisquies</i> , <i>miltomates</i> (groundcherry), eggs.
4, Solola	Onions, <i>miltomates</i> , <i>habas</i> (green)
1, Solola	Flowers, radishes, eggs, <i>canoe</i> leaves for wrapping.
2 w, San Andres	Black beans, avocados, maize
1 w, Solola	Oranges, eggs, <i>miltomates</i>
2, Argueta	Avocados, <i>piloy</i> (large kidney beans), maize.

Animal market (upper left-hand corner of diagram) :

2, Chichicastenango	Little pigs (about 10 each)
2, Argueta	Black sheep (8)
1, Solola	Sheep (4), half-grown pigs (8)
Do	Sheep (5, black and white)
1, Argueta	Dog (1), goat (1), sheep (4)
1, Solola	Black sheep (2)
Do	Large pig
Do	Goats (3)
Do	Goats (12)

Line 7 (N.-S.):

1 w, Solola	Pig (half-grown)
Do	Lettuce, beets, flowers (red and white)
2, Solola	Avocados and turnips
2 w, Solola	Avocados and <i>habas</i> (green)
1, Solola	Avocados and onions
1 w, Solola	Flowers, onions, lettuce
1 w, Solola	Peas, onions
1 w, and 1, Solola	Onions, flowers
1, Santa Lucia	<i>Suyacales</i>

Line 8 (N.-S.):

2 w, Solola	Carrots, onions, cauliflowers
1 w, Solola	Flowers (white and red)
1, Solola	Lettuce and flowers (white and red)
2 w, Solola	Onions and red flowers
5, Solola	Onions
3 w, Solola	Do.

Line9(N.-S.):

5, Solola	Onions (1 with cabbages also)
10 w, Solola	Lettuce, onions, flowers, <i>canac</i> leaves, peas, cabbages, beets, avocados.
3, Panajachel	Onions, flowers, avocados

Line 10:

- 10, Totonicapan.....Semiglaze pottery

Line 11:

- 8 w, and 6, Solola Mainly onions; also (women) beets, *mltomates*, *ocote*, onion seeds, flowers, cabbages, carrots, turnips, *granadiUas*; (men) cabbages, and chiles (1).

Line 12 (N.-S.) :

13 w, and 10, Solold	Onions and garlic
5, Panajachel	Onions and garlic (some cabbages, carrots, turnips, etc.)
2 w, Solola	Black beans and eggs
3 w, Panajachel	Black beans, eggs
7, Chichicastenango	Jocopilas jars and <i>comales</i>
1 w, Argueta	Semiglaze pottery
1, Argueta	Chinaulta <i>tinajas</i> (decorated)

Line 13 (N.-S.):

24 w, and 10, Solola	Onions and other vegetables as in Line 11
4, Santa Cruz	Sugarcane, oranges, tomatoes, bananas

Line 14 (N.-S.) :

1, Santa Cruz	Oranges and <i>limas</i>
1, Solola	Eggs
1, Solola	Onions
7, Santa Cruz	Oranges and <i>limas</i>
2 w, Solola	Green beans
1, Santa Cruz	Hen
1, and 1 w, Solola	Black beans
1 w, Santa Cruz	Do.
2, and 1 w, Solola	Onions and garlic
1, Chichicastenango	Black beans
6 w, Solola	Onions, beets, carrots, and other vegetables.

Line 15:

- 26 w, and 11, Solola Onions, flowers, *mltomates*, peas, lettuce, greens, *granadiUas*,
avocados, eggs.

Line 16 (N.-S.) :

27, and 24 w, Solola	Onions, onion seeds, beets, peas, flowers, <i>mtltomates</i> , maize, <i>habas</i> (green).
4, Panajachel	Tomatoes, garlic, bananas, chile, onions.

Line 17 (N.-S.) :

3, and 6 w, Solola	Onions and flowers
4 w, and 1, Chichicastenango	Plantains, bananas
4, Santa Cruz	Bananas
16 w, Solola	Flowers, vegetables, bananas, <i>limas</i> .

Line 18 (N.-S.):

1 w, Solola	Onions
1, Argueta	<i>Injertos</i> , green beans
7, and 1 w, Chichicastenango	Bananas, plantains, cojol palm fruits, <i>injertos</i> , <i>epotes</i> , <i>caimito</i> .

Line 18 (N.-S.)—Continued

- 8, Chichicastenango Chiles, salt, coffee (unroasted) rice, cotton (white and **brown**),
limas, *coyol* palm fruit, *paxtes* (gourd sponges), *hiff-*
 3 w, Solola *Limas*, *miltomates*, avocados, onions, cabbages, flowers
 1, Solola Onions
 1 w, Solola Flowers
 Do. Avocados
 1, Argucta Eggs
 Do. Candlesticks, toy dishes and whistles of glazed pottery.

Line 19 (N.-S.):

- 5, **and** 7 w, Solola Onions, vegetables, flowers, etc. (see line 11).
 14, Chichicastenango Chile, salt, plantains, *pataxes*, spices, *limas*, *giisquiles*
 2, and 7 w, Solola Onions, avacados, flowers, beans, cabbages, etc.

Line 20 (N.-S.):

- 9 w, and 2, Solola Onions, radishes, carrots and other vegetables, flowers.
 2 w, Argucta Small pottery, toys, spices, seeds
 3, Chichicastenango Salt (Tahuesco via Mazatenango)
 1 w, Santa Lucia Flowers
 2, Solola Pepinos (from Panajachel)
 4, Chichicastenango Salt (Tahuesco via Mazatenango)
 13, Santa Cruz Bananas, *limas*, oranges, tomatoes
 2 w, Argucta Do.

Line 21:

- 12 w, Solola, 1 w, Panajachel Onions and beets

Line 22:

- 4, Chichicastenango Salt and brown cotton

Line 23 (N.-S.):

- 7, and 2 w, Santa Lucia Salt (1 also with spices, cigars, etc.—see Line 4).
 2 w, Solola Avocados
 1, Solola Onions

Line 24 (N.-S.):

- 9, Chichicastenango Dried chiles, especially "chocolate"
 2 w, Santa Cruz Oranges
 1 w, and 2, Santa Cruz Bananas

Line 25 (N.-S.):

- 12 w, Solola *Atol*, beans, *ocote*, peas
 2 w, Panajachel Green beans, *ocote*
 1, San Antonio Palapd Anise

Line 26 (N.-S.):

- 5 w, San Jorge Flowers, tomatoes
 2 w, Panajachel Green beans
 2, and 1 w, San Antonio Anise

Line 27 (N.-S.):

- 2, Santa Cruz *Limas* and bananas
 1 w, Solola Peas, eggs
 6, Santa Cruz Oranges, *limas*, tomatoes

Line 28:

- 7, Chichicastenango Dried chiles (especially "chocolate")

Line 29 (Vv>E.):

- 2, Solold (Ladina) Soft drinks (bright-colored, sweetened water), cakes (table).
 2, Chichicastenango Annatto, chiles, peanuts, cigars, cracklings, cotton (white and brown).
 1 w, Solold Cracklings, peanuts, chiles
 2, Chichicastenango Annatto, chiles, peanuts, cigars, cracklings, cotton (white and brown).
 4, Chichicastenango Chiles, salt, spices, annatto, cotton, cigars, seeds, herb medicines
 1 w, and 2, Argueta *Tinajas* (Chinaulta) and cracklings
 2, Totonican Dried shrimp, coffee (unroasted), hats, ropes, *zapotes*.
 2, Chichicastenango Do.

Line 30:

- 12, Chichicastenango Chile (dried), coffee (unroasted), annatto, cotton, cracklings;
 4 of them also with cloth goods, thread, spices, seeds, herbs.

Line 31 (N.-S.):

- 1, Chichicastenango Coffee (unroasted)
 1, Solold Cracklings
 3, Solola Onions
 9 w, Solold *Miltomates*, onions, squash seeds, *matasanos*, avocados, *caibas*.
 1 w, Panajachel Onions, *matasanos*, avocados

Line 32 (N.-S.):

- 5 w, Argueta Avocados, green beans, potatoes, toasted *habas*.
 1, Argueta Cracklings
 1 w, Solola Avocados
 1 w, Panajachel *Injertos*
 1 w, Argueta Pottery
 3 w, Solola Oranges and bananas

Line 33 (N.-S.):

- 1, Panajachel Garlic
 1 w, Solold Cracklings and *limas*
 1 w, Argueta Squash seeds, toasted *habas*
 2 w, Argueta Cigars, matches, spices, tinware, cinnamon bark, pottery (small glazed bowls, cups, candlesticks, whistles, toys), thin-wood decorated boxes.
 1 w, Solola Tomatoes, chiles
 2, Panajachel *Injertos*
 3, Solold Onions

Line 34 (N.-S.):

- 1 w, San Jorge Panela, *injertos*
 1 w, Solold *Atol*
 3 w, Solold Bananas, sweetpotatoes
 1, Argueta Cigars, etc. (see Line 33)
 5 w, Solold *Ocote*, bananas
 3 w, Solold *Atol*
 1 w, Solold *Miltomates*, cabbages
 3, Chichicastenango Agave fiber
 1, Solold Oranges

Line 35 (N.-S.):

- 1, Argueta Cracklings
 1 w, Solold White beans
 1, and 3 w, Argueta Plantains, *limas*, toasted *habas*
 4 w, Solold *Atol*

Line 35 (N.-S.)- Continued

2 w, Solola	Limas, garlic, vegetables, bananas
6, and 1 w, Santa Cruz	Bananas, <i>granadUlas</i> , tomatoes, oranges, small fish on grass stems.

Line 36 (N.-S.):

1 w, Solola	Panela
2, Atitlan	Chile
5, Santa Cruz	Oranges
8 w, Solola	Maize, flowers, vegetables, chile, small fish on grass stems.

Line 37 (N.-S.):

2, Santa Cruz	Oranges, <i>limas</i>
11 w, and 1, Solola	Coffee (roasted and ground), flowers, eggs, beans, <i>coyol</i> palm fruit, onions; 4 with <i>atol</i> also.

Line 38 (N.-S.):

1 w, Solola	Chile seeds
3, Atitlan	Small smoked Lake fish (sold in small saucer measures)
8, Atitlan	Bananas and plantains and a few other Lowland fruits

Line 39 (N.-S.):

4 w, Solola	Black beans and eggs
2, Santa Cruz	Limas
1, Santa Cruz	Oranges

Line 40 (E.-W.):

17, Argueta (usually under canvas shelters)	Sandalmakers; also have belts, straps, and other leather goods.
4, Cerro de Oro	Rush mats
2, Santa Catarina Palopo	Do.
13, Chichicastenango	Blankets (small, black, with bar of small red and white checks near each end; fringed).
15, Nahuala	Wool <i>rodilleras</i> and black <i>c'apixai</i> cloth; few blankets.

Line 41 (S.-N.):

11 w, Santa Lucia	*Toasted <i>habas</i>
11 w, and 4, Santa Lucia	Soap
1, Chichicastenango	Cigars, spices, etc. (see Line 33)
2, Atitlan	Bananas
4, Chichicastenango	Bread
2 w, Solola	Candy (taffy)
1 w, Tonicapán (now lives in Solola)	Rice in milk (hot)
1 w, Solola	Candy (table)

Line 42 (N.-S.):

4 w, and 2, Santa Lucia	Bread
2, Chichicastenango	Do.
6, and 1 w, Santa Catarina Palop6	Small fish (smoked) on grass stems, live crabs (from Lake Atitlan).
6, Chichicastenango	Coffee (unroasted), hats, ropes, chile, spices, cotton.

Line 43 (N.-S.):

24 w, and 2, San Jorge	Panela
1 w, Solola	Avocados
1 w, Solola	<i>Atol</i>

Line 44 (omitted from map):

5 w, and 1, Santa Lucia	Panela

Line 45 (N.-S.):

- 5, Chichicastenango Hats, tinware, ropes, cigars, matches, thread, spices,
- 2, Totonicapan White cotton manufactured cloth from Cantel mill.
- 1, Chichicastenango Hats from Quiché*

Line 46 (N.-S.) (under canvas shelters):

- 1, Chichicastenango Cloth goods and threads
- 1 w, Solola Cloth goods and threads (cotton), yarns
- 2, Totonicapan Cotton yarns of various colors (Cantel mill and imported).

Line 47 (under canvas shelters):

- 2, Chichicastenango Cloths, thread (imported), and yarns, cloth goods, shirts, trinkets, cigars, etc.

Line 48 (E.-W.):

- 5, Chichicastenango Same as in Line 47, under shelters
- 2, Quezaltenango Yarns and cloths
- 1, Totonicapan Yarns and cloths
- 3, Chichicastenango Same as Line 47
- 1, Sacapulas Candy (*alfenique*)
- 1, Chichicastenango Needles, ropes, spices
- 1 w, Totonicapan Bread and candy (taffy)
- 3 w, Solola Toasted *habas*, squash seeds, *miltomatcs*, chickpeas, tomatoes, *ocote*, avocados, panela.

No. 49 (corner):

- 1 Totonicapan Ladino and his wife Skirts (jaspe), shawls, belts, and other cloth goods.

1,130 total number of vendors.

SATURDAY MARKET, APRIL 23, 1932

(Along street by Public Square)

Line 1 (E.-W.):

- 1 w, Solola *Matasanos*
- 2, Chichicastenango Hats, ropes, cigars, etc.
- 3 w, Solola Tortillas
- 1 w, Solola Pig meat, soap
- 2 w, Solola (Ladinas) Do.
- 4 w, Solola Do.
- 1 w, Solola (from Quezaltenango) Taffy

Line 2 (E.-W.):

- 1 w, Solola Onions
- Do Onions, ground coffee, candy
- Do *Matasanos*
- 1, Solola Greens
- 1 w, Solola Greens, onions, cabbages
- Do Eggs
- Do Onions, ground coffee, tomatoes
- Do Chile and onions
- Do *Atol*
- 1 w, Concepcion Avocados
- 1, Sacapulas *Alfeiiiique*

Line 3 (E.-W.):

- 1 w, Soldi *Atol* and greens
- Do Ground coffee and canna (?) leaves (for wrapping).
- Do Peaches

MARKET, APRIL 17, 1932

Line 1 (E.-W.):

1 w, Solold
 Da
 2 w, Solola
 1 w, Solold (Ladina)
 1 w, Solold (from Quezaltenango)
 1 w, Santa Lucia
 1 w, Solola (from Quezaltenango)

Eggs and tortillas
 Pig meat and soap
 Lard, cracklings, soap
 Pig meat
 Taffy
 Soap
 Taffy

Line 2 (E.-W.):

1 w, Solold
 1 w, and 1 girl, Solola
 1 w, Solola
 Da
 Da
 Da
 4 w, Solola
 1 w, Solola
 3 w, Solola
 1 w, Solola
 Da
 1 w, Solola (from Quezaltenango)
 1 w, San Jorge
 2 w, Solold
 1 w, Solola
 Da
 Da
 Da
 Da
 Da
 Da
 Da
 Da
 Da
 1, Santa Cruz
 1, San Jorge
 Da
 1, Solold

Ground coffee
 Onions, yucca flower, avocado
 Oranges
 Eggs and greens
 Beets
 Avocados, onions, plantains, lettuce.
 Avocados
 Atol
 Avocados, *limas*, beets
 Onions and lettuce
 Avocados and *limas*
 Avocados and *-matasanos*
 Rice in milk.
 Panela, *injertos*, *ocote*, ground coffee.
 Avocados
 Avocados and *miltomates*
 Very small bananas and *limas*
 Avocados
 Bananas and peaches
 Bananas and *miltomates*
 Chile, garlic, avocados
Achiote, salt, panela, *miltomates*.
 Lettuce, greens, brown cotton
 Onions and cabbages
 Onions, cabbages, avocados
 Avocados
Matasanos
 Panela
 Panela, *injertos*, black beans
 Avocados and *ocote*

Line 3 (E.-W.):

1, Chichicastenango
 1, Solold
 1, Chichicastenango
 2 w, Tonicapdn
 1 w, Solold
 3 w, Solold
 6, Chichicastenango
 2 w, Solold
 1 w, Solold
 Da
 Da
 Da
 1, Solold
 1 w, Solold
 Da
 Da

Maize
 Do.
 Maize, *piloy* (large kidney beans).
 Maize
 Do.
 Do.
 Do.
 Cabbages
 Avocados
 Onions
 Cabbages and *miltomates*
 Avocados
 Peas and lettuce
 Plantains and bananas
 Squash seeds and small tomatoes.
Ocote, onions, **eggs**
 Avocados and peas

MONDAY MARKET, APRIL 18, 1932

Line 1 (E.-W.):

1, Agoeta	<i>Tinajas</i> (Chinaulta)
3, Chichicastenango	Merchandise (see Friday market list, Line 33)
1 w, Solola	<i>Tortillas</i>
Do.	<i>Tortillas and onions</i>
Do.	<i>Soap</i>
Do.	<i>Pig meat</i>
3 w, Solola	<i>Tortillas</i>
1 w, Solola	Soap, cracklings, avocados
Do.	Pig meat and soap
1 w, Solola (Ladina)	Do.
1 w, Solola (from Quezaltenango)	Taffy
1, Tonicapán	Potatoes
2 w, Santa Lucia	<i>Habas</i> (toasted) and soap
1 w, Solola	Squash seeds, chile, * salt, <i>fniltomates</i> , brown cotton, panela.
2 w, Solola	Onions
1, Sacapulas	<i>Alfahique</i> (candy)
1 w, Solola (from Quezaltenango)	Taffy

Line 2 (E.-W.):

1, Nahuala	Plantains
1 w, Solola	Avocados, <i>litnas</i> , <i>pepinos</i>
1, San Pedro	Tomatoes
1 w, Solola	Maize
2 w, Solola	Avocados
1 girl, Solola	Green beans, <i>litnas</i> , <i>injertos</i> , small bananas.
1 w, San Jorge	Oranges, eggs, bananas
1 w, Solola	<i>Giisquiles</i> , <i>injertos</i> , onions, lettuce, cabbages, beets.
Do.	<i>Atol</i>
Do.	Bananas and green beans
Do.	Onions and tortillas
Do.	Avocados
Do.	Cabbages
Do.	Fish on grass stems
Do.	<i>Atol</i>
2 w, Solola	Avocados
1 w, San Jorge	Bananas and <i>granadillas</i>
Do.	Bananas and <i>litnas</i>
1 w, Solola	<i>Atol</i>
Do.	Oranges
Do.	Onions, chile, salt, ground coffee
Do.	Oranges, <i>limas</i> , bananas, <i>injertos</i>
Do.	Cabbages, greens, chile, avocados
Do.	<i>Limas</i> , oranges, bananas
1 girl, Solola	<i>Atol</i>
1 w, Solola	Leaves and cotton
Do.	Avocados and tomatoes
Do.	<i>Limas</i>
1 w, Tonicapán	Toasted <i>habas</i> and ground roast corn.
1 w, Solola	<i>Atol</i>
2, San Jorge	Panela

Line 3 (E.-W.):

1, Tonicapán	Maize
1 w, Solola	Do.
Do.	<i>Atol</i>
1, Solola	Onions and maize
3, San Jorge	Maize
2 w, Solola	Onions and avocados

Line 3 (E.-W.)—Continued

1 w, Solola	Anonas, avocados, <i>granadillas</i>
3, Solola	Maize
1, Solola	Onions
1, Santa Lucia	<i>Habas</i> (green and toasted)
1 w, Santa Lucia	<i>Habas</i> (toasted)
1, Solola	Onions
1 w, Solola	<i>Ocote</i>
1 w, Argueta	Squash seeds (raw) and <i>ocote</i>
1 w, Solola	Avocados
2 w, Solola	Onions
1 w, Solola	Taffy, avocados, oranges, peaches
1, San Jorge	Onions, cabbage, yucca flower
1, Solola	Onions
1 w, Solola	Onions and <i>miltomates</i>
1 w, Argueta	Small tamales
1, Solola	Greens and small tomatoes
1 w, Solola	Avocados
Do	<i>Matasanos</i>

Line 4 (E.-W.):

1 w, Solola	<i>Atol</i>
Do	Peaches, <i>injertos</i> , <i>giiisquiles</i>
Do	Onions, turnips, greens
Do	Black beans, eggs, corn leaves (fodder), fish on grass stems, cabbage.
Do	Avocados, <i>ocote</i> , onions, <i>giiisquiles</i>
1, Santa Cruz	Oranges
Do	Bananas
Do	<i>Matasanos</i>
Do	Oranges
2, Santa Cruz	<i>Matasanos</i>

TUESDAY MARKET, APRIL 12, 1932

Line 1 (W.-E.):

1, Totonicapan	Stndals, belts, and other leather goods.
2 w, Solola	Tortillas
7 w, Santa Lucia	Soap
1 w, Solola (from Quezaltenango)	Taffy
1 w, Chichicastenango	Potatoes and coffee
Do	Maize and coffee
1 w, Solola (from Quezaltenango)	Taffy
1 w, Solola	<i>Limas</i> , ground coffee, toasted <i>habas</i> , tomatoes, onions, chile.
3 w, Solola (Ladinas)	Pig meat
2 w, Solola (Indian)	Do.
1 w, Solola	Maize and tortillas
3, Totonicapan	Furniture (especially chairs and chests).

Line 2 (E.-YV.):

3 w, Solola	Maize
1, Chichicastenango	Do.
17 w, Solola	Maize, also toasted <i>Jtabas</i> , cabbages, beans, and avocados.
1 w, Totonicapan	Toasted <i>habas</i>
2 w, Solola	Onions, <i>giiisquiles</i> , avocados
Do	Flowers, panela, ground coffee, green <i>habas</i> , onions.
8, Chichicastenango	Hats, ropes, cigars, spices, tinware, etc.
5 w, San Jose	Panela and ground coffee

Line 3 (N.-S.):

1 w, Solola	Atol
Do	Eggs, onions, <i>miltomates</i>
Do	Garlic and greens
Do	Onions
Do	Eggs
Do	<i>Miltomates</i> , garlic, ground coffee
Do	Cabbages, <i>gUisqutles</i> , avocados
Do	<i>Ocote</i> , onions, <i>tnatasanos</i>
1, Solola	Onions

Line4 (N.-S.):

1, Solola	Maize
1 w, Solola	<i>Matasanos</i>
Do	<i>Miltomates</i> and carrots
2 w, Concepción	Avocados
1 w, Solola	Onions
Do	<i>Atol</i> , <i>piloy</i> (large kidney beans), corn leaves.
Do	Corn, coffee, onions
Do	<i>Ocote</i>
2 w, Solola	<i>Atol</i> , tortillas, greens
1 w, Solola	Fish on grass stems
1 w, Solold	Bananas, <i>limas</i> , avocados, tomatoes
1 w, Santa Lucia	Carrots and greens
1 w, Tonicapán	Ground coffee and gourd sponges

Line 5 (N.-S.):

1 w, Solola	Maize and <i>atol</i>
1 w, Santa Lucia	Soap
1 w, Solola	Maize

line 6 (N.-S.):

3 w, Santa Lucia	Toasted <i>habas</i>
7 w, Solola	Eggs, carrots, squash seeds, oranges, and peas.

Line 7 (N.-S.):

4, Santa Lucia	Soap
6, Santa Cruz	Tomatoes, oranges, <i>limas</i> , rush mats
1, Tonicapán	Cloth goods and trinkets
1 w, Solola	<i>Miltomates</i>
Do	Cabbages
Do	Onions

Line8 (N.-S.):

3 w, Santa Lucia	Toasted <i>habas</i>
4 w, Solola	Peas and cracklings

Line 9 (N.-S.):

3, Chichicastenango	<i>Pomarosa</i> (rose-apple, <i>Eugenia jambos</i>), <i>gUisqutles</i> , bananas, plantains, <i>limas</i> , mangoes, <i>zapotes</i> , <i>coyotes</i> , chile.
2, Solola	Same (up from Lowland Sunday markets)
6, Chichicastenango	Same fruits as first three vendors
2, Chichicastenango	Pottery
1, Chichicastenango	Cinches (agave)
1, Chichicastenango	Same as first three.
2, Chichicastenango	Spices, ropes, hats, etc.
4, Chichicastenango	Same as first three.
1 w, Sololi	Oranges and avocados
1 w, Solold	Green beans
1 w, Solola	Onions

Line 3 (E.-W.)—Continued

1, Santa Cruz	Maize
1 w, Solola	Onions
2 w, Solola	Maize
1, Solola	Do.
2 w, Solola	Do.
1 w, Tonicapán	Eggs
1, Solola	Cracklings
Do	Onions and eggs
1 w, Chichicastenango	Potatoes

THURSDAY MARKET, APRIL 14, 1932

Line 1 (E.-W.):

1, Chichicastenango	Coffee, chile, cigars
2 w, Sololá	Tortillas
4 w, Sololá	Pig meat and soap
2 w, Sololá (Ladinas)	Do.
1 w, Sololá	Coffee (ground), roast corn (ears), squash seeds
1, Santa Lucía	Maize
1 w, Santa Lucía	Do.
1 w, Sololá (from Quezaltenango)	Taffy

Jne 2 (E.-W.):

1 w, Sololá	Onions
Do	Avocados
1 w, Tonicapán	Avocados, toasted <i>habas</i> , and <i>granadillas</i>
1 w, Argueta	<i>Habas</i> (toasted) *
1 w, Sololá	Maize
Do	Peaches and eggs
Do	Bananas, onions, corn
Do	<i>Granadillas</i> , onions, eggs, toasted <i>habas</i> , <i>miltomales</i>
Do	Avocados
Do	<i>Atol</i>
Do	Avocados
Do	Rice in milk (hot)
Do	Toasted chickpeas, <i>atol</i>
Do	Onions, ground coffee, eggs, panela
Do	Oranges and <i>limas</i>
Do	<i>Limas</i>
Do	<i>Limas</i> , oranges, tomatoes, eggs
Do	Onions and oranges
Do	Chile and beans
Do	<i>Atol</i>
Do	Onions and chile
Do	Onions, cabbage, chile
Do	<i>Atol</i>
1 w, San Jorge	Panela

Line 3 (E.-W.):

1, Chichicastenango	Maize
1 w, Sololá	Do.
1, San Andrés	Do.
1, Sololá	Do.
1, Tonicapán	Do.
1, Sololá	Do.
1 w, Sololá	Onions and cal
1, Santa Cruz	Bananas
Do	Oranges

as many Pedrano rope vendors per week as Pablano. And at Chicacao, where *sogas*, or halters, are much in demand for livestock, I have always seen more men from San Pedro, who have the advantage of greater proximity to the coast, and close relationship with their colony of Cutzan. Pedranos occasionally sell Lowland products on a small scale in Highland markets, but for the most part they are resold at dwellings in San Pedro, where there is no market.

SAN MARCOS

The 3.3 sq. km. of arroyo land in San Marcos (map 20, pi. 45, b, c) is occupied by 490 people, which amounts to a density of 148 a sq. km., almost twice that of Santiago (about 81.5 per sq. km.). This area cannot keep the inhabitants supplied with corn, so much of which must be bought elsewhere, or obtained as compensation for work on the fincas. To pay for some of it, the Marquenos have undertaken various economic activities, all on an insignificant scale. These include some rope spinning from local maguey, mat weaving, raising certain money crops, such as tomatoes, *jocotes*, and citrus fruits (especially oranges and *limas*), and catching tiny fish and crabs (until fishing was outlawed in 1937). These products are marketed far afield. I have seen one or two men selling tomatoes and stringbeans in Quezaltenango; dried *jocotes* and oranges on the fincas (they also sell these in Santa Lucia, Nahuala, and Tecpan); dried fish strung on bunchgrass stems (p. 124), *jocotes*, and mats in Sblola; and crabs in Santiago. There is apparently a little commerce in bananas and other Lowland fruit, which are sold ki the Highlands.

The fish traps of San Marcos, corrallike enclosures of Lake weeds built against the shore, with two openings, were more elaborate than any I saw on the Lake except those of Santa Catarina. I was told that about one-third of the people fished at that time, and that there were eight crabbers. Though crabs were caught wherever it was practicable to do so around the Lake, I never saw them marketed except by Indians of San Marcos and Santa Catarina. Crabs were always sold alive in strings of 5 or 6 tied together with strips of yucca leaves; Marquenos even bound all the crab legs together with rushes, and they could thus be recognized in the markets. Though there is little meat on these crabs, they make an excellent soup. The Marquenos were second to the Catarinecos in fishing, in terms of relative importance. More fish were caught in Santiago, but it had 11 times the population of San

Marcos. San Marcos and Santa Catarina are by far the smallest of all municipios on the Lake (or of any others in Guatemala that I have yet seen), having areas of about 3.3 and 4.2 kms. respectively (largely cliffs and ridges, which, with one exception, form the boundaries in both instances). For want of land, they turned for resources to the water and what little it had to offer. Villages which engaged in commercial fishing and crabbing were hard hit when these activities were prohibited by law.

San Marcos, according to tradition,¹⁶⁴ has moved its site five times. The most recent change was from the alluvial valley bottom to the two terraces (where most of the inhabitants now live, in the "Barrio Oriental" and Barrio Occidental," each with about 150 persons) on either side of the streambed, following the 1881 flood which destroyed the village (Panajachel and Finca Jaibal were known to have been partly destroyed in the same year). San Marcos had been moved to that valley under the direction of Alcalde Juan de Barranich, of Solola, who on January 11, 1726, officially transferred the village from "Jaibalito," the second arroyo west of Santa Cruz la Laguna (see map 20 and pi. 45, c, d, e), where they had settled in 1666 (?). A "terrible flood" at Jaibalito had destroyed the houses, sometime between 1724 and 1726, leaving the church in ruins (where today *brujos*, or shamans, conduct pagan rites). A few Indian huts of Santa Cruz still occupy this hazardous arroyo site. The present territory of San Marcos was said to have been granted jointly by an old woman of the family "Sipac" in Santiago, and by Santa Lucia Utatlan and San Pablo, each contributing a parcel of land. The first settlers of San Marcos, according to tradition, came to the Lake about 1666 from a coast site below San Lucas Toliman, where they had lived near the present Finca Santo Tomas, until a "bat plague" drove them out, as they had previously been forced by these animals to move from their home two leagues below, near the present Finca San Jeronimo el Ingenio.¹⁶⁸ Fuentes y Guz-

¹⁶⁴ Supported by historical data from an unpublished manuscript entitled, "Monografía del Departamento," dated September 9, 1926, appended February 24, 1930.

¹⁶⁵ This is plausible, as it was probably the vampire bat. Destruction by this pest, and even annihilation of herds of cattle is recorded in 1576 by Palacio (1866, p. 10). He says that on the "coast of Guazacapan," below Escuintla and Amatitlan, there were many bats bleeding and killing animals, especially calves, so that entire ranches were in places bereft of their cattle: "So many bats that it is astonishing; and they are so bad that if they come upon a calf they kill it and bleed it." In and about the large ruin* of the colonial church of (Santiago) Zambo, formerly a town, now a finca, I have seen enough bats to make life disagreeable if they were true vampires, whether they attacked only animals or included human blood in their diet.

man verifies in some measure the later history of San Marcos; for his map (about 1685; Fuentes y Guzman 1932-33. vol. 2, opposite p. 60) shows San Marcos near Santa Cruz, even east of it; however, in about 1700, Vazquez states that, going east from San Pablo "the first town one comes to . . . is San Marcos" (Vazquez, 1937-38, p. 171). This could refer either to the present site or to Jaibalito, as both are between San Pablo and Santa Cruz.

SANTA CRUZ AND TZUNUNA

Economically as well as physically there is a fairly close parallel between the municipios of Santa Cruz (particularly the *aldea*, Tzununa) and San Marcos (map 20; pi. 45, d, e). The last two named are at present among the closest neighbors on the Lake, and the erstwhile proximity of the sites of San Marcos and Santa Cruz has already been pointed out. The latter is but slightly better situated with regard to area and quality of land than are the two villages west of it (San Pablo and San Marcos).

Fruits, mostly uncultivated, are prominent among the products of all the wooded ravines along the northwest shore; far more so than on the more open south side. Though in the main, fruits are consumed locally, these north shore municipios seem to derive a small profit from them in the markets. The area is too high for large papayas like those of the Lowlands and too low for the best grade Highland *anonas* (*A. cherimolia*)¹⁶⁶. Certain smaller fruits thrive, however, especially *matasano* and *injerto*; and there are avocados, mangos,¹⁶⁷ and small, generally acid guavas, wild or semicultivated. The important fruits, and those which enter the markets, are the several yellow *jocotes*, oranges, and *limas*. I have seen numbers of Santa Cruz and Tzununa men in Chicacao early in March selling *limas* (pi. 27, f), oranges, tomatoes, onions, and boiled *jocotes*,

which were much in demand; the same, with fresh *jocoUs*, sugarcane, tomatoes, and bananas, in Panajachel and Solola. The *jocots* of Santa Cruz were the following: Chicha, pcpata, and mico, approximately in descending order of importance (though only the first two, with some corona, were much sold); Santa Cruz seemed to have more iK-tapa. Corona was rare, much having been inundated by the rising Lake, especially at Tzununa, (See Appendix 2, table 8; pi. 19, c.)

That even limes (only about one-third as abundant as *limas*) bear at Tzununa (1,560 m., or 5,118 ft.) when the Guatemala Anuario del Servicio Tecnico report (1931, p. 68) gives the upper limit as 910 m. (2,980 ft.) and the fact that this *atda* is particularly noted for its oranges are further indicative of the mildness of the Lake climate (map 6).

Many wild herbs are eaten, particularly *chipilin* (*Crotalaria longirostrato*), and in Santa Cruz and Tzununa, small irrigated Lake shore garden* are planted to sweet manioc, sugarcane, tomatoes, and onions. Thus, they do not depend so largely upon fruit as does San Marcos. They fish with seines (pi. 27, d), also with baskets and cane funnels, but there is little crabbing in this locality, reportedly engaged in by only one family, using lines. Hunting of small animals, especially armadillos, using dogs, was reported at Tzununa. Mats and cordage are made at Santa Cruz, on a small, almost noncommercial scale.

As in the case of San Pablo and San Marcos, inhabitants of Santa Cruz must buy most of their corn outside the municipio (e.g., in Solola, Santiago, and Panajachel); I have even seen them buying it in San Andres Sacatebaj.

The village of Santa Cruz was said to have formerly occupied a "valley ten blocks away" (probably the larger alluvial fan just below its present ridge), but "was destroyed there by a flood and moved to its present site 100 years ago," (Also from "Monografia del Departamento," September 9, 1926. Copies of both the above accounts were lent to me by Don Jsaia de Leon, of Solola.) If this report is correct, the *playa* settlement must have represented only a portion of the village, for the church of the present settlement up on the ridge appears to be contemporaneous with the others around the Lake.

GATDRN VILLAGES

No such similarity as exists in the three last-mentioned villages is to be found east of the Rio Quixcap. (map 20; pis. 45, f; 46, a, h). That is an area of in-

¹²⁷All along the shore these *tmamat* were small, infer lot, and wormy (a common condition even higher up) and hardly valued at all. Regions from 1,950 to 2,200 m. (6,398 to 7,218 ft.) are bent for them; at Concepcion, at the former deration, being as famous for OENONAS as for Avocados. TW Anuario del Servicio Tecnico, 1931, p. 59, gives 1,220 in. to 1,830 m. (4,000 to 6,000 ft) as the best general limits, but this does not appear true on the Lake. Papaya* (op. cit., p. 66, give* 1-220 ax. as the upper limit) bear wall fruit at Cerro de Oro, 1,585 to 16,200 ft.), on the south shore. wbrttt i* the highest record I have for f-m. Bukaxov (1930, p. 536) places the upper fault of papayas at 1300 m. (5,577 ft.), that they certainly do not go as high* by the Lake, despite its mild climate. That the fruits on the north side, as at San MATOOS, are generally too man to eat is evidence of climatic and edapakk differences between the two sides of the Lake. The behavior of birth these fruit plant* is indicative of the relative mildness of this Wam, for its elevation, apparently owing, in part at least, to the wafer early p. til).

¹²²Toe Amur* del Serokie Teenfoo. 1M1, p. 81, gives as the uvus upper liana of flungs 1,220 n.

tensive vegetable garden culture (see maps 21, 23), which was first studied* and described in detail, at Solola, in 1932 (McBryde, 1933, pp. 109 ff.). A great number of mountain streams, easily diverted, supply the needs of irrigation throughout this area, which lies within the optimum elevation limits for vegetables (1,500-2,200 m., or 4,921-7,218 ft.). Almost all of the numerous springs along the steep north slopes supply irrigation water to gardens. The "tablon culture" (see p. 30) area includes most of the municipios of Solola, Panajachel, Concepcion, much of San Jose Chacaya, and a part of southern Chichicastiango, adjacent to Solola. In several Lake shore villages besides Panajachel, *tabldnes*, mainly planted to onions and cabbages, are cultivated on a small scale.

San Jorge.—The economy of San Jorge, based largely upon irrigated vegetable and flower gardens, is very similar to that of Solola, of which it is an *aldea* (pi. 12, d). Citrus fruits and *jocotes* are of high quality in San Jorge, since it is near the upper elevation limits of their production. San Jorge Indians are also the traditional *panela* merchants for Solola. Though they still retail *panela* on a large scale in the Solola market, they lost their old business of carrying the wholesale *panela* shipments on foot between the Tzanjuyu boat pier and Solola. Since the completion of the highway in 1926 it has nearly all gone by truck. I was told in 1932 that the Jorgenos were still disgruntled about it. At that time, agents in Solola received about 160 tons of *panela* a month in addition to about 55 tons a month used in the Government-controlled *aguardiente* (rum) industry in Solola. Intermediate location on the portion of the Lowland-Highland trade route extending between Solola and the Lake once was basic to San Jorge's supplementary occupation of transshipping *panela*, and to some extent this is still the case.

The Jorgenos rely now, however, mainly on garden culture and finca labor to supplement the products of their fields. Besides their *tabldnes* in San Jorge, a considerable tract of Lake front vegetable gardens in Panajachel was pointed out to me as being owned by San Jorge Indians, who come down to the delta to cultivate them. Tax recorded 75,000 sq. m. of "foreign-Indian" property (delta) mostly owned by Jorgenos in Panajachel.

San Jorge Indians are almost indistinguishable in dress and general appearance from those of Solola,

Concepcion, and San Jose Chacaya, all of which differ considerably from those of Panajachel (pi. 6).

Of San Jorge, Francisco Vazquez writes (about 1675?) that it occupied "twenty years ago" a sandy plain, and that it was "destroyed by a flood." I am certain that this was the delta of the Quiccap, where tradition still holds that there was an important market "long ago," and from which the Finca Jaibal (*caibal* means market place in Cakchiquel, Quiche, and several other Guatemala Indian languages) was wiped away by the great flood of October 1881. The finca was rebuilt on higher ground, where it still stands. Ponce's companions described in 1586 the old site of San Jorge as a "good distance" from the Lake shore (Ponce, 1873, vol. 1, p. 443), so that it was probably built well back to avoid Lake flooding, but was exposed to overflows of the Rio Quiccap (pis. 10, c; 45, f).

Panajachel: village of tabldnes (maps 20, 23; pis. 19; 20; 46, a, b).—Panajachel¹⁸⁸ is the most important garden center on Lake Atitlan. The lower Panajachel' River delta,¹⁶⁸ parts of it subject to periodic flooding, is nearly covered with scattered Indian houses (all except the tourist-hotel section of the west corner) and most of this premium land is carefully gardened. The river furnishes ample water for the network of diversion ditches used for irrigating the fertilized¹⁷⁰ *tabldnes*, or plots (map 23; pi. 20). So inclined are the Panajachefios to gardening that even a great amount of corn (unirrigated) and some beans are planted in these delta gardens. Coffee, mainly in small non-Indian fincas, occupies most of what is not gardened. The chief money crops are onions and garlic, though there are many vegetables of various sorts produced, as well as fruits (p. 31). Pepinos are especially prominent from March to July (the harvest months). I was told that Solola Indian merchants come down and buy onions by the *tabldn*. Both onions and garlic are sold in quantity to itinerant merchants in the Panajachel plaza. The steep slopes are planted largely to milpa, wherever possible, yet the corn "produced here is not enough to meet local needs. There is practically no fishing, and finca labor, as well as industrial pur-

¹⁶⁸So! Tax, Carnegie Institution ethnologist, has made a detailed study of this community. Other villages of the Lake where he has worked intensively are San Marcos and Santa Catarina Palop6. He has spent much time also at Santo Tomas Chichicastenango.

¹⁷⁰made a physical and economic map of this delta (map 23) » September 1936; Tax mapped it, even to land ownership and tenure, during the preceding dry season.

"These are fertilised mainly with leaf litter from the *caftal** (coffee groves), though some animal manure is also used.

suits, is uncommon.¹⁷¹ There are only a few professional Indian merchants living in Panajachel. Tax recorded five, one an Ariteco.

This vegetable-garden economy¹⁷² was not known in Panajachel in Alonso Ponce's time, 1586 (op. cit., vol. 1, p. 447), when the delta was planted to corn and "many fig and peach trees." Neither of these fruits is to be found there today, vegetables and coffee having replaced them, along with much of the maize. As a consequence, the production of this basic grain is insufficient, so that it must be bought in the plaza by most Panajachelenos, from Indians of east Lake municipios. Native fruits, of which *injertos* and *jocotes* are particularly important, probably were grown then as now.¹⁷³ A 1778 Noticias (Anon., Ms. 1778, p. 16, f. 235) records rope manufacture there, and this is corroborated by Tax's records of tradition and folklore. The growing tourist trade at Panajachel, a fairly important industry by 1930, probably had its beginning in the establishment of Tzanjuju, about 1885.¹⁷⁴

SANTA CATARINA PALOPO

Just 2 miles southeast of Panajachel by a well¹ beaten path skirting precipice walls, one comes upon a little village so different from the first that it might almost be a part of another continent. And yet those two villages have existed, 2 miles apart, since about the time of the discovery of America, and possibly before. A native of one village may be distinguished from one of the other almost as far away

¹⁷¹ In direct contrast with this is the transplanted, exotic economy of a small settlement of Totonicapeños (almost always craftsmen of some sort), called Patanatic (3 km. northeast of Panajachel village, yet within this municipio), who tan leather, make sandals, and dress lumber (all as in Totomcapdn, whence they emigrated, according to the unpublished 1930 census report, in 1890). They probably came originally to work on the lumber finca, Santa Victoria, less than a kilometer away. This culture is similar to that of Panimache, a canton of Chichicastenango just to the north. Costumes and language of the homeland are preserved, as usual, and women use the tumplic and sandals, as in their former municipio.

¹⁷³ The first dated reference I have found relating to gardening of European vegetables by Indians in Guatemala is in the *Rdacin* for Vera Paz written in 1574 and covering the years since 1544. The vegetables and herbs mentioned were coles, radishes, lettuce, parsley, coriander, *ytrba buena*, borage, marjoram, fennel, artichoke, and onions; "winch bear very well and the water-wheel is not necessary, for the Iord waters them" (Anon., Ms. 1574, p. 5, f. 93). This referred to the year-round rains of Vera Paz, which made it a favorable place for introducing such crops. Oviedo (1851-55, vol. 1, pp. 373-374), also writing early in the 16th century, lists a great number of European vegetables, with the remark in almost every case, that they do not need, but the seeds must be brought from Europe. Most vegetable seeds are still imported (see p. 32).

¹⁷² The *ahachel*, or *matasmo*, from which the name "Panajachel" is derived, should have been the *injerto*, if we judge by its present abundance.

¹⁷⁴ The 1930 census report states that power navigation on the Lake began here in 1888, with the steam launch "General Barillas."

as the human limbs are discernible, so different are the costumes (see pis. 6; 7, *d, e, j, g*; 9, *a, b*). Santa Catarina dress resembles that of San Lucas far more closely than it does the Panajachel costume. And of the 13 common words selected by Tax (1937, p. 346) from Andrade's list, only five approach identity. Of all the Lake neighbors, this is perhaps the extreme example of diversity in proximity, in a region where such a condition is almost the rule. There are almost as many inhabitants in Santa Catarina as there are in Panajachel; and population density is much greater in Santa Catarina because of its highly limited area. Yet there is no delta, nor even much of a beach. Steep slopes are right at their backs and all around the banks of their little-sheltered bay (map 20; pi. 22, *a, b*). Since the Lake has risen (beginning in 1933) even the narrow beach is reduced, and the rush-fringed shoal is deepened. There is some fairly level land above the cliffs behind an elevated glade, just 600 m. (1,968 ft.) higher than the Lake. Most of this is cultivated, however, by the small settlement (*labor*) of Xepec, a community of Lucianos, from the high plateau municipio of Quiche-speaking Indians, Santa Lucia Utatlan.¹⁷⁵ One of them told me that they had been there only about 25 years, and had bought 5,000 *cuerdas*¹⁷⁶ (roughly 1,000 acres) from the Catarinecos. The latter have an insignificant *caserio*, Xesiguan, situated high on the bench, and remote from *cabecera* or chief village (Santa Catarina).

The old church of Santa Catarina (bell dated 3762) was 20 feet (6 m.) above the water level in September 1936, the lowest such edifice on the Lake (except for the later ruins of Jaibalito); it is built on a gently sloping terrace 100 feet (30.5 m.) wide. Most of the houses are on the steep slopes behind. In Santa Catarina much importance is attached to *jocotes*, which are sold in great numbers, and to the small quantities of oranges and *injertos*. Four *tabldnes* (pi. 22, *c*) near the small Xepec Creek were planted to onions by a Catarineco, and twice that many by Panajachelenos who rent the land. The limited local maguey is spun into cord, though it is not durable in water and so is not suitable for fishing. There are a few merchants in Santa Catarina, some selling

¹⁷⁵ They cultivate, in addition to corn and beans, such cold-land crops as broadbeans and wheat—in contrast to the *jocotes*, oranges, and tomatoes grown in the village directly below.

¹⁷⁶ I could not verify this. The area seemed a bit exaggerated. I can testify, however, to the existence of the settlement, though neither this nor Xesiguan is included in the official 1921 census. This may be attributed to an oversight rather than to their not having been there. Catarinecos concurred on the age and provenience of both settlements.

Patzum maize in Solola, others, Solola vegetables in Patulul, while still others peddle crabs.

The major occupations here are dependent upon the Lake: fishing, crabbing, and mat weaving. The land limitations of the municipio having been pointed out, the water advantages may be summarized as follows: (1) Hot springs (*aguascalientes*) occurring in the shallow water along the bank for a mile or so on one side¹⁷¹ and on the other (2) shallow water along the shore for a total littoral distance of nearly 4 miles.¹⁷⁸ Both conditions, largely nullified when the lake level is high, favor the abundance and availability of fish, while the shallow water is conducive to a good growth of rushes and the propagation of crabs in an accessible zone. No doubt the Panajachel natives availed themselves also of these natural advantages, meager though they are, prior to their development of vegetable culture. Their aquatic occupations have made the Catarinecos extremely sensitive to the vagaries of the Lake, and their fortunes have risen and fallen, in reverse order, with periodic fluctuations of the water level. In 1936 their fish runways by the hot springs could be seen well below the water, too deep for much benefit, and their larger rush funnels (often 6 ft. long; pi. 22, d), especially made for hot-springs fishing, were lying idle, as many of them had lain since 1933. Rushes had likewise suffered from inundation: the planting of rushes and the purchase of them from other parts of the Lake were necessary even for small-scale mat making. Only crabbing seems not to have been affected by the rise of the Lake level. A recent law prohibiting all catching of fish and crabs during the "breeding season" (May to August was the closed season in 1936, I was told),¹⁷⁹ as recommended in 1905 by Meek (1908, pp. 177, 191, 203), followed by a law prohibiting all fishing, also affects the Catarinecos more than any other group. These are among the economic reasons why they have come to depend so largely upon employment on the fincas.

In attempting to understand the importance of fishing to the Catarinecos above all other Lake dwellers (until 1937) the question is not why others do not fish so much, but why the Catarinecos do. It seems that, of the two influences, water resources and land

poverty, the latter is the more significant. For, if they had an abundance of cultivable land, the probability is that they, like most of the other villagers would pay little attention to the crabs and very small fish. Delicacies though they might be to the Indians the resource does not appear to be a lucrative one Meek suggested this when he wrote: "These fishes are much used for food by the natives, especially for those people living in Santa Catalina. These fishes are eaten only because no others are to be had" (Meek, 1908, p. 180). Large numbers of them are sold in the markets, however, especially at Solola Catarinecos take them to market as the Marqueno do, impaled on bunchgrass stems, five or six on a stem, and smoked. Natives of Atitlan and other villages sell them in smaller quantities, by measure in bulk. Ocana in 1662 wrote that crabs and littl fish (*pescaditos de Atitlan*) prepared exactly as they are today, roasted on grass stems, were a major source of livelihood. Little fish were caught because of their abundance and the ease of getting them; the big *mojarras* would not bite a hook. Little fish were sold for cacao in many provinces (Vazquez, 1937-38 pp. 167-168).

SAN ANTONIO PALOPO

San Antonio is just a league ($2\frac{1}{2}$ miles) south east of Santa Catarina. (Though both villages are given the agnomen Palopo, the original "Polopo" was probably San Antonio, according to early maps see p. 103.) Linguistic and costume differences are almost as great as in the preceding instance. No does the economic comparison show any great similarity. The distinction is in fact fundamental the Antoneros look only to the land and not at all to the Lake for support. And with good reason for their municipio extends as far east as the Rit Madre Vieja, and as far south as the southern Lake shore. Their area of 25.5 sq. km. (about K sq. miles) is more than six times that of Santa Catarina (4.2 sq. km.), yet their total population¹⁸⁰ is scarcely double that of the latter. Though there is a steep wall with a few cliffs behind them, the situation is not nearly so bad (map 20; pis. 23; 46, c, d) to the south the mountain rim is considerably lower and there are many excellent cultivable slopes, especially east of the divide, in the drainage basin of the Madre Vieja River. A number of small communities

¹⁷¹ Mainly south; several reported also in 1892 to have existed at either extremity of the Panajachel delta.

¹⁷² Not far away it the rocky shoal off Cerro de Oro and the lava fringe, which, being shallow, is good fishing ground.

¹⁷³ Meek (1908, pp. 178, 186, 189, 203) recorded the breeding seasons as follows: Mojarra, April-June; gulmina and pescadito, March-May; serica, April-June; crabs, February-April.

¹⁸⁰ According to the 1921 census, San Antonio had a population of 1,963, and Santa Catarina had 844.

ve been established here, notably Agua Escondida,¹⁸¹ and there are several Ladino *finqueros* in the municipio. The supplementary specialty is the cultivation of aniseed (in fields like milpa, but planted at the end of the rainy season), which they sell far and wide. Anise is used mainly for flavoring drinks, such as pinol; in the capital it is used in baking. Vazquez, writing about 1700, says: "much anise is gathered especially in the north" (Vazquez, 1937-38, p. 172). According to informants in both communities, anise and pepinos have changed places in the last 50 years, anise before then having been much planted in Panajachel, where it is not cultivated today. Pepinos, requiring milder temperatures, were introduced into Panajachel, it was said, 10 or 15 years ago, from San Antonio. These reports are mentioned also in Tax's Panajachel manuscript, though he gives no dates. Local tradition is frequently inaccurate in this regard.

At low levels, near the village, tomatoes and beans are important, and recently (mainly since 1933) *tabldn-culture* has spread here from the west, with crops confined as yet (1936) to onions and cabbages. That the latter are not abundant there is indicated in the purchase of cabbages, among other vegetables, by Antoneros in the Panajachel market, primarily for resale in Patulul. Wheat, having a "summer growing season (May-November), is much planted on the higher slopes (pi. 23, c), though in one field it is as low as 1,650 m. This is the lowest that I have seen it in Guatemala. As would be expected, the yield here was poor.

Industrial pursuits are lacking at San Antonio, and even fishing is extremely rare, confined to the placing of a few small traps (*garlitos*) along the shore.

Commercial activity here is secondary. A few men, said to number about 15, buy vegetables from Solola and Panajachel, in the latter market, and resell them in the plaza of Lowland Patulul. Their intermediate position on this important trade route favors such traffic. Local residents reported a small market at San Antonio, though I never verified this by personal observation. The village is on a "cross-road" between the Chichicastenango-Solola to San Lucas-Patulul and the Santiago Atitlan to Patzum-Tecpan routes, crossing at right angles. Santiago Merchants, en route to the two last-named plazas (convening Sunday and Thursday, respectively),

beach their 15 or 20 canoes at San Antonio and elirnb the steep trail behind (pi. 23, d). The few Chichicastenango and Solola merchants who take the circuitous land route to the Sunday and Thursday Lowland markets, go through San Antonio mainly on the same days, as well as on Fridays and Tuesdays (also Solola market days) from the San Lucas market. Thus, though some merchants are passing through on virtually every day of the week, there seem to be more at one time on Wednesdays and Saturdays, when both coast-bound and east-bound groups of merchants converge. The vendors were said to line up as on the small fincas, remaining only a short while. Because of the relative isolation of San Antonio, the merchants have only local buyers, and were it not for the more distant objectives of the *comerciantes*, there would be little or no market. There are actually only three real market places on the Lake, Santiago, San Lucas, and Panajachel (map 19), all of them in large communities, on converging trade routes, and readily accessible.

GRANARIES OF THE EASTERN LAKE REGION

The municipios of San Andres Semetebaj, Tecpan, and Patziim, northeast and east of the Lake, grow maize in large quantities, and constitute the greatest granaries of the Lake region, more significant by far than the southwestern municipios, Santiago and San Pedro. The eastern municipios have the lands for it,¹⁸² the smallest of them, San Andres Semetebaj, being considerably larger than the combined area of all five of the north shore Lake municipios.

At San Andres, Old World broadbeans, or *habas* (*Vicia jaba*), are grown with maize, as around Quezaltenango (having elevations that are comparable), and there are wheat and some potatoes planted mostly by Ladinos but their specialty is bush beans in separate fields, *jrijoles de suelo*. Anise culture (mostly Ladino) seems to be coming in more and more, brought from San Antonio, where, at Agua Escondida an undetermined disease is said to have reduced the yields considerably between 1929 and 1936 (time of observation).

Patzum and Tecpan have their industrial specialties as well as large-scale agriculture, the former town supplying the area with candied popcorn, sold in great quantities during fiestas. In Tecpan, wooden articles are made, such as double-edged combs, loom

¹⁸¹It is here that Robert Redfield has established a sociological research base.

¹⁸² Roughly 55, 80, and 160 sq. km., respectively.

sticks, and dolls.¹⁸⁸ These are secondary, however, to the big surplus of maize, which is the chief source of income. This is not always apparent in the various neighboring Indian markets, however, for most of the maize is taken out in quantity, by mule train;¹⁸⁴ it is grown by Ladinos with large estates.

ENVIRONMENTAL BASIS OF SETTLEMENTS AWAY FROM LAKE ATITLAN

Settlements and communities in other parts of Guatemala may be analyzed in the same manner in which the Lake villages have been considered above, and with certain similar results. Nowhere will there be found, probably, such a degree of local diversity, both physical and cultural, as exists about the shores of Lake Atitlan. As to the general distribution of villages and towns in southern Guatemala, it can be summed up by saying that, between 350 m. and 2,600 m. elevations, there are numerous small towns and villages in which the Indian element is high, but for the most part the Indians are rural, living out in the fields and woods (*monte*). That the concentration of their numbers into compact settlements is often a result of relief conditions is evidenced not only by the Lake centers, but by such villages as Almolonga, Zunil, and Santa Maria, in the deep gorge along the Samala River. And yet, that site restriction is not essential to agglomeration is clearly shown in such open-valley towns and villages as San Andres Xecul, San Juan Ostuncalco, and Concepcion Chiquirichapa; and even the larger towns, Quezaltenango and Totonicapan. Though they had a wide valley from which to choose their town sites, nearly all have concentrated upon the piedmont of one side or the other. There are several reasons for this, as will be brought out in the following pages.

QUEZALTENANGO-TOTONICAPAN VALLEY REGION

Abundance of water is a major basis for piedmont locations, where streams and springs are numerous and rapid. Most of the upper Samala Valley settlements are at the foot of the mountains, abundantly supplied with water. The water system (see map 21; also McBryde, 1933, p. 65) depends upon streams

of good gradient for the small, slightly elevated reservoirs, to which water is conducted for redistribution to *pilas*. These are open watering places on the streets and in parks, patios, and buildings (pi. 10, d). Though I have as yet no record of their first establishment, they are certainly colonial, and probably were built at the time when the towns were founded.

Even though the Ladino town of Salcacha appears to be a notable exception, out on the Rio Samala, it is fairly near the mountains, and there are tributary springs flowing into the river here. Ruins near Salcacha indicate a pre-Columbian beginning, as do early accounts for Quezaltenango (ancient Xelahii; see p. 10).

Another important consideration here regarding bases for settlements is the matter of land diversity in supplying various needs of the community. Since trees are almost lacking from the valley, each settlement looks to the hills behind it for firewood. One of the unique features of this region is the appearance of firewood as a commodity in the market place (pi. 38, c), besides its usual role as a peddler's vendible. In this valley, as is often the case elsewhere, woodlot, pasture, and field converge at the piedmont.

The situation of Quezaltenango on the southern edge of the vallejo, centrally located with respect to the settlements of the region, gives it an excellent trade position. It is on the crossway of two important automobile roads and routes of native commerce; the north-south road from coastal Mazatenango to Huehuetenango and the Cuchumatanes (the southern part is by far the busiest transverse traffic line through the Altos of the Southwest);¹⁸⁹ and the east-west Altos road—the national highway that leads to the capital—affords a well-traveled route to Totonicapan in the east and San Marcos in the west (map 1). The daily market of Quezaltenango is large and crowded with as many vendors in a day as some of the big Altos centers have in a week (map 24). It is within easy access by open, level trails and roads, to all the numerous surrounding villages of the Valley. And, since this is a region of crafts, manufactured goods of all sorts fill the stalls of the large, enclosed market place. Pottery pours in from the eastern ceramic area of Totonicapan-San Cristobal-Santa Maria Chiquimula (map

¹⁸⁸The last two are from Tax, Ma. 1935.

¹⁸⁴ Though Indians from San Andres, Patzún, and Tecpán sell maize in big sacks at Panajachel on Sunday (on one occasion, October 25, 1936, I walked along the trail with six Tecpán men, each having a mule loaded with 120 lb. of maize, all of which was sold in Panajachel, with no return cargo), they are little in evidence at Sololá, among the rows of maize vendors. Ladino mule-shippers, usually two or three at a time, with five or six mules each, seem to handle this almost entirely.

¹⁸⁹ This is such an important trade route that the Guatemala Government spent eight million dollars in the construction of an electric railway from Lowland San Felipe to Quezaltenango. It was soon abandoned, however, for the grade was too steep and traffic was insufficient to repay high operating and maintenance costs. The line was in operation for only 3½ years (1930-33).

15). Local foot-loom (cotton) textiles, skirts, huipiles, and *sutes*, and "ready-made" clothes are supplements by cotton goods from the electric looms of Cantel by the *japce* (tie-dye) skirts and *sutes* of Salcajá and San Cristóbal, the huipiles of Totonicapán, and the famous blankets and woollens of Momostenango. Baskets are brought from Aguacatán, ropes from Cobán, hats from Quiché, lime from San Francisco, Cabricán, and Santa María Chiquimula; and so on; special products from centers in every direction (see maps 9, 10, 13, 15, 16, 17, 18). Highland broadbeans, *píloy* (large butter beans), and peaches meet coastal rice, pancia, and pineapples.

Though a linguistic boundary is crossed, and the western villages of the valley fall within the region of the Mam dialect, while the rest speak Quiché, paucity of distinctive costume types is apparent. From Cantel to Momostenango, from Totonicapán to San Marcos, the same peg bottom, all-fitting and shrunken blue denim suits, of modern European design, make all Indian men practically indistinguishable as to provenience (pls. 12, *r*, 13, *a*). There may be a bright-colored, distinctive, trouser belt of hand-woven material here and there, but that is the only identifying feature. The same condition exists on the Coastal Plain, with white trousers and often no top garment. One has but to step out of the high Quezaltenango Basin southward, however, in the strip above the Lowlands, to find distinctive dress still worn. The robes of San Martín men are striking, for example (pl. 32, *b*, *c*), and the men of Zunil who have not become Ladinized still wear a purple-and-orange-striped white suit (short trousers and cape-like shirt or women's huipil cloth) that resembles the Lake Atitlán dress. Almolonga men have special ceremonial costumes, including double pantaloons (pl. 31, *a*), of a type said to have been commonly worn a few generations ago, but otherwise they dress like Quezaltecos. These municipios where men have distinctive dress are also among the few surviving centers of stick-loom weaving. Just as the Lake Atitlán Basin is an area of isolation and diversity, so the Quezaltenango-Totonicapán Valley is one of intercommunication and relative homogeneity, bordered by areas of distinctive costumes.

Even among women whose dress is generally distinctive, many villagers in the Highland Quezaltenango region are difficult to identify. No one could mistake a Quezalteca or a woman of Almolonga, Cajolá, or Olinpeque; but one cannot always be

sure about the identity of women from San Cristóbal, San Andrés, Cantel, and San Francisco. Since stick weaving is no longer practiced (except for San Francisco *sutes*, and foot-loom turn out only skirts, *sutes*, napkins, belts and the like, the women have no huipil patterns of their own. They buy the electric-milled white cotton, and a few of them add a distinctive touch of collar embroidery (p. 52).

In this valley, among the professional itinerant merchants there are even many women middlemen who buy in one town and sell in another,¹⁰⁰ or sell goods in a number of different markets¹⁰¹ during the week.

San Francisco has probably the greatest "mushroom market" of the entire Highlands; it is chiefly a wholesale market. From an almost deserted village on all other days, high on a cold, wind-swept ridge, it becomes a crowded market center for thousands of Indians every Friday (pls. 35, 36). This is an illustration of commercial development due largely to intermediate location between several diversified producing areas. Though no pottery is made there, it is sold in great quantities, coming in from at least five centers on almost every side, both near and far. Numerous middlemen stock up with it, for resale in various smaller Highland centers, but particularly the Lowland plazas. Momostenango blankets, and local ones as well, are offered for sale in large stacks, and side streets are carpeted with newly made ones drying in the sun. Blankets are piled high on mules and shipped to Quezaltenango by hundreds. Sheep and raw wool come from many sources in the neighboring high country, and wire wool cards made in Chantla are much in demand.

The many loads of garlic¹⁰² that come from far-away Aguacatán, in the deep valley of the Rio Negro, far exceed the production of Patzúnchel, which is the chief source of garlic in the Lake region. Little pigs are driven by the hundreds down the trail, each squealing on the end of a string, to be sold in Lowland

¹⁰⁰ Illustrative of this were two Quiché women, who bought round potatoes, from three or four sources, on Friday at San Francisco de Alim and resold it Sunday at San Juan Chamelal. They carried large loads by themselves. Quiché's, such merchants are more (p. 80).

¹⁰¹ One group of women, who brought to San Andrés Xucil, sold regularly at San Cristóbal on Sunday, San Andrés on Tuesday, and San Francisco on Friday (pl. 39, *a*). I recognized only two who visited all three places. These were always about one of them. Such women trade in extremely rare goods from Lake Atitlán, because of relative inaccessibility and the scarcity of markets.

¹⁰² I have seen Quiché men in Chantla, who have bought this Aguacatán garlic here in quantities, crossing the border into Chantla to sell it. Both is brought up by truck; chiefly by a Ladino owner of a San Cristóbal. This is also the case now in San Marcos, Quezaltenango, and other large Highland centers.

markets (pi. 13, *t. inset*). From there come the great piles of salt; truckloads of panda (crude black cant sugar) and, sometimes during Lowland harvests, maize. Most of the enormous sacks of dried red chite are from the desiccated lands of the east, around Asuncion Mita, being sometimes trucked in, especially for fiestas.

Though there probably are not many more vendors at San Francisco than at Solola, there are more

wholesalers, with a greater variety of goods, and more commercial merchants. Here, near the Continental Divide, is a major meeting place of north and south, where streams of people flow to and from the weekly market. Apparently, this divide location, with accessibility to diversified products on all sides, constitutes the chief basis for the commercial importance of San Francisco Alto (p. 82).

SUMMARY AND CONCLUSIONS

Physically, Smith west Guatemala is highly diversified. The Pacific (controlled) Plain is low and hot, with rain falling only during the summer half year (here called winter, *a** in many other countries of the Latin American Tropics). Trees are usually scattered except along stream courses, and there is much good savanna grass for pastures. Soils are of rich alluvium derived mainly from volcanic ash and lava. Population is sparse and nearly all are Ladinos (culturally non-Indians) or Ladinized Indians, except along the inner plain, where there are towns and plantations (*fincas*) on or near the railroad. At the inner edge the lowlands rise steadily to the foot of the volcanic range, a straight row of high cones with long, steep slopes extending seaward. When, very rainy almost all year, and clothed with lush monsoon forest except where cleared for coffee plantations, this piedmont zone (to 1,500 m, or 4,921 ft, elevation) is well peopled. Indian farmers predominate—perhaps Ladini? permanent colonists of Highland origin and seasonal migrants coming down for the clearing and harvest. Climate and soil are ideal for coffee, which covers much of the piedmont. As in other crops, the quality is best near the upper limit of cultivation.

The Continental Divide is formed by an older volcanic range, mostly inland from and parallel to the file of young cones. Immense canyons have resulted where the larger streams rising at the Divide flow between high volcanoes to the Pacific. The volcanic Highlands, where most of the independent Indians live, are wooded in large part, oak and pine predominating. Much of the region has been repeatedly cleared for maize, so that it is covered only with grass or scrub. The Queraltenange-San Cristobal-Totonkapan Valley is almost without trees. The climate is cool, with rain coming during the summer 6 months as in the Lowlands. Soils are

fertile, derived mainly from volcanic ash and lava. The east-west deep interior valleys—structural depressions through which large rivers flow—are hot and dry (only a little rain coming during the summer), covered with scattered thornbush, cactus, and brush, with scrub oaks and pines coming in at higher levels on the mountains. This region, like the lofty Cuchumatanes Mountains to the north, is essentially nonvolcanic, consisting largely of limestone.

About 65 percent of the population of Guatemala is Indian, predominantly of Maya linguistic stock. Most of the rest are native-born whites and Mestizos of European culture (listed in the census as Ladinos), who control the political and economic affairs of the Republic. There are a few foreigners and fewer Negroes. The densest population in Guatemala is found in the cool southwestern Highlands, where most of the Indians reside. Here, besides climate—favorable terrain, good water supply, and natural routeways stimulate concentrations of population. In the Quezaltenango-Totonicapan area, densities range well over 300 per square mile, with as high as 97 percent Indian. Lowland agricultural colonies of Highland Indians are sometimes still maintained as was done on a much larger scale in pre-Columbian times. In speech and in dress, especially, Indians have become Ladinized in regions of greatest ease of intercommunication where many Ladinos live in fairly close contact with them, and where Indians go far to trade and must speak Spanish. With isolation, the cultural individuality of the Indians is best preserved. Ladinos are for the most part town dwellers, whereas Indians usually live on the outskirts, or in small villages, or scattered over the countryside.

The economy is basically agricultural, with maize by far the most important staple, supplying possibly as much as 80 percent of the food consumed in the

region. Beans and squashes are next in importance. The milpa, or cornfield, is deeply and carefully hoed and in some regions plowed, notably in and near the Cuchumatanes Mountains. Fertilizer is often used, in the Highlands almost exclusively, with shifting sheep pens providing most manure in the higher mountains where soils are leached. One harvest in the Highlands, two or more in the Lowlands, and all coming at different seasons, contribute to an important interzonal corn exchange. Some of the most important New World cultivated plants were domesticated or improved in western Guatemala. Wheat, broadbeans, and European vegetables are important introduced crops in the Highlands, from high latitude Old World regions; coffee, rice, and sugarcane are the chief Lowland exotics from the Old World Tropics and sub-Tropics. Coffee grown mainly along the volcanic piedmont, began to replace cacao, ancient Maya and Aztec "money", as the chief plantation crop about 1850. In its cultivation, clearing of the monsoon forest and replacement of shade trees has transformed the vegetation in much of the inner Lowlands. Great population shifts have taken place also; foreign planters have come in, and thousands of Indians have moved, some permanently, some seasonally, from their Highland homes. Vegetable culture, one of the major local enterprises in commercial agriculture, is confined almost entirely to three areas in the Highlands. Though this is an Indian occupation, the Indians themselves have acquired a taste for little other than onions and garlic; they grow vegetables to sell primarily to Ladinos. Lowland agriculture is generally desultory, and most of the many useful trees are little cultivated. Chickpeas constitute an important Lenten specialty, produced almost solely, in one locality, San Pedro on Lake Atitlan.

The chief domesticated animals are cattle, mules, sheep and a few goats, and pigs. Cattle bred in the dry Departments of eastern Guatemala are driven to the Lowlands of the Pacific southwest. There they are raised and sold, the bulls for slaughter mainly in the Highlands, where cows are kept chiefly for milk. Sheep, numerous above 2,000 m. (6,562 ft.), are little eaten. Wool is their most important product, and many flocks consist principally of black sheep. Pigs bred largely in the Highlands by small-scale farmers, are raised for the most part in the Lowlands, where there are more seeds, greens, fruits, and corn to feed growing animals. Iguanas are the most important wild animals eaten. They are marketed alive, mostly

during Lent, as they are not considered flesh (at that time of year the females are more easily caught while on the ground to lay eggs). Much salt fish is then eaten also, brought from the Pacific coast of Guatemala and Mexico. Most of the meat consumed is unsorted beef and pork; but meat is considered a luxury reserved mainly for festive occasions, and constitutes probably less than 5 percent of the total diet.

House types show a close relationship to the natural environment. In the hot Lowlands, walls are of vertical canes, poles, or boards, widely spaced for ventilation. Better houses and buildings are made of adobe. Above about 1,500 m. (4,921 ft.) elevation, where it is cool, adobe brick and wattle-and-daub walls predominate. Adobe, usually whitewashed and tinted, is the wall material for house and courtyard in the towns, where tile roofs are the rule. Thatch, of the best material locally available, is the roof type for rural dwellings from the Pacific shore to the mountains. There are no chimneys, and large windows are seen only in Ladino houses.

Ladino dress is essentially European, of simple peasant style except among the modern well-to-do plantation (finca) owners and town dwellers. Such exceptions would be considered Ladinos only in the census, for the well-dressed aristocracy are "Guatemaltecos." Indians, on the other hand, have a wealth of colorful, individualistic costumes, varying from one municipio to the next in areas where villages are isolated from one another and women weave much of their own clothing. There is less variation in easily traversed regions, where men nearly all dress alike in blue denim. Women retain more of their traditional costumes than men, just as they learn less Spanish, for they do not travel as widely.

In five Highlands especially, crafts and industries are varied and localized. This is true in the making of pottery, basketry, metates, lime, textiles, hats, mats, leather, furniture, charcoal, and many other products. To a large degree, special occupations are located within easy access to raw materials, as in the case of wool weaving, metates, lime, pottery, calabashes, and others. In many cases, however, they are based largely upon tradition. Weaving is the most highly developed of the crafts, and the one which offers the best medium for artistic self-expression. Few industrial pursuits are carried on in the Lowlands; there are not so many Indians or raw materials.

With agriculture and crafts extremely specialized and diversified from place to place, owing largely to great local environmental and traditional differences

close together, complementary and mutually dependent economic regions have developed in juxtaposition. This has stimulated trade, so that markets play a major role in the economic and social life of most of the larger communities. This seems to have been equally true in pre-Columbian time, for Maya and Aztec commerce were well established. Plaza and church are closely associated, as were market and temple in ancient days.

Acculturation is evident in settlements and settlement patterns as in other aspects of culture. Not only combined Spanish saint and Indian place names, but village and town plans as well show the stamp of the European veneer over the deep-rooted native substratum. A stone church and a square often appear among irregularly scattered thatched huts. In larger villages and towns there is usually a rectangular street pattern; but people of European descent determine the nature of town or village in most cases. A large number of Indians almost without Ladinos generally occupy a village, such as Santiago Atitlan, which is almost twice as large in population as the town of Solola. The latter has more Ladino than Indian inhabitants.

The municipio (smallest political unit) is ordinarily the area of greatest cultural homogeneity, manifested in dress, speech, kinship, and even economic pursuits in many instances. Some of these areas are probably modern survivals of colonial *reducciones*, or groupings of Indians into compact settlements.

They were established by Spanish governors in conjunction with the Church, for ease of administration of the "heathens." Similar *municipios* grouped together may formerly have been larger culture areas. Much land is privately owned by the Indians, but *municipios* have communal property, which, besides woodlots and pastures, contain farm lands that may be deeded for life to landless inhabitants.

Some settlements are clustered, with the population compressed into small, compact centers, from which the people go out to work their fields, or to trade and return home. Other settlements are dispersed, with dwellings widely sprinkled over the landscape, and a relatively minor village to which the Indians come in from market, church, and any official business to be conducted. Clustered settlements are best developed around the shores of Lake Atitlan, where site limitations are extreme. Other nucleating factors besides terrain conditions are: Permanent water supply; situation with regard to arable lands, markets, trade routes, and sources of goods; specialized occupations, commercial, industrial, or agricultural, which may depend in turn upon environmental advantages; availability of remunerative employment; tradition or historical precedent.

Though routes follow natural corridors wherever possible, many cross major relief barriers, to which the movement of people is often remarkably indifferent.

APPENDIX 1

SUMMARY NOTES ON THE
PHYSICAL ENVIRONMENT

GEOLOGIC FOUNDATION OF THE LANDSCAPE

(Map 5)

In their broad features, the physical landscapes of Southwest Guatemala reflect to a high degree the underlying geologic make-up of the region. The Pacific Coastal Plain (*costa*), with its frayed, recently emerged lagoon shore, consists for the most part of alluvial material (V. A1, map 5) derived from the parallel volcanic Highlands which loom to the north and rise abruptly from the Lowlands in the form of a nearly straight inner range, trending northwest-southeast. This southwestern margin of the elevated interior is fringed with strikingly steep, young eruptive cones of andesite, ash layers alternating with lava flows (V., map 5). There is a disparity between the highest points of elevation and the Continental Divide. The latter is formed by an older volcanic range (*Los Altos*, V., map 5) with its axis parallel to and inland from the recent volcanic chain; many of the cone summits rise higher than the broadly undulant crest of the Altos, the average elevation of which is greater, however, than the file of recent volcanoes. The trough between the two ranges, which coincide only at the great cone of Tajumulco, highest point in Central America, is filled with immensely deep deposits of pumiceous ash and breccia. Great irregularities characterize this zone, with basins which may contain lakes such as Atitlan (map 20) and Amatitlan, or wide expanses of nearly level plains composed of fine fragmental ejecta like that of Quezaltenango (pi. 38, a); between such basins rise great ridges of resistant volcanic material such as lava flows from recent cones. The interior trough country of Huehuetenango-Sacapulas-Salama (pi. 42, e) is made up predominantly of ancient crystalline rocks (Cr., map 5), especially granites and gneisses, which apparently form a basal horizon underlying much of the more recent, superimposed volcanics to the south. In this older region of Antillean structure, the fold-axis is east-west, the strike of which is reflected in the master streams, as the Culco and Negro. These rivers follow close upon the line of contact between the crystallines on the south, and the calcareous sedimentaries of the tremendous, sharply elevated horstmassif of the Altos Cuchumatanes, directly to the north (Ls., map 5).

The Highlands are everywhere deeply dissected, though the *barrancas*, or gorges, that attain immense depths, are frost steep-sided and abrupt in the region of fragmental eruptives, where loesslike ash retains high, vertical faces. Short, rapid, nearly parallel rivers are very numerous along the rainy Pacific versant (map 1). The greatest canyon profundity is attained where antecedent streams flow between volcanic cones. Erosion is at a maximum where steep "initial slopes (formed by eruption of faulting) lend high elevities to the torrential wash of heavy rainy-season downpours, and unconsolidated material has been exposed by

agricultural clearings. Such combinations of factors are not at all uncommon in the more populous sections of the Highlands (pis. 26, a; 45, 0.

CLIMATE AND WEATHER

(Map 6)

Climates in native terms, as generally classified in mountainous Latin American countries within the Tropics, are three: *Tierra caliente* (hot) roughly 0-1,000 m. (3,280 ft.), *tierra templada* (temperate) 1,000-2,000 m. (6,562 ft.), and *tierra fria* (cold) over 2,000 m., the limits being somewhat vague and inconclusive as regards natural vegetation and agriculture. There are two seasons recognized locally: "*Verano*" (dry) and "*invierno*" (rainy), in which the words "summer" and "winter" are actually applied in reverse to seasons of low sun and high sun, respectively. In terms of the Koppen system, there are three major climatic belts, a broad Lowland tropical savanna (Awgi) (see map 6 for explanation of symbols), extending upward into the Lake Atitlan Basin through the low gap of San Lucas; a narrower tropical monsoon (Amw"i) along the piedmont and orographic front exposed to marine winds; and a mesothermal winter-dry (Cwg), extending throughout the Highlands, above an average elevation of about 1,450 m. Seasonal ranges of temperature are everywhere slight, though diurnal extremes are generally high, especially during the clearer dry season. This almost rainless *verano* lasts from early November through April in most of the region except in the monsoon belt, where it is reduced to a December-March period of low rainfall, not, however, so dry as in other climates above and below the wet zone. The band of heaviest precipitation here along the Pacific slope is between about 700 and 1,400 m. (2,297 ft. and 4,593 ft.) elevations, where humid marine air is cooled below condensation temperatures by orographic ascent. There is a distinct double maximum (June-September), with most of the rain coming in heavy afternoon and evening showers. The prevailing day-time wind of the Highlands is southerly (marine), beginning about the middle of the morning, and accompanied by heavy cloudiness above about 2,000 m., even during the dry season. Only on days of high pressures and strong northerly winds, commonest from December through March, are skies exceedingly clear all through the day. The pronounced diurnal wind-shift ordinarily brings such north winds ("land-breeze," "mountain-breeze," and trade-wind, combined) at night, through most of the year, except during wet season "*temporales*," or prolonged, almost uninterrupted spells of rainy weather. Normally, after sunset the massive cumulus banks associated with afternoon convection are rapidly dissipated or swept southward, leaving the sky clear. (For a more complete discussion of climate and weather, see McBryde, 1942 a and 1942 b.)

SOIL TYPES

Soils in the Lowlands (*costa*) below about 700 m. are predominantly alluvial. In the outer Lowlands, or Coastal Plain, from sea level to 100 m. (328 ft.), there is a heavy black silty soil, swampy in the rainy season, then dried and cracked in rough, irregular blocks during the rest of the year. Above this region there are loams, varying in color from buff to mahogany brown. Reddish loams over pumiceous, ashy subsoils characterize the *boca costa*, or piedmont, marginal to the inner edge of the Coastal Plain, with which it blends imperceptibly. Highland soils are loamy, with more clay than in the Lowlands, yellowish to dark brown in the young volcanic region, often reddish in leached and eroded sections of the older volcanic and nonvolcanic areas. Severe gullying is widespread, especially in the sheep-grazing regions of the Highlands. Near Momostenango and Quiché it is particularly evident (pis. 29, c; 30, e, f). Raw humus is deep and well developed in the high, undulant alpine meadows, especially above about 2,500 m. (8,202 ft.) (pi. 32, a, b).

NATURAL VEGETATION

(Map 7)

The vegetation pattern fits roughly into the climatic and edaphic scheme. Along the littoral back from the high, bare, barrier beaches is a low, dense thicket dominated in places by swamps of mangrove and fan palms. Most of the Coastal Plain, however, is covered with savanna grasses and open stands of tall, spreading trees, having a somewhat deciduous character (pi. 3, c, d). Gallery forests line the numerous streams which flow across the plain. Dense groves of giant corozo palms are common in the outer Lowlands (pi. 2, a). There is a great diversity of useful plants, cultivated and uncultivated, throughout the coastal Lowlands, the open, parklike aspect of which is in part a result of climate and in part, of oft-repeated clearing for agriculture. The belt of heavy orographic rains, along the lower Pacific mountain slopes, is covered with a natural vegetation of luxuriant, wet monsoon forest (pi. 5, b, c; maps 6, 7). Much of this has been replaced by artificial plantings, especially along the interfluvial ridges, of coffee and shade trees. Upward from about 1,500 m., where annual rainfall is generally reduced, more open forest prevails, with evergreen oaks and long-leaved pines in abundance, the latter appearing especially above 1,800 m. along the Pacific versant (pis. 10, i; 12, d; 28). A giant, coarse bunchgrass (*Muhlenbergia* sp.) becomes dominant in the vegetation picture, along with pines, in the elevated realms (above 2,500 m. or 8,202 ft.), while the rounded summits are crowned (above 3,000 m. or 9,842 ft.) with flower-carpeted alpine meadows, shaded occasionally by thin stands of cypress and giant pines, and draped, during the day, with billowing mountain fog (pis. 30, a; 32). The desiccated interior troughs and basins of Southwest Guatemala are covered with xerophytic associations, dominated by cactuses and thorny acacias and mimosas (pis. 42, e; 43, e).

REGIONS OF SPECIAL EMPHASIS IN THE FIELD WORK
(Map 4)

Lake Atitlan region (map 20).—The Lake Atitlan Basin is a huge, oval-shaped, volcanic depression (caldera) which has resulted apparently from a crustal collapse following long-continued outpourings of ash and lava. The average diameter of the caldera is about 15 miles (24 km.). Precipitous gullied walls, gorges, and headlands border the crescentic Lake (mean elevation 5,100 ft. or 1,554 m.; maximum depth 1,083 ft. or 330 m.) on three sides (pis. 45, 46), the south shore being formed by volcanic cones (three major and four minor ones) which have risen from the old caldera floor and rim, and which have apparently elevated the level of the water somewhat by blocking the normal drainage toward the Pacific. Because of the rugged surroundings and rough water, most of the 13 well-nucleated Lake-shore settlements are sharply isolated from one another. The Lake drainage is now entirely subterranean, the greater flow probably being from under the southeastern corner. There are long-term periodic fluctuations in level which seem to be due to shiftings of deep-seated fissures, variously opening and closing outlets. I observed water moving toward one of these outlets near San Lucas in 1936 (see map 20). (What is probably this same outlet, and another near San Antonio, are indicated on the 1685 (?) map of Fuentes y Guzman, 1932-33, vol. 2, opposite p. 60.) A subordinate factor is seen in alternations of abnormally wet and dry years. A hypothetical physiographic and probable historical sequence of levels, based upon field and library evidences, follows.

In the early history of the Atitlan Basin the water level was much higher than at present, perhaps between 5,700 feet (1,737 m.) and 6,000 feet (1,830 m.) elevations, with surface drainage, mainly, if not solely, at the present bay of San Lucas (pi. 46, d). Erosion may have cut down the southeastern arm, dropping the Lake far below its present level, so that the Rio Panajachel and Rio Quixcap, entering the basin from the north, cut deep canyons. As Volcano Atitlan grew, it raised the southeastern Lake rim, and hence the water level, to about 5,200 feet (1,585 m.). Then the northern river valleys were flooded, so that fine-grained deltaic deposits resulted. At the time of the Conquest, the Lake level was about 30 feet lower than at present (5,080 ft. or 1,548 m., 1936), then by the late 17th century it was about 20 feet higher (5,100 ft. or 1,554 m.), where it still appeared to be early in the 19th century. In about 1824 it had fallen 40 feet or 12 m. (to 5,062 ft. or 1,543 m.); risen to 5,100 feet by 1866; dropped to 5,080 feet (1,548 m.) between 1900 and 1910; reached 5,062 feet about 1920, until it began to rise once more in 1930 (pi. 18, b). The greatest known increase of any one year was 11 feet, in 1933, which was phenomenally rainy. The rise continued until 1936, when outlets appeared to maintain it at about 5,080 ft (pi. 18, d). An average annual rise and fall, with wet and dry seasons, is approximately 3¼ feet. As an historical average, and for convenience, 5,100 feet has been assumed as the Lake level for map 20 (pi. 47). Rich in micro-organic life, the Lake teems with fish, especially very small ones, of which there are three main species, one of them important for food. Larger fish (*fnojarras*), though numerous, are seldom taken,

the natives preferring the more easily caught *Pescadíos* (pis. 22, *d, e*; 27, *c, d*). The only other fauna of economic significance in or around the Lake are crabs, which are numerous and much in demand, being caught by natives of only a few of the shore villages (pi. 22, *f, g*). All of the above-mentioned forms of life have been known in the Lake since pre-Columbian time. Climatically, the Lake is in a border zone between tropical and mesothermal, winter-dry (map 6). Chaparral and oak-pine vegetation predominate (map 7), and population is generally sparse except in the concentrated villages (map 8).

Quezaltenango-Totonicapán Valley region.—The Highland Quezaltenango-Totonicapán Valley region ranges around 2,350 m. (7,710 ft.), 800 m. (2,625 ft.) higher than Lake Atitlán. The rather level floor is composed of recent beds of pumiceous ash, across which meander the entrenched Salama headwaters (pi. 38, *a, /*). The area is colder and drier than the Lake Basin (map 6); short grass predominates in the valley (map 7), bunchgrass on upper slopes; trees are few, except for pines on the high surrounding

mountains (Continental Divide range to the north, young volcanic cones to the south); most of the land is cultivated, settlement is dense (pi. 8), yet extensively scattered; intercommunication is easy and people travel freely from village to village.

The Lowlands.—The piedmont between Chicacao and Retalhuleu, and the Coastal Plain between tyazatenango and Tahuesco, constitute the third region of emphasis. Elevations here range from 200 to 1,000 m. (656 to 3,280 ft.). Physically, this is a region of mainly unconsolidated volcanic eruptives and alluvium, traversed by numerous short rivers, roughly parallel, flowing from north to south (maps 1-5). The climate is tropical, ranging from savanna to monsoon (map 6); natural vegetation, open park-savanna to dense, lush monsoon forest (map 7). Shrimp and fish both large and small, and all of economic significance, are numerous in the streams and lagoons, while iguanas abound in the outer Lowlands. Plantation settlements prevail, population is moderately dense in the piedmont and sparse in the Coastal Plain (map 8); and accessibility high.

APPENDIX 2

MAJOR CULTIVATED PLANTS
NATIVE TO THE AMERICAS
OR EARLY INTRODUCED¹⁸⁹CHIEF CROPS IN GUATEMALA SUBSISTENCE
AGRICULTURE

MAIZE OR INDIAN CORN

Maize (*mate*, *Zea mays*) until recently was thought by most authorities to have been a derivative of some sort, probably hybrid, of teosinte (*Euchlaena mexicana*). Since this "god grass" of the Aztecs has been found as a weed in Mexico, and as a true species growing wild only in several limited areas in Guatemala,¹⁹⁰ the Mexico-Guatemala region was regarded as the original home of teosinte and maize. Vavilov reached this conclusion on the basis of varietal diversity in conjunction with the occurrence of wild relatives.¹⁹¹ He was strongly influenced by the presence of teosinte solely in Mexico and Central America, so much so, in fact, that, as Mangelsdorf and Reeves point out (1939, p. 243), he was apparently inclined to overlook the greater variety of maize types in Peru than in Central America. These latter authors have shown that teosinte is a relatively late and natural hybrid of *Tripsacum* and *Zea* which originated in some part of Central America (ibid., pp. 203 ff.). They conclude that maize in its original form was a wild pod corn (the homozygous, true-breeding type), having, as Weatherwax (1918) had earlier suggested, and Montgomery before him (1906), a common progenitor with *Tripsacum*, and native possibly to extratropical South American Lowlands (Mangelsdorf and Reeves, 1939, pp. 231, 248 ff.), whence it spread to the Andean region and was improved by domestication and selection, reaching Central America and Mexico relatively late, as a small-seeded flint (ibid., p. 254). This latter idea is evidently based, at least in part, upon the Russian findings here of the greatest diversity of flint corn in the world (Bukasov, 1930, p. 33, English summary, p. 472). My collections of over 500 ears from nearly 50 localities representing most of western, and much of southern and eastern Guatemala, have shown a maximum variety and abundance of flinty corn, especially in the Highlands, with much less flour and dent corn there (pi. 30, d). The latter grows mainly at lower altitudes.

Bukasov (1930, pp. 472-473, English summary) concluded that dent corn originated in Mexico, flint in Central America, and flour corn in Colombia. Mexico and Central America

were found by the Russians to be the center of diversity of three out of the four main corn endosperm types (apparently considering *Zea mays everta*, or popcorn, as one of these, in addition to the three named above), and hence, according to them, "the primary center of maize origin."

One of my collections, made in 1940 for Harvard University, was studied cytologically by Mangelsdorf and Cameron. Their publication, "Western Guatemala a Secondary Center of Origin of Cultivated Maize Varieties," presents their principal conclusions derived to date from this study. Plants from 200 ears of the collection were grown in Connecticut. With regard to chromosome knobs, they found in an area approximately the size of New York City, in corn from the Department of Huehuetenango, "almost all the knob positions known in maize from any part of the world. . . ." They concluded that "in an area less than half the size of the State of Iowa, are found probably more distinct types of corn than occur in the entire United States," and that western Guatemala, though "not the area where maize culture originated or the focus from which it spread to all parts of the Americas," is "the center from which the majority of maize varieties now cultivated in Central America, North America, the lowlands of South America and the West Indies, have been derived" (Mangelsdorf and Cameron, 1942, p. 224).

BEANS

Beans (*Phaseolus* spp.), *frijol* in Mexico and Central America, and according to Bukasov (1930, p. 505) usually *frijol* in Colombia, also showed greatest diversity, in the Russian collection, from Mexico and Guatemala, with Colombia second, and Peru-Bolivia third.* The large geographic group north of the Isthmus of Panama appeared to be quite distinct from those of South America. Of the four species of *Phaseolus* the Russians found tepary (*P. acutifolius*) to have the most limited distribution. They collected it only along the Pacific coast of Chiapas, to the "frontier of Guatemala, where it probably also occurs."¹⁹² In 1936 I collected this bean at Santo Domingo Suchitepequez, in Guatemala, 40 miles from the Mexican border, substantiating their supposition and extending the record of its oc-

¹⁸⁹ The question of origins of American cultivated plants has been considered in a critical and stimulating paper by Carl Sauer (1936).

¹⁹⁰ Kempton and Popenoe, 1937. These men determined the distribution of teosinte in the Jutiapa-Lake Retana region of eastern Guatemala and discovered remarkably heavy growths of the plant in the vicinity around San Antonio Huista, western Guatemala. I found it also, in 1940, near San Luis Jilotepeque (eastern Guatemala) and as far out from the San Antonio Huista center as Santa Ana Huista and Santiago Petatan. Jusepczuk, of the Vavilov school of Russian plant geographers, ventured to call Guatemala the "cradle of maize" (on the basis of horn-like, teosintelike endosperm in Guatemala *Zea mays indurata*).

¹⁹¹ Vavilov, 1931. For a good summary of the Russian method, see Brutnan, 1936.

¹⁹² Results of Ivanov's research showed 246 Mexican varieties of "common and multilobed bean" (2/3 uncolored) and only 77 Peruvian, all colors equally divided (Bukasov, 1930, ch. 12).

¹⁹³ Bukasov, 1930, p. 505. The English summary of this work erroneously states further that the Russians actually found *Phaseolus acutifolius* in Guatemala: "to its area known up to the present time and limited in the south by the state of Guadalajara must be added the region of Chiapas and Guatemala established by us" (ibid., p. 511). Yet in the Russian text, they state specifically their single discovery: "Two rare species were discovered here side by side with *Phaseolus vulgaris*, *P. multiflorus* (= *P. coccineus*) and *P. lunatus*: on a small strip of Chiapas (Tapachula, Suchiapa) was *P. acutifolius*, and only in one place namely in Santa Isabel (fig. 47), *Canavalia ensiformis*" (for discussion of *C. ensiformis*, see p. 147).

currence into Guatemala; it was called *ixcumita* (Bukasov recorded *escumite* or *escontite* from Chiapas and Guatemala).¹⁵⁴ Butter beans (*P. coccineus*, *multiflorus*) the Russians found in greatest variety of form and "widely grown only in Mexico and Guatemala" (Bukasov, 1930, p. 505). Common Mexican names are *ayecote* (Oaxaca) and *botil* (Chiapas). In the Cuchumatanes Mountains of Guatemala it is called *chatnborote*. In Southwest Guatemala large varieties of butter beans are generally called *piloy*, white, red, yellow, black, and mottled, common in the Quezaltenango market and other Highland centers. In the Lowlands, "piloy" ordinarily refers to the small and large lima (respectively, *P. lunatus sieva* and *P. lunatus macrocarpa*), also called *ixtapacdl* in certain regions.¹⁵⁵ The lima bean is not called *haba* in Southwest Guatemala, as it is in some Spanish-speaking countries. *Haba* always refers here to *Vicia faba* (see pp. 22, 28). *P. lunatus* is reported by Bukasov (1930, p. 505) as "grown everywhere [in Guatemala], but in limited quantities." In Southwest Guatemala it is not grown except in the Lowlands,¹⁵⁶ and is rarely seen in any of the Highland markets. Bukasov's statement that "*P. vulgaris* is cultivated upon the largest area and in preference to the other species" is true for Guatemala as a whole, but near the upper limits of bean cultivation *P. coccineus* is grown almost exclusively. The small, black *P. vulgaris* of middle altitudes is most in demand of all beans in the area (p. 104). Bukasov's statement that all the beans are cultivated to elevations of 2,500-3,000 m. (8,202-9,842 ft.), with *P. lunatus* and *P. acutifolius* belonging "chiefly to the torrid zone," should be modified. It is doubtful whether these two grow above 1,500 m. or 4,921 feet (except on Lake Atitlan) and 1,300 m. (4,265 ft.) respectively, so that they more properly belong only to the warm Lowlands.

The Russians present a strong case for the origin of all the beans except *P. acutifolius* (Mexican origin; see Bukasov, 1930, p. 551) in Central America. E. Dittmer (ms.) is quoted by Bukasov to the effect that *P. coccineus* and *P. lunatus* var. *microspermus* (small-seeded) are native to Central America. Bukasov puts the small round variety in Yucatan, and the small flat type in Mexico and Guatemala.¹⁵⁷

Oviedo, in listing the major 16th-century food staples of Honduras, included "maize, manioc (bitter and sweet), sweetpotatoes, chile, and a great abundance of zapote mamey" (Oviedo, 1851-55, vol. 3, p. 219) but did not even mention beans. However, he said of Guatemala that the healthy, prolific soil produced "maize, many fruits and vegetables, beans of many kinds," etc. (ibid., vol. 4, p. 33). In his special section on crops, he cited Mexico and Nicaragua as particularly noted bean-producing areas. The mainland generally was more important for beans than the West Indies. In Nagrando (Nicaragua) Oviedo "saw harvests of

¹⁵⁴He states also that the name *asconita* or *escumita* is applied in the Department of San Marcos to *Vicia sinensis*.

¹⁵⁵In the United States, "butter bean" may refer either to *P. lunatus* or *P. coccineus*, so that lima and butter bean are sometimes not distinguished, as is the case in Guatemala.

¹⁵⁶A small, red, flat "piloy" at Santa Catarina Palopd is a lima variety (*sieva*); this (1,550 m. or 5,085 ft) is probably higher than the usual upper limit, since it is on the mild Lake shore.

¹⁵⁷Bukasov, 1930, p. 551. In a later work, Ivanov says, "Yucatan apiwara as a secondary center and a noteworthy focal point of endemic forms of *Phaseolus lunatus*. . . ." (Ivanov, 1937, p. 62).

hundreds of 'hanegas'" of beans." In that land and others of the coast (Pacific) there were many kinds of beans, some yellow, others speckled. A large one like an *haba* (broad-bean), bitter when eaten raw, may well have been a large lima.¹⁵⁸ More care with this agriculture was taken in Nicaragua than in any part of the Indies where Oviedo had been (Oviedo, 1851-55, vol. 1, p. 285).

PROBABLE ORIGINS OF PHASEOLUS SPECIES IN GUATEMALA

Kidney bean (*Phaseolus vulgaris*).—In December 1941, I found a wild bean that was strikingly similar to *P. vulgaris* (no wild form of which had been previously recorded in botanical literature), though it was considerably smaller than the common kidney bean. It was growing on a steep slope high above San Antonio Huista, along the trail leading from Jacaltenango, and at an altitude of about 1,500 m. (4,921 ft.). Here, it was deriving mechanical support from stalks of teosinte, wild relative of maize. Pods were small and green, and there were no flowers. The same bean came to my attention in the woods just southwest of the village of San Antonio, elevation 1,200 m. (3,937 ft.). The pods were dry and many of them had sprung open; with a quick spiral twist they ejected the seeds. Varied collections of these (most of them quite small, black, dark brown, yellowish brown, or mottled black and coffee brown) were sent to several botanists, but to no avail insofar as positive identification was concerned. It was agreed that the plant looked in every way like a wild form of *P. vulgaris*. There were no flowers, however, and none of the seeds which were grown in California, Ohio, and Maryland produced any inflorescence, though the plants were vigorous. The long summer day no doubt caused the difficulty (see Mackie, 1943, p. 12). Finally, through the efforts of Gen. Miguel Ydigoras Fuentes, Guatemala Director of Roads, and Colonel Rosales, Jefe de Huehuetenango, I was able to obtain flowers early in 1944. Dr. Roland McKee, of the United States Department of Agriculture, identified the bean as a wild form of *P. vulgaris*, and found a record of a similar bean sent from Guatemala by Garcia Salas in 1933. Because of the removal of this material from Washington for safekeeping, it will not be possible to compare these beans and make certain the identification until after the present war. Dr. McKee doubts whether the plant has been named.

Locally, this bean is called "matz" or "cumatz" by the natives of San Antonio Huista. The Indians collect the beans, which are highly esteemed, and eat them usually in gruel (*atol*), I was told; *mate* means *atol* in Tzental, a language of nearby Chiapas. They are also eaten in the pod (*ejote*).

The occurrence of this wild form, with highly varied seed colors, as well as the great variety of cultivated types of *P. vulgaris* throughout the region, may be regarded as strong evidence of Guatemala origin of the common kidney bean.

¹⁵⁸ *Hanegazfaneoa* (hundredweight, a measure of grain, roughly corresponding with the English bushel).

* The cyanogen contained by all Hraa (according to Mackie's species criterion) would cause the bitter taste. Although this large bean may have been a lupine, as Mackie suggests, the date was early for such an introduction (the lupine of cultivation in El Salvador today is *Lupinus hirsutus*, of European origin. See Standley and Calderon, 1925, p. 114.)

Lima bean (*Phaseolus lunatus*).—W. W. Mackie recognized great varietal diversity of limas in even the small seed collection which I made in various parts of western Guatemala in 1935-36. This diversity served as corroborative evidence in support of his hypothesis of large and small lima origin in Guatemala (Mackie, 1943). Ivanov (1937) expressed the belief, with little evidence to support it, that the large lima as well as the small originated in Central America. Most botanists put the home of the large lima in Peru as the name indicates. A remarkably large, thin lima, bright red and black striped and splotched, under desultory cultivation by the Indians along the piedmont of western Guatemala, from whom I first obtained it in 1935, is regarded by Mackie as a primitive prototype, and indicative of Guatemala origin for the large lima (Mackie, 1943, p. 8). In 1940-41 I found wild limas in the western Cuchumatanes piedmont (near San Antonio Huista, department of Huehuetenango), in the Lake Atitlan region, and along the Pacific piedmont.

Among the economically important varietal traits of some of the small black limas from Guatemala was a strong nematode resistance, which Mackie was able to breed into commercial California limas, at great savings to those crops.

Both in Chiapas and Guatemala great local diversity of limas is apparent, and special Indian names are given to them, such as *ixtapacdl*, *ixpanqui*, *piloy*, etc. There is a great range in size, color, and shape, from nearly spherical to flat, as evidenced in table 6, describing some of the beans which I collected in 1935 and 1936.

SQUASHES, PUMPKINS, AND GOURDS (FAMILY CUCURBITACEAE)

CUCURBITA SPP.

The many cucurbits, both American and those of Old World origin, serve a great range of purposes in Guatemala; for receptacles, the gourds are probably as important in the daily life of the Indian as are the squashes and melons for

food; greens, flowers, and seeds (for *dulces*, or candy) as well as fruit, are eaten in abundance.

The American origin of all species of the genus *Cucurbita*, as maintained by most botanists since Decandolle, is confirmed by Russian opinion (Bukasov, 1930, p. 301).

Squashes and pumpkins (*ayote* and *calabaza*, *Cucurbita moschata* and *C. pepo*).—Particularly widespread and abundant are the varieties of squash and pumpkins (*ayote* and *calabaza*, *Cucurbita moschata* and *C. pepo*) of many dark greens and whites, variously mottled and striped, though some are yellowish; round (globular and flat) and oblong, smooth and lobed, they form an essential element of the milpa. Not only is the flesh of the squashes eaten, generally boiled or in soups, but the seeds (*pepitoria*, commonly made into candy and preserves), leaves and flowers as well, boiled as greens.

Since *C. pepo* was "not found" by the Russians "to belong to the crops grown in South America by the natives" (Bukasov, 1930, p. 531), and since it is commonly called in Central America "ayote" (an Aztec name), these facts would seem to indicate northern origin, possibly Mexican, or as Zhitenev suggests, even farther north, in "Canada and the U. S. A." (Bukasov, 1930; Zhitenev's ch. on Cucurbitaceae). He states that the determination "is difficult by reason of the suppressing of the native culture from Canada and the

Standley points out the confusion in the identity of the squashes: "There is some doubt as to the proper specific name of the 'calabazas' grown in Central America, but they seem to be squashes rather than pumpkins, and are therefore referable to *Cucurbita moschata*, rather than to *C. pepo* L., if there is any essential difference between the two" (Standley, 1930, pp. 434-435). In an earlier work he identified the *ayote* of El Salvador as *C. pepo* (Standley and Calderón, 1925, p. 213). The terms are loosely applied in Guatemala. Bukasov says with regard to this nomenclature, that "at present *C. pepo* carries in Mexico and Costa Rica the native name 'ayote' or the Spanish one 'calabaza', serving for all Cucurbitaceae. *C. pepo* is called by the natives 'guicoy'" (Bukasov, 1930, pp. 19). From my own experience, I cannot verify this with reference to Southwest Guatemala where the name "guicoy" is always applied specifically to a small, warty, deeply-lobed variety (apparently *C. pepo*), confined to altitudes probably above 1,600 m. (5,249 ft.).

TABLE 6.—*Phaseolus* specimens and other edible legumes collected in Guatemala during 1935 and 1936¹

Locality	Scientific name	Common local name	Description	Weight in grams per 100 beans
Quezaltenango	<i>Phaseolus coccineus</i>	Piloy	White	71.4
Do	<i>P. vulgaris</i>	Red	Black	70.2
Do	do	do	Bright yellow	60.2
Do	do	do	do	61.3
Do	do	do	do	67.5
Do	do	do	do	84.2
Tecpan	do	Frijol blanco de surco	White	22
Santa Catarina Palopé	do	Frijol negro de surco	Black, cylindrical	25.7
Patzum	do	Frijol de milpa	Bright black kidney	23.7
Santiago Atitlan	do	Frijol Colorado	Long, dark-red kidney	51
Santo Domingo Suchitepequez	<i>Vigna sinensis</i>	Cola	Black	10.7
Do	do	do	Brown	15.2
Do	<i>P. lunatus</i> sieva	Ixpanque	Red like Hopi; 1 or 2 seeds per pod, small.	25.8
Do	<i>P. acutifolius</i>	Ixcumita	Gray mottled	11.4
Do	do	do	Brown	11.6
Do	<i>P. lunatus</i> macrocarpa	Ixpanqui, itxapacdl pinto	Large, flat, thin lima; dark red, black stripes.	86.0
Do	<i>P. vulgaris</i>	Frijol blanco de vara	Dull white, cylindrical	18.8
Do	do	Frijol negro de suelo	Dull black, cylindrical	29.5
Do	<i>P. coccineus</i>	Frijol huevo de gorrin	Dull gray striped or mottled	115.3
Do	<i>P. vulgaris</i>	Frijol negro de vara	Dull wrinkled, cylindrical	27.3
Do	<i>P. lunatus</i> sieva	Piloy (pole)	Black and red splotched	46.2
Do	do	do	do	42.3
Do	<i>Canavalia ensiformis</i>	Frijol haba	Large white	121.4
Do	<i>P. lunatus</i> sieva	Ixapacdl bolinillo (black)	Bright black, flat	40.1
Do	do	Ixapacal negro	Bright, black, flat, thin	51.6

¹ From notes of W. W. Mackie on beans collected by the author.

U. S. A." *C. moschata* is widely grown from Mexico into South America²⁰¹ Bukasov suggests "Mexico and Guatemala origin," on the basis of "varietal endemic forms." In 1940 I found a wild squash or gourd with a globular, hard-shelled yellow and green fruit about 4 inches in diameter, growing in great profusion near the port of San José.

Chilacayote (*Cucurbita ficifolia*).—This fruit, which looks like a greenish-white watermelon, thrives in high altitudes, mostly above 2,000 m., and, like *guisquil*, is a rather common high-elevation cucurbit. Chilacayote is eaten cooked (usually boiled) and in soups, green, and boiled with panela when ripe. Standley and Calderón (1925, p. 213) state that it was thought to be Asiatic in origin. The Russians point out that it is probably Mexican, however, largely on the basis of linguistic evidence.¹⁰⁰ The ones which I have seen around Lake Atitlán had white flesh. As in the squashes, the seeds (*pepitira*) are widely used in making *dulces*, and both seeds and sweets appear in markets.²⁰²

Tamalayote (*Cucurbita maxima*).—Another variety of cucurbit which is common in Guatemala, and which has a much wider range than many of the others, is the so-called *tamalayote*. One near Lake Atitlán (at Tzununa) looked like a small white pumpkin. *Tamalayote* was also grown in Santo Domingo Suchitepequez, in the Lowlands, where it was sometimes called *ayote blanco*²⁰⁴ and seemed to be the same plant. Zhitenev mentions three distinct varieties of what he suggests might, for the size, be called *C. maxima*** under the name *tamalayote* (one of them from the "torrid zone") and states it is an "indubitable South American species," which he thinks did not penetrate into Mexico, since he found none there.

Two statements of Zhitenev regarding cucurbits only in Mexico are equally applicable in Guatemala: (1) "in Mexico they are often raised between rows of corn;" (2) "the Aztecs used the buds of the Cucurbitae in cooked and fried form . . . the flowers of Cucurbita are always on sale on the Mexican markets. . . ." (Bukasov, 1930).

AMERICAN CUCURBITS NOT IN THE GENUS CUCURBITA

Vegetable pear, *guisquil* (Mex.), chayote, *Sechium edule* or *Chayotea edulis*.—This vegetable, familiar to many Americans, especially in California, where it is sold in markets, is widely grown and is important in Guatemala (pi. 14, d). All parts of the plant are commonly eaten, the vine being among the major greens consumed, while the large, bulbous,

starchy root is known as *echintal***. In Central America it is usually planted in little enclosures built of pole* and sticks for the purpose, close to the Indians' houses (pl. 22, rf). There are many varieties of *guisquil*, large and small, spiny and smooth. Though it is consumed more and is of better quality²⁰⁷ at higher elevations (probably planted as high as 2,200 m.), I have seen it at San Pedro Cutzan (350 m.) and elsewhere along the Pacific piedmont. Judging from Standley's publications, it is not so abundant on the Atlantic side.**

Zhitenev supports Decandolle's idea that *Sechium edule* is of Mexican-Central American origin. This is based upon wide dissemination among natives of these regions. The presence of a near relative in the wild state (*Chayotea to-caco*** in Costa Rica) is also of significance. Supported by Pittier's statement that only non-Indians use chayote in Costa Rica,²¹⁰ Zhitenev suggests that "the initial distribution of the cultivated chayote was restricted to the region of the old Toltec cultural influence, including that of the Maya." He considers the home of *Sechium edule* as central Mexico-north Central America, which coincides with these old culture areas (Bukasov, 1930). Standley also suggests "probably native in Mexico and Central America" (Standley, 1938, p. 1404).

Zhitenev points to the "value of the chayote" as "proven by its introduction under cultivation in southern Europe (Spain), Africa (Algeria), the U. S. A. (down to Georgia), India and Australia." From his statement that "the chayote fruit used to be on the Paris market," one might conclude a waning popularity. Standley frequently refers to the reluctance of Americans to accept it, but he is inclined to blame this upon the "conservatism" of the American, especially the housewife (Standley, 1931, p. 381; 1938, p. 1404). This explanation seems plausible.

Caiba (*Cyclanthera pedata*).—This plant is rather common in the Southwest Highlands. Being somewhat hollow, the elongated fruit is generally eaten stuffed, and the young leaves are also consumed, as in so many of the Cucurbitaceae. Zhitenev also mentions both of these uses, and says the name in Costa Rica (where it is known wild) is "caifa."²¹¹ (From the Peruvian caihua), and cites its greatest frequency in Peru and Colombia. All names are thought to be of Peruvian origin (Bukasov, 1930). Though Zhitenev calls it simply an "American annual," it seems that the evidence points strongly to South American origin, with probably Peru as the homeland.

Melocoton (*Sicana odorifera*).—This lowland cucurbit (not observed by me above 1,600 m., or 5,249 ft.) is of minor

²⁰¹ Zhitenev states that in Colombia and Panama it "is the only annual species of cultivated *Cucurbitae*" (Bukasov, 1930, p. S31). According to Zhitenev, "the varietal diversity (of *C. moschata* in Central America and Colombia) proves to be unique on the globe" (Bukasov, 1930, p. 311).

²⁰² Etymology given: Aztec, *teicayotl*, or "droning pumpkin," from the noise made by striking it. Bukasov (1930) states also that *C. ficifolia* had (1925) the "largest area under cultivation of all *Cucurbitae*" in America, that it was "disseminated over Mexico before the discovery of America," and that it "is confined to the mountain regions of the temperate climatic belt."

²⁰³ Standley and Calderón (1925, p. 213) and Bukasov (1930) also mention this use of seeds.

²⁰⁴ This may be the Mexican *ixtacoyotl* or white cucurbit (Bukasov, 1930).

²⁰⁵ Bukasov suggest* that this form "probably belongs to *C. moschata*."

*Standley and Calderón (1925, p. 215) give "*chinta*" as the Salvadorean word. The fact that in Costa Rica, according to Standley (1938, p. 1404), the root is called only *raie* (root), indicates (1) probable late arrival there, and (2) large non-Indian population with Spanish words more frequently employed than in such Indian regions as Guatemala.

²⁰⁷ Often they appear in Lowland markets, brought from the Highlands, as from Santa Catarina Ixtahuacán to Maratenango.

²⁰⁸ Standley, 1930, p. 436; 1931, p. 381; "cultivated occasionally" both in Yucatan and British Honduras.

²⁰⁹ This is probably the *Frantia pittieri* (*Cyclanthera pUtieri*) described by Standley (1938, pp. 1396-1397) and given the names *tocaco*, *chayotillo*, and *taca*.

²¹⁰ Standley make no such statement (1938, p. 1404), and it is possible that such an impression may derive because there are so few Indians in Costa Rica.

²¹¹ "Caifa" is also given by Standley, 1938, p. 1392.

significance, but, being American, deserves inclusion here. I found two varieties at Santo Domingo Suchitepequez, a "black" and a "red" (fruit color).¹²¹ Standley and Calderon considered it as being Brazilian.¹²² Zhitennev also states that its homeland is Brazil, where it is called *sicana* (Bukasov, 1930). Uses for *dulces* as observed by me are also stated by the two sources mentioned.

EXOTIC CUCURBITS PROBABLY OF FINE-COLUMBIAN INTRODUCTION

Lagenaria spp.—The vine gourds, including bottle gourds, usually called in Guatemala *tecomate*¹²³ (*Langenaria siceraria*), serve a great variety of useful purposes in Central America. Bowls, cups, ladles, and spoons are fashioned of them, and in areas of irrigation agriculture, as around Lake Atitlan, they serve (where not replaced by tin bowls) as vessels for tossing water over crops, from Lake and irrigation ditches. It is a common sight to see traders on the trail with a bottle gourd for water, stoppered with a corn cob, and securely tied by a maguey cord around the natural constriction in the side of the "bottle".¹²⁴

Authorities seem to agree that it is of Old World origin, though Standley, who elsewhere (1931, p. 379) calls it a "native of tropical Asia and Africa," writes of *L. siceraria* in British Honduras that it is "perhaps native in America" (Standley, 1936, p. 392). He had in "Flora of Yucatan" (1930, p. 435) earlier called it "native of Africa," and later he said it was "probably native in the tropics of the Old World" (Standley, 1938, p. 1399). Such doubt is readily understandable in the light of the great wealth of native American Indian names for the plant, and the ancientness of its use. Much pre-Columbian ceramic ware, especially Peruvian and Mexican, seems to have been designed from *Ucomates*, which, themselves, have been found in early burials.¹²⁵

Standley (1938, p. 1399), after Pittier, lists three forms: (1) "large and globose" ("nambiro" in Nicoya), (2) "elongate and sausage-shaped" ("calabaza dulce"), and (3) "the most common, bottle-shaped." The second form is, as he points out, the one used for marimbas, where wooden soundboards¹²⁶ have not supplanted the more primitive form (p. 17, d, e).¹²⁷

¹²² Zhitennev gives the colors as yellow red, red, and dark green (probably the "black"). The name "metocaton" ("peach"), as well as *olor* and others, he attributes to the peculiar peachlike odor. *S. odorifera* is planted at Santo Domingo S., usually at the foot of a tree, so that it climbs the trunk. It is common in the Lowlands to see trees with these large, cylindrical, melonlike fruits dangling from the limbs.

¹²³ Standley, 1930, p. 437; Standley and Calderon, 1925, p. 215. Standley lists the plant only among the flora of Yucatan and Salvador.

¹²⁴ At Santo Domingo Suchitepequez, I was given only the name *tol* for the gourd. Standley records both names, among others, for the same plant (*L. leucantha* or *L. vulgaris*) in Salvador (Standley and Calderon, 1925, p. 215).

¹²⁵ Many Indians said they did not carry water while on the trail, for they crossed many streams, but used the bottle gourd for getting water when needed. While working in their cornfields, however, often away from streams, they usually keep water in the gourds, and carry them to the milpa field.

¹²⁶ Zhitennev cites Uhle, 1889, in this regard (Bukasov, 1930).

¹²⁷ This is by far the commoner type today in Guatemala, the gourd marimba being something of a rarity.

¹²⁸ Zhitennev disagrees with Spinden and Sapper, thinking that the marimba may not be, as they say, "a recent instrument of African origin" (Bukasov, 1930). The word "recent" here seems poorly chosen; possibly the fault of the translator.

Of the first type of gourd listed above, I saw one 18 inches in diameter being used by a native Tzuntma for watering tomatoes.¹²⁹ The common bottle gourd was grown in this same community (Tzununi) in the milpa, and reached 10 to 12 inches in length.

Luffa aegyptiaca.—"Taxte" (*Luffa aegyptiaca*) is another Old World cucurbit which "was possibly in ancient times raised by the natives" (of America), as "Hernandez describes 'tzomyotH'—'bsary gourd' with the fibrous, inedible flesh," etc."¹³⁰ In Santo Domingo Suchitepequez, where I collected the seed, only the inner "sponge" is used, the rest being discarded; young fruits were said to be eaten occasionally. Standley's report for Costa Rica (1938, p. 1400) cites the same uses there. He states that the plant is "native of the Old World, but widely naturalized in America." It is used as a sponge, especially in washing dishes and bathing.

CHILES (CAPSICUM SPP.)

Far more prominent in the markets than the cucurbits are the chiles (p. 38, b), especially abundant in some plazas (such as San Francisco el Alto) and at fiestas, almost ranking in quantity with maize and beans. There are many varied uses of chiles in native dishes. The area of greatest variety and productiveness of *Capsicum* is in the Lowlands generally, below about 1,000 to 1,500 m., (3,280-4,921 ft.), and in drier climates particularly (e.g., Asuncion Mita, Jutiapa), though varietal diversity is probably less here than on the Pacific side. Large chiles (*guaque* and *siete caldos*) are grown in the Lake Atitlan region, notably at San Antonio Palopo (1,600 m.). Great variety and considerable abundance are to be found along the Pacific piedmont and Coastal Plain. At Santo Domingo Suchitepequez alone, 1 recorded the 13 kinds of chiles¹³¹ described in table 7.

I did not see the *C. pubescens* recorded by Bukasov (1930). He found the greatest variety of forms of chiles in Mexico. This country and Brazil he cites (1930, p. 527) as the two centers of diversity of *C. camuun*, which has a wider range of distribution than the perennial *C. frutescens*, since the latter, though disseminated throughout the Tropics (var. *baccatum* most common) requires higher temperatures than the former. Bukasov records many varieties of *baccatum* in the wild state, whereas "there are no indications of *C. antium* growing in the wild state." Standley says of *C. antium* that it "is really only a cultivated form which doubtless has been derived from the wild *Capsicum frutescens* through long centuries of cultivation."¹³²

The large-fruited varieties (*longtm* and *grossum*) were

¹²⁹ He had bought it in Soloa a year before, from a Totonicapan merchant who had brought it from Guatemala City.

¹³⁰ Zhitennev (Bukasov, 1930) recorded the name "payste" in Guatemala; Standley gives "paste" and "tstopa" in Costa Rica (1938, p. 1400).

¹³¹ Since my observations and collections were made during the late dry season, dependence for identifications rests entirely in seeds and dried fruits. These seeds were never planted, so there is still no plant material upon which to base any identifications. I therefore rely upon the nomenclature as reported by the Russian botanists (Bukasov, 1930, ch. 18, p. 526 ff.).

¹³² Standley, 1931, p. 341. Regarding the use of chile, he says that "it is used currently for flavoring food in Honduras, but not nearly so frequently as in Mexico. Except in Guatemala, chile is not used to excess in Central America, and in some regions is seldom employed in the kitchen."

TABLE 7.—*Guatemala chiles collected at Santo Domingo Suchitepeques*

Common name	Probable scientific name	Size (length in cm.) and description of ripe fruit	Special uses cited
Chiltepe	<i>Capsicum frutescens</i> var. <i>baccatum</i>	1 1/2 cm., oblong, red, very "hot".....	
Pasa (ancho) (said to be Mexican)	<i>C. frutescens</i>	2 1/2-3 cm. (?) like chiltepe.....	
Kelero	<i>C. annuum</i> (var. <i>grossum</i> ?)	13-14 cm. (?) dark purple, mild, broad.....	
Zanbo	<i>C. annuum</i> var. <i>abbreviatum</i>	8 cm. (?) red, broad.....	
Guacac	<i>C. annuum</i> var. <i>abbreviatum</i>	J4-5 cm., thick purplish 11 cm., red.....	
Samayacuc	<i>C. annuum</i> longum	7-11 cm., red, "hot".....	
Costeño (chocolate)	<i>C. annuum</i> <i>accuminatum</i>	5-6 cm., red.....	
Santo Domingo (chocolate)	<i>C. annuum</i> var. <i>acuminatum</i>	3-5 cm., bright red, "hot" (sold green and red, not dried).....	
Siete caldos	?	10-14 cm. (?), yellow.....	Dipped in soup for flavoring (said to be good for 7 soups).
Pacaya	?	Yellow, "hot".....	
Charabon	?	12-14 cm. (?) yellow.....	
Cobán (same as Mexican "cascabel" ?)	<i>C. annuum</i> var. <i>cerasiforme</i>	Small, 2-3 cm., round, 2 varieties, bright red, dark red.....	

i Identification fairly certain.

> This chile, given the name Santo Domingo because of its abundance and presumable nativity there, is widely sold, fresh, green and red, all along the piedmont. This seems to be the "chile chocolate" (a name I also found sometimes given) described by the Russians, who said it was "disseminated only in Guatemala, very widely." They collected it in Guatemala City, Esquintla, and San Felipe (Bukasov, 1930).

found by the Russians to have their greatest center in Central America.

The common name used by the colonial Spanish writers (a/t) survives today mainly in South America (as does the old *frisoles* for beans). Standley and Calderón (1925, p. 191) give the name in Central America only as an alternative one for chiltepe (*baccatum*) in Salvador.

The distribution of chiles as outlined above indicates two major centers of domestication of *Capsicum*, namely, Mexico and Brazil, with Central America, particularly Guatemala, between the two, as an important secondary center. At least one variety, "Santo Domingo," seems to have arisen in the central piedmont area of Pacific Guatemala.

Oviedo, writing of the many varieties and the merits of "axi," especially emphasized its great "healthfulness," and told of its early popularity with the Spaniards, and its immediate introduction into Spain, Italy, and other parts of the Old World (Oviedo, 1851-55, vol. 1, p. 275).

SECONDARY AMERICAN STARCHES:

TUBER AND ROOT CROPS.

Manioc (Yuca,²²³ *Manihot gpp.*).—Known only as "yuca" in Southwest Guatemala, manioc, or cassava, is grown widely, though in no great quantity,²²⁴ up to about 1,600 m. elevation (shores of Lake Atitlán). Mainly the common "sweet," non-poisonous species (*Manihot dulcis*) is grown in that area. Standley and Calderon (1925, p. 134) report it also as escaped in Salvador. Its root attains great size, and is eaten, usually boiled, as a vegetable. Starch balls, about 1 1/2-2 cm. in diameter are prepared from it in the Lowlands, and these appear in large sackloads in Highland markets, brought by itinerant merchants. The "bitter" species (*M. utilissima*),

"This name is of West Indian origin, and was picked up by the Spanish when they found the plant growing there, and probably introduced it into Central America. Bukasov (1930, p. 241) states that "yuca" is a word of the Taino dialect of Santo Domingo, but that the plant is of South American origin, all 42 wild species being native to South America.

²²⁴ Bukasov (1930, p. 241) reported manioc 2n "limited quantity in Mexico and Central America in the torrid zone." My Guatemala observations verify this. Apparently, larger quantities are grown in Salvador (Standley and Calderon, 1925, p. 134).

well known for its prussic acid poison, and for its value as a fine starch, tapioca, seems to be grown on a smaller scale in Central America as a whole. Oviedo wrote of the importance of *cacabi* bread in the West Indies, where mainly the bitter cassava was grown, in six varieties. Central American introduction of the technique of breadmaking with sweet cassava was said to have been effected by Spanish soldiers.* According to Medel (Ms. 1550-60 p. 143, f. 191), the use of manioc was limited to the West Indies and "some coasts" of the mainland.

Sweetpotato (camote).—Bukasov (1930) asserts that, though the sweetpotato is definitely American, "the center of culture origin . . . is not known." Its widespread pre-Columbian cultivation (from Mexico through Brazil), and the use of the Aztec word "camotli," distorted to "camote" throughout Mexico and Central America, are also pointed out. Bukasov suggests "its initial rise in Brazil and the Antilles." Oviedo (1851-55, vol. 1, pp. 272-274) described it in the West Indies under the local names "aje" and the superior "batatas" (five varieties).

As in Mexico, sweetpotatoes are raised in small plots, and in limited quantities, by Indians in Guatemala. The highest point where I have seen sweetpotatoes growing is San Bartolome Aguascalientes (2,000 m., or 6,562 ft), in 30-foot-square corstallk enclosures within the milpa. This is the upper limit as given by Bukasov. The purple-skinned variety appears in particular abundance in markets of western Guatemala.

"Irish" potato (papa, *Solanum tuberosum*).—Bukasov points out that, unlike such "basic American cultivated plants as maize, beans, peppers, and curcubitae," the "native cultivated potato" is much less extensively cultivated than the "wild potatoes," which are found from Brazil to as far north as Arizona, and include about 100 species.

"The ancestor of all our selected species (*S. tuberosum*) started," according to Bukasov, in "the Chilean littoral. . . . A great number of wild potatoes are found in Mexico and Guatemala, about 30 species, which is double those of Peru or Chile."

*Oviedo, 1851-55, vol. 1, p. 270; a sort of bread is made today in Colombia from manioc (Bukasov, 1930, p. 244, figs. 136, 137).

In Southwest Guatemala, I found potato cultivation confined almost entirely to large "American" varieties, (*S. tuberosum*), red and especially white, probably imported within relatively recent years. In competition with this is a small, round red potato (*S. andigenum* f. *guatemalense*), probably a pre-Columbian introduction here, little developed beyond the wild state. It is raised in small quantity in the southwest, but on a large scale to the north, in the Cuchumatanes Mountains, and is brought into the Quezaltenango-Totonicapan region by Todos Santos men for sale in the markets, where the demand for them is extraordinary.*

The more important, large "Irish" potato began, according to the Russians, in Chile; then it was taken to Europe where it was cultivated and improved, especially in east Prussia in the 18th century, through the instigation and edict of Frederick the Great. Its importance in the British Isles gave it the usual name "Irish." After finding its way back, then, to North America, where it was further improved and perfected, this potato was reintroduced into Latin America. Pre-Columbian ceramic representations which I have seen in Peru (e.g., Mochica and Nasca vessels) indicate also, however, a large, well-developed potato similar to the "Irish" potato of modern agriculture.

Jicaraa (*Pachyrhizus erosus*).—This minor food plant has a white turniplike root, which Standley and Calderon describe in Salvador as attaining the size of a man's head. I have seen very large ones of this description near Pueblo Nuevo, Retalhuleu. They occasionally appear in the markets, mainly in the Lowlands. Bukasov (1930) calls it a "very old cultivated plant of Mexico and Central America." Evidence seems to point to its nativity here. Standley (1931, p. 228) considers it a native of Mexico. His statement that they are eaten raw in Honduras is also true in the Guatemala Lowlands.

Quequexque (*Xanthosoma* spp.).—This is another genus, "akin to the Colocasia (*taro*) of the Old World" (Bukasov, 1930), that supplies a large edible root, there being a number of species, of which Bukasov cites *X. sagittifolium* as the "most extensively cultivated." Standley and Calderon (1925, p. 45) list *X. vilaceum*, the common Antillean species, as an edible Salvadoran plant abundant along stream banks. Among the many native American names given is "Yautia" (Yucatan, Vera Cruz), indicating that it may be the same "yautia" that was listed by Oviedo as "one of the poorest of the cultivated plants of the Indians." The natives, however, appeared to be very fond of it, and raised it in quantity, whereas the Spaniards regarded it only as "emergency rations" (Oviedo, 1851-55, vol. 1, pp. 274-275). Bukasov calls it a "very old cultivated plant of Brazil, largely on the basis of the numerous native names, the Antilles, and the Atlantic coast of Central America and Mexico."

* My field notes in this connection, taken at San Cristobal Totonicapan, March 29, 1936, are as follows: "Two men from Todos Santos were being stormed by local women to buy their small, red potatoes. Police keeping people back, calling for order, and trying to prevent thieving. This appeared to be high point of activity in entire market." The same performance was repeated on the next Sunday, April 5, when there were four Todos Santos vendors instead of two, and on April 19, when there were six. The explanation of this demand seemed to be that their potatoes sold at 2 pounds for 154 cents, or half the price of the large "American" ones from Concepción Chiquirichapa. Competitors from there said Todos Santos potatoes were "muy gusano" (very wormy). Many natives seemed to prefer them, however, for their flavor.

MISCELLANEOUS NATIVE AMERICAN PLANTS

Tomato (tomate, *Lycopersicon* Bpp.).—Of the several cultivated species of tomato, the Russians found the following two "most richly represented" in Central America: *L. cerasiforme* and *L. esculentum*! the latter in particular being the "richest species, containing at present more* than 200 varieties. The deeply lobed *L. esculentum* var. *columbianum* was collected by the Russians in several parts of Guatemala (Guatemala City, Amatitlan, Quezaltenango). From the description and illustration (Bukasov, 1930, p. 285, and fig. 181), it is apparent that this is the common tomato of Indian cultivation in Southwest Guatemala, particularly around Lake Atitlan (pi. 4, e). It is probably the *tomate del pais*, or *criollo*, for the fruits range in size from about 2 to 5 cm. There is a very small, round one (usually 1 to 2 cm.) called *tomate de culebra* (*tomatillo*, Standley, 1938, p. 1064), grown in many of the Lake villages, especially at San Antonio and Santiago, and appearing not infrequently in the markets. In all probability it is a wild or retrograde escaped form of *L. esculentum* var. *cerasiforme*?²²⁵ The fact that this variety was most frequently seen by the Russians indicates the widespread occurrence of small, globular forms throughout Central America. In certain of the Lake villages, especially San Pedro, where gardening is practiced, large *tomate mansano* (literally, "apple-tomatoes") from imported American seeds are grown with irrigation.

The history of tomato cultivation in Guatemala roughly parallels that of the potato. Both American, domesticated from poisonous nightshades, they apparently were little developed, half wild, before the invading white man took them over, introduced them with some difficulty into his own lands, improved them through selective breeding, and then brought them back as "exotics" to the place of their origin. This appears to bear out the statement of Bukasov (1930) that "there is ground for the assumption that the tomato as an aborigine of America might not be the cultivated plant, but only the [utilized] wild and often rudimentary plant." The fact that Hernandez and other early writers, including Oviedo y Valdes, make no mention of the tomato among the cultivated plants of Mexico, may be regarded as further evidence "that the cultivation of the tomato was not known among the Aztecs."

Groundcherry (miltomate, *Physalis* spp.).—This low-growing plant, seldom over 1 m. high, occurs in many parts of Central America as a weed, but it is frequently cultivated. The widespread use of the small (usually under 2 cm.) yellowish-green fruit in sauces, soups, and preserves extends, according to Bukasov, through Central America, from the United States-Mexican border. *P. angulata* and *P. aequata*, the latter having been almost the only one collected in Mexico by Bukasov, are the two species listed. The husk of the "groundcherry" facilitates transportation, according to the same author, who characterizes it as "very non-exactmg," it having succeeded in Russia as far north as Leningrad (Bukasov, 1930, ch. 18).

²²⁷ According to V. I. Maikévich (Bukasov, 1930) *L. cerasiforme** is usually given as a variety of *L. esculentum* (Standley, 1938, p. 1064).

²²⁸ The Russians reported this "wild growing" tomato in Guatemala only "in Antigua" (Bukasov, 1930, p. 275).

Miltomates are much in demand in Southwest Guatemala, and are generally to be found in the markets.

Melon pear (*pepino*, *Solatum muricatum*, S* guatemalense hort.).—Standley and Calderón (1925, p. 195) state that the pepino is a native of South America.

It had probably a fairly late introduction into Guatemala, despite its common varietal name, if we may judge from the absence of references to it in early literature.

Today, it is grown, to my knowledge, in Southwest Guatemala only at Panajachel, (1,600 m., or 5,249 ft.), where it is a major garden product,²²⁶ abundant in the local market from late March well into June, following a vegetative period of about 8 months. The usual variety is light yellowish with purple stripes, exactly like the ones which appear on the fruit stands in California. They will stand frost, according to Bukasov (1930, ch. 18), who records their growth as far north as New Jersey, Paris, and Russia, where it was introduced in 1887. Climatic limitations, then, will not explain the restricted distribution in Guatemala. Tax says that, relative to the cash return (Tax, Ms., 1936), they are difficult and expensive to cultivate at Panajachel. As a rule, however, according to Bukasov, "the melon pear is of interest for its tasty qualities and its ease of cultivation," though he did say that the plant proved "very exacting" in Russia.

Peanut (*mani*, *Arachis hypogaea*).—This plant usually is called by its Antillean name ("*mani*") in Guatemala though Standley and Calderón (1925, p. 107) report also "*cacao de la terra*" in use in El Salvador, where the peanut is said to be rarely cultivated. That is a hispanicized form of the Aztec "*tlalcachuatl*" (modern Mex. *cacahuete*). The naming of the peanut after cacao, obviously because of the resemblance of the "nut" to the *Theobroma* "bean," may be regarded as evidence of greater antiquity for the latter, and relatively recent introduction for the former. Furthermore, Bukasov (1930) points out that, whereas Hernández makes no mention of the peanut, Sahagún later does so.

Peanut cultivation appears to be quite recent in Southwest Guatemala, at least in the Lake Atitlán region. There, at San Pedro, it was said that the planting of this crop began about 1925. The greatest sources still are in the northern and western peripheries, in the Department of Huehuetenango (Chiantla) and San Marcos (Comitancillo).

The peanut is a luxury, generally expensive (8 cents a pound), according to native standards. Roasted peanuts are sold in markets, particularly during fiestas, along with sweet buns and candies. The chief peanut merchants of the Southwest are itinerant Maxefios and Quezalcas.

Pineapple (*pina*, *Ananas comosus*).—Though pineapples are of considerable significance in parts of the Lowlands, the upper limit is not above 1,300 m. (4,265 ft.), with the plant infrequent even above 1,000 m. (3,280 ft.). The 1931 Guatemala Anuario del Servicio Técnico (p. 57) puts the limit at 5,000 ft. (1,524 m.). Bukasov, as in other instances (e.g., papaya, 1,700 m. or 5,577 ft.) places it too high (1,700 m.).

At least two kinds of pineapple, besides the semiwild *pinuela* or *pinguin* (*Brotelia pmauin*, the fruit of which appears occasionally in markets) are grown along the pied-

mont—a spiny-leaved yellow (*asucar*, called by some "Hawaiian," which may be native, however) and a smooth-leaved white (*cuco*) presumably *criollo*, or native. The yellow is preferred, though the white seems commoner. The Anuario mentions, besides *osucar* and another unnamed* also a variety "*Cayena Lisa*" as the finest grown on the Pacific plain.

That the pineapple is native American is not disputed, though its specific provenience is somewhat open to question. Oviedo described the plant at great length, giving three varieties in the West Indies (*Yayatna*, white, sour; *Boniama*, white, sweet, fibrous; and *Yayagua*, yellow, sweeter, tender.) He was lavish in his praise of the delicate flavor of the fruit which defies description, telling also of a "multitude of wild pineapple," and the making by the Indians of an inferior pineapple wine, poorer than low-grade Spanish wines (Oviedo, 1851-55, vol. 1, pp. 280-283). The latter apparently carries through to the present, judging from Bukasov's reference to *garapiha* in the West Indies today.

Standley suggests that the pineapple "is probably a native of Brazil, although it has been under cultivation in Mexico and Central America for a long time, perhaps before the Conquest." He reported "pineapples naturalized in woods or thickets in a few places about Tela" (Honduras).^{8*}

On the basis of the evidence considered, some authorities have been led to assume for the pineapple a parallel route with manioc: that perhaps from Brazil it went to the Antilles by Arawak introduction, and was there improved by long cultivation, and probably taken to the mainland during late pre-Conquest time. The Aztec word for it is given by Bukasov (1930) as "matzalli." This, coupled with west-coast Central American varietal diversity and good climatic adaptation (wet savanna), occasional naturalization, and the presence of a wild relative, supports the possibility of Central American or Mexican origin.

Passion fruit, or "raaypop" (*granadilla*, *Passiflora ligularis*).—This species of native American *Passiflora* furnishes a juicy, refreshing fruit, with sweet fleshy, gelatinous pulp surrounding a mass of brittle seeds in a pod of egg size or larger and orange color, which is commonly sold in the markets. The natives eat them raw, seeds and all, in great quantities in Southwest Guatemala. They are sometimes cultivated. This is the species mentioned by Standley and Calderón (1925, p. 155), cultivated in Salvador on the high volcanic slopes, and "imported in large quantity from Honduras." It has a wide altitude range, probably reaching 2,600 m.

Night-blooming cereus (*pitahaya*, *Hylocereus undatus*); not the common North American night-blooming cereus, which is *Selemereus grandiflorus*.—This slender-stemmed, climbing cactus is common along the rocky shores of Lake Atitlán, and the bright scarlet, black-seeded fruit is eaten, though it seldom appears in the markets.

Tobacco (*tabaco*, *Nicotiana tabacum*).—It is doubtful whether much tobacco (*Tabaco*, *Nicotiana tabacum*) was ever raised in Southwest Guatemala, judging from early

^{8*} It is planted in large mounds (pi. 20, d), just as tomatoes are in certain localities (e.g., at San Pedro). Each mound in December is covered with purple flowers.

^{8*} Standley, 1930, pp. 220-221', 1931, p. 127. I have also seen pineapples naturalized in an uninhabited portion of Chiapas (Santo Domingo-Jatate* River junction, 1928), where no human settlement had existed for many years. The pineapples were small (about 8 cm.), but of good flavor.

accounts. In any event, this crop, as in the case of any alcoholic beverages that may have once been made, has been strongly checked by Government regulations controlling tobacco and liquor production. When I occasionally saw a tobacco plant growing near an Indian's house, he would never admit its identity. The plant does not grow in any quantity in the area today. Termer (1929, p. 29) described the cultivation of tobacco in the Copan valley as a fairly large-scale industry, favored by climate, especially the fine rains ("*grano de oro*") of the transplanting season (October-November), heavy rains at that time being injurious and limiting tobacco growing in parts of the Atlantic seaboard (Termer, 1929, p. 29). This may also be a limiting factor along the Pacific coast.

Greens and herbs.—Many leafy parts of plants, both cultivated and wild, fill an important element of the Indians' diet, which is so predominantly starchy. *Chipilin* (*Crotalaria longirostrata*) and *bledo* (*Amaranthus* sp.), both sometimes cultivated, are for the most part gathered in the woods and fields (p. 147). The frequent use of greens of various of the cucurbits, notably *gilsquil* (*Sechium edule*), has already been mentioned. Many herbs are employed as medicines.

CULTIVATED AND SEMICULTIVATED PLANTS EMPLOYED IN TEXTILE CRAFTS

CENTURY PLANT (MAGUEY, AGAVE SPP.)

The century plant is a widely utilized plant in Southwest Guatemala, particularly above about 1,500 m. (4,921 ft), in the drier Highlands, where it attains its maximum size and abundance. It is used in the Lake Atitlan villages in the making of ropes, cordage, nets, bags, and the like, a major industry of San Pablo, San Pedro, and San Juan, though in other villages (Atitlan, San Marcos, Santa Cruz, Santa Catarina) small-scale noncommercial cordmaking is practiced. Buds and leaf bases of the *mescal* agave are cooked and eaten, being somewhat sweet when roasted or baked.** The huge flower stalks (diameter at base about 8 in.) are made into ladders (e.g., Santa Catarina, San Pedro) by cutting notches about 1/2 feet apart along one side; they serve as aqueducts split and laid end to end (San Marcos la Laguna); as *gilsquil* enclosures; as fences* of close-bound, upright stalks (San Pedro la Laguna); and even rafters and chicken coops (San Pedro la Laguna); corncrib ridge poles (Santa Catarina Palop6); and have other minor uses. Abundant growth of maguey around the Lake is to be noted, however, only at the western end, where it is cultivated for ropes (see p. 103). A very large variety thrives at San Pedro (pis. 22, c; 26, d). Paul C Standley, on the basis of photographs and descriptions, thought it might be in the genus *Furcraea*, as many of the fiber magueys are. The San Pedro maguey is called *maguey de lasso* or *de pita* in contradistinction to the *mescal* (probably species of *Agave*) of the other areas around the Lake. It is the latter which supplies an edible bud. Various species of maguey appear in great profusion through the sides and floor (often along roads and trails) of the Quezaltenango-Totonicapan Valley, especially a broad-leaved variety, probably *A. teeta* (pis. 29, c; 38, a; 41, d). Here however, there is little

utilization of it, possibly because the leaves, from which the fibers are derived, are not so long as those of magueys elsewhere. Other industries, notably pottery and weaving, occupy the inhabitants. Their rope work comes mainly from Coban and San Pablo la Laguna.

In all probability the more useful species of *Agave* were introduced from Mexico. Standley and Calderon (1925, pp. 50-51) suggest this with regard to three species in El Salvador, out of a total of eight listed by them. Of the two major ones for *henequen* extraction, *A. letonae* (said to be superior to *sisal*) is regarded as native to eastern Salvador; *A. sisalana* f. *armata* is said to be "possibly introduced from Mexico" (Standley and Calderon, 1925, pp. 50-51).

Historical evidence of Mexican introduction of certain agaves at the Conquest of Guatemala may be found in an obscure passage in the journal of Alonso Ponce's travels through Guatemala. Describing the vicinity of Ciudad Vieja in 1586, the anonymous chronicler writes of "some Mexican varieties of magueys planted by the Mexicans who accompanied the Spaniards in their Conquest" (Ponce, 1873, vol. I, p. 421).

Diversity of Mexican agaves is extraordinary. Standley (1920-26, pp. 107-142) lists 170 species. Of those *A. tequilana*, famous for the distilled liquor "*mescal de Tequila*," and *A. atrovirens*, for the great Mexican pulque industry of the central valley, serve uses in Mexico that are unknown in Guatemala. It is a type like the *sisal*, or *henequen* agave (*A. fourcroydes*) of Yucatan, the significance of which has been approached by certain Guatemala *pita* agaves.

TUNA ("PRICKLY PEAR," NOPALEA SPP. AND OPUNTIA SPP.)

The fruits (berries) of the various cacti that are called tuna are eaten and much liked by the Indians, though the many seeds are hard and there are spines to be avoided. These remarks concern the usual variety grown and eaten in the Lake Atitlan region, and often sold in markets. It has a whitish-green fruit, 6 to 8 cm. long. The smaller (3-4 cm.), red fruit of another tuna was apparently not eaten.

Tuna as a fruit is of minor significance. Its great ancient role (especially *Nopalea cochenillifera*) was as a host plant of the famous insect cochineal, which was "planted" and propagated upon its fleshy leaves by the Aztecs to obtain from it the beautiful red dye. This gave rise to a colonial trade of immense proportions. Aniline dyes have almost entirely replaced cochineal, until today the use of it is rare; in Guatemala, mixed with aniline reds, some is still employed, especially, at Momostenango, in dyeing wool yarn woven into blankets. Until about 1860, when European aniline dyes began to compete in the world market, cochineal cultivation was still very important in Guatemala, and centered around Antigua and Amatitlan. Reaching a peak in 1854 (Guatemala production 8,786,500 francs), a decline was under way in the 1860's with coffee providing strong competition, promising a "new era of prosperity." Dollfus and Mont-Serrat (1868, p. 38) dated the introduction of cochineal culture into Guatemala from Oaxaca as 1818, saying that General Bustamente effected it. He may have given an impetus to the cochineal industry, but that he did not actually introduce it is evidenced by the following passage from the

²³¹This was one of the few pre-Columbian sources of sugar, not so sweet as honey, but much more abundant.

Capotitlin report of 1579, to the effect that President Villalobos of Guatemala had ordered the nopal introduced, and that it was there in abundance (Zapothlan) with cochineal, but no one had attempted to exploit it (Anon., Ms. 1579, p. 18.) M^del also wrote of tunas in both Mexico and Guatemala in the middle 16th century. A fine white one is mentioned in particular as good to eat, though "wild" red-fruited ones were common "in all parts of the Indies" and they were usually called "figs." This apparently accounts for the common early appearance of the word "fig" (here applied to tuna) in colonial literature.

From this there appears little doubt that certain species of *Nopalea* or *Opuntia*, or both, were introduced from Mexico for cochineal culture. In all likelihood it was mainly *N. cochenillifera*, probably native to Mexico.

BLUE-DYE PLANTS

Blue is the only color in dye-stuffs locally produced in Central America that is used in any quantity today in the Guatemala cotton-textile industry. There are two plants commonly employed in its application. These are *anil* or *jiquilite* (indigo, *Indigofera suffruticosa* and *I. guatemalensis*) (Standley and Calderon, 1925, pp. 112-113) and *sacatmta* or *tinta* (*Jacobinia spicigerd*).

Indigo is a Lowland plant, having an upper limit which probably does not exceed 750 m. in Central America. Guatemala has never been a large-scale producer of the plant. In the literature, from the 16th century to the present, there are few references to indigo in connection with the modern area of western Guatemala. Dollfus and Mont-Serrat (1868, p. 113) give as the upper limit 500 m. (1,640 ft.), but cite no production figures or any cultivation methods. Ponce's companion mentions "native indigo" only in the Province of San Salvador (Ponce, 1873, p. 399). Apparently, judging from 16th-century literature, in the great cacao areas, from western Salvador into Soconusco, there was no indigo. Since their environmental requirements are much the same, indigo probably could not stand the competition, for cacao was money, in the literal sense of the word. Juarros, early in the 19th century, writes of Salvador, a country whose Indians were then "highly civilized and all speak the Spanish language;" that it produced "chiefly indigo, now [1800-1810?] almost exclusively . . . in this province," though some was formerly grown outside of it (Juarros, 1823, p. 30). Sapper's economic map of 1895 showed two indigo areas, one in central Chiapas, the other in central and eastern El Salvador (Sapper, 1897, map 4). Janes (1940, pp. 198-202) refers to the importance of indigo in Guatemala, but this was the Captaincy-General, which included Salvador. The only present-day Guatemala place names mentioned in connection with indigo are Guazacapan, Jalpatagua, and Escuintla (Milla, 1879-62, vol. 2, pp. 285-286), all in the eastern Pacific lowlands, adjacent to the Salvador producing area. Standley (1920-26, p. 441) states that indigo was used by the Pre-Columbian inhabitants of Mexico. This was probably the source of the "black" used in dyeing the black cloth (the dark indigo blue in Guatemala today is sometimes called "black") demanded from certain towns as tribute by Moctezuma (Cortes, 1770, pl. 27, foil. p. 176). The origin of American indigo is probably Mexican. An Old World species was later introduced (*indigofera tinctoria*) and much

used (Standley, 1920-26, p. 440). Standley (1931, p. 222) points out one cause for the decline of indigo, in the danger to those engaged in extracting it. Chemical dyes produced in Europe, especially Germany, began to offer serious competition to natural dyestuffs between 1860 and 1870.

Today the indigo used in quantity in Southwest Guatemala for dyeing threads, employed mainly in skirt weaving, is all imported from Salvador, put up in cakes. It was similarly prepared at the time of Ponce's visit (Ponce, 1873, p. 399).

Mixed with indigo in dyeing thread are aniline dye (mainly German in 1936) and an infusion of fresh leaves of the *sacatinta*, *cuajutinta*, or *tinta* (*Jacobinia spicigera*). It grows in abundance along the Pacific versant, having an upper limit of probably 2,000 m. (6,562 ft.), for it is apparently absent from the Quezaltenango-Totonicapan Valley. There in the markets, especially of the dyeing center, Salcaja, the green leaves are sold in large bunches. For the country as a whole, the greatest consumption of *sacatinta* comes in washing, for it is the chief "bluing" plant of the Indian women, who wash their white clothes with it to get a bluish cast. This is reported as widespread also in Mexico, Salvador, Honduras, and other parts of Central America, various species of *Jacobinia* being employed. Standley suggests that the use of the infusion (which turns acid red, like litmus) in whitening clothes is pre-Columbian, and that the plants are therefore American, probably native to Mexico.³²²

COTTON

Cotton (*algodon*, *Gossypium* spp.) cultivation seems to have declined in the Pacific Lowlands, though not so much so as some of the crops already mentioned. Sixteenth century accounts (manuscripts herein cited) list cotton among the major crops, from Guazacapan to Suchitepequez, mainly along the piedmont. Today in the Southwest it is found only in small patches,³²³ mostly from around Mazatenango, and westward into Chiapas. Mazatenango is the main market, and it is sold there in some quantity, to itinerant merchants (Maxefios in particular) and to Indians, who come from as far as Huehuetenango (Todos Santos) to buy it, apparently for home consumption.

White cotton (*G. hirsutum*) and red-brown (*ixcdco*, *G. mexicanum*) are both grown, the former in larger amounts. The highest elevation at which I have seen cotton (white) is 1,600 m. (5,249 ft., San Pedro la Laguna).³²⁴ Both are probably natives of Mexico. *G. hirsutum* appears commonly to have escaped from cultivation, a point also brought out by Bukasov (1930) and Standley (1920-26, p. 785).

Brown cotton was given the Aztec name "Ichcaxihuitl" ("wool-plant"). It is probable that this was the origin of

³²² *Jacobinia* as used in washing clothes is described on the following pages: Standley, 1920-26, p. 1346; 1930, p. 423; 1931, p. 360; 1936, p. 369; 1938, p. 1225; Standley and Calderon, 1925, p. 204.

³²³ Bukasov also mentions the limited quantities of cotton grown in small plots in Chiapas and Central America (op. cit., p. 182).

³²⁴ Here the tall, yellow-flowered plants attain a height of 12 feet, though 8 feet is more common. It is often planted among fields of corn, manioc, maguay, etc., is said to bear 3 years; is trimmed back every May at maize planting, and grows out again with maize. Cotton is annually planted by Indians of Santo Domingo (Suchitepequez, where a Ladino farmer said that better results obtain from cutting back, and that plants would bear for 2 or 3 years.

the word *ixcdco*, used in Southwest Guatemala today. Bukasov reported brown cotton only in Chiapas, though Dondé is cited as mentioning it in Yucatan (*cmcacu*) and Pittier, in Costa Rica (*tecolote*).

Cotton is imported for manufacture in Guatemala,²²⁵ mainly from Nicaragua and the United States.

NATIVE HIGHLAND FRUIT TREES

A number of fruit trees are mentioned and described among the useful plants of the Lowlands (Appendix 3). It is there that many of these plants are best developed and most abundant, as, for example, papaya, matasano, and injerto which are found below elevations about equal to that of Lake Atitlán (1,550 m.). Certain native fruits attain their best development between about 1,500 and 2,200 m. Outstanding among these are the avocado and *jocote* ("Spanish plum," *Spondias purpurea*).

Avocado (aguacate, *Persea Americana*).—The so-called "Guatemalan" variety of avocado with rough, thick, brittle skin, is the only one grown,** the trees being abundant among all the Lake communities. Cultivation is desultory, however, and plants spring from castaway seeds. There is room for tremendous improvement by grafting, which is not practiced. Avocados generally reach the markets in quantity, almost all the year round perhaps (least abundant during the late rainy season). They are eaten by man and beast (especially dogs) and they go in great numbers to piedmont plazas.

Avocados probably provided the main source of fat to the Indians of pre-Columbian Mexico and Central America, playing the role of the olive in the Old World. *Aguacate* is from the Nahuatl, *aguacatl* ("testicle"). "Avocado" may

²²⁶ The large electric mill at Cantel imports about one-half the cotton used, 35 percent from Nicaragua and 15 percent from the United States (approximate figures for 1936). (See p. 66.)

²²⁷ The "Antillean," smooth-skinned variety is confined to the Coastal Plain below 1,000 m. (3,280 ft.), and the "Mexican" variety is grown only in the Departamentos of Sacatepéquez and Chimaltenango, according to the Anuario del Servicio Técnico, 1931, p. 84. The rough-skinned avocado is probably the one from which the name "alligator pear," commonly applied in the southeastern United States, was derived, from its resemblance to the hide of an alligator.

be a corruption of *aguacate*, but it probably derives from *bocado* (Spanish, "appetizer"), for it is widely used today as a spread ("*guacamole*") like butter, mashed with onions and served on crackers as hors d'oeuvres.

"Spanish plum" or ciruela (*jocote*, *Spondias* spp.). Since the *jocotes* (Mexico, "*ciruelas*") are little known north of the Rio Grande, and since the varieties have not been described in detail in botanical literature, more space will be devoted here to this fruit than to the more familiar-avocado. Though sometimes called "Spanish plum," the *jocote* is neither Spanish nor a plum.

Jocotes, generally quite acid (Nahuatl, *jocotk*—"som fruit"), are much liked by the Indians. The newcomer to Guatemala during the early dry season is impressed with the great baskets of plumlike yellow and red fruits (pi. 19, c) that fill the markets, and the large, unfamiliar seeds, yellowish and fibrous, that cover the ground of the plaza; for the Indians eat them by the hundred in the market (pi. 21, a).

The tree is low, spreading and much-branched, often gnarled and twisted, having small, oval leaves somewhat like those of a locust, and distinctly deciduous habit.

At Panajachel and neighboring centers, I noted the varieties of *jocotes*, in 1936, described in table 8.

Except for *mico*, these grow in most of the Lake villages, especially on the north side. Distribution and relative abundance of varieties in the Lake region, have been discussed briefly in an earlier section.

At Pueblo Nuevo, in the *boca costa* of Retalhuleu, it was said that the principal *jocotes* were *corona*, *agosto* (*costeno*), *martenica*, and *pascua*, all red varieties, with yellow types lacking. Here I was told that the Indians did not show so much interest in them as they do in the Highlands. Ladinos said they made jelly of *jocotes*.

Both *Spondias* and *Persea* (Guatemalan variety) are probably native to Central America, perhaps Guatemala. They were described by Oviedo in the West Indies, in the early 16th century. Nicaragua was cited as a region where special care was taken in the cultivation of avocados, as in the case of beans (Oviedo, 1851-55, vol. 1, p. 353).

TABLE 8.—Varieties of *jocotes* observed! in Guatemala in 1936 (illustrated in pi. 19, c)

Name	Description of tree	Length and description of fruit	Season of harvest	How consumed
	Trunk tortuous, much-branched.	154 in.; slightly oblong; yellow to orange; shiny, smooth, little spotted; rather acid taste.	Sept.-Jan.	Raw, boiled, dried.
	Trunk tortuous, much-branched.	164 in.; oblong; red-orange to red; 5-7 "warts" on end; sweetest variety, only slightly acid.	Sept.-Dec.	Raw (preferred variety for eating).
	Trunk tortuous, much-branched.	161 in.; oblong; yellow-orange; thick skin, rough, spotted, very acid.	Sept.-Feb.	mented to make chicha beer.
	Trunk tortuous, much-branched.	171 in.; oblong; red (lighter than No. 2) slightly warty; sweet, but more acid than No. 2.	Oct.-Mar.	
	Lower than No. 5; straighter than 1-4.	1 in.; oblong; yellow; acid, flavor, between Nos. 1 and 3.	Sept.-Jan.	Mostly cooked, also raw and dried.
		1½ in.; oblong; yellow; sweetest of yellow varieties.	Oct.-Feb.	
			Aug.-Nov.	Raw, often ratlie green (much)
			Oct.-Feb.	Little eaten, mainly used for chichi (a fermented drink).
			Aug.-Nov.	Raw (little ester inferior).

¹Thia may be *jobo* (*Spondias lutea* or *mombin*) which does not occur in the Lake Atitlán region, as 1,200 m. (3,937 ft.) is about its upper limit. It is common in the Lowlands, however.

APPENDIX 3

USEFUL PLANTS OF THE GUATEMALA PACIFIC REGION

PALMS

COHUNE (COROZO)

The uses to which the tall and stately *cohune*²¹ (pi. 2, a) palm (*Orbignya cohune*) is put are manifold. Particularly valued are the extraordinarily large, pinnate leaves, commonly 30 feet long and 6 feet wide, which are much employed for roofing throughout the Lowlands (see map 14). Leaf segments entire serve for making *sopladores* (fire fans) in various coast towns, particularly San Sebastian Retalhuleu. The chief industry of that town, however, one of the few craft centers in the Lowlands, is the making of *suyacales* (rectangular raincoats) of de-veined leaf segments (see p. 67, pi. 2, b, c, map 17), in quantities sufficient to supply the needs of all of Southwest Guatemala. Bunches of leaf-segment veins are fashioned into stiff brooms. The young bud, or heart (*palmito*), called also the "cabbage," is eaten, raw, roasted, or boiled, and it is reported that a strong intoxicant is surreptitiously allowed to ferment in the cavity from which the bud has been cut, and into which panela, or brown sugar, is put. Fermentation is said to occur thus within 5 days, but the only first-hand information I obtained on this was with reference to Mexico. The coyol palm is more significant for this purpose, and it may be that the two were confused by the informant; the common nomenclature itself is sometimes misleading (see Standley, 1920-26, p. 83).

The yellow, branched, musty-smelling and funguslike staminate inflorescence in its long (up to 6 feet), ribbed, spindle-shaped spathe²²⁸ is a major trade item marketed in the Highlands, especially at Quezaltenango, on a large scale for Palm Sunday to decorate churches for fiestas (pi. 39, /). The husk and flesh of the fruit are important cattle food, animals often being fed the fruit so as to clean off the seed. The flesh is eaten, being fibrous like a mango, and rather acid, with a black walnut flavor. The seed kernel is rich in fat (as high as 50 percent), and Ladinos in the Lowlands, as at Mazatenango, use it for making oils, soaps, and confections. The thick, hard, cocolike shell of the seed (2-3 inches long) is cracked only with difficulty, however, and this has hampered attempts to produce oil on a commercial scale for export. The tough shells are said to make excellent buttons, and the Indians make small tobacco pipes by cutting an end off of the seeds and using them as bowls. The woody trunk

²²⁷ Its various names are, besides *cohune*, *corozo* and *manaco* (in places along the Pacific Lowlands as at Santo Domingo Suchitepequez; said usually to apply only to the leaves). Brigham recorded *manaco* for the young, trunkless stage, *corozo* for the mature tree (Brigham, 1887, p. 329).

²²⁸ Oviedo described the use of corozo spathe as half-bushel (or half hundredweight, "media hanega") measures for corn in the West Indies. He said that several inhabitants of Salvatierra de la Savana had them. Sometimes they were so large that they had to be "diminished" in order to measure a half "hanega" (*fanega*) according to Royal standards. Such corozo spathe measures were called *manahuacos*. These lasted, according to Oviedo, for 2 or 3 years, were very tough, and would not break, even when dropped from a high place (Oviedo, 1851-55, vol. 1, p. 333).

is put to various uses, as for firewood and construction purposes. Standley (1920-26, p. 83) mentions a corresponding usefulness of the cohune in Mexico, where he characterizes it as "one of the most important palms economically." A further use, in Costa Rica, is the making of hats from the leaves. Standley (1930, p. 217) quotes Gann to the effect that Indians of British Honduras make oil for lighting and cooking, also "wine from the trunks".*

Because of the widespread utility of the trees, they bring a good price, and consequently they have been heavily cut out in many sections. In Santo Domingo Suchitepequez, I found that natives purchase leaves from the landowners, cutting them themselves, for 1 cent each. At San Sebastian Retalhuleu, where the demand is greater because of their needs in making raincoats, Indians pay 50 cents for a cargo of about 100 pounds (average 25 leaves ?), and for a good supply they must go as far as Las Cruces (12 miles) and Caballo Blanco (17 miles). Though the palm occurs, in reduced size, as high in elevation as 850 m. (2,789 ft., Palmar), it grows best below 650 m. (2,132 ft.), and because of the cutting out of it in the more populous upper portions of this zone, the most luxuriant stands today are apparently confined to the outer Lowlands, below about 100 to 150 m. elevation (328 and 492 ft.; see pi. 2, a). I found no evidence of the *cohune* ever being planted by man.

COCO

The coco (*Cocos nucifera*, upper limit about 875 m.) is of economic significance for food, drink, and fiber, the latter having given rise to a budding Ladino industry in the fashioning of bright-colored mats and other souvenirs at San Sebastian Retalhuleu.

COYOL

Coyol palms (*Acrocomia mexicana*) bear well to 1,700 m. (5,577 ft.) elevation. The numerous fruits are eaten, raw or cooked, and the flowers are used for decorating at religious fiestas.

The former species name *vinifera* derives from the importance of the tree in making a mild fermented drink from the trunk sap, a practice which dates apparently from pre-Columbian time (see Oviedo, 1851-55, vol. 1, p. 334), but which is carried on less extensively today. This is probably due to governmental monopoly and restrictions on all alcoholic beverages. Standley calls it "Mexican wine palm," however.

Henry Bruman, who has made a survey of native intoxicants in Mexico and Central America,** has found reference to the coyol palm, as follows:

²²⁹ Several uses of corozo are described by Oviedo, who calls it *manaca*. These include food (flesh, of the fruit), both "Indians and even Christians" (it was supposed to turn them yellow as in the flesh of pigs), feed for pigs, and thatch (Oviedo, 1851-55, vol. 1, p. 333).

* Bruman's Ph. D. thesis (Ms. 1940), as yet unpublished, is in the University of California Library.

The Relación de Chalcaltanguiz (on the lower Papaloapan River in Mexico), dated 1777, refers to palm wine made by cutting a hole in a standing coyol palm, after the heart is removed, so that the juices of the plant would fill the hole and form wine through natural fermentation. Modern Indians of Chiapas told Bruman of the process known to them of felling the palm and carving a hole of 1 to 2 cu. m. capacity near the top of the reclining trunk, then allowing the sap to ferment. Lacandones, according to his Ocosingo informant, similarly prepare a hole in a 4-foot stump.

Fuentes y Guzmán (1932-33, vol. 2, p. 64) describes the making of wine in a similar manner on the south coast of Guatemala. According to this source, a hole is cut in a fallen coyol trunk, near the middle. Josef de Cistirf mentions coyol palm wine on the south coast of Guatemala, Lowland Salvador, Nicaragua, and in the Nicoya region of Costa Rica.

PACAYA

Another palm of economic value is the pacaya (*Chamaedorea* sp.) which thrives to elevations around 1,500 m. (4,921 ft.). The edible flower of this tree is well described by Standley (1930, pp. 217-218), who says "the unopened inflorescence resemble small ears of corn with husk" and are "much used as a vegetable in many parts of Mexico and Central America." This is certainly true for the Pacific coastal region of Guatemala. The small, green pacaya spathes (staminate) are commonly seen in Highland Indian markets, for sale by those merchants who deal in tropical fruits, such as the Atitecos (of Santiago Atitlán; see p. 99). These bitterish palm flowers are very palatable, usually eaten in an omelet, and are much liked by both Ladinos and Indians. Branches of bright-colored fruit of various palms are sold in markets of the Altos during Holy Week for decorations. I noted them particularly at Quezaltenango (1936).

NATIVE FRUIT TREES

Useful plants other than palms are far too numerous to list in this report, so that only the principal ones have been selected. Considering first the fruit trees, it should be pointed out that, though these are sometimes planted, their cultivation by the Indians is so desultory as to merit placing them among the trees of the forest, and calling the "harvest" simple gathering. There are virtually no orchards, the trees most nearly "cultivated" growing more or less close by habitations, in no order whatever. In most cases their growth is fortuitous, though a seed may be planted (usually an accident), or a seedling taken up by an Indian and planted closer home.

Sapotaceae.—*Zapote mamey*.—Large native American sapotaceous trees are well represented in Lowland forests. Perhaps the largest and most abundant, as to tree and to fruit, is the *zapote mamey* (fr. Nahuatl, *tzapotl* = sweet fruit; *Calocarpum mammosum*, mainly below 1,200 m. elevation), its brown, egg-shaped, sandy-skinned fruit, with smooth, sweet, sepia-red flesh, reaching 8 inches or more in length. From the *zapote* is derived the name Zapotitlán, colonial province and modern town (San Francisco Zapotitlán). The large, black seed, *zapuyul*, is widely used to prepare a beverage (ground and mixed with *atol* or corn gruel) and

soap, and is abundant in many Highland markets, particularly Quezaltenango and San Juan Ostuncalco, brought mainly by Zunil and Almolonga traders. San Antonio Suchitepecque, Mazatenango, and Palmar are major sources of supply, along with other centers between 400 and 1,000 m. (1,312 and 3,280 ft.) elevation. It was reported in Chicacao that the fat was used for soap, and the ground, roasted kernel mixed and drunk with chocolate.²⁴¹

Ingerto (*Calocarpum viride*, elevation limits 1,000-1,800 m., or 3,280-5,905 ft.) has a smaller, softer skinned fruit, but is otherwise quite similar, even to the use of the seed, also called *zapuyul*. It is especially *ingerto zapuyul* which is sold, as well as the fruit, in large quantities in the Panajachel market.

Chicozapote or *nispero* (naseberry or sapodilla, *Achras zapota*, grows to about 1,200 m., or 3,937 ft. elevation) is the famous *chicle*, or chewing-gum tree. The smaller fruits (globose, average 3 in. in diameter) thinner skinned than the mamey, with buff-colored flesh, are regarded as a special delicacy. The "*chico*" (Sp., "small") in the name does not refer, as it might appear, to the size, but is a Nahuatl derivative (*tzico* = gum).

Caimito (star-apple, *Chrysophyllum cainito*, grows well to 1,000 m. elevation) is smallest as to tree, and perhaps least abundant of the 4 zapotes. The sweet, purple-fleshed, green- or purple-skinned fruit is about the size of the *chicozapote*, both appearing in small quantities in Highland markets. All of these Sapotaceae, except the latter, are reported by Standley (1920-26, pp. 1114, 1119-1120; Standley and Calderón, 1925, p. 169; Standley, 1930, pp. 378-380) as cultivated, or probably cultivated, in various parts of Central America. That seems to be true in some measure for the Pacific coast. They appear in abundance in Lowland markets, but they are mostly gathered from the *monte*, or uncultivated forest. Standley suggests Central American origin for *zapote mamey* and *chicozapote*. Possibly *ingerto* is also indigenous.

Matasano or zapote blanco (white "*zapote*," *Casimiroa edulis*, elevation limits, 600-2,000 m. or 1,968-6,562 ft.) is similar to *ingerto* except that the fruit pulp is cream-colored and it has usually five seeds instead of one. The Cakchiquel name *ajachel* explains the etymology of the town Panajachel (literally, "place of the matasano"). Xankatales bring them in quantity to the market at Santo Tomás la Unión, from the lands of Nahuala and Santa Catarina Ixtahuacán. *Ingertos* and *matasanos* are abundant along the shores of Lake Atitlán.

Nance (*Byrsonima crassifolia*, small (1/2 inch), bright yellow fruit (elevation limit about 1,400 m. or 4,593 ft.)) is common in Highland markets, particularly around Lake Atitlán, to which Atitecos bring up at least one cargo a week from Lowland Chicacao. Nance is valued also for tanbark.

Anona (custard-apple, mainly *Annona cherimolia* and *A. reticulata*, to 1,000 m. elevation), papaya (tree-melon, *Carica papaya*, mainly below 1,400 m.), jocote marañon (cashew

²⁴¹ That the widespread use and importance of *C. mammosum* is an ancient one is seen not only by implication in the numerous place names derived therefrom; many references are made to it in early literature, perhaps most significant of which is that of Oviedo, who classes it along with the staple foods, and states that the fruit occurs "in such quantity that they are a very important food for the Indians" (Oviedo, 1851-SS, vol. 3, p. 219).

fruit, *Anacardium occidentale**, to 1,000 m. elevation), and several species of guavas, all are Lowland fruits of some importance, though none except papayas are cultivated with any pains, if at all. Only the first two get up into markets of the Altos. They are all native to the Americas.

EXOTIC FRUIT TREES

Exotic fruits include the mango (*Mangifera indica*, important fruit to 1,600 m., or 5,249 ft. elevation) and tamarind (*Tamarindus indica*), presumably from India; Polynesian breadfruit, two varieties, seldom eaten except when mixed with com,²⁴² in times of need, and apparently as much disliked here as in the West Indies plantations; and numerous citrus fruits. Among these are sweet and sour orange, sweet lime (*lima*, *Citrus limetta*, rather insipid and bitterish than sweet; pi. 27, /), lime (bears to 1,000 m. elevation, usually 1,600 m. at Lake Atitlan), grapefruit, and *cidra* (citron, *Citrus medica*), grown mainly for confections. The first three of these (oranges, *limas*, and limes) are the only citrus fruits commonly appearing in the markets of Southwest Guatemala, their abundance being about in the order given; citron is seen occasionally in the plaza of Totonicapan. Grapefruit is rare in western Guatemala, though an excellent variety is produced in some abundance in the dry regions of eastern Guatemala, as around Zacapa. Lime is called *limon*: I have never seen a true lemon growing in Guatemala; they are unknown in most parts of Central America. Several Lake Atitlan towns are noted for citrus fruits, particularly Santa Cruz and its *aldea*, Tzununa; the fruits are said to be best in the dry season, November to March. Oranges (bearing to 1,800 m., or 5,905 ft.) and *limas* (reaching about 1,600 m., or 5,249 ft.) from here and from Santiago Atitlan are even sold in quantity in the Lowland markets, chiefly Chicacao. Nahual is the main source of supply for San Antonio Suchitepequez, Santo Tomas la Union, and Mazatenango, as well as all Highland markets between Quezaltenango and Solola.

There are several reasons for this preferred higher-elevation producing area. First, all crops seem to have best quality near the cold margin (high elevation in the Tropics corresponding with high latitude on the globe), owing possibly to slow maturing; second, a cooler climate more closely approximates the native, extratropical habitat of the citrus trees; third, diseases and pests are at a minimum where temperatures are lower. The fruitfly (*Anastrepha ludens*, primarily), which ravaged Lowland orange crops in some sections, has been practically unknown on Lake Atitlan.²⁴²

Factors that favor the western lake towns in citrus fruit production are fertile volcanic soils, fairly high in potassium, and apparent immunity from the fruitfly and other pests, as a result probably of mountain and water barriers, swept nightly by a strong northeast wind, with cooler temperatures than those prevailing in the Lowlands.

MINOR FRUITS (PROBABLY INDIGENOUS)

There are other Lowland fruit-producing plants, probably indigenous, but they are of little significance in the native

²⁴² Breadfruit is fairly important for fattening pigs at Santo Domingo Suchitepequez.

*Anuario Servicio Tecnico, Guatemala, 1932, p. 100, states that this fly infests fruits of many sorts in the Pacific Lowlands (to 5,000 ft. or 1,524 m.) and also in the valley around Zacapa.

enonomy, for example: The *icaco* (*Chrysobalanus icaco*), the fruit of which, according to the Guatemala Anuario Servicio Tecnico for 1931 (pp. 67-68), are shipped to the capital from Mazatenango; the inferior Antillean avocado (*Persia americana*) of the Lowlands, no competitor of the native brittle-skinned Guatemala variety of the Highlands, arriving in quantity from San Pedro, San Juan, and Santiago Atitlan to Chicacao, San Antonio Suchitepequez, Mazatenango, and other coastal markets; *jocote mico*, *jocote agosto*, or *jocote costeno* (small, red, acid variety of *Spondias purpurea* or possibly *S. lutea*), and *jobo* or "hog-plum" (*Spondias lutea*), both producing inferior fruit (see table 8, p. 144). The Lake Atitlan villages are the chief *jocote* producers of Southwest Guatemala, though the Amatitlan region is also important (see pp. 97-126).

MISCELLANEOUS USEFUL PLANTS

HERBS

There are great numbers of uncultivated herbs which have food or "medicinal" value. Particularly prominent among the former is a small legume, *chipilin* (*Crotalaria longirostrata*), widely gathered and eaten as greens in many parts of Guatemala. It is sometimes cultivated, as at Santa Catarina Palopé, where there are small gardens of it. La Farge and Byers (1931, p. 74) mention it by its common name around Jacaltenango (Dept. of Huehuetenango), and Standley (1920-26, p. 437; Standley and Calderón, 1925, p. 109) cites its importance as a food plant in both Guatemala and Salvador. *Blcdo* (*Amaranthus* sp.), also sometimes cultivated, is another important herb of which the leaves are eaten (p. 142).

SWORDBEAN

The origin of the swordbean (*frijol haba*, *Canavalia ensiformis*) has been subject to much disagreement, and the question has not yet been clarified. Standley and Calderón (1925, p. 108) called it native to the Old World Tropics. Bukasov (1930) reported *C. ensiformis* (as "*haba criolla*") in Venezuela, where it is known to occur wild. Dinner's interpretation of a gold object from a pre-historic Colombian burial (depicted by Uhle) as *C. ensiformis* is cited by Bukasov, with an illustration (fig. 87) of the pod. Archaeological evidences which I have seen in Peru seem to indicate that *Canavalia ensiformis* was the commonest bean of that region in pre-Columbian time, having appeared in pre-ceramic cultures and probably antedating the lima bean.

The Russians found *C. ensiformis* only once "on the whole of our itinerary." That was at Santa Isabel, Chiapas, where it was grown by a native for food. I found it in small quantities in a number of localities in Oaxaca (*ayecote*), Chiapas ("*antirdibico*"), and Guatemala, in the Pacific Coastal Lowlands, where it is called "*frijol haba*" because of its large size, like the *haba*. As the Chiapas name implies, the bean there, large and white, is thought to have curative properties against rabies, but exhaustive tests conducted by Mrs. Ruth Chesbro, University of California Department of Bacteriology, failed to substantiate these claims. The plant is grown on a small scale in Chiapas, Guatemala, and other parts of Central America, for the edible seed.

According to Bukasov (1930), "the majority of the species *Canavalia*," namely 24, are American and only 13 from the Old World.

I collected specimens of small, wild forms of *Canavalia* along the north shore of Lake Atitlán in Guatemala, and in many parts of the mountains of Chiapas (1941).

ANNATTO

Annatto (*achiote*, *Bixa orellana*, probable upper limit of good production, 600 m., or 1,968 ft.), which grows in abundance in the Lowlands, is a common ingredient of native beverages. There are two varieties of this small tree, one with a smooth pod and one spiny, the capsules being about 2 inches long and containing numerous seeds the size of BB shot, coated with soft, claylike, brick-red pigment. This is much in demand throughout Guatemala as a coloring substance for foods, especially rice, and drinks.²⁴⁴ Chichicastenango merchants buy it in Lowland markets, chiefly Mazatenango, and sell it in many Highland plazas.

PATAXTE

Pataxte (*Theobroma bicolor*, upper elevation limit, 600 m., or 1,968 ft.) is commonly planted as a shade tree, along with *cuxin* (*Inga punctata*, more important for coffee shade, q. v., p. 34) for *Theobroma cacao* (discussed under agriculture, p. 33), and it also serves rather widely as a substitute for it.²⁴⁵ *Pataxte* pods (smaller than those of cacao, which is ordinarily sold in beans or as chocolate) are generally sold entire, in small quantity by the weekly Atiteco fruit vendors in Solola, Patzún, Panajachel, and other Highland markets. I saw one of the heavy, woody pods, cut in half transversely, used as a cup at Santa Catarina Palopé. At San Pedro Cutzín the *pinol* (ground toasted-corn and spice drink) as prepared in the Lowlands was described to me as containing *pataxte*, cacao, aniseed, sugar, and sometimes ginger or cinnamon, in addition to toasted corn. There are many regional variations in this drink, which is almost universal with Indians and Ladinos alike. In the Lake Atitlán region, for example, the partial substitution of *pataxte* for cacao seemed to occur less frequently than on the coast, where it is more readily available. Also, around the Lake, Chiapas pepper (*pimienta de Chiapas*) is added and barley, but no sugar; at Guatemala City, sugar is used as on the coast.

CALABASH, OR GOURD, TREE

The native calabash or gourd tree, *jicaro* (*Crescentia cujete*), is abundant through the inner Coastal Plain, supplying useful gourds for receptacles (*jicaras* or *guacales*), generally oblong, up to 8 or 10 inches in length. The round-fruit species (*C. alata*), generally called *morro*, is much the

commoner in Guatemala. These go in quantities to Highland markets, but not in quantities comparable with those of Rabinal (see p. 57). Both habitats are characterized by hot, dry climates, to which the tree seems best suited.

HEDGE PLANTS

The universal hedge plant, *chichicaste*, or nettle-tree (*Urera baccifera*), from which the town of Santo Tomás Chichicastenango derives its name, is somewhat less in evidence in the Lowlands than in the Highlands, where there are infinitely more small land-holdings of independent Indians to be fenced in. Pinuela (*Bromelia pinguin*), looking like a large pineapple plant, but with small, inferior, acid fruit, is also commonly planted as a hedge. Both native to tropical America, neither one could well be called "cultivated."

Yucca (*hizote*, *Yucca elephantipes*).—Grown mainly as a hedge plant, especially in the Highlands (pis. 16; 23, d), the *hizote* bears a large white flower (panicle) which is gathered for food, and frequently appears in Highland markets. Having a mildly bitter taste, it is regarded as a delicacy, and justly so, prepared in an omelet. Standley suggests that the plant was in ancient times imported originally from Mexico, where it is "probably native to Veracruz" (Standley, 1930, p. 228; 1920-26, p. 92; Standley and Calderon, 1925, p. 50). Bukasov (1930) describes it as a "half cultivated textile plant of the Costa Rica Indians (and Guatemala?)." The usual uses of *yucca* in Guatemala are as hedge and minor food. Standley (see reference above) cites and lists additional uses in Costa Rica as follows: Soap (roots), thatch and fiber (leaves); stockades and posts (trunks); these also in Salvador and Mexico. In the Mexican plateau, I have seen the leaves used extensively for thatch, but this is extremely rare in Guatemala.

The coral tree (*flor de pito*, *Erythraea* sp.), is a common fence plant, especially around Lake Atitlán. The flowers, like small red machetes, are eaten (boiled), and the red seeds are used as beads, often in the rituals of medicine men.

PLANTS USED FOR ROOFING, FURNITURE, ETC.

In addition to the rubbery *bejucos* already mentioned, fine and flexible plant material is provided by the *mimbre* or osier of the "sauce," or willow (*Salix chilensis*), used in the Lowlands for making such articles as wicker furniture, baskets, and hats. Like the *bejucos*, *mimbre* is to be found to some extent throughout the southwestern Lowlands, but is particularly abundant in the *boca costa*. From Nahuala-Santa Catarina Ixtahuacán come great quantities of it, regularly brought by the natives of those municipalities to furniture shops of Mazatenango. The Indians of Nahuala and Santa Catarina make baskets and hats, which look as if they were designed after British cork helmets, of osier, and sell the former, for the most part, in the Mazatenango market.

Another genus of considerable economic significance, which should be mentioned in connection with the *boca costa*, is that of *Calathea*, including the so-called *hoja maxón* or

²⁴⁴ . . . enters in the mixture of the drink cacao" (Anon. Ms. 1579, p. 17 f. 113). Annatto is used for body paint in Amazonia and other tropical regions, and is made into dyes in some sections, as well as being exported in considerable quantity for coloring butter and cheese (Standley, 1920-26, p. 835).

²⁴⁵ The value of *pataxte* in early colonial time was about one-half that of cacao (Anon., Ms. 1579, p. 17, f. 113).

...*ja de bijoo* (*C. macrosepala*) and *hoja de saP*" (*C. lutea*). Both have the broad leaf characteristic of so many of the Marantaceae, the former (*maxdn*) being somewhat smaller, 2 or 3 feet long instead of 4 or 5. The leaf is green on both sides, whereas *hoja de sal* has a chalky underleaf. Both apparently grow to elevations of about 1,000 m., the latter not so well adapted to a shady habitat as *hoja tmaxdn*. (This point is mentioned by Standley and Caideron, 1925, p. 56, and by Standley, 1931, p. 143, and pi. 25.) In the Guatemala Lowlands I have heard them referred to as the "one growing in the shade" and the "one growing in the sun." It is probably for this reason that *hoja tmaxdn* grows more abundantly in the forested *boca costa*, and *hoja de sal* more in the open park-savanna of the Lowlands, especially in marshy habitats.

The chief source of supply of *hoja maxdn* to Highland markets is Pueblo Nuevo, where it is a major product, ranking perhaps next to coffee. Almolonga and Zunil merchants, on their return trips from Lowland markets, chief of which is Mazatenango, where they go to sell mostly garden vegetables, load up with these broad leaves for resale in the Highlands, especially at Quezaltenango. They are used for wrapping bulk foods bought in the plaza²⁴⁷ such as meat, lard, flour, salt, and sugar, and constitute an important addition to the Lowland cargo. The latter consists usually of salt, coffee, rice, tropical fruit, and panela, which are loaded into rented trucks, about 8 of them a week ordinarily, and 15 for fiestas.

Palmar is also an important center of production of *hoja maxdn*, for sale in quantity at Quezaltenango and San Felipe. At Palmar, Pueblo Nuevo, San Pablo Jocopilas, and other towns, I was told that both *hoja de sal* and *maxdn* are frequently planted, sometimes as a major "crop," being much in demand, but this could not be verified; they grow wild in considerable profusion.

²⁴⁶ Standley (1931, p. 143) reports that *Calathea macrosepala* is called *hoja de sal* in Guatemala, but in the coastal sections visited by me that term was applied only to *C. lutea*. The terminology is complex, however, for in the outer Lowlands (below 500 m.; San Bernardino, e.g.) *C. lutea* is called *hoja maxdn* as well as *hoja de sal*; perhaps since it so greatly predominates here in the park-savanna. Higher up, they are distinguished. Since salt and foodstuffs are more often wrapped in *C. macrosepala* than in *C. lutea*, it is more reasonable that the former be called *hoja de sal*, but such seems not to be the case in Southwest Guatemala.

²⁴⁷ *Hoja de sal* is sometimes used also for wrappings, especially salt; it is from that use that its common name is said to be derived. For wrapping food, maxan is preferred, as it seems to be tougher, and does not get the bad odor of *hoja de sal* when old, according to reports. Both are used for roof thatch, but *hoja de sal* somewhat more, apparently, and at lower elevations (see map 14 and pl. 3, a, b, c). Standley states (1931, p. 143) that *C. lutea* (called *hoja de sal* in Salvador) is used for wrapping food and for "temporary thatching."

The many early uses of "bihao," which may have been *Calathea*, are listed in elaborate detail by Oviedo (1851, vol. 1, pp. 276-277); they include food, thatch, raincoats, fine, beautifully woven, rainproof baskets, including one made especially for clothing, and one for salt

MINOR PLANTS

Cojon (*Stewmadenia* sp.) provides a latex of which a gum (*kach*) is said to be prepared, and bought on a large scale by Chichicastenango merchants passing through San Pablo Jocopilas.

Old World *rosa de Jamaica*, or simply *Jamaica* (Jamaica sorrel or roselle, *Hibiscus sabdariffa*), is noted for its red calyxes, which are sold in Highland markets during and after fiestas. The acid febrifuge prepared from them is prized, I was told in Solola, as a remedy for the after-effects of alcohol. Standley (1920-26, p. 779) and Bukasov (1930, p. 351, English summary, p. 534) mention the drink as used in Mexico, with no reference, however, to the "hangover" remedy.

Conspicuous throughout the Lowlands is the giant ceiba, or silk-cotton tree (*Ceiba pentandra*, which grows to 1,500 m. elevation), important as a preferred market shade tree since ancient times²⁴⁸ (pi. 5, a). One in the plaza at Palm is especially famous. The "almendro" (*Terminalia catappa*) is sometimes planted for market shade, as at Chicacao; it is low-growing and flat-topped, having the appearance of a large parasol. White-trunked, slender *guarumo* trees (*Croton mexicanus*) are widely used for house walls, the hollow trunk being split (see map 14 and pi. 2, b, g). The prized *jaboncilil*, or soapberry tree (*Sapindus saponaria*) produces berries which are much employed for washing clothes, but only by the poorer people, I was told.²⁴⁹

A widely used fiber, finer and perhaps more durable than agave, is derived throughout the piedmont from the *pita floja* ("silk-grass," *Aechmea magdalenae*).²⁵⁰ In San Sebastian Retalhuleu, strips of corozo palm tree leaves used in *suyacales* are sewn together with thread made of *pita floja* fiber. In certain sections, as Santo Domingo Suchitepequez, the thread is fashioned into fish nets and cordage of various sorts.

Pokeweed (*Phytolacca rugosa*) called *sacachidn* (San Juan Ostuncalco) and *tzipchap*, literally "dog soap" (Momostenango), is widely sold (entire clusters of purplish berries) in Highland markets as soap. It is considered especially good for washing blue skirts, to keep the color strong. It grows both in Lowlands and Highlands.

EscobUla (*Sida rhombifolia*) is used in the Lowlands for making fish nets of the fine bark fiber.

²⁴⁸ Mentioned as a market shade tree by Oviedo, 1851-55, vol. 1, p. 345.

²⁴⁹ This tree is probably the one mentioned by Bukasov under the name *amolillo*, which he said was an "unknown plant," the seeds of which "are used as may be gathered from its Spanish name, at a substitute for soap" (Bukasov, 1930, p. 485).

²⁵⁰ Called by Standley "one of the best fibers known" (1936, p. 90; cf. also Standley, 1930, p. 220; 1931, p. 126).

GLOSSARY

Achiote, see **Annatto**.

Adobe, sun-dried construction block or "brick" of clayey earth, generally dark; also, the earth, which may be daubed on walls.

Aguate, avocado, or "alligator pear" (*Persea americana*).

Aguardiente (lit., "fire water"), strong ruin made from brown cane sugar (*panela*).

Alcalde, in Guatemala, the political chief of a municipio before 1935, since which time the ranking official has been an *mtendente*.

Ajeantarilla, aqueduct, generally of unglazed tiles.

Aldea, small settlement or hamlet, generally larger and more important than a *caserio*, but smaller than a *pueblo*.

Alfeliique, a kind of candy ring made at Sacapulas, of squash seeds and sugarcane juice.

Alguacil, minor sheriff's deputy and municipal servant who performs menial duties.

Aliso, alder (*Alnus* spp.), from the bark of which a deep reddish-brown dye for wool yarn is derived.

Almendra, a Lowland shade tree (*Terminalia catappa*) distinctive for its whorled branches.

Almud, a volume measure (ordinarily a shallow, square wooden box) used for grain, especially maize, of which it contains about 1254 pounds avoirdupois.

Aftil, or **jiquilite**, indigo (dark-blue) dye stuff, and the plant (especially *Indigofera suffruticosa*, also *I. guatemalensis*) from which it is derived.

Annatto, **anatto**, or **arnotto**, small tree (*Bixa orellana*) and the yellowish red, fugitive dyestuff (mainly for food coloring) derived from it.

Anona, one of various trees (*Annona* spp.), called also *andn*, with large sweet, edible fruits; chirimoya, sweet-sop, custard apple (esp. *A. reticulata*), etc.

Arriero, muleteer.

Arroyo, deep gorge or ravine through which a small stream flows; also, the stream.

Atol, or **atole**, thick corn gruel served hot and variously seasoned.

Auxiliar, lowest order of public servants, who assist the *regidores*, or aldermen, in carrying out public works projects; they are generally recruited from the Indian element of the population in this region.

Axin, or **axi**, a scale insect (*Llaveia axin*) from which a wax (lac) is derived by cooking, used to coat tree calabashes at Rabinal; the insect somewhat resembles chile, formerly called **aji** in Guatemala, still so called in South America.

Ayote, see **calabaza** (squash or pumpkin).

Bajareque, house wall made of interlaced poles or canes (vertical and horizontal) daubed with adobe and sometimes reinforced with rubble, as at Panajachel.

Baranca, deep gully, ravine, or gorge.

Barrio, section, or ward, of a village or town.

Bejuco, small, usually rubbery, tough vine common in the Lowlands, much used for binding, especially in house construction.

Bledo, amaranth (*Amaranthus* 'p.).

Boca costa, inner edge of the Coastal Plain and base of the mountains (lit., "mouth of the coast").

Bocoles, a confection of popcorn coated with sirup made from brown sugar.

Brasil (*pah* de) (*Haematoxylum brasiletto*), dyewood used to dye wool yarn various shades of reds and purples.

Brujo, Indian shaman or medicine man, ministering only to Indians.

Cabecera, capital of a department or municipio; of the latter it ordinarily carries the name, and it usually, but not always, carries the department name.

Cacao, *Theobroma cacao* tree, or its seeds (cacao "beans") from which cocoa and chocolate are prepared.

Cacaste, wooden carrying frame, usually with four legs and one or two shelves, used only by the Indian men and boys for goods transported on their backs with the *mecapal* or *tumpline* (q. v.).

Cafe en oro, unroasted coffee "bean," or seed, with the thin husk (*pergamino*) removed, ready for roasting (distinguished from *caf* *en* *pergamino*, pulped, but unshelled, coffee).

Caiba, cucurbitaceous vegetable (*Cyclanthera pedata*) ; fruit (usually stuffed) and leaves eaten.

Caimito, sapotaceous tree (star-apple, *Chrysophyllum camito*) with sweet, purple-fleshed fruit.

Calabaza, squash (*Cucurbita moschata*) or pumpkin (*C. Pepo*).

Caldera, large crater or depression caused by crustal collapse of volcanoes or volcanic areas undermined by long-continued volcanic eruptions; sometimes due in part also to eruptive explosions.

Camote, sweetpotato.

Campeche, see **Palo de campeche**.

Canasta, deep, handled basket, carried by Ladinas.

Canasto, shallow, open basket without handles, for use in displaying goods in the market; Indian women carry them on their heads.

Canicula (lit., Dog Star), or **Veranillo de San Juan**, short, relatively dry period of varying duration and irregular occurrence, sometime during July-August, between the two periods of maximum rainfall (June and September).

Capixaf, long, natural-black wool robe worn by the Indian men in various municipios.

Carga de cacao, 24,000 "beans" or seeds of cacao, by ancient Aztec measure, adopted also by early colonial Spanish. A *carga*, or manload, consisted of three *xiquipies* (20 *contles* of 400).

Casero, small hamlet, or rural community, generally of an order of size and importance next below that of an *aldea*.

Cassava, see **Manioc**

Ceiba, silk cotton tree (*Ceiba pentandra*) ; plate 5, *a*.

Chalum, important coffee shade tree (*Inga* sp.).

Chamborote, large butter bean (*Phaseolus coccineus*) or, sometimes, giant kidney bean (*P. vulgaris*) in the Cuchumatanes region.

Chicha, fermented drink made from maize (especially "black maize"), and sometimes from certain fruits.

Chicharron, cracklings (of pig fat).

Chichipate, *Sweetia panamensis*; tree producing fine construction wood.

Chicocapote, see *Nispero*.

Chilacayete, *Cucurbita ficifolia*; whitish watermelonlike fruit.

Chile, red or green pepper (*Capsicum* spp.).

Chinche **negrita** (lit., "little black bug"), or *cmco negritos*; a small shrub (*Lantana camara*) used as an ingredient with cochineal in the dyeing of wool yarn at Momostenango.

Chipihñ, *Crotalaria longirostrata*, a small leguminous plant with yellow flowers; widely eaten as greens.

Chirimia, crude reed instrument like an oboe, generally played at fiestas with drum accompaniment (p. 17, d).

Chupete, a kind of cone-shaped candy on a stick, sold especially at carnivals and fiestas.

Cidra, citron (*Citrus medica*).

Cinco **negritos**, see **Chinche negrita**.

Ciudad, town, characterized ordinarily by a rectangular street pattern, small stores and artisans' shops, a representative professional class, some facilities for overnight travelers, and, usually, Government offices (mostly *ciudades* are department *cabeceras*). Guatemala City is the only *ciudad* in Guatemala which approaches our concept of a city. Next in rank below a *ciudad* is a *villa*.

Cochineal, or **grana**, dyestuff made up of dried bodies of a female scale insect (*Coccus cacti*); also the insect, cultivated on various species of tuna (q. v.).

Coco, the coco palm (*Cocos nucifera*), also its fruit (coco-nut).

Cofradia, Indian religious society, membership in which is confined to small localities throughout the region.

Colono, see **Ranchero**.

Comal, saucer-shaped griddle of fired clay, usually unglazed, on which *tortillas* are baked.

Copal, tree (*Idea copal*; also *Elaphrium* or *Bursera* spp.) and its resin, widely used as incense.

Corozo, or **manaco**, the cohune palm (*Orbignya cohune*); the largest palm and one of the most useful plants of the Lowlands (optimum growth in Pacific Lowlands below about 650 m., or 2,132 ft.).

Corregimiento, colonial district served by a *corregidor*, or Spanish magistrate.

Corte, a certain length (lit., "cut") of goods for clothing, especially a length of cloth for a woman's wrap skirt.

Costa Cuca, narrow northwestern Pacific Coastal Lowlands, mainly beyond Retalhuleu (town).

Costa de Guazacapan, narrow southeastern Pacific Lowlands, mainly beyond Escuintla (town).

Costa Grande, main section of Pacific Lowlands, at its widest, essentially between Escuintla and Retalhuleu.

Coyol, a useful palm (*Acrocomia tlexicana*).

Criollo (-a), adj., native indigenous.

Cuadrillero, a *temporadista* (q. v.), or day laborer; one who clears *cuadrillos* (lit., small square areas) of coffee plantation land; a *cuerda* 28 *varas* (of 33 in.) square is the standard *tana*, or day's work.

Cuajatatina, see **Sacatinta**.

Cuarentefio, (lit., 40-day) applied to short (2 mo.) growing season maize.

Cuerda, a measure of land, usually 32 *varas* (of 33 in.) square, which is 7,744 square feet, or between one-fifth and one-sixth of an acre (43,560 sq. ft.). On coffee plantations a *cuerda* of 28 *varas* square is sometimes used as a basis of land measurement.

Cuilco incense, finest grade copal, put up in small, circular loaves, formerly brought only from Cuilco, more recently produced in Santa María Chiquimula.

Cuxin, important coffee shade tree (*Inga* sp.).

Departamento, department, largest political division within the Republic.

Echintal, starchy edible root of the vegetable pear or chayote (*quisquiu*, *Sechium edule*).

Ejote, green bean or string bean; immature *Phaseolus vulgaris* as a vegetable.

Elote, immature ear of maize.

Encomienda, colonial practice of entrusting natives in America to the "protection" of the Spanish conquerors, theoretically for conversion of the charges to Roman Catholicism and other presumed benefits of Old World civilization; actually, enforced labor amounting to slavery.

Escobilla, small Lowland shrub (*Sida rhombifolia*) producing fine fiber (in bark) much used in making fish nets.

Estancia, large farm, usually a cattle ranch.

Estoraque, copal resin (q. v.) in granular form.

Feria, annual fair, specifically the animal market which in many villages is important only at one fiesta a year; hence, an animal market.

Fiesta titular, festival held in celebration of the patron saint of a community, always on the saint's day, a fixed day of the year.

Finca, plantation, generally one where coffee is the major crop.

Finquero, owner of a *finca*, or plantation.

Flor de pito, coral tree (*Erythrina coratodendron*), common hedge plant, with edible flower and ornamental red seeds.

Foot loom or **treadle loom**, European loom with a large wooden frame and treadles by which the heddles are raised and lowered, forming the shed; the shuttle is shot back and forth by hand. This loom is operated only by men, Ladinos and Indians. Small belt and head-band looms of this type are operated by both men and women.

Frijol, bean, generally the small common kidney bean (*Phaseolus vulgaris*). The Cakchiquel word "*qumc*" means literally "kidney seed."

Frijol de suelo, bush bean, kidney (*Phaseolus vulgaris*).

Frijol haba, swordbean (*Canavalia ensiformis*), called *ayecote* in Mexico.

Gabán, short jacket of natural black wool, worn by men; inner sleeves and sides are split for freedom of arm movement.

Gallery forest, growth of trees along the banks of a river in a region where forest is not the dominant vegetation.

Garavito, or *escarda*; weedhook.

- Garhanzo, chickpea (*Cicer arietinum*).
- Garlito, fish trap, those on Lake Atitlan consisting of a split-cine funnel with a cane pole attached to the apex; placed with the baited funnel opening toward the bank, on which the pole rests.
- Gratia, see Cochineal.
- Granadilla, edible fruit of a passion flower, or the vine (especially *Passiflora ligularis*).
- Gravilea, silk oak (*GreviUea robusta*), ornamental tree sometimes used for coffee shade at middle altitudes, but too brittle for good wind resistance.
- Guachipilin, small leguminous tree (*Diphysa robinoides*), having very hard wood much used in house construction (for mainposts, especially) and for railroad ties.
- Guaromo, slender tree (*Cecropia* spp.) having a soft, hollow trunk much used in the Lowlands for house walls.
- Gticioy, a small, warty deeply lobed squash (*Cucurbita pepo* ?) grown generally in high altitudes (above about 1,600 m.).
- Guineo, banana (*Musa sapientum*).
- Gtisquil, vegetable pear or chayote (*Sechitum edule*), having edible fruit, leaves, and root (*echintal*).
- Haba, broadbean (*Vicia faba*).
- Henequen, see sisal.
- Hizote, yucca (*Yucca elephantipes*), common hedge plant.
- Hoja de sal, leaf of *Calathea lutea*, marantaceous plant having large, bananalike leaves with whitish undersides; much used locally in Pacific Lowlands for roof thatch.
- Hoja maxan, or bijao, leaf of *Calathea macrosepala*, broad-leaved marantaceous plant of the Pacific Coastal Lowlands, sold in quantity throughout the region for food wrappings.
- Huipil, Indian woman's tuniclike upper garment, having no true sleeves, but openings left in partially stitched sides.
- Iguana, large (up to 6 feet) edible lizard (*Iguana iguana*), of arboreal habit and largely herbivorous, much prized for food, as are the eggs (*iguaxte*).
- Iguaxte, iguana eggs.
- Ingerito (lit., a horticultural graft), *Calocarpum vvrde*, sapotaceous tree with fruit similar to the mamey, but smaller and smoother skinned.
- Intendente municipal, political chief of a municipio; term in use since 1935, replacing *alcalde*. In municipios having large Ladino populations the *intendente* is always a Ladino, though the Indians have their officials in the *tmnicipalidad indigena*. In municipios with almost no Ladino population the *intendente* is an Indian; the secretary is usually a Ladino, but may be an Indian who can read and write Spanish.
- Inyierno, rainy season, "winter," lasting from May through October in most of the region; actually, summer.
- Irsix, large yellow butter bean (*Phaseolus coccineus*) eaten in the pod, even after drying, by Indians of San Juan Atitan.
- Isohyps, imaginary line of equal elevation above mean sea level.
- Ixcaco, or algod6n ixcaco; cotton (*Gossypium mexicanum*) with a reddish brown fiber; also, sometimes, the color.
- Ixcumita, tepary bean (*Phaseolus acutifolius*), grown in the Pacific Coastal Lowlands.
- IxpanquS, lima bean (*Phaseolus lunatus*) varieties in the Pacific Lowlands; generally red or red and black striped and mottled, large or small, and flat. Other local terms for lima beans are *patashete*, in Cuchumatanes region, and *fwuna*, in eastern Guatemala.
- Irtapacil, lima bean (*Phaseolus lunatus*); Pacific Lowland varieties, generally small, black (may be red or red splotted on black), roundish or slightly flattened. Maya glyph outlines apparently represent this bean, as in Mochica and Nasca ceramic decorations in Peru.
- Ixtle, fiber of certain magueys (q. v.).
- Jaboncillo, soapberry tree (*Sapindus saponaria*), and its berries, much used for soap.
- Jaspe, tie-dyed yarn, or ikat.
- Jefatura, official headquarters of the *jefe politico*, or governor of a department.
- Jefe politico, chief civil officer of a department, largest political division in Guatemala.
- Jicara, tree calabash of oblong shape, much used for drinking vessels.
- Jfcaro, calabash tree (*Crescentia cujete* and *C. alata*).
- Jiquilite, see Afilil.
- Jobo, hog plum, small tree (*Spondias lutea*); also its inferior, acid fruit.
- Jocote, (lit. sour fruit, Aztec) acid, plumlike fruit, yellow or red; *ciruela* (tree), *ciruelo* (fruit) (Hex., Peru); "Spanish plum" or mombin; also, the tree (*Spondias purpurea*).
- Jornalero, see Temporadista.
- Labor, small agricultural settlement.
- Ladinize, to assume or to imbue with a predominance of Ladino traits; used only with reference to Indians.
- Ladino, middle or lower class man having a predominance of European (Spanish) culture traits; distinguished from the Guatemalan aristocracy (except in the census) and from the Indian, who has distinctive culture traits, as in language, food, houses, and dress, some elements of which may be Spanish colonial.
- Lagarto ("alligator"), cayman (probably *Caiman sclerops*, the spectacled cayman, which is most common), crocodilian reptile most closely related to the American alligator.
- Laurel, tree (*Cordia alliodora*) having fine wood for construction and cabinet work.
- Lima, sweet lime (*Citrus limetta*); an insipid citrus fruit which looks like a large, round lemon, and has a thick, loose skin and easily separable segments.
- Lim6n, sour lime (*Citrus aurantifolia*); the tree or its roundish, yellowish green, thin-skinned, acid fruit.
- Macana, planting stick about 2 ra. long, pointed at the lower end, held vertically in both hands; used mainly in Lowland agriculture.
- Machete, large heavy, curved knife, usually with blade 20 to 25 inches long and 2 to 3 inches wide, with convex cutting edge; used for clearing, harvesting, cutting wood, etc. Nearly all are American-made (Collins).
- Madre de cacao, Lowland tree (*Glirklidia sepmn*), used for coffee shade and for construction wood.
- Maguey, century plant; any of a number of species of *Agave* and some species of *Furcraea*, serving mainly for coarse fiber.

- Maguēy de lazo or de pita, any species of *Agave* which yields fiber usable in making cords and ropes.
- Maiz, maize (*Zea mays*); this name was brought in by the Spaniards from the West Indies. *Ixim* is the word for maize in almost all of the 22 or more Maya dialects.
- Malacate, small wooden spindle; for cotton, about 12 inches long, with spherical clay or wooden whorl near one end (bottom when spinning); for wool, about 18 inches long, with wooden disk whorl, generally used by men (pi. 19, d).
- Manaco, see Corozo.
- Mani, or (Mex.) cacahuete; peanut.
- Manioc, or cassava, plants of the genus *Manihot* having edible roots that are high in starch, especially the bitter species (*M. utilissima*, main source of tapioca); sweet manioc (*M. dulcis*) is the one commonly grown in this region, and eaten as a boiled vegetable.
- Mano, slightly fusiform cylindrical stone grinder, held in two hands like a rolling pin and scraped over metate, or basal stone.
- Masa, ground *nixtamal*; corn mash.
- Mata, cluster of plants of the same kind, as a hill of maize.
- Matasano, or zapote blanco, tree (*Cosimiroa edulis*), or its edible fruit.
- Matate, a kind of small carrying bag, with two short handles, generally made of rush pith (*sivdc*).
- Matz, a wild kidney bean (*Phaseolus vulgaris*) which grows in abundance at San Antonio Huista; reported also near Guatemala City.
- Maxeno (-a), Indian man or woman of Santo Tomas Chichicastenango.
- Mecapal, tumpline; broad forehead strap with ropes attached.
- Mecate, maguēy (agave) cord.
- Melocoton, peach; also, a Lowland cucurbit (*Cicana odorifera*).
- Mescal agave, any of the various agaves yielding edible buds and leaf bases, which are sweet when roasted.
- Mesothermal winter-dry climate (Cw, Koppen), intermediate temperatures (monthly means are between 0 and 18° C.); rains are fairly heavy in summer (May through October), with the winter half year almost completely dry.
- Milpa, cornfield, which may contain other crops interplanted; sometimes (esp. as "milpitas") may refer also to individual plants.
- Miltomate, husk-cherry or groundcherry (*Physalis* spp.); low-growing plant with small, greenish, tomatolike edible berry.
- Mimbre, osier, or willow (*Salix* spp.) tree, or its flexible twigs used for baskets, chairs, etc.
- Molinillo, small wooden hand mill, usually four-bladed, held vertically between the flat palms of the hands in stirring chocolate to froth.
- Molote, fusiform ball of wool yarn on a *cañon* (cane spool) as it comes from the spinning wheel, and as it often appears in the market.
- Morral, a bag generally made of agave fiber, of moderate size and with long string handles for hanging the bag from a saddle.
- Morro**, large globular or ovoid tree calabash (*Crescentia alata*).
- Mozo**, day laborer or servant.
- Mulatto**, distinct racial cross involving principally white and Negro blood.
- Municipalidad**, municipal offices entrusted with the affairs of the municipio.
- Municipalidad indígena**, governing body of Indian officials who look after Indian interests where this population element is large in a municipio.
- Municipio**, smallest political unit, containing usually a *cabecera*, or chief village or town of the same name, one or more *aide as*, or rural settlements, and the scattered houses and fields of individual planters (or plantations in certain sections).
- Nance**, tree (*Byrsionina crassifolia*) important for small, yellow, edible fruit and tanbark,
- Nispero**, or Chichozapote, naseberry, or sapodilla tree (*Achras zapota*), source of chicle, or chewing gum.
- Nixtamal, grains of corn softened by boiling in lime water.
- Nopal, prickly pear, or tuna; cochineal "fig" or cactus (*Nopalea cochenillifera*) or other species of *Nopalea* or *Opuntia*.
- Ocate**, pitch pine splints, used for torches and for starting fires; also, the tree, various species of *Pinus*, especially *teocote*.
- Olote, corn cob.
- Pacaya, small palm (*Chamaedorea* spp.) with an edible flower of economic importance.
- Pajizo**, adj., grass-thatched.
- Pajon, large sedgelike grass, especially the bunchgrass (*Muhlenbergia* sp.) of high altitudes, often dominant above 2,500 m.
- Palma del mar, fan palm (*Inodes* sp.) growing near the Pacific shore and there much used for roof thatch.
- Palo amarillo, tree (*Chlorophora tinctoria*) with yellowish wood from which a yellow dye is derived.
- Palo de campeche, or palo de tinte, dark-blue ("black") dyewood (logwood, *Haematoxylum campechianum*), important in dyeing wool yarn; the wood, which looks dark red after exposure to the air, is sold by the pound.
- Pan dulce, small bun made with white flour and egg, and slightly sweetened.
- Panela, brown block sugar made by pouring heated cane juice into a mold.
- Pan frances, small, crusty loaf of white wheat bread.
- Papa, Irish potato.
- Papaya, the tree-melon, or pawpaw, fruit of the papaya tree (*Carica papaya*); the name is a Carib derivative, there being no Nahuatl and almost no Maya names known.
- Park-savanna, landscape characterized by grasses with scattered spreading trees and deciduous woodlands.
- Pataxte, tree (*Theobroma bicolor*) closely related to cacao with a similar fruit, sometimes used as an ingredient in beverages, even as an inferior cacao substitute, and as a cacao shade tree.
- Paxte, sponge, or "dishcloth," gourd, luffa (*Luffa aegyptiaca*).
- Penga or penca, fleshy, thorny leaf of a cactus, agave, or similar plant.

Pepino, melon pear, *Solanum muricatum*, *S. guatemalense*, shaped usually like a pointed egg, yellowish with purple stripes; smaller than the average South American pepino, which often tends to be globular, sometimes nearly all purple.

Pepitoria, candy made with squash seeds.

Pereha, teasel, for raising nap on wool cloth; 12 to 15 teasel flowers tied in a rigid, cane-braced fan, the stems forming the handle.

Peso, obsolete monetary unit worth 60 to the dollar at the time the quetzal was introduced, in 1924; the peso was worth 8 reales, or 100 centavos bronze; was in circulation almost to the extent of quetzal units in some rural communities as late as 1933; the peso and real are still employed to some extent as "verbal" units of currency in Indian markets.

Petate de palma, palm leaf mat

Petate tul, rush mat.

Peyón, shaggy wool rug having a pile surface (as in terry cloth), made by pulling out 6-inch loops in the weft yarn and later cutting them in two, leaving 3-inch ends.

Piedra de moler, metate, or tripod grinding stone made of lava, for grinding maize, cacao, coffee, and other comestibles; potter's clay, dyestuffs, etc.

Pila, a watering place, usually of concrete or stone.

Piloy, lima bean (*Phaseolus lunatus*) in the Lowlands; butter bean (*Phaseolus coccineus*) or giant kidney bean (*Phaseolus vulgaris*, var. *macrocarpa*) in the Highlands.

Pifia, pineapple (*Ananas comosus*).

Pinole, or pinol, drink made of ground toasted maize, vari-ously flavored and seasoned with cacao, *patate*, aniseed, panela or white sugar, ginger, cinnamon, and other condiments. Whole barley, prized for medicinal values, is sometimes added. (See p. 148.)

Piiion, small tree, physic-nut (*Jatropha curcas*) important as the main host plant of the *axin* (scale insect, *q. v.*), hence a major hedge plant at Rabinal, where the *axin* is cultivated.

Pinuela, pinguin (*Bromelia pinguin*), a wild relative of the pineapple; hedge plant, source of an inferior fruit.

Piso de plaza (lit., "market floor"), tax; from 3 to 20 cents (average probably 5) imposed on market vendors who have no fixed, rented stall.

Pitafoja, "silk-grass" (*Aechmea magdalenae*) which produces a fine, durable fiber much used locally in the Pacific Lowlands, as at San Sebastian for sewing *suyacales*, and elsewhere for nets and cordage.

Platano, plantain, a banana (*Musa paradisiaca*), having large fruit ordinarily eaten cooked.

Plaza, market or market place; also a public square.

Pom, small disk of copal incense (*q. v.*).

Posole or **posol**, cold drink made of cold corn mash (ground boiled corn) stirred into water, variously seasoned.

"Pound" of raw wool, 80 ounces, or 5 pounds, avoirdupois.

Pueblo, village, generally the *cabecera*, or seat of a municipio of the same name; larger than an *aldea* in the same municipio, and less important than a *villa*.

Quetzal, national bird of Guatemala; a trogon (*Pharomacrus mocinno*), the male of which is noted for its beautiful long, green upper tail coverts, important in

pre-Columbian commerce. Also, the modern monetary unit (1 quetzal = 1 dollar).

Quintal, unit of weight; as in Mexico, 46.025 kg., or 101.47 pounds.

Ranchero, or colono, laborer (generally Indian) who has taken up permanent residence on a *finca*, or plantation.

Ranchito, small, rustic hut.

Reduccion, as applied in the years following the Conquest, the grouping of native populations into more compact communities, after evicting them from their scattered rural dwellings, for greater ease of religious conversion and government by the *encomenderos*, or conquerors to whom they were entrusted.

Regidor, alderman; member of the municipal council.

Repartimiento, distribution of land among the conquerors of Spanish America after the Conquest; also, the feudal estates which were thus apportioned.

Riscos,* crags; specifically applied to the pinnacled erosion forms at Momostenango.

Rodillera, checkered black-and-white or blue-and-white wool wrap-skirts worn about to the knee (*rodilla*) by Indian men of some municipios; also sometimes worn by young girls.

Rosquitos, small ring-shaped buns.

Roza, process of clearing trees, bushes, and weeds from a field about to be planted; usually involving cutting and burning.

Sacachian, or tzichipac, fruit (bunch of dark purple berries) of a pokeweed (*Phytolacca rugosa*), used as soap, especially for washing blue skirts.

Sacatinta, cuajatinata, or tinta, bluing plant (*Jacobinia spicigera*), fresh leaves of which are made into an infusion in water to which indigo and usually some aniline dye are added. When fermentation of the solution has taken place, after 1 or 2 weeks, the dye is ready for use.

Sal de sol, sun-evaporated salt, made at the Pacific shore during the dry season.

Sapuyul, large, blackish, shiny seed of the *zapote mamey* or *ingerto* (*q. v.*), used in beverages and in making soap.

Sindico municipal, attorney and legal adviser to the political chiefs of a municipio.

Sisal, or henequen, agave or the fiber, sometimes called hemp, obtained from various agaves, most important of which is *Agave fourcroydes* which supplies the greater part of the Yucatan sisal; *A. sisalana* is the principal sisal source outside of Yucatan.

Sivdc, rush pith, used in making fire fans, deep, handled market bags, mats, etc.

Soga, large agave rope, generally used as a halter.

Sopilote (sometimes *eoipilote*), American black vulture (*Catharista atrata*), or the turkey-buzzard (*Cathartes aura*), which is relatively rare and conspicuous for its red head; both valuable as scavengers, and protected by law.

Stick (back-strap) loom, indigenous loom operated ordinarily by Indian women, never by Ladinas; it consists of sticks and strings and a broad strap (*mecapal*) which passes around the weaver's hips and against which she sits or squats so as to give tension to the warp. The

- end of the loom opposite the weaver is attached by rope to a tree or post. Small belt and head-band looms of this type are operated by both men and women.
- Surco, furrow in a plowed or hoed field.
- Suvacal, rain cape made from leaf segments of the corozo palm.
- Tabldn, carefully squared and terraced garden plot, generally well fertilized and irrigated for intensive cultivation.
- Tamale, or **tamal**, short, thick cake of corn which has been softened in lime water and ground on a metate or in a machine, then wrapped in corn husks and steamed in a deep jar; well-seasoned meat and certain vegetables serve as filling inside tamales.
- Tapajo, a heavy leather blind placed over the eyes of a pack animal while he is being loaded, to keep him from bolting.
- Tarea, day's work of a laborer; on a coffee plantation this means generally about 1 *cuerda* of 28 *varas* (33-in. units) square, cleared of weeds, second growth, and rubbish.
- Tarro, giant bamboo, especially important for Lowland house walls.
- Tecomate vine gourds (*Lagenaria* spp.), including the bottle gourd (*L. siceraria*).
- Temascal, sweat bath; a low structure of poles and mud and, usually, stones, with foundation sometimes excavated, and one small side opening; for hot-water and steam bath.
- Temporadista jornalero or cuadrillero, temporary, migrant day laborer on a *finca*, or plantation; generally Highland Indian going to the piedmont or Lowlands of the Pacific coast.
- Teosinte, a grass (*Euchlaena mexicana*) native to Mexico and Guatemala, related to maize; formerly thought to be a maize progenitor, now known to be a natural maize-*Tripsacum* hybrid.
- Tepeiscuinte, small animal (probably *Cuniculus paca*), highly esteemed as food, and a major pest in a cornfield.
- Tienda, small store, generally a home store.
- Tierra caliente (lit., "hot country"), region below about 1,000 m. (3,280 ft.) elevation; mean annual temperature above about 22° C. (71.6° F.), with slight annual range.
- Tierra fria (lit., "cold country"), region above about 2,000 m. (6,562 ft.); mean annual temperature below about 16° C. (60.8° F.) with little annual range.
- Tierra templada (lit., "temperate country"), region between about 1,000 m. (3,280 ft.) and 2,000 m. (6,562 ft.); mean annual temperatures between about 22° C. (71.6° F.) and about 16° C. (60.8° F.), with slight annual range.
- Tinajtf, water jar.
- Tinta, see Sacatinta.
- Tizate, small cone of chalk used for rubbing on the fingers by women spinning cotton.
- Tortilla**, unsalted maize cake made by patting a ball of corn mash to paper-thin, circular form, and baked on a clay (or modern sheet-iron gasoline drum top) griddle. Large *tortillas* are occasionally made of wheat flour.
- Totoposte**, tortilla toasted and sometimes salted.
- Transhumance**, migration of groups of people, as herdsmen, often seasonal.
- Treefern**, any of the family (*Cyathea* spp.) of aborescent ferns having woody trunks, sometimes attaining a height of 50 to 60 feet, reaching their maximum luxuriance on certain rainy Pacific slopes of volcanoes at lower middle altitudes (p. 5, b, c).
- Troje**, corncrib.
- Tropical monsoon climate** (Amw, Koppen), no winter temperatures (all monthly means are above 18° C.); very heavy summer rains with only short, relatively dry period in winter, so that the vegetation is heavy monsoon forest (like rain forest).
- Tropical savanna climate** (Aw, Koppen), no winter temperatures (all monthly means are above 18° C.); rains concentrated in summer half year, with winter nearly dry.
- Tul**, rush, used especially for making mats.
- Tuna**, prickly pear or nopal (q. v.).
- Vara** (lit., "staff"), linear measure, 32 or 33 inches, as specified; originating from the early use of the staff of authority, carried by village officials in settling land disputes, as is sometimes still done in the region today.
- Vara de autoridad**, staff of authority, often made of fine wood with engraved silver head, usually having a specified length (for measuring in settling disputes, particularly over land), and always carried by officials of the *municipalidad* where it is kept and is handed down.
- Verano, dry season, "summer," lasting from November through April in most of the region; actually winter, in terms of the sun.
- Villa**, large village or small town, generally of greater size and importance than a *pueblo*, but less than a *ciudad*.
- Visita (eccl.), visit of a priest to a church having no regular resident curate; also, the area included in such visits.
- Xaca**, dark bread, said to be made of whole wheat, with pancla (brown sugar) added.
- Xancatal, Indian of Santa Catarina Ixtahuacan.
- Xiquipil, 8,000 by Aztec system of numbering: 20 *contles* (of 400).
- Yuca, see Manioc.
- Zambo, distinct racial cross, involving principally Indian and principally Negro blood.
- Zapote mamey, large tree, *Calocarpum mammosum*, or its large, sweet, juiceless fruit.
- Znte**, general utility cloth of Indian women, who may fold them on the head against the sun, wrap them around the shoulders, sit on them, wrap goods or a baby (often thus slung on the back) in them, or fold them on top of a basket of goods; Indian men may wear them wrapped around the head, tied around the hat, or thrown across the shoulder for use as a handkerchief.

BIBLIOGRAPHY

ANONYMOUS.

- Ms. 1544. Letter from Juan de Zarate, Bishop of Oaxaca, to the King of Spain. (May 30, 1544.) Copy. Real Acad. Hist., Madrid, Mufioz Coll., vol. 83, ff. 146-150 v. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1571. Indios de Atitlan. Copy. Real Acad. Hist., Madrid, Mufioz Coll., vol. 42, ff. 115-118. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1574 a. (?). De los montes i arboles i maderas. (Undated description of Vera Paz). Copy. Real Acad. Hist., Madrid, Mufioz Coll., vol. 39, ff. 76-91 v. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1574 b. Relacion de la provincia i tierra de la Vera Paz [covering the years 1544-74]. (Vera Paz, Dec. 7, 1574.) Copy. Real Acad. Hist., Madrid, Munoz Coll., vol. 39, ff. 92-104. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1579. Memorial de las advertencias i cosas . . . en esta provincia i costa de Capotitlan i Suchitepeque. (Capotitlan, Nov. 22, 1579.) Copy. Real Acad. Hist., Madrid, Mufioz Coll., vol. 39, ff. 105-117. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1584. Letter of officials of the Audiencia of Guatemala to the King, April 8, 1584. Original. Archivo General de las Indias, Audiencia de Guatemala, leg. 10 [63-6-10], 21 ff. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1778. Noticias del Reyno de Guatemala, frutos que produce, pueblos, etc. Copy. Real Acad. Hist., Madrid, Mata Linares Coll., vol. 1, ff. 220-246 v. Mosk copy, Sauer Coll. Berkeley.
- Ms. 1783 (?). Salida de Tuxtla a la Capital de Guatemala. Copy. Museo Naval, Madrid. 570. Virreinato de Mexico, vol. 4. In Expediente No. 7, 31 ff. Mosk copy, Sauer Coll. Berkeley.
- NIERSON, TEMPEST.
1908. The volcanoes of Guatemala. Geogr. Journ., vol. 31, No. 5, pp. 473-489.
- WUARIO DEL SERVICIO TECNICO DE COOPERACION AGRICOLA.
1931, 1932. Guatemala, rwooo, W. W.
1933. Lake Atitlan. Bull. Geol. Soc. Amer., vol. 44, pp. 661-668. June 30, 1933.
- LRRETT, OTIS W.
1928. The tropical crops. New York.
- OM, FRANS.
1932. Commerce, trade, and monetary units of the Maya. Tulane Univ., Mid. Amer. Res. Ser., Publ. 4. New Orleans.
- OM, FRANS, and LA FARGE, OLIVER.
1926-27. Tribes and temples. 2 vols. Tulane Univ. New Orleans.

BRASSEUR [DE BOURBOURG], CHARLES STIENNB.

1858. Histoire des nations civilisees du Mexique et de l'Amerique Centrale. 3 vols. Paris.
- 1907-08. Memorial del Tecpam-Atitlan. Revista del Archivo y de la Biblioteca Nacional de Honduras, vol. 3, No. 19-vol. 4, No. 18. Tegucigalpa.
- BRIGHAM, WILLIAM T.
1887. Guatemala, the land of the quetzal. New York.
- BRINTON, DANIEL GARRISON.
1885. Annals of the Cakchiquels. Philadelphia.
- BRUMAN, HENRY, J.
1936. The Russian investigations on plant genetics in Latin America and their bearing on culture history. Handbook Latin Amer. Studies. Harvard Univ. Cambridge, Mass.
- Ms. 1940. Aboriginal drink areas in New Spain. (Ph.D. thesis.) Univ. Calif., Dept. Geogr. Berkeley.

BUKASOV, S. M.

1930. The cultivated plants of Mexico, Guatemala, and Colombia. With English summary. Bull. Applied Botany, Genetics, and Plant Breeding (Trudy Prikl. Bot., Genet., i Selek.), Suppl. 47. Also ms. trans. by M. H. Byleveld, libr. Dept. Geogr., Univ. Calif. Berkeley.

BURBANK, ADDISON.

1939. Guatemala profile. New York.
- CARTER, H. R.
1931. Yellow fever. Baltimore.
- CERVANTES DE SALAZAR, F.
1914. Cronica de la Nueva Espana. Hispanic Soc Amer. Madrid.
- CLAVTGERO, F. J.
1780. Storia antica del Messico. 4 vols. Cesena.
- COMISION TECNICA DE DEMARCACION DE LA FRONTERA ENTRR HONDURAS Y GUATEMALA.
1937. Informe detallado de la Comision tecnica de demarcacion de la frontera entre Honduras y Guatemala . . . Washington, D. C.

COOK, O. F.

1909. Vegetation affected by agriculture in Central America. U. S. Dept. Agr., Bur. Plant Indus., Bull. 145.
1921. Milpa agriculture, a primitive tropical system. Ann. Rep. Smithsonian Inst., for 1919, pp. 307-326.

CORTES, HERNAN.

1770. Historia de Nueva-Espana. Mexico.
- DIAZ DEL CASTILLO, BERNAL.
1837. Historia verdadera de la conquista de la Nueva Espana. New ed., vol. 3. Paris.
- DOLLFUS, A., and MONT-SERRAT, E. DE.
1868. Voyage geologique dans les republicues de Guatemala et de Salvador. Paris.
- FERGUSON, ERNA.
1937. Guatemala. New York.

FUENTES Y GUZMAN, FRANCISCO ANTONIO DE.

1882-83. Historia de Guatemala, o Recordacion Florida estrita en el siglo XVII . . . 2 vols. Madrid.

1932-33. Recordacion florida, discurso historial; y demonstration natural, material, militar y politica del reyno de Guatemala . . . 3 vols. Guatemala.

GARCIA PELAEZ, FRANCISCO DE PAULA.

1851-52. Memorias para la historia del antiguo reyno de Guatemala. 3 vols. Guatemala.

KIRSCH, AUGUST.

1883-86. Handbook of geographical and historical pathology. Creighton trans. 3 vols. London.

INTERCONTINENTAL RAILWAY COMMISSION.

1898. Report of Corps No. 1. Vol. 1, pt. 2. Washington, D. C.

IVANOV, N. R.

1937. Geographical regularities in the distribution of cultivated Phaseolinae. Leningrad Acad. Agri. Sci. Ser. 1, No. 2. Leningrad. Also ms. trans. by M. H. Byleveld, libr. Dept. Geogr., Univ. Calif. Berkeley.

JONES, CHESTER LLOYD.

1940. Guatemala past and present. Minneapolis.

JOYCE, THOMAS A.

1914. Mexican archaeology. London.

JUARROS, DOMINGO.

1810. Compendio de la historia de la Ciudad de Guatemala. Guatemala.

1823. A statistical and commercial history of the kingdom of Guatemala in Spanish America. Trans. f r. Spanish by J. Bailly. London.

KEMFTON, J. H., and POPENOE, WILSON.

1937. Teosinte in Guatemala. Carnegie Inst. Wash., Contr. to Amer. Archaeol., Publ. No. 483, pp. 199-218.

KIDDLE, LAWRENCE R.

1944. The Spanish word jicara. Tulane Univ., Mid Amer. Res. Inst. Publ 11, pp. 115-154. Philol. and Docum. Stud., vol. 1, No. 4. New Orleans.

KROEBER, A. L.

1939. Cultural and natural areas of native North America. Univ. Calif. Publ. Amer. Archaeol. and Ethnol., vol. 38. Univ. Calif. Berkeley.

LA FARGE, OLIVER, and BYERS, DOUGLAS.

1931. The Year Bearer's People. Tulane Univ., Mid. Amer. Res. Ser., Publ. 3. New Orleans.

LARRAINZAR, M.

1878. Historia de America. Mexico.

LEMONS, PEDRO J.

1941. Guatemala art crafts. Worcester.

"LIBRO AZUL" DE GUATEMALA, EL 1915. New Orleans.

LINNE, S.

1938. American roof-apex caps of clay. Ethnos, vol. 3, No. 1, pp. 18-32. Stockholm.

LOTHROP, SAMUEL K.

1928. Santiago Atitlan, Guatemala Indian Notes, vol. 5, No. 4, pp. 370-395. Heye Foundation. New York.

1929. The henequen industry of San Pablo, Guatemala. Indian Notes, vol 6, No. 2, pp. 120-129. Heye Foundation, New York

1929 a. Canoes of Lake Atitlan. Indian Notes, vol 6, No. 3, pp. 216-222. Heye Foundation. New York.

1933. Atitlan. Carnegie Inst Wash. Publ. No. 444.

MCBRYDE, F. WEBSTER.

1932. A hot norther and terrific squall in Eastern Chiapas—April 6, 1928. Bull. Amer. Meteorol. Soc., vol. 10, pp. 130-131.

1933. Solola; A Guatemalan town and Cakchiquel market-center. Tulane Univ., Mid. Amer. Res. Ser., Publ. 5, Pamphl. 3. pp. 45-152. New Orleans.

1938. Maya vendors of Guatemala. Travel Mag., vol. 71, No. 1, pp. 11-15, 52.

1940. Influenza in America during the sixteenth century (Guatemala: 1523, 1559-62, 1576). Bull. Hist Med., vol. 8, No. 2, pp. 296-302. Baltimore.

1942 a. Studies in Guatemalan meteorology. 1. The climates of Southwest Guatemala. Bull. Amer. Meteorol. Soc., vol. 23, pp. 254-263.

1942 b. Studies in Guatemalan meteorology. 2. Weather types in Southwest Guatemala. Bull. Amer. Meteorol. Soc., vol. 23, pp. 400-406.

1943. The black lacquer mystery of the Guatemala Maya Indians. Sci. Monthly, vol. 57, pp. 113-118.

Ms. 1940. Native economy of Southwest Guatemala and its natural background. (Ph.D. thesis) Univ. Calif., Dept. Geogr. Berkeley.

MACKIE, W. W.

1943. Origin, dispersal, and variability of the lima bean, *Phaseolus luvatus*. Hilgardia, vol. 15, No. 1, pp. 1-24. Univ. Calif. Berkeley.

MANGELSDORF, PAUL C. and CAMERON, JAMES W.

1942. Western Guatemala, a secondary center of origin of cultivated maize varieties. Harvard Univ., Bot. Mus. Leaflets, vol. 10, No. 8, pp. 213-252. Cambridge, Mass.

MANGELSDORF, PAUL C. and REEVES, R. G.

1939. The origin of Indian corn and its relatives. Agr. and Mech. Coll. Texas, Bull. 574. College Station, Tex.

MAUDSLAY, A. C. and MAUDSLAY, A. P.

1899. A glimpse at Guatemala and some notes on the ancient monuments of Central America. London.

MED&L, TOM AS LOPEZ DE.

Ms. 1550-60 (?). Undated report. Copy. Real Acad. Hist., Madrid, Munoz Coll., vol. 42, ff. 120-268. Mosk copy, Sauer Coll. Berkeley.

MEEK, S. E.

1907. Notes on fresh-water fishes from Mexico and Central America. Field Mus. Nat Hist., Zool. Ser., vol. 7, No. 5, Publ. 124, pp. 133-157. Chicago.

1908. The zoology of Lakes Amatitlan and Atitlan, Guatemala, with special reference to ichthyology. *Field Mus. Nat. Nat Hist. Zool. Ser.*, Publ. 127, vol. 7, No. 6, pp. 159-206.
- MENDIZABAL, M. O.
1929. Influencia de la sal en la distribucion geografica de los grupos indigenas de Mexico. Mexico, D. F.
- MILLA y VIDAURRE, José
1879-82. Historia de la America Central desde el descubrimiento del pais por los espanoles (1502) hasta su independencia de la Espafia (1821). 2 vols. Guatemala.
- MINISTERIO DE FOMENTO.
1926. Censo de la poblacion de la Republica de Guatemala levantado el 28 de Agosto de 1921. 4o Censo, 2 vols. Guatemala.
- MONTGOMERY, E. G.
1906. What is an ear of corn? *Pop. Sci. Monthly*, vol. 68, pp. 55-62.
- MORRIS, EARL H., CHARLOT, J., and MORRIS, A. A.
1931. Temple of the Warriors. *Carnegie Inst. Wash. Publ. No. 406*.
- MOTOLINIA, TORIBIO.
1941. Historia de los Indios de la Nueva Espafia. Mexico.
- O'NEALE, LILA M.
1945. Textiles of Highland Guatemala. *Carnegie Inst. Wash. Publ. No. 567*.
- OSBORNE, LILLY DE JONGH.
1935. Guatemala textiles. *Tulane Univ., Mid. Amer. Res. Ser.*, Publ. 6. New Orleans.
- OVIDEY Y VALDES, GONZALO FERNANDEZ DE.
1851-55. Historia general y natural de las Indias, islas y tierra-firme del mar oceano. 4 vols. Madrid.
- PALACIO.
1866. Relacion hecha por el licenciado Palacio al Rey D. Felipe II, en la que describe la provincia de Guatemala, las costumbres de los indios y otras cosas notables. *Col. Doc. Inedit.*, etc., vol. 6. (Report dated 8 March, 1576.) Madrid.
- PINEDA, JUAN DE.
1908. Descripcion de la Provincia de Guatemala. Ano 1594. *Col. de Libr. y Doc. Ref. a la Hist. de America*. Vol. 8. Madrid.
- PONCE, ALONSO.
1873. Relacion breve y verdadera de algunas cosas de las muchas que sucedieron al Padre Fray Alonso Ponce en las Provincias de la Nueva Espafia. . . . (Account by two anonymous priests who accompanied him.) 2 vols. Madrid.
- REAL ACADEMIA ESPASOLA.
1791. *Diccionario de la lengua Castellana*. Ed. 3. Madrid.
- REDFIELD, R., and VILLA R., A.
1934. Chan Kom. *Carnegie Inst. Wash. Publ. No. 448*.
- RELACIONES HISTORICAS Y GEOGRAFICAS DE AMERICA CENTRAL,
1908. *Col. de Libr. y Doc. Ref. a la Hist. de Amir*. Vol. 8. Madrid.
- REMESAL, ANTONIO, DE,
1932. Historia general de las Indias occidentales, y particular de la goberacion de Chiapa y Guatemala. 2 vols. Biblioteca "Goathemala," vols. 4 and 5. Guatemala.
- SALVADOR, MINISTERIO DE INSTRUCCION PUBLICA.
1926-193? *Flora Salvadorena*. Vols. 1-5. San Salvador.
- SAPPER, KARL T.
1894. Grundzüge der physikalischen Geographie von Guatemala. *Petermann's Geogr. Mittl. Erg. No. 113*. Gotha.
1897. Das nördliche Mittel-Amerika. Braunschweig.
1905. Der gegenwärtige Stand der ethnographischen Kenntnis von Mittelamerika. *Archiv. f. Anthrop.*, n.s., vol. 3, pp. 1-39. Braunschweig.
1924. Die Zahl und Volksdichte der indianischen Bevölkerung in Amerika vor der Conquista und in der Gegenwart. *Int. Congr. Amer.*, vol. 21 (1924, The Hague), pp. 95-104.
1925. Los volcanes de la America Central. *Studien über Amerika und Spanien, Extra-Serie*, No. 1. Halle (Saale).
1932. Klimakunde von Mittelamerika. *In Handb. d. Klimatol.*, by W. Koppen and R. Geiger, vol. 2, pt. H. Berlin.
- SAUER, CARL ORTWIN.
1936. American agricultural origins. *Essays in Anthropology in honor of Alfred Louis Kroeber*, pp. 279-297. Berkeley.
- SHATTUCK, GEORGE CHEEVER.
1938. A medical survey of the Republic of Guatemala. *Carnegie Inst. Wash. Publ. No. 499*.
- SPINDEN, HERBERT J.
1928. The population of ancient America. *Geogr. Rev.*, vol. 18, No. 4, pp. 641-660. New York.
- STADELMAN, RAYMOND.
1940. Maize cultivation in northwestern Guatemala. *Carnegie Inst. Wash., Contr. Amer. Anthropol. and Hist.*, vol. 6, No. 33, pp. 83-266.
- STANDLEY, PAUL C.
1920-26. Trees and shrubs of Mexico. *Contr. U. S. Nat. Herb.*, vol. 23, pts. 1-5.
1930. Flora of Yucatan. *Field Mus. Nat. Hist., Bot. Ser.*, vol. 3, No. 3. Publ. 279. Chicago.
1931. Flora of the Lacantilla Valley, Honduras. *Field Mus. Nat. Hist., Bot. Ser.*, vol. 10, Publ. 283. Chicago.
1936. The forests and flora of British Honduras. *Field Mus. Nat. Hist., Bot. Ser.*, vol. 12, Publ. 350. Chicago.
1938. Flora of Costa Rica. *Field Mus. Nat. Hist., Bot. Ser.*, vol. 18, pts. 3 and 4. Chicago.
- STANDLEY, PAUL G., and CALDERON, S.
1925. Lista preliminar de las plantas de El Salvador. San Salvador.
- STATESMAN'S YEARBOOK.
1939. London.
- STEPHENS, JOHN L.
1841. Incidents of travel in Central America, Chiapas, and Yucatan. 2 vols. New York.

STOLL, OTTO.

1884. Zur Ethnographic der Republik Guatemala. Zfirich.

STRONG, RICHARD P.

1934. Onchocerciasis. Harvard Univ., Contr. Dept Trop. Med. and Inst. for Trop. Biol. and Med., No. 6, pt. 1, pp. 3-132. Cambridge, Mass.

TAX, SOL.

- Ms. 1935. Santo Tomis Chichicastenango. Unpublished notes on ethnographic field work with the Carnegie Institution of Washington.
- Ms. 1936. Panajachel economics. Unpublished report on ethnographic field work with the Carnegie Institution of Washington.
1937. The municipios of the midwestern highlands of Guatemala. Amer. Anthropol., vol. 39, No. 3, pp. 423-444.

TERMER, FRANS.

1929. Berichte tiber Reisen in Mittelamerika. Sonderdr. Mitt. d. Geogr. Gesell., vol. 40. Hamburg.
1936. Zur Geographic der Republik Guatemala, vol. 1. Sonderdr. Mitt. d. Geogr. Gesell., vol. 44. Hamburg.

TERNAUX-COMPANS, H.

1940. Recueil des pieces relatives a la conquete du Mexique. Paris.

THOMSON, D. and R.

1933. Influenza. Pickett-Thomson Res. Lab., Annals, vol. 9. Baltimore.

THOMPSON, J. E. S.

1945. A survey of the Northern Maya area. American Antiquity, vol. 9, No. 1, pp. 2-24.

TORQUEMADA, JUAN DE.

1723. Primera [Segunda Tercera] parte de los veinte i un libros Rituales i Monarchia Indiana . . . 3 vols. Madrid.

U. S. BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

1938. Foreign commerce yearbook for 1937. Washington, D. C.

VAUGHAN, W. T.

1921. Influenza. Amer. Journ. Hyg., Monogr. Ser. No. 1. Baltimore.

VAVILOV, N. I.

1931. Mexico and Central America as the principal centers of origin of cultivated plants of the New World. With English summary. Trudy Prikl. Bot., Genet., i Selekt (Bull. Appl. Bot., Genet. and Plant Breeding), vol. 26, No. 3, pp. 179-199. Leningrad.

VAZQUEZ, FRANCISCO.

- 1937-38. Cr6nica de la Provincia del Santisimo Nombre de Jesus de Guatemala. Biblioteca "Goatemala," vol. 14. Guatemala.

VELASCO, J. L. DE.

1894. Geografia y descripci6n universal de las Indias. (For the years 1571-74.) Madrid.

VELAZQUEZ DE LA CADENA, MARIANO.

1868. Pronouncing dictionary of the Spanish and English languages. New York.

WARD, ROBERT DE C. and BROOKS, CHARLES F.

1936. Climates of North America. In Handb. d. Klimatol., by Koppen, W., and Geiger, R., vol. 2, pt. J. Berlin.

WAUCHOPE, ROBERT.

1938. Modern Maya houses. Carnegie Inst. Wash. Publ. No. 502.

WEATHERWAX, PAUL.

1918. The evolution of maize. Bull. Torrey Bot. Club, vol. 45, pp. 309-342.

WILLIAMS, HOWELL.

1941. Calderas of the world. Berkeley.

WISDOM, CHARLES.

1940. The Chorti Indians of Guatemala. Chicago.

XIMENES, FRANCISCO.

- 1929-31. Historia de la Provincia de San Vicente de Chiapa y Guatemala. Biblioteca "Goatemala," 3 vols. Guatemala.

EXPLANATION OF PLATES'

PLATE

PLATE 2

- a, The rear platform on this type of canoe, generally about 20 inches square, has a hole in the middle through which a vertical pole is passed (foreground). The pole is thrust deep into the soft mud bottom, and anchors the canoe. Thus the bow is run up onto the beach instead of the stern. The same pole is used for propulsion, by a man standing on the platform facing forward (background). He may face backward in reversing the canoe. Such a boat is best adapted to use in calm, shallow water, such as that of lagoons (shown here) or rivers. (I have seen similar canoes on the Rio Huallaga, one of the headwaters of the Amazon, in central Peru.) View is to the southwest, with the thatched houses and coco palms of Tahuesco on the high sand beach in the background. The Pacific Ocean lies just beyond. Photograph taken* March 1936.
- b, These large pits are generally 6 or 8 feet deep, and usually fenced, as in this case, to keep out cattle. The wells consist of wooden shafts about a foot or more square. The man in the foreground is drinking from a shallow tree-calabash (*Morro*, *Crescentia alala*) saucer. Tahuesco lagoon, background.
- c, A Tahuesco canoe used as a washstand for clothes and dishes. The rear platform here serves as a washboard. Water, brought from the well (unfenced; note another well, fenced, beyond) in 5-gallon tins, is put in a tank, consisting of a 53-gallon gasoline drum. The shelter is made of mangrove poles and corozo palm leaves. Tahuesco and lagoon, background.
- d, Old Tahuesco canoes used in the "cooked"-salt industry. One canoe is supported directly above the other (pointing in opposite directions) on a pole rack. The top one (*coladera*) has a perforated bottom, covered with palm mats which retain a thick layer of sand. Salt-encrusted silt, scraped from the sun-baked *playa* during the dry season and stored, is put on top of the sand. Then water is poured in by a man who climbs a ladder with a brace of buckets (see top of picture). When the lower canoe (*recibidora*) has been filled, the brine is dumped by bucketfuls into the boiling sheet-iron vat (left foreground). The water is kept boiling all day, and large amounts of granular salt are deposited (see p. 58).
- e, Salt is deposited when the sun during the dry season evaporates sea water diverted into shallow basins. The salt is shoveled onto platforms and wheeled away. Looking north-northeast, January 1941. In the background, approximately 35 miles away, are volcanoes Agua (left, near Antigua Guatemala) and Pacaya (right, near Guatemala City).
- a, The salt-truck road shown here is passable only during the dry season (November to April; see p. 5 and Appendix 1, p. 131). (For discussion of the corozo palm, see Appendix 3.)
- b, The scanty costume and open-pole house wall are characteristic cultural adjustments to the warm, humid climate of this coastal region. (For *suyacal* making, see p. 67).
- c, These *suyacdes*, generally transported into the Highlands by muleback, are sold in Highland markets almost exclusively during the rainy months (May-October). Both fringed and hemmed (foreground) types (see p. 67) are shown in the picture.
- d, Women, especially older ones, still appear in public with no upper garment in a few piedmont villages, notably Samayac, San Bernardino, and San Sebastian Retalhuleu, shown in this picture. The bright-colored skirt (made in Quezaltenango) with jaspe patterns (see p. 52), is wrapped tightly around the waist. The upper corner of the inner end is gathered up during the wrapping process, and hangs in a bunch at the side (note also in b.). Formerly this costume was worn all through the Pacific Lowlands, but now blouses, required by law when women appear in public, are dispensed with only at or near home. Sometimes, on the street they are merely draped over the shoulders, in technical compliance with the law.
- e, This is a view across Lake Atitlan, with San Pedro volcanico in the foreground, taken December 12, 1935, at 6 p. m. This storm, probably 30 miles away and having a basal diameter of about 10 miles, is an example of the disturbances which, during the dry season (November-April), move along the piedmont, bringing torrential rains, without affecting the Highlands. The top of the cumulonimbus columns move up thousands of meters into lower pressure levels, where they spread out, and may evaporate or become transformed through freezing into cirrus cloud types which move toward the northeast with the antitrades (southwestlies). (See appendix 1, p. 131, and McBryde, 1942 b, pp. 403-404.)
- f, Valley of the Siete Vueltas, looking upstream (northwest) toward the center of the settlement. The highway along the piedmont here parallels the stream. The vegetation is parklike, with scattered spreading trees and an abundance of good grazing land.
- g, House walls are of vertical, split-*cecropia* trunks, locally available (see extreme right of photograph), as is the abundant savanna grass used as thatch. The pyramidal roof is capped with an inverted bowl from Totonicapán. Slopes are excavated to prepare level house sites above the flood level of the stream.

an The following pictures were renphotographed in black and white from color transparencies (Kodachrome): Plates 1, e; 2, d; 5, a, e; 9, c; 12, a, d; 13, c (inset); 17, b, e; 20, a, c, d; 23, c, d; 24, *; 26, a; 29, a; 30, a, c; 31, b, f, g; 32, c; 33, a; 35, 6; 37, c; 39, c, g; 42, a, b, e, f; 43, a, b, c, d, f; 44, a, b, d.

All the people in plate 1 are Ladinos.

PLATE 3

- a, The green leaves are rolled up in bundles, each containing 700. There are 12 bundles on the cart (see p. 45). The scene is just south of Mazatenango, on the road to Santo Domingo, March 1936. Oxcart, common in the Pacific Lowlands and in parts of eastern Guatemala, are rare in the southwestern Highlands.
- b, The cartload of leaves (about 8,400) shown in *a* is sufficient for the roof of the average house, about 4 by 5 yards. A dozen or more friends and neighbors help the owner, who provides food and rum during the operation.
- c, The walls of this house are of giant bamboo (*tarro*), unsplit, and the roof is of *hoja de sal*.
- d, The Indian man in the foreground wields a machete in his right hand, cutting high weeds and bushes which are flung aside by means of the *garceuito*, curved stick held in the left hand (see p. 23). The square cloth shawl, of jaspe blue cotton, thrown over the man's shoulders, is similar to those used in ancient times (p. 48). Picture taken in March 1936.
- e, The Quezaltenango itinerant merchant is carrying a load of about 30 large cane baskets, as his mule walks alongside carrying a cargo of Momostenango blankets. Both will return loaded with Lowland products.
- f, The high cone in the left central background is Santa Maria volcano. The cloudlike white column just at the left base is from Santiaguito volcano, which erupts constantly (p. 6). The small cone behind the wooden telephone pole is Cerro Quemado. The other volcanoes are Zunil and Santo Tomas, extreme right. March 1936.

PLATE 4

- a, The netmaker is Serapio Marmol. The netting needle used here, said to be made of *guiscoyal* wood (corozo palm?), see p. 145), is of hard, dark wood, thin and flat, 12 inches long by $\frac{3}{4}$ of an inch wide. Near the point is a wide slot, over an inch long, with a 94-inch prong pointing as the needle does. This serves to hold the string. The net is knitted on to another, $\frac{3}{4}$ -inch flat stick, 8 inches long, held in the left hand. Netmaking is mostly men's work, though not exclusively so.
- b, The man standing in the stream is leaning over examining the contents of his net. The hoop, of 54-inch vine, 20 inches in diameter, supports a fine net of *escobilla* (*Sida rhombifolia*?). (For a discussion of Lowland fishing, see p. 94.)
- c, The bearded Ladino who carries this load is a native of Samayac. He buys the tinware in Mazatenango and makes the rounds of numerous markets, from Santo Domingo to Santo Tomas la Uni6n and San Felipe; from Chicacao to Retalhuleu.
- d, The Atitlan vendor is at the left; the four Nahuatl buyers are on the right (see p. 37).
- e, The Atitlan vendors seated in the shade of the *almendro* tree in the foreground are selling small tomatoes from their native Santiago. Many of the 500 or more vendors in the Chicacao market are Atitecos.

PLATE 5

- a, The giant shade tree, with orchids dinging to its trunk, is a *ceiba* (p. 149). This is near the Mexican border at the north, where the climate is much drier than in c,
- b, The foreground is framed by treeferns. Beyond the artificial lake is a heavy growth of monsoon forest, which extends up the volcano slopes for about 500 m. This is at the southwestern base of Tajumulco volcano, near the Mexican border half mile south of El Rodeo (Depto. San Marcos, elevation about 900 m., or 2,950 ft.).
- c, Most of the vegetation shown here is recent second growth, with treeferns and *guarumo* (*Cecropia* spp.; slender trunks in right foreground) dominant. This vegetation is typical of uncultivated slopes in the moist western coffee belt.
- d, Large cement platforms (foreground) are especially constructed for drying coffee, which is spread out after the pulp has been removed from the bean. Drier coffee is indicated in the photograph by lighter tones.
- e, The cutter, standing in the foreground, is holding the cutting tool, a pole about 10 feet long with a 6-inch blade at the end. The cutting edge is perpendicular to the pole. The cutter selects a plant with fruit well filled but completely green and hard, then tells it with one deft thrust just below the leaf bases, so skillfully that the "stem" (bunch) of bananas is in position for the awaiting Indian carrier to take it on his shoulders (see photograph). The stem is severed with one machete stroke, and the *mozo* walks off with the heavy load. It is taken to a nearby fruit car.
- f, The checker, standing at the left in the photograph, punches a counting machine as the stems are put aboard the car and packed with banana leaves. He is a Jamaica Negro, as are nearly all the men who do this work, brought in especially for this purpose.

PLATE 6

Costumes for the northwest and southeast shore villages are not shown. For the San Pablo men's dress (full-cut white knee-length trousers and shirt and red sash), see plate 21, d; many Pablenos said they started wearing jaspe stripes about 1930; some have begun to dress in blue denim, as at Tonicapán. San Marcos men wear costumes similar to those of San Pablo. For Santa Cruz and Tzununa men's costumes, see plate 27, e. The San Lucas men's dress resembles that of Santa Catarina, except that the trouser cloth usually has heavier red stripes and geometric figures (including conventionalized animals, as at Santa Catarina, and also all made on the stick loom), and the shirts (over which blue coats are worn more often than in Santa Catarina) are generally made of plain manufactured cloth. Before about 1915, they said, they were home-woven shirts matching the trousers. The San Lucas women's huipils (of two pieces, with no red central strip like those of Santa Catarina) are of the same cloth as the men's trousers, and skirts are of jaspe-pattern goods from the Quezaltenango region. The San Marcos huipil is white with vertical red stripes,

single wide and single narrow ones alternating, and shirts are heavy dark blue with occasional fine light lines (made in Solola). The Santa Cruz women's huipil is mainly red, with two narrow vertical white lines spaced about 3 inches apart, and a fine *ixcaco* brown line on each side of the white pair. The collar is generally embroidered with alternating bands of yellow and lavender silk, and large triangles (probably representing tassels) of the same color, pointing inward. A narrow head band is worn, with yellow and green bars, like that of Santiago. These were said to be made at San José* Chacaya. Skirts are of heavy, solid blue, Solola cloth. San Pablo women, who do less weaving than is done in most Lake villages, wear a plain white blouse similar to that of San Pedro (usually of manufactured goods, with separate, scalloped collar, and often embroidered with rows of small figures), and a solid, heavy, dark-blue skirt from Solola. For the San Pedro women's dress, see plate 9, *d*. The blue and variegated jaspé-pattern skirt is from Quezaltenango. The Patzum huipil has very wide (about 2-inch) vertical alternating red and white (usually wider) stripes. Each white stripe has a narrow (about one-quarter inch) red (also yellow or green) one in the center. Fine green and yellow lines also border the red. There is a purple silk appliqué collar (ribbon sewn on), with small triangles of various solid colors (mainly green, yellow, and purple; sometimes cerise and white) as at Santa Cruz Laguna. An extra huipil serves as a *sute*, as in many other Highland municipios. Skirts are blue, jaspé patterned. Men wear costumes similar to those of Tecpan (pi. 12, *a*, right).

The crescentic shaded area in Lake Atitlán represents water deeper than 1,000 feet. For other map data, see map 20. The miniature inset map in the lower left shows (in black) the location of the Lake region with respect to South Guatemala.

PLATE 7

o and *b*, Trousers and shirts are usually woven on stick looms by women, though Cantel-manufactured cloth in imitation of the pattern is being used to some extent as a substitute (p. 66). The cloth is of cotton, white with wide red stripes (or *ixcaco* brown with blue) and narrow green and yellow. In the shirts it is gathered to a thin red collar. Sleeves and *zute* (large square cotton cloth wrapped around hat) are commonly red with yellow and green (sometimes also blue jaspé) stripes. Sometimes the stick-loom cloth is decorated with small brocaded figures of birds, dolls, and animals, especially near the bottoms of the trousers, put in on the loom. Knee skirts (*rodilleras*), one worn and one slung over the bag, and tailored coat are of natural black and white wool, woven at Nahuala and Chichicastenango. The coat is rolled up and tied diagonally around the body in *a*. The black and white banded bag is knitted at Solola, probably by the wearer. As in all the Lake region, palm hats come from Quiché; sandals and leather belts to hold knee skirts are from Totonicapán.

c, The women's shirts are like the men's; are worn rolled up by women (pi. 13, *b*) and long by men. *Zutes* are also similar, cotton woven on stick looms, with bands of red and *ixcaco* brown and dark blue, especially wide in the center. Here, one is worn as a head cover, folded up, and a smaller one is thrown over the open market basket. The sash is also of home-woven cotton, mostly red, with some yellow, brown, and dark blue. As in the men's suit material, the women's huipil and *zute* cloth is sometimes decorated with small loom-brocaded geometric figures. The skirt is of dark blue cotton, woven on foot looms by Solola Ladinos. Hair braids are tied up with bright-colored ribbon, usually pink.

d, Trousers are long, of manufactured white cotton; shirt is ready-made cotton, usually green alternating with blue jaspé lines; red cotton sash is usually home-woven on stick looms. *Rodilleras* are bluish, small checked wool, from Momostenango, as are the blue wool coats.

e, The short pants (visible through a hole in the *rodillera*), shirt (usually not worn, as in the present picture), and the *sute* (worn on the hat) are of red-and-white striped cotton, woven on the stick loom. The black jacket and black-and-white, large-checked *rodillera* are from Nahuala, where they are woven of undyed wool on foot looms by Indian men. The agave string-bag is locally made, though some are bought from San Pedro la Laguna Indians; leather belt and sandals are from Totonicapán. For the Panajachel women's costume, see plate 9, *a*, *b*.

f, Trousers are of cotton, stick-loom woven mostly red and white with some yellow. Usually there are red stripes, but sometimes the base is plain white, figured. Geometric figures and conventionalized animals (especially ducks) are woven on the loom. Shirts may be similarly striped, with figured red sleeves; manufactured shirts replacing them since about 1910, they said. Hat, string-bag, *rodillera*, leather belt, and sandals are from the same sources as in *e* above. Blue wool coats (as in *d*) are usually worn ceremonially. The *rodillera* is never worn, but is carried over the shoulder or in a bag (pi. 22, *c*, *d*, *e*, *g*).

g, The huipil, of color and designs similar to the men's pants, and the red sash and red-and-white *sute*, folded on the head, are all woven on the stick loom by the wearer. The huipil consists of three separate pieces, the center one basically red, as at San Antonio. The dark-blue skirt is from Solola. The many strings of beads are bought from itinerant merchants in the Panajachel market.

h, This huipil, woven on the stick loom, has horizontal yellow, red, green, and blue stripes and rows of bars and chevrons, on white cotton. The pink skirt (sometimes blue jaspé), blue and white shawl, and variegated figured belt are all of cotton, made on foot looms in the Quezaltenango-Totonicapán region. The braids wound around the head are bound up with pink ribbon. The men's costume is plain white cotton, bluish *rodillera*, blue wool coat or black cape (pi. 12, *a*, right).

- i., Trousers are white with blue dashes produced by putting jaspe threads from Salcaja in the warp of the stick loom. This weaving is even done commercially by some San Pedro women, and children peddle trousers and shawls to tourists. Usually, trousers are embroidered with rows of conventionalized dolls, birds, and other designs in bright wool, especially pink, green, and blue, and are of various lengths, below the knee (pi. 26, e). Before about 1910, they were reportedly plain white, of knee length, as at San Pablo. Jaspe was said to have started at San Pedro and spread to San Juan. The red sash is also locally woven on stick looms, with blue and white jaspe stripes. Shirts, of modern cut, also contain jaspe stripes, as a rule, and may be locally made or bought in the markets. Blue wool coats are bought ready-made in markets. The Momostenango cloth is usually tailored in Quezaltenango. For hat, leather belt, and sandals, see e, above. The San Juan men's costume is essentially the same as that of San Pedro. The women's costume is likewise similar, except that many San Juan huipils are red and white striped.
- j., The cloth is of white cotton, woven on the stick loom. An occasional thin red stripe may appear in the trousers. The sash is red, also locally woven by women.
- k., Huipils are of the same cloth as men's trousers. Shawls also woven by the wearer, are of cotton, dark blue and *ixcaco* brown. Coins and other small possessions are carried in the knotted end. The head band is narrow, variegated, mostly blue and brown, woven on foot looms at Totonicapán. The skirt is blue, from the Quezaltenango region.
- l., Trousers are locally woven on stick looms; white cotton with purple and occasional orange vertical stripes, and scattered conventionalized animals and geometric designs made on the loom, as at Santa Catarina. Embroidery in cotton or silk, heavy orange, purple, and green zigzags, cross the stripes horizontally. The red sash may be locally woven. Other costume elements have the same sources as at San Pedro. Shirts, sashes, and even trousers are made also in San Pedro and sold on a small scale at Santiago (see pp. 61, 104). Coats of Momostenango blue wool are often worn. Before about 1910, instead of these, black and white striped ones, like those of Solola without the bat, were used. Municipal officials always carry a black *capixai* when they leave their headquarters; like the staff, it is a badge of office.
- m., The huipil cloth is like that in the man's trousers, except for the purple (and sometimes red and variegated) silk embroidery around the collar. The zigzag lines of embroidery are usually spaced so that one crosses the middle of the front, one the middle of the back, and one runs along the shoulders. The shawl, of wide dark blue and red stripes, is also locally woven on the stick loom. The variegated headband is from Totonicapán. It is about 25 feet long (p. 53) and is wrapped tightly upon a braided ring of hair, so that it forms a halo about 14 inches wide and 1½ inches thick. It has 4-inch bars of solid colors, mainly green and yellow, separated by narrow purple bars. The bright red skirt, with white and jaspe lines, is made in Quezaltenango (some also in Huehuetenango).
- n., The huipil, made on the stick loom, is of cotton, red with narrow *ixcaco* brown stripes, and is covered with the same small scattered figures as those of Santiago. Cerro de Oro women, now living within the Santiago municipio, have adopted this element of design from the east Lake villages and combined it with elements brought from the original home municipio of Patzicía, whence they moved about 1880 (p. 90). The blue and white *zute* and red sash are also locally woven by women. The blue skirt is from the Quezaltenango area.
- o., The shirt is white cotton with fine red lines crossing in a small screen pattern (with vertical stripes dominant), and short trousers (hidden by the *rodillera*) are of the same material; collar, sleeves, and sash are red with yellow and black lines. All other elements are from the same source as in e, above. Women of San Antonio, who weave their men's shirts on stick looms, wear huipils of similar material. The San Antonio huipil, like that of Santa Catarina, has a very wide central red element (the same as the men's sleeves, but commonly with small, brocaded, geometric figures woven in) with white (forming the loose "sleeve") on either side. The white has red cross-lines matching the central part of the men's shirts. Red sashes and *zules* are hand-woven at home. Skirts are of heavy dark blue cotton, made in Solola.

PLATE 8

- a., The huipil is of white cotton with fine red lines along the edges, seams, and shoulders. Conventionalized animals in red may be woven also on the stick loom. *Zutes* are home-woven, dominantly olive green and indigo blue with fine yellow lines and animals (especially horses) embroidered usually in purple silk. The solid blue skirt is from Solola. (For Nahuala men's dress see pi. 4, d; men's shirts are like the women's except that the collar and lower sleeves are usually decorated with an elaborate pattern of geometric figures, especially animals, in red, yellow, and other colors, made on the stick loom. The cloth of the trousers, hidden by the *rodillera* when in the Highlands, is like the shirt, with the hem decorated as the collar is, and with scattered woven animals. Some shirts and trousers are *ixcaco* brown and red striped, or dark blue and yellow; or there may be wide bands of *ixcaco* brown. The black wool jacket and heavy-checked *rodillera* are woven locally on foot-looms by men (see p. 49).
- b., The black wool suit, woven and tailored locally, is home-embroidered with bright-colored silk. The red sash and red and yellow *zute* are woven on stick looms and decorated with silk brocade, purple being perhaps the commonest color, conventionalized animals and birds the commonest motif. Sometimes these figures are woven on the loom. Shirts, which may be home-made, are usually bought ready-made (see p. 50). Leather

belt and sandals here and in Nahuala, are bought from Totonicapan (especially Argueta), leather workers. A small, fringed, natural black wool blanket, with terminal bars of red, white, and blue squares and other geometric patterns, is often carried, as is a large, whitish string bag.

- c, The huipil is of white (ixcaco brown also commonly used) cotton, heavily brocaded by women (as are *sutes*) in red (on white) or purple (on brown) silk or cotton. Wide bands of embroidery extend down the center of the front and back and along the shoulders (for color illustrations, see Osborne, 1935, pi. 2 foil. p. 58; Lemos, 1941, p. 25). At the top, front and back, and at each shoulder, a black silk disk is gathered to a central coin or small button or coil of silk chain-stitching (p. 52). This is sometimes done by men, who more often do the needlework on their own clothes. The black-and-white striped wool belt (about 8 feet long and tightly woven) is completely covered with brocade at one end (about 30 in.) in dark purple silk. The blue, white-striped cotton skirts are locally woven on foot looms, generally by Ladinos. Chichicastenango women wear many strings of glass beads, generally silver, which form a very thick mass around the neck.

- d, The long, draped huipil is of *ixcaco* brown cotton with wide red stripes and geometric designs of various bright colors woven in on the stick loom by the wearer. The skirt is of blue cotton, with large white checks; some have *jaspé* patterns. Coin necklaces (*chachwies*) are usually worn (see *e*). The men's costume is similar to that of San Andres (see under pi. 7, h; also pi. 12, a, right).

- e, The Comalapa huipil is essentially deep wine red (across the shoulders) and white or *ixcaco* brown, basically cotton with many fine bars and bands of different colors, often of wool, and rows of bright-colored figures (animals or geometric designs) brocaded in silk, which fades to beautiful pastel shades. The sash is red; skirt is blue cotton. The *zute* on the basket and the one coiled under it are usually woven on stick looms and may be as elaborate as the huipils. Just behind the Comalapa is a Tecpan woman (see *d*). The child at the right edge of the picture is wearing a hand-woven cap which is made deep enough to pull over the head as a hood to protect the wearer, according to some, from the "evil-eye" of strangers. Frequently these caps exhibit some of the finest stick-loom weaving.

PLATE 9

- a, For a list of the essential parts of the loom, see page 61. The Panajachel women's costume (*a* and *b*) consists of a huipil that is mostly *ixcaco* brown with vertical red stripes and a mass of red or purple brocade pattern in the center of the front and back. The belt is mostly red with fine yellow stripes. *Zutes* are mostly red, with narrow white stripes. All these elements are woven on stick looms, but the blue skirt is made in Solola by Ladinos using foot looms. Many strings of beads are worn, and the braids of the hair are tied with pink ribbon.

- b, Spinning of cotton, here being done by a girl about 11 years old using the common spindle (*malacatt*), is accomplished by twirling the small end of the stick with the whorl end usually resting in a bowl or gourd which acts as a guiding surface causing little friction. In front of the spindle is a ball of chalk (*Heats*) for keeping the spinning fingers dry. The raw cotton, held in her left hand, is pulled away from the whirling spindle on which the thread is spun. In her lap is another bunch of raw cotton. Homespun thread is sometimes twisted on the spindle with bought yarn. Once loaded with thread, the spindle is sometimes used as a bobbin, as the San Antonio woman in *c* is doing, without troubling to transfer it to the regular bobbin stick. Spinning is often done by women seated in the market (pi. 25, *e*). This picture illustrates the San Pedro woman's costume, with plain short-sleeve, white blouse, some of which even have buttons (collar and sleeves may be trimmed with lace and sometimes the collar is embroidered in red); narrow figured belt from Totonicapan, and *jaspé* cotton skirt from Salcajá, mostly blue, greenish or pink. A shawl is generally carried, blue with *jaspé* patterns and fringed at the ends.

PLATE 10

- a, In the background, about 600 m. (1,800 ft.) below, is Lake Atitlán, with volcanoes Toliman and Atitlán lined up in the distance (see maps 20 and 21). Photograph taken in March 1932.
- b, The old woman seated in front of the house is weaving with a stick loom, the end of which is attached to the post in the foreground. The administrative center of Solola is directly in the background.
- c, Even more than most north-Lake arroyos, this valley, here viewed from the precipitous southern edge of Solola, is subject to disastrous flooding, especially during September (p. 61).
- d, This is Calle de la Torre (right foreground in *b*). The tower at the right is a small reservoir from which water, brought from mountain streams through tile aqueducts (*alcantarillas*), is distributed through iron pipes; another may be seen 100 m. down the street. The contiguous whitewashed, tinted adobe houses present a solid wall which is characteristic of Guatemala towns, as elsewhere in Latin America.
- e, The field in the foreground has been freshly furrowed with broad hoes and is ready for planting. The old *milpa* in the background consists of rows of hills over a foot high, which were built up around each group of corn plants as they grew larger, as support against high winds. A tuft of giant bunchgrass may be seen at the left end of the new field. Government officials are inspecting the site, during March 1932 preparatory to converting it into an emergency landing field. The cone of San Pedro volcano appears in the right background. This scene is near the edge of the upper terrace shown in plate 46, *a* and *b*.
- f, They are carrying a load of earth from the bank behind them, to be molded in the wooden frame just in front of them. Water is added from the 5-gallon gasoline

tin. The darker bricks are still wet, while the lighter ones are dry. The blocks are to be used for the wall in the background (see p. 43).

- g, The Indian dwellings in the foreground are surrounded by freshly hoed *mil pas*, the furrows of which roughly follow the contours of the valley. Many trees are left standing, far enough apart so as not to shade the corn excessively. The cliffs in the distant background are those of Panka at a confluence of Quixcap tributaries (see map 20), and consist of unconsolidated volcanic ash and pumiceous conglomerates, subject to serious landslides with undercutting.

PLATE 11

This trail has been depressed nearly 15 feet in places, largely through centuries of walking by Indians and their animals. The Indians in the foreground are from Concepción and the environs of Solola, while the three men in the background are *Maxenos* (from Santo Tomas Chichicastenango). Photograph taken February 1932.

PLATE 12

- a, This cargo weighs about 150 pounds, slightly more than the heaviest load ordinarily carried by a man. The Solola man on the left is wearing an old-style large-checked *rodillera* (black and white wool); the Tecpan man on the right wears a new style one, with small, bluish checks, folded in front instead of wrapped.
- b, The vendor is a Quezalteca who lives in Solola. Gasoline tins (see foreground) were used exclusively for shipping the honey in trucks. SoloU men are standing in the background.
- c, These *cacastes*, made in Totonicapan, usually measure about $2\frac{1}{2}$ by 2 feet, and 10 inches deep, with legs about 10 inches high to make it easier to lift them from the ground from a stooping position (see p. 9). Young boys carry smaller *cacastes*, in proportion to their size. They may be lined with palm mats or covered with maguey cargo nets, as here shown. The man on the left has plantains, pineapples, and other tropical fruits inside, and a sea turtle tied on the outside. The Indian facing the camera has on top of his *cacaste* a bunch of *pacaya* palm leaves, to be used for decoration. Men on the trail generally carry a blanket and a palm mat (*petate*) for a bed, palm rain cape (*styacal*) during the rainy season (or all year in the piedmont), cup, coffee pot, small kerosene lamp, a bottle of kerosene, and a bottle gourd for water. Pitch pine torches are often used instead of lamps on the trail after dark. Gasoline boxes (crates for two cans of 5 gallons each) serve the purpose of *cacaste* for carrying fruits, vegetables, and many other comestibles, and cloth goods and the like. Nets are also much used especially for corn ears. Cloth merchants in the Quezaltenango-Totonicapan-Momostenango region roll up their goods in carrying cloths, the ends of which are tied and passed around their heads or shoulders, not requiring the *mecapal*. Women, though they sometimes use the

mecapal, especially with netloads of pottery, never carry a *cacaste*.

- d, In the background is Lake Atitlan and volcanoes Toliman and Atitlan. Pine trees are often trimmed as in this picture, for the branches are used for decoration and for flooring, especially during *fiestas*. Sometimes only a few terminal tufts are left on a tree.
- e, For notes on iguanas, see p. 39.

PLATE 13

- a, The iguanas are tied on so that their tails hang down on either side of the net-covered *cacaste*; the green parrot is sitting on top of the load just back of the iguanas. Note the rolled-up *suycal* on the left, the blackened coffee pot on the lower right side of the frame, and the staff. Lake Atitlan and San Pedro volcano are in the background.
- b, Solola women vendors are seated at the left. Their shirt sleeves are always rolled up to about the point of the huipil "sleeves." The woman buying the chickens is from Argueta (Totonicapan). Light brownish turkeys like the one shown are common in this region. The older types of Solola men's *rodilleras* may be seen at the extreme left and extreme right. (Line 3, map 22, looking east.)
- c, These pigs are brought from the markets of Ouche* and Chichicastenango and are sold in Solola, Atitlan, and Lowland markets. The Maxeno in the right foreground is wearing the usual costume for trade journeys (especially to the Lowlands), consisting of white cotton manufactured shirt and pants with red home-woven sash. The vendor to the left of the center is wearing the regular Chichicastenango men's costume, of black wool (pi. 8, b). Grouped around him are (left to right) an Argueta woman, San Antonio man, and Solola man. Totonicapan cobblers occupy the booths in the background, against the Municipal Theater. (North end, line 7, map 22.) The men in the inset picture are San Francisco la Union men at San Francisco el Alto, setting out for distant Lowland markets. The strings from the pigs, one attached to each, are twisted so as to keep them in a compact bunch (see pp. 38, 39, 78).

PLATE 14

- a, Seven *cacastes*, of various sizes and variously loaded with small glazed and large semiglazed pottery are visible in the picture. These men will return to the Altos from Guatemala City with Chinaulta *tinajas*, (see pp. 54, 80).
- b, Miscellaneous small items sold by these merchants include everything from cigars, spices, medicinal herbs, soap, and trinkets (left) to ropes, needles and threads, incense, and shallow tin pans (right) for irrigating onions. Three gasoline boxes used for carrying these appear in the background (see p. 77, and line 48 (middle), map 22, view to southwest).
- c, This picture illustrates the use of the common balance, with baskets (many have tin bowls instead). The woman is holding open a *tsute* to receive the maize. (Line 3, map 22.)

- d, Stacks of Solola onions are almost the only goods visible in the background. (Line 20, map 22, looking west)
- e, The lime is brought from Tecpan. Note the tin balance at the feet of the man on the left; basket scales in front of the other men. Lime, here spread out on heavy wool cloth in which it is wrapped, is often carried in goatskin for greater protection against possible rains (p. 73). The rest of the load of lime of the man on the left is kept in the burlap sack, retained by a heavy cargo net (left). (Line 3 (middle), map 22, looking east.)
- /, Note the cloth (*sutes*) folded upon the women's heads in lieu of a hat. One woman is selling flowers, especially calla lilies. The women buyers kneeling at the left are natives of Santa Lucia Uatlan. Except for the Maxefio (in white at left; see also pi. 13, c) all of the men in the picture are Sololatecos. (Line 16, map 22, looking southwest.)
- a. Coffee, soup, stew, beans, tortillas, tamales, hot gruel (*atole*) and spiced drinks (*pinole*), rice in milk, and many other foods and drinks are served at such stands. Indians drink boiled coffee rather than the concentrated "essence" and hot water used in most of Latin America. The two men lunching at the right are itinerant merchants from Chichicastenango (Maxefios); at the left is a Nahualeño. (Map 22, looking north toward line 47.)

PLATE 15

Ladinos carry the richly clad image on a litterlike scaffold upon their shoulders, from the church of the *Calvario* (background) to the principal church, just in front of the lead woman. They walk slowly, in cadence, so that their heavy burden sways rhythmically to and fro, to the accompaniment of a dirge intoned by a small brass-wind band. Behind them are women (Ladinas) carrying images of the Virgin Mary and other saints. Both Ladinos (background) and Indians (foreground) participate in this service. The latter, members of a Solold *cofradia*, or religious society, may be seen carrying large, lighted candles. Note also the numerous *sutes* folded upon the heads, arms, and shoulders. On other days, especially Fridays during Lent, Indians carry images of saints, including small ones of Santiago on horseback, from one church to the other. The market is suspended for 3 days before Easter; Judas in effigy is flogged and torn to pieces on Saturday. The steep slope north of Solola is visible in the extreme background, giving the dark tone beyond the rooftops.

PLATE 16

Besides the velvet-robed saints, elaborate silver crosses and ornaments are carried. The San Jorge Indian man at the extreme left is playing a *chirimía* (a reed instrument like an oboe), which has a high-pitched whining note, to the accompaniment of drums and rockets. In the background are yucca trees, one of which, just beyond the image of the principal saint, has a large white panicle of edible flowers.

PLATE 17

- a, The altar is covered with corn, silver medallions, flowers, lighted candles, and images of saints, including Santiago on his horse. General Miguel Ydigoras Fuentes told of Indians in San Marcos Department insisting on using a Santiago mounted on a white mule. These are depended upon to give ample rains and a good harvest (see McBryde, 1933, p. 77). Note the Solola coats with the bat designs, and the ceremonial black outer pantaloons worn by the kneeling Indian *cofradista* official.
- b, The ears are of yellow maize with occasional black grains serving as eyes and mouth; "hair" is of corn silk. "El Santo Maiz" is dressed in rich silk robes, with beads and crucifix. Decorations include bright-colored silk ribbons and flowers, especially of bromeliaceous epiphytes and orchids. This altar and the saints were made for the Guatemala National Fair of November 1940, by the Indians of San Pedro Sacatepequez (Depto. San Marcos), exactly as they prepare them for their local planting ceremonies.
- d, This is a small instrument, played by a father (left) and his two sons. Some marimbas are as much as 10 feet long, and may be played by a half dozen men.
- /, Note the bull mask, of wood with natural cow's horns, on the net-load of regalia in the foreground. This is part of the accoutrement for the dramatic dance of Los Toros, which features a bullfight. These costumes are rented rather than sold by the owner, a San Cristóbal Totonicapán Indian. They are expensive to make and are needed only for festivals (see p. 68). The man at the left is a Santa Cruz la Laguna Indian; at the right is a young girl of Solola with a hooded baby on her back (see pi. 8, e).
- g, In this ceremony the Indians reenact their conquest by the Spaniards, some of them dressing as Alvarado and his lieutenants. Dramatic dances such as this are held throughout Indian Guatemala to celebrate festivals of various sorts.

PLATE 18

- a, This photograph was taken from the top of the high ridge above Jaibal (see map 20), looking east, in August 1936. Hotel Tzanjuyu is in the center foreground, and leading off to the left are the roads to Solola (upper) and San Buenaventura (lower). Just to the right of Tzanjuyu the flooded former mouth of the Panajachel River (c) is visible. Note the muddy discharge from the swollen river (the present course a straight white channel in the center of the delta) (shown in pi. 19, a) as it empties into the Lake and turns right (toward the camera) under the influence of the prevailing wind. The large gully shown in plate 19, e, may be seen in the left background beyond the delta.
- b, This daily launch transported passengers from Tzanjuyu to Santiago. The heaviest traffic going south was on Saturday, when many itinerant merchants from the Sololá Friday market crossed the Lake to go to Sunday Lowland markets. The photograph shows a Saturday morning crowd, with pottery and other large

cacaste loads going aboard (see pp. 68, 101). (The smallest boat, with outboard motor, is the one in which I mapped the Lake in 1936.) The Lake level in 1932, when the photograph was taken, was about 5,065 feet, little above the minimum (5,062 ft.) which had been reached about 1920, after a steady drop of nearly 40 feet since 1900 (5,099 ft.). This former level is still recalled by old residents of Lake villages, and is evident from recent reentrenchments of streams. The old Lakeshore trail is always just above this level at its lowest points.

- c, This is a close-up of the flooded channels seen in the foreground in a. They are viewed from the boathouse by Tzanjuyu. The water level was probably 30 feet lower than shown in the photograph (5,080 ft., August 1936) when these former river channels were formed. The outline of Toliman-Atitlan volcanoes is faintly visible through the haze.
- d, The Lake level here is about 15 feet higher than it was just 4 years previously. This would submerge everything shown in b (foreground), even the largest boat, leaving only the tops of the willow trees out of the water. The tip of the tree shown in b is barely visible beyond the pier in this picture (see also Termer, 1936, pi. 29). Long-term periodic fluctuations of the water level are due apparently to shiftings in the lava rocks along the south shore of the Lake, opening and closing the subterranean outlets through which the Lake has its only drainage (see Appendix 1).

PLATE 19

- a, This picture is made up of five overlapping photographs. The main part of the village is in the center of the picture, though dwellings are scattered widely over the delta. The ruins of the old Franciscan church are in the center; central square, left; market beyond. Vegetable gardens (*tabldnes*) are visible in the foreground and to the right; shaded coffee groves to the left of and beyond the village center. The rocky, braided stream course appears at the left. Tzanjuyu and the former river mouth (pi. 18, a and c) may be seen at the extreme right of the shore. In the back ground, across the Lake, are volcanoes Atitlan and Tollman (left) and San Pedro (right). (See maps 20 and 23.)
- b, Banana plants, which grow so rapidly that they can afford effective shade within a few months, are used at first, until more permanent shade trees (here the gravilea or "silver oak," behind the Indian) can become established. The coffee bush beside which the Indian is standing is about 4 feet high, and is covered with fragrant white flowers (April 1932).
- e, The jocote varieties, reading from right to left, are as follows: 1, *Petapa* (yellow to orange); 2, *corona* (red orange to red); 3, *chicha* (yellow orange); 4, *Pascuo* (red, lighter than *corona*); 5, *famallito* (yellow); 6, Rio Grande (yellow). The ruler besides the *jocotes* measures 14 inches. (See Appendix 2, table 8, for fuller descriptions.)
- d, Wool is usually spun on a wheel (pis. 33 and 37) but sometimes is twisted with two hands as shown here.

with the spindle stick dangling below, often serving little purpose other than to retain the thread.

- e, September 1933 was probably the rainiest month in the history of Guatemala. Water above this point ponded naturally in a depression, and when the ground holding it gave way, the water tumbled down with destructive force. Such gullies have occurred at various points along the north side of the Lake, notably at Tzununa, where a gully deposit blocked and diverted the main stream of the arroyo. The flood which destroyed Ciudad Vieja, first capital of Guatemala, in 1541, was probably of this character. The story of the Lake in the crater of Agua volcano (hence, its name) is a myth (pi. 44, d).
- f, Foot of the gully shown in e. Scale is indicated by the man at the base. At left is a small species of ceiba tree.

PLATE 20

- a, *Tabldnes* are often built up 20 inches or more above the base, of carefully worked, fertilized soil. Water is diverted through ditches surrounding the straight earth sides of the plots, and is tossed over the growing plants with shallow pans or gourds, as in c. Coffee bushes may be seen growing in the background, beyond the cane fence.
- b, It may be seen from this picture that almost one-fifth of the garden area shown is planted to corn (see map 23). Most *tabldnes* are over 3 varas (nearly 9 ft.) wide, and vary in length.
- c, The *tabldnes* shown here are all planted to onions, with cabbage scattered at wide intervals along the edges of the plots.
- d, These special hills for pepinos resemble the ones made for tomatoes at San Pedro la Laguna (see p. 141). For discussion of *tablon* culture at Panajachel, see pages 30-31.

PLATE 21

- a, *Jocotes*, especially *petapa*, *corona*, and *chicha* varieties (pi. 19, c), are very prominent in this market during the height of their fruiting season, from September to January. The two large baskets just to the left of the center are filled with *jocotes* (*mico*). The duller looking ones in the nearer basket are boiled. The small center basket contains unroasted coffee ("en oro"), while those to the right are filled with *jocotes* (*petapa*), tomatoes, and local *manzana* bananas (see table 2). Garlic in bunches braided together and small green onions occupy the right foreground. Solola women in left foreground, center background; *Panimache* lime vendors, right rear.
- c, For a discussion of this *tinaja* trade, see page 80. A *suyacal*, or rain cape, is leaning against the pottery in the foreground. In the extreme right foreground is a San Pedro woman; Solola woman next to her; Argueta woman with child, standing in the background. Beyond her is a cargo of pine chairs from Argueta, en route to Guatemala City.
- d, The three men in this picture are San Pablo Indians with loads of large ropes (*sogas*), going to the Patzum market. Note the *bajareque* (wattle-and-daub) house at the right (see p. 43).

PLATE 22

- a* and *b*, show the steep, rugged slopes surrounding the limited favorable terrain upon which the village is built. Most of the many trees are *jocoles*, especially *petapa* and *chicha*. The church (lower edge of *a*, near center in *b*) is at the lowest level of any on the Lake, at the water's edge, according to old residents, at the end of the 19th century, when the level was about 5,100 feet (it was about 5,080 ft. in August 1936, when these pictures were taken). The rapid rise of the Lake in 1933 inundated most of the rushes, used in the once-important mat craft, and about 100 yards of good shore land. Attempts are being made to plant rushes for mats, but most of them are still bought from other municipios.
- c*, There are only about a dozen gardens like this at Santa Catarina (1936), having a small fraction of the area of those of Panajachel; and 7 of these are worked by a man from Panajachel, who rents them for onions. The light soil, though good for onions, is not favorable for garlic. Beyond the garden in this picture are wild cane, left; agave (and flower), center; avocado, right. Atitlan and Toliman volcanoes appear in the left background.
- d*, The large split-cane trap on the left is for use at hot springs, the nearest of which, in the municipio, was inundated too deep to reach after the Lake rose in 1933 (pi. 18). The small *garlitos* are baited and placed along the shore with the apex of the split-cane funnels pointed outward, and the long cane resting on the bank (p. 124). These are used on a small scale in all the Lake villages, but especially Santa Catarina. Besides a fish trap, the man on the right is holding a canoe paddle. In the right background is a well-developed *quisquil* vine.
- e*, These fish are not over 2 inches long, and five are strung on each stem (two stems for 1 cent when this picture was taken, February 1932). The fish are smoked after they are impaled on the stems. This is an ancient practice (p. 124). The Solola woman at the right is stooping to pick up her basket; the coiled cloth to steady it is already on top of her head.
- f*, Lake Atitlan crabs caught and sold at about 1 cent each by Santa Catarina men. They are tied up with yucca leaves in bunches of five; top view, left; rear view, right. The section of tape measures 12 inches.
- g*, Note cactuses in background: *pitahaya* (below) and tuna. The cane pole held in his right hand is used for catching crabs at night. Bait, consisting of a piece of meat, small fish, or (best) a live frog, is tied on the end with the heavy string attached for the purpose. This crabbing is done in dugouts, by pitchpine torchlight; hence, it can be done successfully only on fairly calm nights. At his feet Gonzales has a small-mouthed crab basket. In his left hand he holds a coiled crab line made of three *bejuco*s (fine, rubbery vines) having a total length of 16 *varas*, or about 45 feet. This is stored in the smoke above the fire so that the soot will preserve it. Maguey cord is not used because it rots rapidly. Bait is tied on at intervals and the line is weighted with rocks

in fairly deep water, preferably where there is a good growth of Lake weeds on the bottom. This is done in the early morning, without the aid of nets. Crabs are caught in this manner also in San Marcos. A San Pedro man and his three sons catch crabs in underwater stone enclosures which they build about 2 feet square, with a small opening in one side (away from the shore). They fill the enclosure with Lake weeds; weekly they close the openings and trap 1 to 2 dozen crabs in each.

PLATE 23

- a*, Most of the houses of San Antonio are constructed on terraces, for the slope of the site is quite steep. The trail to Santa Catarina may be seen skirting the promontory in the background (p. 102).
- b*, The adobe house in the foreground has a common type of roof crest (poles laid along either side) (p. 47). The church is in the center of the picture. In the background are volcanoes Atitlan, left, and Toliman, right. A spearhead of clouds from the Lowlands is just beginning to move up through the gap of San Lucas. This is likely to occur during the latter part of the morning, any season, when the south wind sets in (see Appendix 1, p. 131).
- c*, Horses are driven in a circle, often in an enclosed corral. There is always a wind to blow the chaff (p. 28).
- d*, These men cross the Lake from Santiago (just off of left background) in dugouts, which they beach at San Antonio. They then climb the steep trail, 500 m. to the summit shown here. Note the agave and yucca in the right foreground. It is still a long journey to Tecpan, where they sell their Lowland products and buy quicklime as a return cargo (see p. 73). For this hard climb they have discarded their shirts, which are draped over their shoulders.

PLATE 24

- a*, Often, as in this case, all of the men paddle, standing and facing forward. The stern handles used for lifting and beaching canoes may be seen, especially in the foreground. Note also how gunwales and prow are built up with wide boards (for a description of these canoes, see page 99). In the right background is the base of San Pedro volcano, with Toliman beyond and Cerro de Oro at the extreme left. Submerged treetops appear beyond the canoe.
- b*, These are the so-called "*Pescadores*" or mail carriers, who are also traders. There are four well-filled cacas in the canoe, containing tomatoes to be taken to Solola (see also pi. 12, *c*).
- c*, The canoe is being paddled stern-first towards the beach for a landing. There are 10 San Pedro paddlers and 15 passengers, mostly women. Some are from Santa Clara, with four large loads of shallow baskets (*canastos*), packed in the prow of the boat. The pyramidal roofs of Atitlan houses are visible beyond. In the background are Toliman volcano (left, with two summits) and Atitlan (right).

- d, These are mostly merchants with Highland products for Lowland markets. Cargoes of Totonicapaa pottery are especially in evidence, as in / (p. 80).
- e, From the stern of this small canoe 4 Atitlan paddlers and 5 passengers with cargoes are stepping ashore. They will go to the Friday market at Sololi. The water is calm at this time (about 7 a. m.), as the heavy waves do not come until the south wind sets in, about 9 a. m. The 9-mile crossing from Santiago to Panajachel is made in about 4 hours (p. 99). Handles for lifting are visible on both stern and prow of the canoe.

PLATE 25

- a, The thatching material is *pajdn* (high-altitude giant bunchgrass). About 20 relatives and friends of the builder are helping him roof his house, for which he, in turn, provides food and drink (see p. 44). This new house is of the short-ridgepole type; the one at the extreme right in the picture is pyramidal, with an inverted bowl on top (p. 44). The houses of Santiago are of both types, fairly evenly divided (& see also map 14). Rocks for walls are abundant, as the village is built upon a lava terrace. Not only alleys are walled (foreground) but most yards are enclosed by stone walls, and house walls are of stone (lower half), usually whitewashed, and vertical cane (upper half). The lava is basaltic andesite, porphyritic, with phenocrysts of olivine and pyroxene. San Pedro lava is similar; samples were lighter colored, more compact, and less prominently porphyritic (plagioclase phenocrysts). My samples were analyzed by Dr. Charles M. Gilbert, University of California.
- b, The houses are grouped in stone-fenced enclosures, usually according to families, brothers or other relatives occupying groups of houses close together. View from a high lava terrace just east of the village; Lake Atitlan in the background.
- c, This picture includes part of the area shown in b, from a greater distance. Two *sopihets* (buzzards) are seen soaring, against the white background of the Lake.
- 4, This overlaps c about one quarter inch, the point of the peninsula in the upper left appearing in both pictures. The municipal buildings and market place are in the extreme right. The principal "street" leads from there across the peninsula, and may be traced in c and d by the line of larger, whitewashed adobe houses, most of which are owned by the few Ladinos of the village. The narrow strait of Santiago Bay, with the base of San Pedro volcano beyond, is in the background.
- £, An Atitlan woman seated in the foreground is spinning white cotton thread. The *txzate* (chalk for her fingers) is at her right. In the background is San Pedro volcano, across Santiago Bay.
- f, All the water used at Santiago is brought from the Lake in this manner, so that the village is an especially good market for *tinajas* (pi. 42, b).

PLATE 26

- A, The column of smoke, horizontal in the stable, early morning air, is from the *rosa*, burning and clearing for

corn planting (this was March 4, 1941). The line of smoke, at about 8,000 feet, marks approximately the upper limit of cornfields here. They cover most of the lower slopes despite their steepness and the seriousness of soil erosion where there is no vegetation binder. The summit of San Pedro volcano is rounded and wooded, and slopes are deeply cut by gullies. It is the oldest of the major cones by the Lake. Tollman, somewhat less old, is less rounded and eroded, while Atitlan, the most recent (there are still a few fumaroles at its summit) is bare, sharply conical, and the lower slopes are little etched by erosion. The edge of the Atitlan cone appears faintly in the picture just above the end of the visible line of smoke.

- bj The man in the foreground is taking agave (maguey) fibers handed to him by the woman seated in the shadow at the right. He separates, straightens, and holds them as the woman (left of the center, in line with church in the background) about 80 feet away, whirls a spinner to which the end of the cord is attached; (see p. 69). Another woman (extreme left) is feeding out fibers for a strand being spun off to the left of the picture. Note the Y-post just to the left of the man; also potsherds on top of the low-eaved, grass-thatched dwellings.
- c, The two prongs of the Y-post serve to separate the three double strands of rope and maintain tension as they are spun by two men (e) while another spins the finished rope in the opposite direction (off right of pictures c and e; note rope at extreme right in c). In spinning the double strand (second step before final spinning), the single strands are also tied to this Y-post. The man to the right handles the finished rope at the Y-post.
- e, This picture shows an earlier stage than c, which was taken several minutes later. The man at the left handles one spinner, the center man two; all are spun to the right, as is the finished rope, which is being spun at the same time (off picture to right). The man at the right keeps the rope going smoothly through the fork.
- d, Scraping a fresh-cut agave leaf (*penga*), about 4 or 5 feet long. Two such leaves provide fiber enough for a small-sized rope, one-half inch in diameter and 4 to 5 varas (about 11 to 14 ft.) long. The fence (background) is of split agave flower stalks. For fuller details of ropemaking see p. 69.

PLATE 27

- a, The whitewashed walls of the few central buildings may be seen at lower left center. The ridge is low, the village center being about 400 feet (125 m.) above the Lake level (see also pi. 45, e, and map 20). Rugged mountains rise as high as 3,600 feet above the Lake. Extensive areas along the steep lower slopes have been cleared for cornfields.
- b, The top of the church and part of the square may be seen (right of center, 50 m. below camera level) and a few dwellings at the right. Most of the houses are hidden behind trees (*Jocotes*, and oranges; also

avocados, *limas*, and limes). The east shore of Lake Atitlan may be seen in the distance, with San Antonio Palopo left of center.

- c. The two pieces of sacking (1 by 2 yd. each) are tied to two canes about 6 feet long and one diagonal about 9 feet long, making a tapered trap. Placed in shallow water, the canes float, leaving the sacking hanging to the bottom. Small fish (not over 2 in. long) are driven into the opening (about 2 yd. wide). The tall stumps were formerly trees growing along fence lines when the water was lower (until the rise began, about 1930; see Appendix 1, p. 132). A strip of rich gently sloping alluvial land about 150 yards wide was flooded between 1930 and 1935 (December 25, date of this picture).
- d. This seine, about 3½ feet by 15 feet, is of very fine mesh, for catching only small (2-inch) fish. Only 2 seines were reported in Santa Cruz, and none of this type were observed elsewhere around the Lake.
- e. The younger men at each end, 30-35 years old, wear blue coats and black and white *todilleras* over hand-woven cotton knee-trousers, white with fine blue vertical lines one-half to three-quarters of an inch apart. Shirts are bought ready-made. The three other men, ranging in age from 40 to 65 (center), wear black wool *capixais* over hand-woven cotton shirts and knee-trousers, white with red stripes. The change in dress reportedly began about 1900.
- f. These insipid citrus fruits, which look like large round lemons with prominent navels, are among the chief products of Santa Cruz and especially, Tzununi; (see Appendix 3, p. 147). Oranges from here and San Marcos, also appear in quantity in the markets. The men in the picture are part of a group of 18, 5 with *limas*, 3 with oranges (and some *limas*), 5 with tomatoes, 5 with greens and onions from Tzununi.

PLATE 28

The animal market (*feria*) is in an enclosure off to the left. Small pigs especially are sold there (p. 79). In the right foreground is the section where most of the pottery is sold. In the background is the small Calvario church, with the cemetery beyond. Eucalyptus trees and Australian pine have been planted in the *plaza*. Most of the surrounding hills are covered with pines and oaks. Photograph taken from the top of the principal church (pi. 29, a), February 1932.

PLATE 29

- a. The pottery in the foreground comes mainly from San Cristobal Totonicapan. The merchants are Chichicastenango men who will resell them in the Lowlands and elsewhere. Many local men may be seen standing and kneeling on the church steps, in the background, swinging incense burners, smoke from which fills the air.
- b. A Chichicastenango woman is kissing one of the silver images extended to her.
- c. Sheep are grazed in many Highland regions, such as this one, and since they crop the grass very close, little binder is left where they have overgrazed. Once

started, gullying proceeds rapidly. Many roads and trails in the Highlands are, like this one, lined with maguey plants. These are unusually small ones, recently planted. The pots in the cargo shown are held on by ropes passed through the handles and attached to a wooden frame. A cargo net is passed around them; here not reaching the upper ones.

PLATE 30

- a. Great areas in the high mountains (altitude here 2,500 m., 8,202 ft.) are almost completely covered with this coarse, sedge-like grass. Clearing it with hoes (note man, lower left) is an arduous process. A large patch (center and lower right) has already been cleared.
- b. Men are thatching the larger house with bunchgrass (seen growing in immediate foreground, right). Maize in the fields is about 6 weeks old (date of photograph, May 4, 1936). The distant slopes beyond the fence line have been cultivated within recent years (old furrows are visible), but are being left to go back to bush. They will probably remain fallow for 10 years. The small structure in the middle of the *milpa* is a shelter for lookouts, to be occupied when the grain is ripe.
- c. This is 20 km. south of Sacapulas, elevation 1,800 m., or 5,900 feet, February 8, 1941; planting here is in March; harvest, October. These carefully made furrows, usually about 3 feet apart, may be as deep as 18 inches. Furrows follow the contour of slopes. For a description of this process, see p. 20.
- d. Except for the ear on the left end, which is from near Guatemala City, all of these ears are from Santa Cruz. From left to right, they are as follows: (1) white flint, (2) yellow flint, (3) white flint, (4) "black" (dark purplish blue) flint, (5) white flint, (6) white flint, (7) white dent, (8) "black" (dark blue and purplish with scattered yellow grains) flint. The two on the end are 8 inches (about 20 in.) long. I rarely found ears longer than 10 inches (25 cm.) in Guatemala; the largest was about 12 inches (30 cm.) long (San Pedro Pinula, 1,550 m., eastern Guatemala). Most maize ears from high altitudes (above 2,500 or 8,202 ft.) are even smaller than (1), though otherwise resembling it, averaging about 4 inches. No. 6 has the largest grains of any I saw, some of them being nearly one-half inch (1 cm.) in width. Flour corn ears are usually the size and shape of No. 7, very light and chalky white, the grains soft and floury.
- e. At the ground surface (top of picture) may be seen in cross section old furrows of a *milpa* or of a wheat field. Lateral gullies are starting to form at the furrows. The top of a road culvert appears at the lower right; the road in the extreme corner.
- f. These pinnacles, the larger ones as high as 60 feet, may have started as shown in e. Many of them are capped with well consolidated sand and they can retain sharp, symmetrical spires (right foreground). Though these *riscos*, which are tourist attractions on the edge of the town of Momostenango, are not extensive, there are many badly eroded areas of less advanced stage in the region. This reduction of cultivable surface may

have contributed to the development of weaving in Momostenango (p. 15). When the town was built at its present site (said to have been 1705), forests of huge white pine reportedly covered much of the area, as evidenced by the hewn boards nearly 1 m. (39 inches) wide in the ceiling of Ernesto Lang's house, one of the first to be built.

PLATE 31

- a, The hand-woven trousers and shirt are red and white (women's huipils are of the same material, mostly like the one on the right; skirts are dark blue); jackets and outer pantaloons are of natural black wool. Newer European-style coats are blue, woven in Momostenango (p. 50). A red bandana tied on the head is generally worn under the low-crowned straw hat. The picture was taken in Pueblo Nuevo, and the Todos Santos were going to Mazatenango to buy *ixcaco* brown cotton, they said.
- b, Shirts and trousers are of hand-woven white cotton; sleeves, collar, and *eute* (worn under hat) are red-striped. Sandals have heels like shoes, as at Todos Santos. The long black wool *capixais* are comfortable in this cold region (p. 50). These men are loaded with *ocote* (pitch pine) which they cut in the high forest between San Juan Atitan and Todos Santos. Note machetes leaning beside the men at left and right.
- e, Plows are simple wooden shafts, generally having metal-tipped shares (p. 20).
- d, These instruments, mostly made by Ladinos living on the outskirts of town, are elaborately inlaid, sometimes with as many as 13 concentric rings of different wood around the sound hole. This is the operation shown in the photograph. Tools consist of a peg, a slotted piece of hardwood that rotates like a compass, and a pocketknife. There is also a jack plane on the work bench (upper right in picture). These elaborate guitars sell for between \$2.00 and \$3.00.
- i, At the right is a portion of the market (Thursday, December 26, 1940).
- f, The altitude here is about 2,400 m. (7,900 ft.); date December 24th, 1940 (p. 20).
- g, At the right is a conical, stone and adobe sweat-bath structure (*temascal*), with square opening facing the camera.

PLATE 32

- a, Black humus at the surface, often as thick as 2 feet and underlain by clayey red-brown horizon is the typical soil profile here, apparent along either side of the road. This is the main highway between Guatemala City and Quezaltenango, now a part of the Pan American Highway. The law requiring 2 weeks' road work a year (or \$2.00 tax) by each man has resulted in a good road net. Though short-grass meadows predominate on these highest summits, there are patches of woodland and forest, mainly coniferous (pines, cypresses, and junipers; p. 6). The pines here, as in the Cuchumatanes, have been killed in

great numbers, reportedly by a boring beetle and by fires.

- b, Blue and yellow meadow flowers dot the smooth slope in the foreground. In this area about 95 percent of the sheep are black, for the dark brown wool is widely used in weaving (p. 64).
- e, The size of the bunchgrass may be estimated by comparison with the sheep. Here in the Cuchumatanes Mountains, black and white sheep are more evenly divided in the flocks, for there is more demand for white wool than farther south, where black sheep predominate. The woman at the extreme left, with a baby slung on her back, is herding the animals.
- d, The pen, with sheep inside, just to the right of the center, has been moved from its previous position as indicated by the smooth squares extending to the cornfield at the left edge of the picture. The vertical stakes in the corral are lifted on all sides but one, so the new position is contiguous with the previous one (see p. 20). Note the lookout shelter at the left of the pen, and the furrows of an old field, right.
- e, The pen occupies almost the same relative position in this picture as in d. The three squares immediately to the left of the corral are darker than the others, which are older and more bleached. Often, increasingly dark tones clearly indicate the course of the shifting pen. A lean-to lookout shelter appears near the pen. Note also the bunchgrass (foreground, by the Cantel road), dwellings, beyond the pen and the characteristic open, level terrain of the upper Samala Valley in the background.

PLATE 33

- a, The Indian weaver, Jose Barrera, holds a bunch of raw wool in his upraised left hand, which he draws slowly away from the spindle as he turns the wheel with his right hand. The yarn may be seen passing in front of his cap. This picture was taken during February 1941; the others on this plate in May 1936.
- b, Carded white wool is lying on the table at the right. The wheel is operated as in a. The boy seated at the left is carding the raw white wool in the basket. The cards have long, heavy wire bristles; are made mostly in Chiantla, and marketed in San Francisco and Momostenango. The boys card and spin, and tread blankets (pi. 34, e) but do not weave. Spinners are sometimes hired.
- c, In this manner a skein of yarn is rolled from the free-spinning, rhomboidal reel onto the spindle made of a section of cane (*canon*) for use in the creel (see d). Thread on a *canon* is called *molote*. It is sold in the market in this form or in a ball (*bola*). The dye pot in the foreground is from San Bartolome. Note the rawhide pulley from the wheel to the spindle shaft.
- d, The son of Jose¹ Barrera, at left, turns the freely rotating warping frame (*urdidor*) so that the warp threads are spooled in the desired arrangement for the blanket pattern. Note that the rotating spindles on the creel (right) are placed with six white at the left and

six black at the right. This is sometimes done also by cotton weavers at Salcaja. The spindles all turn together as they feed the warping frame simultaneously. From the frame the threads are transferred to the yarn beam. The elder Barrera in the background continues spooling thread as in c. For other steps in wool weaving, see plates 34 and 37; pp. 63-65. The small chair in the foreground is characteristic of those used by Guatemala Highland Indians, adults as well as children (pi. 43, b, c). Sitting on small chairs and low stools is the closest approach to squatting on the ground, as the Indians still do much of the time. Before the Conquest small hollowed log sections were probably used. These are frequently seen today, cut out of "*pito*" *Erythrina* sp. (eg., at Chalhchitan), with a little straight handle left at one end. The Indians have adopted but little of European furniture.

- e, This blanket has a unique feature in the row of bars and openings near each end (seen at the knees of each of the men). It is a large, heavy blanket, of good quality, worth \$3.50 in 1936. Though mostly black and white, it has bars of purple and green in a large plaid. Scotch plaids, of red, blues, and greens are common.

PLATE 34

- a, The man in the center of the inset has his hands braced against a rock while he treads a blanket with his feet against another rock as the men are doing in e. The man at the right in the inset is swinging a blanket down with force against a rock. Both blankets have been soaked in the hot springs.
- b, The woman in the center cards the white wool from the basket beside her, while the woman at the right behind her spins white yarn. The loom, behind the seated woman, is operated by her husband. The yarn beam, with wide black and white bands, appears just above the head. They are working in a special shed behind their dwelling; in some cases the loom is under the same roof in a separate room.
- c, Two women are selling *palo amarillo* (bright yellow wood, foreground), *brasil*, reddish wood (woman at left seated on it), and *campeche*, purplish wood at right, from the vicinity of San Pedro Carcha (see p. 65). Momostecos are buying it rapidly. The woman in the center (from Coban) is weighing wood in a balance. Note filled cargo net, right foreground. The woman at the left is a Momosteca, with white huipil and white-checked blue skirt; the typical huipil is dark red cotton with fine black horizontal lines: local foot-loom work. A checked cloth is often tied on the head (pis. 33, e; 34, b) as at San Francisco el Alto.
- d, The men are at the stream which flows by the village. They have soaked the blankets in water heated in the heavy San Cristobal vessel in the background (pi. 41, a.).
- e, The same men as in d at the scene shown in d. Special racks are built of poles to give the men support as

they tread and knead and twist, manipulating their feet with remarkable agility.

- f, From this belfry the rolls of blue woollen goods for coats appear in an unbroken line on both sides of the street for a distance of over two city blocks. Most of the tailoring of the coats for the Southwest is done in Quezaltenango. The tower of the municipal building is at the right. Note the stripped pines in the right background.
- g, These are the largest, heaviest, and best felted blankets made in Guatemala. Colors of figures are generally browns, blues, reds, yellows, greens, and black. Dolls and animals are worked in with short weft threads, using cardboard cut-outs as guides. These blankets more than any are well teased before being washed (teasels grow in abundance in cantons Xecanayi and Jutaci, and are sold in the market). Then they are well worked afterward, as in d and e. They are made chiefly on the south side of the town, in the cantons of Los Cipréses and Tierra Colorado. Most of the blankets with jaspe patterns are also made here (see p. 64).

PLATE 35

- a, The church faces upon this square, which was probably once the main, central plaza (p. 57). It is used now mainly for drying blankets, when there is no religious festival with dances and carnivals. Of about 85 blankets visible here, nearly 80 have large plaid patterns, mostly black and white. Scale may be determined from the gray-looking blankets at the lower left (and three others at the lower right), which have fine bluish checks on white. Note from the shadows the directness of the noon sun (May 1, 1936).
- b, Since San Francisco is like a deserted village on Sunday and teems with life every Friday, which is market day, the big attendance at Mass is naturally on Friday (p. 127). The afternoon sunlight streams through narrow windows, making bluish beams in the smoky air. Many candles are being burned by the worshippers, who are mostly Indians. The great altar in the background, almost completely covered with gold leaf, had been painted over for centuries, until Padre Carlos Knittel discovered its true nature, about 1934, and painstakingly directed its restoration.
- d, Here in the *feria* (upper right in c) wool may be seen in all of its stages. Black and white sheep appear at the left; netloads of raw wool, black and white, in the center; and plaid blankets, of black and white wool, drying in the foreground. Blankets are usually brought to market wet, fresh from felting. In the middle distance is the white roof of the church, from the right end of which plates 35, c, and 36 were taken. The upper San aid Valley lies beyond, with Cerra Quemado and Santa Maria volcanos on the horizon.

PLATE 36

In the right foreground are Quiche' hats and Coban ropes. Large sacks of dried chile from Asuncion Mita, in eastern Guatemala, are sold just beyond the open-

ing between the tents. Plain white Cantel cotton goods are sold along the edge of the square to the right, and lengths of indigo-blue cotton skirts may be seen hanging in the shade in front of the building across the square. Blankets and woollen goods are also sold there, out in the sun. Wool textiles spread out to dry may monopolize the street on the far left-hand side for several blocks. The two streets parallel to the camera and behind it are also crowded with vendors, especially of pottery (right) and corn, some in trucks (left). Not over two-thirds of the total market is visible in this picture. San Francisco is primarily a wholesale market and redistribution center (p. 127). Note how the distant hills have been cleared of woody growth, except along fence lines.

PLATE 37

- a, An outside loom may be seen on each side of the house to the left. The one nearer the center is pictured in *b*, *d*, and *e*. Note black and white sheep and bunchgrass in the foreground; fog in the background. Black wool jackets with split sleeves are worn by men here as in much of the Cuchumatanes region and in Chiapas.
- b, The man in the left background is spinning white yarn, the other, black. For closer views and explanations of the spinning wheels, see plate 33.
- c, These crosses and shrines are common along roads and trails, especially at summits and crossroads, in most of Catholic Latin America. Travelers, stopping a moment for prayer, leave flowers or light candles.
- e, The weaver has just thrown the shuttle through with his left hand and caught it in his right. For a description of *peyon* weaving, see page 65.

PLATE 38

- a, The Samala River flows from right to left across the picture. The common agave of this area appears in the left foreground. There are few trees in this valley, so that the little patch by the Quezaltenango road is exceptional. Cerro Quemado (immediately behind Quezaltenango) and Santa Maria volcano are in the background. For a brief description of the valley, see pp 4, 133. There is not the isolation in this valley that is seen in the Lake Atitlan Basin. On the contrary, there is free intercommunication. Consequently, individuality among municipios is less apparent. Men are indistinguishable as to provenience throughout the valley. Even women, who speak more Spanish than those of the Lake basin, are more alike. In many municipios women wear distinctive costumes, as at Quezaltenango (c). Olintepeque women wear two types of huipils: (1) red with wide-spaced horizontal white stripes and white sleeves with longitudinal red stripes; (2) dark blue with ½-inch cerise stripes, horizontal, about 4 inches apart: skirts are solid dark blue, belts 4-inch red cotton, with fine longitudinal white lines. In the line of villages near the western end of the valley, from San Martin to Cajola, all women wear the same blue checked skirts and wide black wool belt,

with a few widely spaced thin white stripes (p. 89) • huipils are basically red. At Cajola there is on this an occasional horizontal yellow-bordered 54-inch black line; at San Juan, Concepción, and San Martin intricate designs in over-all patterns, green, orange, purple, and red, are woven on the stick looms. An unusual twill technique, with double heddle, was found here by Dr. O'Neale. *Zuies* are decorated much like huipils (pi. 42, g). Almolonga huipils and *zutes* are heavily brocaded with beautiful over-all designs on the loom, on one side only: red, purple, cerise, green, yellow, cotton, and some silk. Skirts are blue as at Zunil.

- b, The Quezalteco is selling the following types of chile: foreground, left to right, *Cob&n* (2 sacks); *sambo*; *costeno*; background at left, *chile chocolate* from Asuncion Mita (see table 7, Appendix 2). In the smaller, deeper sacks are Tahuesco salt and Tapachula salt shrimp. Behind the vendor, at the right, arc *ixtle* (slender agave) leaves, which are used, entire, like heavy twine; this plant is especially abundant around Chichicastenango.
- c, This is a specialty of Pie de Volcan, and these women may always be seen here at the foot of the market steps (p. 74). They wear a regular Quezalteca costume, with full, pleated skirts. There is great individual variation in the intricate designs of the huipils, made on foot looms.
- d, The Indians have a stone altar on top of Santa Maria volcano, and conduct pagan rites (*brujeria*) there, as they often do on peaks and in caves. It was reported that, in 1916, after some Quezalteco Ladino schoolboys had disturbed the altar, 5 young mountain climbers (2 Germans, 1 Ladino, 2 Indian guides) were massacred on the peak by vindictive Pie de Volcan Indians wielding machetes. The western Guatemala Indians are normally friendly and docile, rarely resorting to violence. Santa Maria volcano, obviously recent, as indicated by one of the sharpest cones in the world, yet covered with pines to its summit, was classified as extinct by French (Doll fus and Mont-Serrat, 1868, p. 475) and American (Intercontinental Railway Commission Report, 1898, p. 246) investigators, yet, October 24-26, 1902, Santa Maria erupted laterally from its southwest base, in one of the greatest volcanic outbreaks in Central American history (see MpByrde, 1933, p. 67, fn. 3). In 1922 a new volcano began to grow in the crater; in 2½ years it was 66 m. high, and was christened "Santiagouito." Located about 4 km. (2¼ miles) north of Palmar, it is now hundreds of meters high.
- f, As in *a*, the church (front shown in *e*) is the prominent landmark of the village center, and there are great areas of tall maize extending almost uninterrupted up and down the valley. An agave flower appears in the left foreground.

PLATE 39

- a, For San Andres soap making, see page 70.
- b, The thatching material is giant bunchgrass. Though most of the men are wearing their black wool robes (c), about eight of them are not. This is April 30, 1936;

most thatching and repairing are done thus, just before the rains start. The house at the left has a corrugated iron roof; all houses here have adobe walls. The towers of the church, in the center of the village, appear at the extreme left. The lower slopes in the background are largely cleared for maize and potatoes; the light color (see also c) is due to the fine pumice nodules, recent ejecta from Santa Maria volcano, which cover the surface everywhere in this area. This makes a good tilth for potatoes, which require a light soil; here they are an important crop.

- g, The men on the left are wearing robe and trousers of red-lined white cotton, locally made on stick looms, with red and yellow sleeves elaborately embossed on the loom (for illustration, see Lemos, 1941, p. 24) and red and variegated sashes with beautifully woven decorations. A *zute* or a felt hat (sometimes both) may be worn. One man in the picture has his black wool *capixai*, worn over the white cotton clothes; like the head *sute*, it is a protection against the cold. The huipil of the women at the right matches the men's sleeves. She is wearing a *jaspe* apron of various colors over her dark blue skirt (from Quezaltenango; p. 52). The black wool sash is very wide and has narrow white stripes about 2 inches apart.
- d, Since the abandonment in 1933 of the short-lived electric railway for which this dam was built, there has been a great excess of power from the plant. Quezaltenango and other western towns and villages, the Candel cotton mills, and some of the coffee *fincas* (many have their own turbines) do not offer a sufficient market for all the power produced.
- e, This is a monument to bad planning and unwise engineering. (See Jones, 1940, p. 255.) A German company constructed the line, completing it all the way from San Felipe to Quezaltenango in March, 1930. In about 28 miles, it climbs 5,400 feet in elevation, with grades as high as 9 percent. The nature and volume of traffic over the route were far insufficient to justify the expense even of operation (construction cost about \$8 million dollars, according to reports covering the entire project). The power plant generated more electricity than needed, even with the line in operation. The floods and the wash-outs caused by the record rains of September 1933 brought about the final collapse. The right-of-way is returning to bush, and the cascades move up a well-beaten path, as before.
- f, This is a characteristic scene in Quezaltenango before Palm Sunday (*Domingo de Ramos*); this picture was taken on Saturday (April 4, 1936). The yellowish, musty-smelling inflorescence of the corozo palm is much in demand, along with strips of palm leaves, for decorating altars and churches, Christian and pagan.
- 7, The women in many of the villages in the Cuchumatanes Mountains wear these long, heavily collared white cotton huipils, which fall loosely over the long red skirts, nearly covering them. The large, separate collars are ruffled at top and bottom, and are decorated with many lines of silk embroidery, colors here being chiefly purple, yellow, green, and black (chainlike design and outer margin especially). These details

vary with different raucipios. The usual headdress consists of a heavy black wool cord with which the hair is braided and bunched into a frontal knot (extreme right). Sometimes a bright-colored, tasseled silk Totonicapin head band is worn (left foreground), but this is exceptional. The machete lying besides the woman's right hand is used for cutting the hard blocks of *panela*. The heavy stick is used to hammer the machete blade. Weighing is done with the basket balance.

PLATE 40

- a, (For further discussion of the arrangement of warp yarn, see p. 63). In the background are Cerro Quemado (left) and Santa Maria volcanoes.
- b, Flowers, birds, and animals are favorite motifs in this embroidery. • Cardboard cut-outs are traced in pencil on the cloth, which is manufactured white cotton from Candel (p. 52). Not all women here take the trouble to embroider their huipils, either wearing them undecorated or buying them already decorated (these are generally available in the San Cristóbal market). There is no stick-loom weaving here, or anywhere in the upper Sammla valley, though some of the San Francisco women (about three in each of the six weaving cantons) up on the high slopes adjacent, weave a characteristic *zute* of white having alternate brown and blue $\frac{3}{4}$ -inch stripes. These are worn by some local women and those of San Cristóbal and Aguacatan.
- c, The warp ends are attached at the opposite side of the room off to the right. This a special loom room, apart from the dwelling. Most of this work is done by men, but many women also participate in it. The woman's huipil is of many colored bars and bird and animal patterns, made on the foot loom; the skirt is blue *jaspe*. Often, huipils here have names and dates woven between horizontal bars, on purple and *jaspe* huipils unlike the one pictured. The common Totonicapin head band of the type being woven here consists of alternating bands and figures (especially highly conventionalized birds and animals) in various colors, usually red, yellow, blue, purple, green; black and white. The most elaborate ones are made of silk with a variegated pompon at each end, and silver cord loops attached, fringed with bright-colored tassels (pi. 39, g). A modern use of the cotton head bands is the making of women's high-heeled sandals, which sell in New York for \$15.00 (head bands cost 50 cents). One large New York firm has a shop for this purpose in Guatemala City.
- d, The yarn is being wound from the *canones* (8-inch cane-section spindles) onto a reel off to the right, a simple frame about 6 feet high and 3 feet wide. The yarns shown here are white and indigo blue.
- e, When these threads have been separated and spaced properly (a), they are wound on the yarn beam of the loom. This is one of the many families of Ladino skirt weavers in Salcaja. The physical type is common, more Spanish than Indian in blood. The man at the right has a large external goiter, a widespread affliction among Highland Indians and Ladinos alike. This dwelling has the usual adobe walls.

PLATE 41

- a, The vessels, some of them used also in the textile industry (pis. 33, c; 34, b, d) are generally of greenish and brownish yellow, highly glazed inside and outside (sometimes only upper half outside). For their manufacture, here and in Totonicapan, see page 54. No *comales* (tortilla griddles) are to be seen, for they are little used in the open valley. Few tortillas are eaten, since they require much more firewood than tamales (p. 10). The deep, wide-mouthed pots to the right of the San Cristóbal women in the foreground are colanders (p. 55).
- b, The solid wooden wheel (bottom of picture) is spun clockwise by kicking with the ball of the right foot, as it is brought backward. This rotates a vertical shaft at the top of which is an 8-inch disk. The clay is worked on the top disk, starting with a 15-inch-high truncated cone (p. 54).
- c, In firing, the vessels are placed as close together as possible, the larger ones on the bottom, mouth up, smaller ones on top, mouth down. Clay in foreground.
- d, Of the three men descending the trail, the one in the rear has a load of small, blackened San Miguel Ixtahuacan pitchers in and around his *cacaste* (10 inside and 15 outside). From Santa Maria Chiquimula *tinajas* (water jars) may be seen on top, along with his *suyucal* (rain cape). The one in the center has a more evenly divided load of the two types. The front man has mostly black pitchers, with *tinajas* on top and stewing dishes from San Cristóbal below. No cargo nets are used by these merchants. Some carry only *tinajas*, 18 or 20 neatly tied on with maguey cord. They are bought wholesale at San Francisco for 4 cents each, and sell in Mazatenango market for 8 cents. Just beyond them are maguey plants, one with flower stalk. The ridge in the middle distance is covered with long-leaved pine. Directly beyond the ridge, over the men's heads, is San Cristóbal on the winding Samala River. There is little tree growth in the valley, which is largely cultivated to corn and wheat or left in shojit-grass pasture. In the extreme upper right, volcanoes Cerro Quemado and Santa Maria may be seen through the haze.
- t, This is part of a group of 18 San Miguel men (2 seated, 2 standing, right) selling crude yellowish, unglazed pitchers, said to be made in their home municipio. Note the use of cargo nets around the load of pottery. The smaller ones, about 10 inches high, sell for 2 cents each at Quezaltenango, San Juan, and other markets in this region. They are much in demand, and go in quantity to Quezaltenango and the municipios around it, from Cantel to San Marcos, and into the Lowlands. Comitancillo men also bring pottery of this type, especially *tinajas*, reddish with a light glaze (g). With the group shown in the picture are three Comitancillo men selling these water jars. A San Martín Sacatepequez Indian and his wife are standing in the left of the picture, about to buy pottery.

- f, Bowls, with lids (foreground) and without; pitchers mugs, cups, miniature toy dishes, whistles (shaped like birds and fish), candlesticks, and sometimes incense burners. The larger pieces are yellowish and brownish, and the miniature pieces are usually green. All are highly glazed, but the glaze is thin and brittle, and wears off in a short time.
- g, Totonicapan pottery merchants, after stocking up with a variety of goods at San Francisco on Friday, walk (d) to Mazatenango for the Sunday market. Many small bowls, saucers, and pitchers, all glazed Totonicapan ware (f), may be seen in the photograph. The larger pitchers and jars, at left, are from San Miguel Ixtahuacan. The larger *tinajas*, at the right, are from Comitancillo. The vender is seated at the left. In the immediate foreground is his *cacaste*, which is covered with palm matting. The small ceramic ware is packed inside, while the larger jars and pitchers are tied on the outside. A *suyucal* is rolled up and tied on to the back of the *cacaste*, with heavy maguey twine spiraled around it.

PLATE 42

- a, These cargoes consist of about 25 pieces each. No *cacaste* is used in such homogeneous cargoes of large pottery. A net is passed around them from the bottom; sometimes it will not reach, as in the forward load; also plate 29, c. Note use of the *rodillera* over long white cotton trousers.
- b, Santiago is one of the best markets for these fine, unglazed *tinajas*, for it is a large Indian village, all the women of which take water from the Lake in these jars. The village is built on a lava terrace, with no permanent streams to supply water to *pilas*. The kneeling woman holds a coin in her outstretched hand; she carries money and goods tied up in the ends of the *zute* over her shoulder.
- c, Many of the women take their own *tinajas* to market, most of them going to Guatemala City. This pottery is made only by women, and Friday is the big firing day, for the market on Saturday (their chief day, though there is a big daily market in the capital). The Chinautla Indian women are so occupied with pottery that they do not weave; their costumes are very similar to those of Quezaltenango, whence many of their foot-loom-woven huipils come (some also from Totonicapan). They also wear the full, pleated blue jasper skirts with draw-strings and 3-inch black-and-white belt. Though they carry heavy loads on their backs of as many as 10 *tinajas*, weighing about 50 pounds, they are barefoot. In the western Highlands, women who use the *mecapal* nearly always wear sandals. At the right in the picture is a Solola Indian merchant with Panajachel garlic. His stand, stacked with onions and garlic, is visible at the extreme left. Coban ropes may be seen in the background. The two Chinautla women at the right are unpacking their cargoes of *tinajas*.
- d, Leather thongs may be seen hanging from a rope above the pile of sandals. In Guatemala the making of sandals from tires is a specialty of Santa Cruz del

Quiche" Indian men, who also make heavy rubber bands from inner tubes. A sharp knife is used to cut out the sandals, which are outlined in pencil on the inside of the casing. Most of the cord is cut away, and the tread leveled down a bit with the knife. An ear-shaped extension on each side (larger on the outside of the foot) near the back of the sandal, in line with the ankles, serves to hold the tapered leather thong, which is a meter (about 39 in.) long and one-fourth of an inch wide. Four round holes (less than one-fourth in.) are made through the sandal, one through each ear, and two in line near the toe, about three-fourths of an inch apart; the same distance from the end and inside the great toe. The thong is passed through both holes, the big end, split and twisted, wedging in the front one, passing under the sandal and up through the rear hole. It is then passed through each ear, and tied in a bow over the instep. These sandals are very widely worn by the Indian men in the Highlands, where many prefer them to leather ones for comfort and wear. Six-ply truck tires, though heavy on the feet, are especially prized for long wear. In the warm Lowlands rubber sandals are worn less frequently, because of the greater heating and perspiring of the feet on rubber. On various occasions in Highland Guatemala markets, I have been asked by Quiche sandalmakers if I wanted to sell my spare tire.

e, Here the Rio Negro, flowing from west to east (right to left) is seen near the center of the picture, with light-colored salt *playa* left of center, and the rows of houses (about 25) for cooking salt just beyond. The village of Sacapulas (elevation about 1,200 m. or 3,937 ft.) is near the river (upper center) and leading from it, across a bridge, is the road (extreme right) to Cunén, Cotzal, and Nebaj. This is a steep ascent up the high north face of the valley. Except for the salt *playa*, the clearings seen in the valley are cornfields; there is some sugarcane in the wet river bottom at the extreme right. The vegetation along the lower slopes is mostly thorn bush and cactus, with wooded areas of pine and oak higher up (above about 1,400 m. or 4,593 ft.).

f, This is the last step in the making of Sacapulas cake salt, which appears in quantity in the local market and others in the vicinity; sometimes in distant ones. Men carry the heavy baskets of dirt, but women participate in other steps, such as pouring water from *tinajas* over the dirt to leach it, and pouring fluid salt into molds; for this industry, see page 60. The huipil worn here is white, scalloped at the bottom, and worn outside of the skirt, which is jaspe patterned, blue or variegated (mostly red). There may be red scallops embroidered on the collar. *Zutes* are large, with blue jaspe patterns, and fringed. A many-colored head band is wrapped around and bunched in front and at one side of the head.

h The Guatemala piece is of various colors, mostly black, red, green, and yellow, whereas the Italian textile is pale green on white. In both there may be seen conventionalized birds, the tree of life, and geometric

designs. Undoubtedly all such motifs came in with the Spaniards, and many of them may be traced to the eastern Mediterranean.

PLATE 43

- a, (For the various steps in this craft, see p. 57.) Stones are piled up, leaving only a shallow space at the top, where thick layers of soot are accumulated. Flames may be seen on the ends of sticks of pitch pine held by the man stooping at the right. The neighbor standing in the background is wearing trousers made of a flour sack having a prominent label across the front, not an uncommon sight where white cotton trousers are worn.
- b, The pitcher at the left is filled with soot, which is poured as needed into the large clay pot where the man is working. Finished *jicaras*, polished and incised and ready for the market, are seen in the basket at the lower left. The man is seated on a chair so small that it is not noted in the photograph (*b* and *c*).
- f, Several of the gourdlike fruits may be seen on the upper branches of the tree; also, at the extreme upper left, epiphytic bromeliads, commonly used to decorate churches and altars (p. 17, *b*).

PLATE 44

- a, In the background are large rolled-up rush mats from San Antonio Aguascalientes (*c*). Through the ruined arch is Agua volcano, the peak obscured by clouds. All the churches of Antigua were severely damaged by the earthquake (June 29, 1773), though local tradition holds that some were also blown up with gunpowder to break the power of the Church.
- b, This is a view to the southeast. Patches of pine woods, as in the foreground, cover only limited summits and steep-sided *barrancas*, since most of the level land is cleared for maize and wheat. The volcanoes in the background are Agua (left center), and Pacaya, faintly visible to the left of it; Acatanango and Fuego are at extreme right.
- c, The man's suit is of white cotton; his *capixal* (here called *codiarte*) is of dark-blue wool.
- d, Antigua Guatemala, which appears prominently in the picture, at the lower left, was the capital of Guatemala from 1543 until 1773, when it was destroyed by an earthquake (see *a*). (The present capital, built after the abandonment of Antigua, was also badly wrecked by an earthquake in December 1917.) In the distance at the left, beyond Antigua, may be seen Ciudad Vieja, formerly called Almolonga, capital of Guatemala from 1527 (after the move from Iximché) until 1541, when a September rainy period resulted in flooding which destroyed it (p. 19, *e*). The patch of white off to the right of Antigua is another village, probably Jocotenango or San Felipe. Several zones of vegetation are visible in the picture. The plateau in the vicinity of the villages is extensively wooded, with fine coffee groves interspersed with *mil pas* (cornfields); above that, slopes are cleared for corn as along the base of the volcanoes; pine and oak forests clothe much of the middle and

upper slopes of the volcanoes; the summits of the cones are bare lava and ash (especially Fuego) or are covered with heavy bunchgrass and scattered pines. Fuego has been the most consistently active volcano in Guatemala, as its name implies. The large, gaping crater is plainly visible from the northeast. In the distant background, to the left and beyond the volcanoes, may be seen the Coastal Plain merging with the Pacific on the horizon.

- e, This is a section of the Pan American Highway, January 30, 1936. The vegetation here, about 3 miles north of San Cristóbal, near Lake Gijijá, is characteristic of that of most of Southeastern Guatemala: dry thickets, where mimosas, acacias, and many types of thorny trees and cactuses are common. The seared aspect of the vegetation is pronounced during the dry season (November-May). Xerophytism reaches its extreme about 60 miles north of here, in the Motagua Valley around El Rancho and Zacapa, where organ cactuses and other desert forms are dominant. It is from the dry departments of southeastern Guatemala that cattle, competing successfully with field crops, are raised in abundance for markets in Southwestern Guatemala. Ascunción Mita, in this type of country, at 500 m. just 12 miles north of here, is the greatest source of dried chile for Southwestern Guatemala. Ox carts, rare in the Southwest, are among the most important means of transportation in Southeastern Guatemala and El Salvador.
- f, The selection of maize ears for seed is done throughout Southeastern Guatemala. Often the husks of ears are peeled back and tied together, and the exposed ears are hung up under the roofs of dwellings, especially along the pole plates and purlins. The smoke from the fire, escaping through the roof, coats the grains with soot and protects them somewhat from insects, especially weevils and moth larvae. Nets and baskets of food and perishables of many sorts are hung up and fumigated in this manner.

PLATE 45

See map 20 and pages 100, 122, 132.

- a, San Pedro is built upon a lava terrace, at the northern foot of San Pedro Volcano, just below the central point of the photograph. San Juan may be seen at the extreme western end of the Lake, beyond the fingerlike peninsula of San Pedro. In the distance, above it, at the top edge of the picture, is Zunil Volcano, with Santa Tomas in the extreme upper right. The straight horizontal line, half-way up between San Juan and the volcanic peaks, is the top of the western wall of the caldera, here largely volcanic breccias, with Cerro Cristalino rising above it (extreme left in b) to a point about 600 m. (2,000 ft.) higher than the Lake (map 20). Santa Clara is just to the right of this peak, the lower half of which is granite, the upper half andesite.
- b, San Pablo is built on the top of a low, gently sloping ridge, just below the central point of the photograph. The deep valley of the Rio Nahualate lies beyond the high, rugged mountains back of San Pablo. Steep

cliffs along the shore, skirted below by a narrow footpath, separate San Pablo and Saa Marcos (right foreground, between the two jutting headlands).

- c, The high ridge near the center of the picture, jutting out into the Lake, presents a barrier between the two settlements, and partly forms a small bay in front of each. San Marcos is divided into two sections, on high ground on each side of the valley. Tzununa is up on the slope to the left of the valley at the extreme right, as it is viewed from the Lake. All of these settlements are well above the adjacent valley bottoms, to avoid damage from flooding during the rainy season (p. 120).
- d, Cerro Chichimuch, whose summit is at the upper right edge of the photograph, is 1,100 m. (about 3,600 ft.) above the Lake surface, yet is only 1½ miles back from the shore. Jaibalito, a small group of houses in the arroyo mouth at the extreme right, now an *aldea* of Santa Cruz, was the former site of San Marcos, according to local records (p. 120).
- e, The village is situated on a low ridge, probably a fault block which slipped into the caldera (see also p. 27, a, b). Local history tells of a former location of Santa Cruz on the alluvial fan just to the right (east) of the present ridge site, and of the destruction of the valley settlement around 1830-40 (see p. 121). The church would indicate at least a nucleus of an old settlement on the ridge top. About a mile beyond the highest point above Santa Cruz is San Jose Chacaya, up on the plateau. Most of the trees around the settlement of Santa Cruz, Tzununa, and San Marcos are *jocotes* and citrus fruits.
- f, Two terraces are plainly in evidence in this picture. One is just at the lower edge of Solola, about 460 m. (1,509 ft.) above the Lake; the other is at about 900 m. (2,952 ft.) above the Lake level (see also pl. 46, a and b), a fault escarpment which is probably the northern rim of the caldera. For flooding by the Rio Quixcap, see page 61. The valley at the extreme right, with Jaibal Finca visible at its base, is planted to coffee groves, almost up to San Jorge (elev. 1,770 m. or 5,807 ft.) visible higher up and near the right margin of the picture. Coffee is also planted along the slopes to the left, below Solola.

PLATE 46

See map 20 and pages 122, 125-126, 132.

- a, The escarpment of the north wall of the caldera may be traced horizontally near the top of the picture. Panajachel is seen as a cluster of white buildings at the extreme right, in the coffee groves back from the Lake, on the delta just to the left of the rocky river course. From it the road (alternate route of the Pan American Highway) leads to Tzanjuyu at the base of the sharp ridge meeting the corner of the delta. Thence the winding course of the road may be traced up through the well-wooded gorge above San Buenaventura (alluvial fan in the center) and around the mountain to Solola, the white streets of which are visible at the upper left near the edge of the lower terrace. This distance by road is about 5 miles (8

Ion.); see maps 20, 21, and 23. The Quixcap delta, more frequently and more severely flooded than the other two, is almost bare of trees. The flood of 1881 wiped out the Finca Jaibal, then planted largely on the delta. The coffee groves are now only on the high ground, extending up almost to San Jorge (pi. 45, f). Coffee bushes, shaded mainly by gavilea trees (pi. 1D, b) cover much of the other deltas (center and right). There are many *jocote* trees also in Panajachel. Except for the wooded areas mentioned, the vegetation is mostly scrub on the steep shores of the Lake and open oak and pine higher up (above the lower terrace, elev. about 2,055 m. or 6,741 ft.). Bunchgrass and scattered pine and cypress dominate above the level of the upper terrace (about 2,455 m. or 8,054 ft.; see pi. 10, e). Thick layers of volcanic ash, tuffs, and breccias predominate in the geology of the north and east shores of the Lake. The commonest lava is pyroxene andesite, porphyritic, with phenocrysts of plagioclase and often considerable amounts of hornblende (samples from ½ mile southwest of Santa Cruz). Olivine pyroxene basaltic andesite like that of Santiago occurs near Solola.

- b, The valley of the Rio Panajachel (maps 20 and 23) may be seen curving to the left upstream from the delta, just beyond the end of the terrace at the right. This terrace, upon which the village of San Andres Semetabaj is situated (above and midway between the two promontories) is about 580 m. (1,902 ft.) higher than the Lake level at the right edge of the picture, and thus is 120 m. higher than the terrace below Solola. The upper terrace shown in the picture is about 900 m. (2,953 ft.) above the Lake, as is the terrace level above Solola. At the extreme lower right is the village of Santa Catarina Palop6. Note the trees, mostly *jocotes*, in the moister colluvial bottom below the open grassy and bushy slopes of the steep amphitheaterlike wall.
- c, Santa Catarina Palopo is immediately off the left edge of the picture, which is almost contiguous with b. The height of this eastern wall of the Lake basin is approximately the same as the upper terrace shown in a and b (900 m. or 2,953 ft. above the Lake; elevation about 2,455 m. or 8,054 ft.)
- d, Through the gap south of San Lucas (lowest point on the rim of the Lake Basin) appears one of the small piedmont domes (*penones*; map 5) at the base of Atitlan volcano. By the first peninsula to the right of San Lucas (map 20) the water moves slowly in under the lava flows to a subterranean outlet. Water gushes out in a large stream below San Lucas, and also feeds many other streams after passing through the lava at the bases of the volcanoes. Openings and closings of channels by volcanic and seismic disturbances have caused major fluctuations in the water level. There was probably once a surface outlet at this gap (see Appendix 1, p. 132). Extensive coffee groves may be seen along the slopes of Tollman volcano; the clearings are *milpas*. The road from Patulul to Godinez, following the eastern wall

of the Lake, is visible on the steep ridge to the left of San Lucas.

- e and f, Clearings for cornfields in e (right) and f extend high up the slopes of Toliman and Atitlan, to elevations above 3,000 m. (9,842 ft.). Irregular lava terraces and flow lines characterize this landscape, Cerro de Oro ("Gold Hill"), at left in / is so named because there was said to be an ancient Tzutuhil citadel on top, with gold and other treasures cached there. This small volcanic cone rises about 330 m. (1,100 ft.) above the Lake surface. The scattered settlements at its base (map 20) takes its name. The Pacific Coastal Lowlands appear in the distance (left background).

PLATE 47

The terraces and shore features in the left foreground are the result of lava flows from Toliman Volcano. The village of Santiago is compactly built on the largest lava peninsula (upper, or farthest south, on the left); see maps 20 and 25. The trees in the village are mostly *jocotes*, peaches, and oranges. The sloping plain (El Plan) at the upper left, beyond the village, is of fertile alluvial and colluvial material washed down from the slopes of Toliman and Atitlan Volcanoes. The wooded ridge beyond the Bay is a part of the old caldera rim. The contact between the rim and the volcanic alluvium of El Plan is sharply emphasized by the vegetation, the plain being cleared for maize, the ridge covered with trees, the main source of firewood for Santiago. All cleared areas in the picture are planted to maize (*milpa*). Intermediate tones of gray on the ridge indicate temporarily abandoned fields going back to bush. The trail from Santiago to San Lucas skirts the lava terrace in the left foreground; the trail leading into the Lowlands (Chicacao and fincas) crosses the plain in the left background. To the right of Santiago Bay are the lower slopes of San Pedro volcano. At the northernmost point (nearest the camera) on this west shore is Chuitinamit, a dome that rises 150 m. (about 500 ft.) above the Lake. In pre-Spanish times the royal residence of the Tzutuhils is said to have been on top of this hill, with the plcbian population living across the bay. Local tradition holds that in ancient times people walked across, with the aid of a short bridge of logs. Soundings that I made in 1936 to check this, however, discounted it, for a channel between Chuitinamit and the submerged island of Teachuc had a minimum depth of 165 feet. Though the pre-Conquest level was probably 30 feet lower (Appendix 1) than in 1936, there still would have been a 400-meter strait to cross. The island in the center foreground is Tzanjayam or Isla del Gato. Faintly visible through the water beyond it is the small submerged island of Teachuc; the top branches of willow trees growing on it were almost touched by the bottom of the transport launch passing over it in 1936. Tzanjayam and Teachuc were said to have been stepping stones for the crossing of the strait in earlier

days when the water was lower. This may have been true, but probably crossings were by boat rather than by bridge. Teachuc reappeared as an island, and Tzanjayam became a peninsula when the Lake level reached its low of about 5,062 feet (reportedly 1920) and they remained so until 1932. Though the water began to rise in 1930, it was a slow increase until 1933; Lothrop's 1932 map (Lothrop, 1933, p. 17) shows Teachuc. About 1921, according to former officials of Santiago, an Atiteco started to plant corn on the newly emerged island. When he was questioned by the authorities, who considered this as communal land, he reportedly produced a title to the island, dated 1824, and was permitted to plant on it. (The 1866 map of Dollfus and Mont-Serrat shows high water again, 5,100 ft., by that time.) Local tradition also holds that the island was larger at the time of the Conquest, having then an area of 200 *cuerdas* (40 acres). Lothrop's discovery (op. cit., p. 4) of ruins 3 feet below the low water of 1932 indicates a receded Lake level in pre-Conquest time. The level at which the Lake surface has stood during most of historic time, according to many types of evidence, is 5,100 feet. Judging from shore features, maps proving it are as follows: in 1685 (?), Fuentes y Guzman, 1932-33, vol. 2, op. p. 60; in 1812, unpublished map made in San Pedro (dated January 18, 1812, now in Santiago archives); in 1866, Dollfus and Mont-Serrat, 1868, pi. 16, fig. 2; in 1891, Intercontinental Railway Commission Survey, triangulation figure, Report of 1898, p. 81, and unpublished map of Lake Atitlan. Photographs showing the 5,100 feet level are as follows: Brigham, 1887, op. p. 156; in 1904, Termer, 1936, pi. 29, fig. 1. Reports of the old residents all around the Lake, the growth of large trees (avocadoes especially) only above 5,100 ft., and the reentrenchment of streams below this level, all lend supporting evidence. Medel about 1550 described Santiago as an important village with some 3,000 Indians, and mentioned subterranean outlets from the

Lake, refusing to believe Indian tradition that it was bottomless and without any outlet. (Medel. Ms. 1550-60?, p. 65, f. 152)., Ponce in 1586 told of a great river near Patulul which sprang from the mountain, draining the Lake from the southeast shore (Ponce 1873, p. 444). Fray Diego de Ocafia, a Dominican priest, was probably the first to write (1662) regarding the origin of the Lake depression. He described it as a calderalike crater, resulting from the collapse of a giant volcano, and attributed Lake drainage to subterranean outlets which controlled the level; he wrote that Atitlan volcano was also called "Patulul" at that time (Vazquez, 1937-38, pp. 168-169). (It was also known as "Suchitepequez"; erupted in 1469, and a number of other times to 1856; McBryde, 1933, p. 67 and fn. 4.) Dollfus and Mont-Serrat (1866) explained the Lake entirely through blocked drainage by volcanoes, as in the case of Lake Amatitlan, and cautioned against the crater notion. They were probably the first to advance this idea (op. cit., p. 238). The United States Army engineers who made the Railway Survey in 1891-92, considered both hypotheses, leaning slightly to the crater idea (Intercontinental Railway Commission Survey, Report of 1898, p. 82). Tempest Anderson, an English volcanologist, in 1908 reiterated independently the conclusions of the Americans (Anderson, 1908, p. 482). The German volcanologist, Karl Sapper, wrote in 1913 that the Lake, like Amatitlan, was due essentially to blocked drainage. Atwood in 1932 concluded that the basin was a caldera (Atwood, 1933, p. 664); while Termer in 1936 found "no geologic evidence of an old crater formation," and though the rivers Quixcap and Panajachel must have formerly joined the coastal streams southwest of the Lake before being blocked by the volcanoes (Termer, 1936, pp. 251-252). One of the most convincing arguments against a previous drainage through Santiago Bay is seen in the older ridge which stands between the Bay and the Coastal Lowlands (background in pi. 47).

INDEX OF PLACE NAMES AND GEOGRAPHICAL REGIONS

- Acatenango, volcano, vm, 6,177. (PI. 44, b, d.)
 Agua, volcano, 161, 168, 177. (PI. 1, e; 44, a, b.)
 Aguacatan, v, 30-32, 64, 73, 76, 84, 127, 175.
 Agua Escondida, 125.
 Ahachcl, 103.
 Almolonga, 27, 30-32, 77, 98, 126, 127, 146, 149.
 Almolonga (Ciudad Vieja), 177.
 Aiotenango, 101.
 Alta Vera Paz, 42, 45, 96.
 Amatitlan, 9, 33,120, 140, 142,147, 180.
 Amatitlan Lake, 131, 180.
 Amazonia, 148.
 Antigua, v, VIII, 15, 54, 66, 68, 85, 87, 140, 142, 161, 177. (PI. 44, a, c, d.)
 Antilles, 139, 140.
 Argueta, Totonicapan, v, vi, vn, 27, 28, 57, 68, 69, 74, 76, 97, 100, 104-112, 115, 116, 119, 165, 166, 168. (Pis. 13, b; 14, a; 21, c; 42, b.)
 Asuncion Mita, 84, 85, 128, 173,178.
 Atitlan Lake, v, vi, VIII, 3, 4, 12, 16, 21, 24-26, 29-32, 35, 39, 41, 43-45, 48, 49, 62, 68-70, 73-80, 83, 84, 86-89, 91, 93, 95, 97-104, 112, 120-124, 126, 127, 129-133, 135-142, 144, 146-148, 151, 161, 163-171, 174, 178-180. (Map 20; pis. 2, e; 6; 7; 8; 9; 10, a, c; 12, d; 13, a; 24, 25, b-d, f; 27, ar-e; 45; 46; 47.)
 Atitlan, municipio and village, see Santiago Atitlan.
 Atitlan, volcano, v, VIII, 6, 27, 97, 132, 165, 166, 168, 169, 179, 180. (Pis. 5, b; 10, a; 12, d; 22, r; 23, b; 24, c; 26, a; 46, e;47.)
 Baja Vera Paz, 37, 45, 78.
 Barillas, 75.
 Belize, 85.
 Boca costa, see Piedmont.
 Bolivia, 134.
 Brazil, 138, 139.
 British Honduras, 43, 65, 137, 138, 145.
 Buena Vista, 8.
 Cahallo Blanco, 145.
 Cabrican, 73, 74, 98, 127.
 Cajabon, 24.
 Cajola, 20, 27, 63, 71, 74, 78, 89, 98, 127, 174.
 Campeche, 44.
 Cantel, vn, 20, 32, 38, 52, 62, 66, 77, 78, 89, 98, 113, 127, 172, 174-176. (PI. 32, e.)
 Capotitlan, 48, 51, 59, 86, 92, 102, 143.
 Orro de Oro, v, VIII, 53, 68, 90, 91, 98-102, 104, 112, 121, 124, 164. (Pis. 6; 7, r.)
 Cerro de Oro, volcanic cone, 169, 179. (Pis. 24, a; 46, /.)
 Cerro Quemado, volcano, vn, 3, 6, 162, 173-176. (Pis. 3, f; 35, d; 41, d.)
 Chajul, 39, 78.
 Chalhchitan, 172.
 Champerico, 13, 58, 73, 80, 92.
 Chiantla, 64, 65, 73, 76, 78,127, 141, 172.
 Chupapas, 2, 7, 51, 62, 72, 79, 84, 96, 97, 134-136, 141, 143, 144, 146-148, 174.
 Chicacao, v, vi, vn, 2, 12, 23, 25, 35, 37, 41, 48, 67, 73, 78, 84, 87-94, 98, 99, 120, 121, 133, 146, 147, 162, 179. (Pis. 4, c,e;27,f;41,f.)
 Chichi, vi, 15, 37-39, 50, 67, 75, 77-79,83, 89,166. (PI. 29, c.)
 Chichicastenango, v, vi, VIII, 3, 29, 39, 43, 49, 50, 52, 53, 56-58, 62-65, 67-71, 73-81, 83, 84, 87-90, 93, 96-99, 102, 104-119, 122, 123, 125, 148, 149, 153, 163, 165-167, 171. (Map 25; pis. 6; 7, b, c; 14, b, d,e,g,l 17, e; 28; 29, a, b.)
 Chile, 139.
 Chimaltenango, 15, 33, 88, 91.
 Chinaca, 73.
 Chinautla, vi, vn, 51, 54, 80, 109, 111, 115, 166, 176. (Pis. 21, c;42, &c.)
 Chinique, 37, 39, 74, 78.
 Chiquilajd, 20, 28, 95.
 Chiquimula, 11, 34, 45, 72, 78.
 Chiquimulilla, 15.
 Chocola, 35, 39, 78,90.
 Ciudad Vieja, 142, 168, 177. (PI. 44, d.)
 Coastal Plain (La Costa), 2-6, 10, 16, 22, 23, 25, 30, 33, 37, 39, 43, 45, 51, 58, 59, 127, 128, 131-133, 138, 148, 150, 178.
 Coatepeque, 2, 15, 73, 75, 78, 83, 98.
 Coatunco, 41.
 Coban, vn, 24, 34, 44, 51, 52, 65, 69, 102, 127, 142, 173, 176. (PI. 34, c.)
 Cocales, 92.
 Colomba, 32, 75, 77, 78.
 Colombia, 66, 134, 137.
 Colotenango, 69.
 Comalapa, 16, 29, 101, 165.
 Comitán, 79.
 Comitancillo, 64, 69, 141, 176. (PI. 41, e, g.)
 Concepcion, v, 30, 49, 76, 89, 98, 104, 113, 117, 118, 121, 122, 166.
 Concepcion Chiquirichapa, vn, 27, 75, 76, 78, 89, 98, 126, 140. (PI. 42, g.)
 Continental Divide, 4, 6, 128, 131, 133.
 Copan, 142.
 Cordillera, 6.
 Costa Cuca, 5.
 Costa de Guazacapdn, 5, 38, 59.
 Costa Grande, 5.
 Costa Rica, 43, 136-138, 144-146, 148.
 Cotzal, 39, 78, 177.
 Cubulco, 37, 79.
 Cuchumatanes Mountains and villages, vi, vn, 7, 20, 32, 39, 43, 48-51, 54, 55, 58, 62, 64, 65, 67, 72-75, 78, 81, 83, 84, 87, 93, 126, 128, 129, 131, 135, 140, 152, 172, 174, 175. (Pis. 30, a; 37.)
 Cuilco, 71, 151.
 Cuilco River, 7, 131.
 Cunen, 101,177.
 Cutz&n River, 94.
 Cuyotenango, 32, 38, 41, 58, 76, 78.
 El Baul, 14.
 El Rancho, 178.
 El Rodeo, San Marcos, 162. (PI. 5, c)

- El Rosario Tumbador, 8.
 Escuintla, 32,39, 73,88,120,139,143,151.
 Esquipulas, 85.
- Filadelfia, 93.
 Flores, 14.
 Fuego, volcano, VIII, 6, 177, 178. (PL 44, b, d.)
- Godines, vi, 97,179. (PL 23, c.)
 Golfo Dulce, 34.
 Guatemala City, v, vn, 15, 32, 53, 54, 64, 67-69, 71, 74-76, 79, 80, 82, 85, 92, 138-140,148,161,166,168,171,175,176. (PL 42, c.)
 Guatemala Dept., 37.
 Guazacapan, 143.
 Gtija Lake, 178. (PL 44, e.)
- Helvetia, v, 8. (P1.5,<0
 Highlands, v, vn, VIII, 2, 5-7, 10, 11, 14-17, 19-26, 28-30, 32, 33, 35, 37, 38, 41-46, 48, 51, 52, 54, 57, 58, 64, 67, 70, 73, 74-85, 87-95, 97, 98, 101, 120-122, 127-129, 131-135, 137, 139,142,144-149,153,155,161-164,170-172,175-177. (Pis. 6-42 c 44-47.)
 Honduras, 15, 46, 67, 81, 85, 96, 135,138, 140, 141, 143.
 Huehuetenango, vi, vn, 3, 15, 20, 32, 38, 39, 52, 54, 63-65, 72, 75-79, 81-83, 97, 126, 131, 164. (Pis. 31, c, d; 41, b.)
 Huehuetenango Dept., 52, 55, 61, 66, 79, 134-136, 141, 143, 147. (PL 31.)
 Huitan, 52,74, 89, 98.
- Ileal, 73.
 Ilopango Lake (El Salvador), v, 94. (PL 4, a.)
 Iximche, 177.
 Ixtapa, 15.
- Jacaltenango, 39, 78,135.
 Jaibal, vi, VIII, 30, 101, 120, 167, 178, 179. (Pis. 18, a, b; 19, bl 45, /; 46, a.)
 Jaibalito, vm, 89,121,123,178. (Pi. 45, d.)
 Jalapa Dept., 37, 72,78.
 Jalpatagua, 143.
 Jamaica, 162. (PL 5, /.)
 Jatate River, 141.
 Jocotenango, 177.
 Jutiapa Dept., 37, 78,134.
- La Abundancia, 93.
 La Democracia, 75.
 Las Mercedes, 8.
 La Union (San Marcos), 15, 52, 57, 61, 63, 67, 73, 75, 81,126, 127, 135.
 Livingston, 14.
 Los Altos, 6,131,166.
 Los Encuentros, 28, 30.
 Los Esclavos, 14.
 Lowlands, v, vr, 2, 4-6, 11, 13-16, 19, 22-25, 28, 30, 32-39, 41, 46-48, 50, 51, 56, 57, 61, 66, 68, 70, 72-86, 88-99, 101, 103, 104, 107, 112, 117, 120-122, 125-129, 131-135, 137, 138, 140, 143-155, 161, 162, 166, 169-171, 176, 177, 179, 180. (Pis. 1-5.)
- Madre Vieja River, 124.
 Malacatancito, 61, 72.
 Mazatenango, v, vr, vn, 2, 16, 30, 32, 37-39, 45, 66, 73, 75 % 78, 80, 82-84, 92, 93, 110, 126, 133, 137, 143, 145-149, 162, 172,176. (Pis. 3, a, f; 5, e; 41, 0.)
 Mexico, 2, 9, 58, 59, 66, 72, 79, 85, 97, 129, 134-143, 145,146 148,151, 155.
 Mixco, 56.
 Moca, v, 5, 35,80,90. (PL 5, b.)
 Momostenango, vx, vn, 3, 4, 13, 15, 16, 20, 26, 27, 48, 61-65 73-75, 77, 81, 85-88, 90, 98, 118, 127,132, 142, 149,151,154 162, 163, 166, 171, 172. (Pis. 30, b, f; 33; 34; 35, a.)
 Motagua Valley, 7,178.
- Nahuala, v, 57, 61, 65, 69, 73, 74, 82, 89, 93, 98,104, 106,112 115, 120, 146-148, 162-165. (Pis. 6; 8, a; 14, g.)
 Nahualate, 24, 94.
 Nahualate River, 178. (PI. 45, b.)
 Nebaj, 177.
 Negro River, 7, 32,127, 131,177.
 Nenton, 68.
 Nicaragua, 33, 37, 57, 62, 66,135,144,146.
 Nicoya, Gulf of, 62,146.
 Nuevo San Carlos, 72.
- Oaxaca, 38, 142,147.
 Olintepeque, vn, 39, 52, 53, 63, 68, 74, 78, 80, 98, 127, 174 (PL 38, a.)
- Pacaya, volcano, 161,177. (Pis. 1, e; 44, b.)
 Pacayal, 22, 35.
 Palencia, 78.
 Palin, 51, 149.
 Palmar, 36, 67, 78, 90,145, 146,149.
 Panajachel, v, vx, vxn, 8, 12, 15-17, 20, 21, 26, 29-31, 36, 45 49, 50, 73, 74, 77, 79, 84, 87-91, 94, 97-99, 102-106, 108-111 120-127, 141, 146, 148, 150, 163, 165, 168-170, 176, 179 (Map 23; pis. 6; 7, d, e; 9, a, bl 12, a; 18-21; 24, d-f 46, a, &.)
 Panajachel River, vi, vm, 31, 122, 132, 167, 179, 180. (Pis 18 o, c; 19, a; 46, a, b.)
 Panama, 85,134,137.
 Panebar, 90, 98.
 Panimache, 73, 74, 123,168. (PL 21, a.)
 Patanatio, 68, 90, 91, 123. (PI. 14, e.)
 Patulul, 2, 67, 68, 80, 92, 93,124,125,179,180.
 Patzicia, 15, 53, 75, 90,91,102, 164.
 Patzite, 15, 79, 89.
 Patzum, 3, 16, 49, 51, 58, 73, 75, 78, 87, 99, 124-126, 136, 148 163, 168.
 Paxixil, 60, 73.
 Pecul, 90.
 Peru, 94,134,137,139,161.
 Pet6n, 14, 65,66, 88, 96.
 Pi6deVolcan,vn,20,43,45,74. (PL38,<r,rf.)
 Piedmont (La Boca Costa), v, 2, 5, 10, 14, 15, 23, 29, 31, 33 35-37, 39, 43, 45, 52, 67, 70, 73, 75, 77, 79, 80, 82,86, 90,92 93, 95, 98, 104,126, 128,129, 133, 136-139,141,144,148-150 166. (Pis. 2,3,4,5.)
 Pochuta, 80.

Palopé, 88, 103.

(See also San Antonio Palopé and Santa Catarina Palopé.)

Pueblo Nuevo, v, 3, 32, 33, 36, 38, 40, 71, 90, 95, 140, 149, 172. (Pla. 3, e; 31, a.)

Puerto Barrios, v, 14.

Quezaltenango, vii, viii, 4, 6, 8, 10, 13, 15, 16, 20, 26, 29, 31, 36, 39, 41, 44, 46, 50-53, 56, 57, 61, 62, 66-70, 72-82, 85, 87, 88, 95-98, 101, 104, 105, 113-116, 118-120, 125-128, 131, 135, 136, 140, 145-147, 149, 161-164, 166, 172-176. (Pla. 32, e, 36, b; 39, f.)

Quezaltenango Dept., 88, 90, 98.

Quezaltenango-Totonicapán Valley (see also upper Samalá Valley), 3, 4, 16, 19, 62, 71, 74-77, 82, 83, 97, 102, 120-128, 133, 140, 142, 143, 163. (Map 24.)

Quiché Dept., 39, 88, 93, 98.

Quiché (Santa Cruz del Quiché), v, 37, 39, 67, 73, 75, 78, 113, 122, 127, 132, 163, 171, 177. (Pla. 13, e, 30, e; 42, a.)

Quiché River, v, viii, 30, 100, 102, 121, 122, 132, 166, 178-180. (Pla. 10, e, g; 43, f, 46, a.)

Rabinal, viii, 37, 56, 57, 64, 70, 79, 81, 148, 150, 154. (Pl. 43, a-e.)

Retalhuleu, 2, 16, 28, 32, 36, 73, 75, 76, 78, 80, 82, 88, 98, 104, 133, 140, 151, 162.

Retana Lake, 134.

Sacapulas, vi, vii, 48, 58, 59, 60, 71, 73, 74, 104, 113, 115, 131, 150, 171, 177. (Pla. 30, e; 42, e, f.)

Sacatepequez Dept., 88.

Salamá, 37, 79, 131.

Salamá, vii, 16, 27, 32, 62, 63, 74, 81, 82, 98, 126, 127, 164, 165, 175. (Pla. 39, a; 40, a, d, e.)

Salvador, El, v, viii, 5, 9, 11, 13, 15, 32, 34, 37, 38, 41-43, 57, 62, 63, 66, 67, 72, 81, 87, 94, 127, 135, 138-143, 146-149. (Pl. 44, e.)

Samalá River, vii, 3, 4, 31, 66, 126, 133, 173, 174, 176. (Pla. 35, d; 38; 39, d; 40; 41, d.)

San Andrés, 43, 45, 70, 161, 162.

San Andrés Sajcabajá, 68, 70, 93, 101. (Pl. 17, a.)

San Andrés Semetabajá, v, vi, viii, 17, 20, 21, 22, 25, 28, 49, 75, 76, 98, 104-106, 108, 118, 119, 121, 125, 127, 165, 179. (Pla. 6; 7, b; 19, e; 46, b.)

San Andrés Xecul, v, vii, 20, 52, 55, 66, 70, 74, 86, 89, 95, 102, 126. (Frontispiece; pla. 32, d; 38, e, f; 39, a; 40, b.)

San Antonio Aguacatalmota, viii, 51, 66, 177. (Pl. 44, c.)

San Antonio Huixtla, v, 134-136, 153. (Pl. 5, a.)

San Antonio Palopé, v, vi, viii, 25, 26, 28, 41, 69, 80, 68, 75, 76, 87-89, 96, 102-105, 110, 124, 125, 132, 138, 163-166, 169, 171. (Pla. 6; 7, e; 9, c; 13, c; 14, d; 23; 27, a; 46, c.)

San Antonio Suchitepequez, 35, 37, 41, 58, 87, 92, 108, 146, 147.

Atzacuba, 78.

San Bartolomé Aguacatalmota, 92, 101.

San Bartolomé Aguacatalmota, 19, 46, 56, 98, 139, 172.

San Bernardino Suchitepequez, v, 23, 34, 38, 45, 51, 58, 70, 92, 149, 164. (Pl. 3, d.)

San Buenaventura, viii, 166, 178. (Pla. 18, a; 46, a.)

San Carlos Silá, 71, 73, 98.

San Cristóbal, Alta Verapaz, 27, 42, 49.

San Cristóbal, Justapa, 44 (Pl. 44, e.)

San Cristóbal Totonicapán, vii, 20, 27, 29, 32, 40-46, 52, 54-57, 62, 63, 64, 68, 70, 73, 74, 76, 77, 80, 81, 87, 88, 92, 96, 120-126, 140, 167, 171, 173, 175, 176, 178. (Pla. 17, f; 20, a; 32, d; 41, a, c.)

San Felipe, v, 32, 38, 75, 77, 78, 80, 126, 139, 149, 162, 177.

San Francisco el Alto, v, vii, 3, 20, 22, 27, 28, 32, 38, 39, 52, 54-57, 61, 63-65, 67, 69, 73-83, 86, 89, 92, 98, 104, 106, 127, 129, 138, 166, 172-176. (Frontispiece, pl. 13, c; 35, b-d; 36.)

San Francisco la Unión, 38, 79, 79, 98, 166. (Pl. 13, c.)

San Francisco Zapotitlán, 38, 90, 146.

San Gabriel, 40.

San Jerónimo Itzaboncha, 75.

San Imbel, 134.

San Jorge, v, vi, viii, 37, 68, 104, 110, 112, 114-116, 118, 122, 167, 178, 179. (Pla. 12, d; 16; 45, f; 46, a.)

San José Chocoyá, vi, 30, 60, 58, 71, 74, 88, 89, 98, 102, 104, 116, 122, 163, 178. (Pl. 17, a.)

San José Puerto, v, 2, 16, 23, 73, 173. (Pl. 1, e.)

San Juan Atitlán, vi, vii, 49, 51, 172. (Pla. 31, b; 52, c.)

San Juan Bautista, 93.

San Juan Comalapa, v (Pl. 8, e.)

San Juan Incey, vii, 75. (Pl. 39, g.)

San Juan la Laguna, vi, 28, 69, 76, 78, 81, 90, 93, 98, 99, 101-104, 142, 147, 164, 178. (Pl. 45, a.)

San Juan Oroscoy, vii, 3, 4, 20, 22, 27, 28, 32, 38, 49, 71, 74, 75, 77-81, 84, 89, 95, 98, 126, 127, 140, 149, 174, 176. (Pl. 41, e.)

San Juan Zacualpa, 98.

San Lucas Tolimán, vi, viii, 16, 26, 41, 42, 44, 46, 80, 83, 90-92, 95, 98-101, 103, 120, 125, 131, 132, 162, 169, 179. (Pla. 23, b; 46, d, e.)

San Luis Jilotepeque, 72, 134.

San Marcos, see La Unión (San Marcos).

San Marcos Dept., 67, 72, 162, 167, 176.

San Marcos (la Laguna), viii, 3, 13, 26, 49, 93, 98, 102, 104, 120, 121, 141, 142, 169, 171. (Pl. 45, b-e.)

San Martín Jilotepeque, 78.

San Martín Sacatepequez ("Chile Verde"), vii, 27, 44, 50, 52, 76, 89, 98, 127, 174, 176. (Pla. 39, b, e; 41, e.)

San Mateo, 20, 90, 98.

San Mateo Itzaboncha, 58, 75.

San Miguel Arcángel, 83.

San Miguel Itzaboncha, 36, 80, 175, 176. (Pl. 41, d, e, g.)

San Miguel Panabá, 67.

San Miguel Sigüelá, 71, 89, 98, 101.

San Miguel Uspantán, 67.

San Pablo (la Laguna), viii, 13, 26, 49, 50, 69, 84, 87, 92, 93, 98, 102-104, 120, 121, 142, 162-164, 168, 178. (Pla. 21, d; 45, b, c.)

San Pablo Jocopilas, v, vi, 23, 45, 80, 90, 149. (Pl. 3, b.)

San Pedro Ayampac, 76.

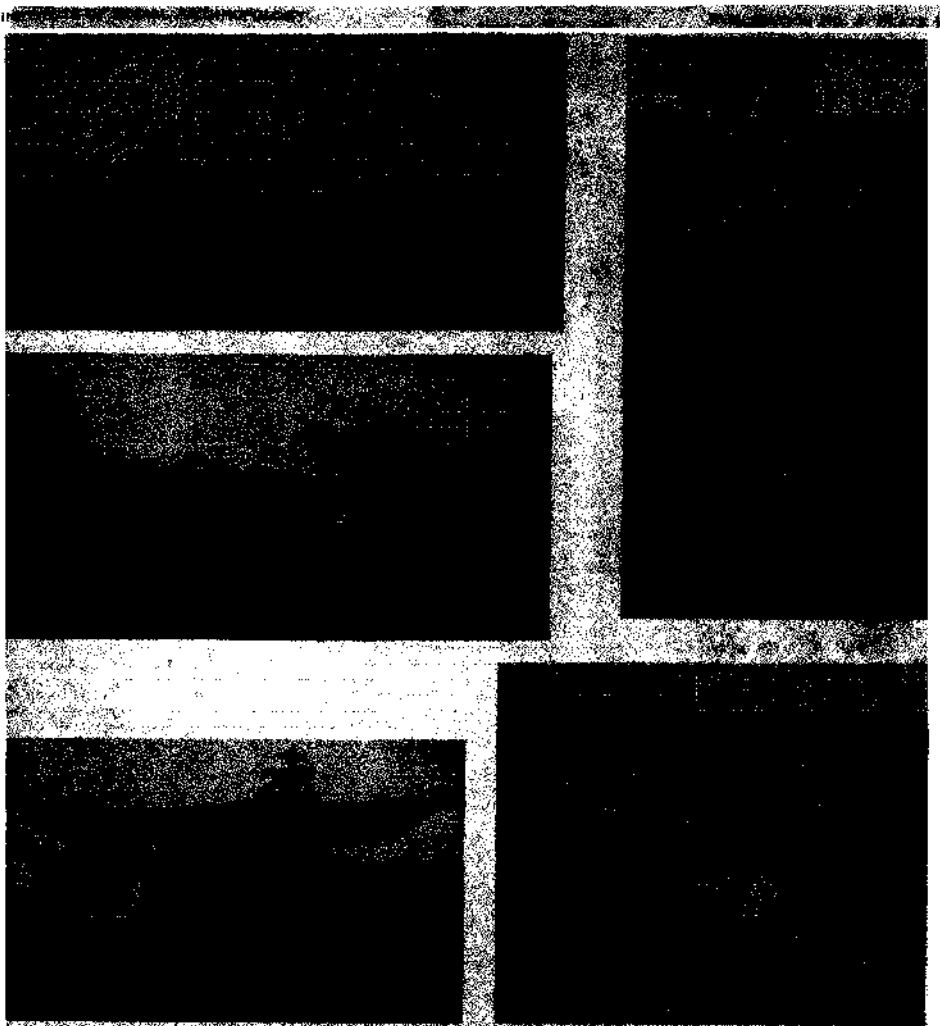
San Pedro Carcolá, 26, 65, 173. (Pl. 34, c.)

San Pedro Carcolá, v, 22, 23, 24, 42, 46, 48, 62, 70, 92, 94, 95, 101-104, 120, 127, 148. (Pla. 2, f; 4, b.)

San Pedro Jocopilas, vi, vii, 34, 54, 80, 169. (Pla. 29, c; 38, c; 42, a.)

San Pedro la Laguna, v, viii, 28, 29, 36, 38, 42, 44, 46, 48-50, 61, 62, 69, 70, 73, 76, 88, 89, 94, 92, 94, 95, 97-99, 101-106, 115, 128, 129, 140-143, 147, 163, 164, 168, 169, 178, 180. (Pla. 6; 7, d; 9, d; 21, c; 24, a, c; 26; 44, f; 45, a.)

- San Pedro Necta, 75.
 San Pedro Pmula.vra, 171. (PL 43,f.)
 San Pedro Sacatepequez (Dept. San Marcos), 16, 53, 57, 61, 167. (PL 19, 6.)
 San Pedro Soloma, vx. (PL 30, a.)
 San Pedro, volcano, vx, 100, 102, 161, 165, 166, 168-170, 178, 179. (Pis. 2, e; 10, e; 13, a; 24, o; 26, a; 45, a; 47.)
 San Pedro Yepocapa, 75.
 San Raimundo, 76.
 San Salvador, 68, 143. (PL 42, d.)
 San Sebastian Coatín, vn, 65, 81, 83, (PL 37.)
 San Sebastian Huehuetenango, 62, 84.
 San Sebastian Lemoa, 58, 67.
 San Sebastian Retalhuleu, v, vn, 8, 15, 43-46, 51, 52, 67, 98, 145, 149, 154, 161. (Pi 2, b-d.)
 Santa Adela, v. (PL 5, e.)
 Santa Ana Huista, 134.
 Santa Apolonia, 47, 73.
 Santa Barbara, 64, 67, 90, 91, 92, 93, 94.
 Santa Catarina Ixtahuacan, 9, 14, 16, 37, 49, 50, 56, 64, 72, 77, 78, 88, 89, 98, 99, 137, 146, 148, 155.
 Saata Catarina Laguna, 103.
 Santa Catarina Palopo, v, vi, vni, 15, 21, 25, 27, 46-50, 68, 74, 84, 90, 97, 98, 102-104, 112, 120, 122-124, 135, 136, 142, 147, 148, 162, 164, 169, 179. (Pis. 6; 7, f, g; 22; 46, b.)
 Santa Clara la Laguna, 56, 93, 98, 102, 104, 169, 178. (PL 44, a.)
 Santa Cecilia, 8.
 Santa Cruz del Quiche\ see Quichee
 Santa Cruz la Laguna, vx, vm, 9, 13, 20, 24, 26, 30, 46, 48, 49, 50, 68, 88, 89, 98, 102-104, 109, 110, 112, 114, 116-121, 142, 147, 162, 163, 167, 171, 178, 179. (Pis. 17,,/; 27; 45, d, e.)
 Santa Elena, 94.
 Santa Eulalia, vx, vn. (Pis. 20, a; 37, c.)
 Santa Lucia Colzumalguapa, 41, 75.
 Santa Lucia Utatlan, 49, 53, 57, 70, 78, 90, 93, 94, 98, 102, 104, 105, 108, 110, 112, 114-117, 119, 120, 123, 167. (PL 14, /.)
 Santa Maria, vn, 61, 98, 126. (PL 39, d, e.)
 Santa Maria Chiquimula, 54, 55, 57, 71, 73, 74, 77, 80, 89, 93, 98, 104, 126, 127, 151.
 Santa Maria Visitación, 98.
 Santa Maria, volcano, 3, 6, 14, 27, 36, 74, 98, 162, 173, 174-176. (Pis. 3, f; 35, d; 38, c, d; 41, d.)
 Santa Rosa, 37, 78.
 Santiago Atitlan, v, vi, VII 13, 16, 17, 19-21, 25, 26, 29, 39, 43, 46, 48-50, 52, 62, 68, 73, 75, 78, 80, 82, 83, 85-104, 112, 120, 121, 124, 125, 130, 131, 136, 142, 146, 147, 162-164, 166, 167, 169, 170, 179, 180. (Pis. 6; 7, /~n; 23, d; 24, <~c; 25; 42, b) 47.)
 Santiago Bay, vm, 170, 180. (PL 47.)
 Santiago Petatan, 134.
 Santiago Sacatepequez, 53.
 Santiago Zambo, 14.
 Santiaguito, volcano, 6, 162, (PL 3, /.)
 Santo Domingo Suchitepequez, v, 2, 24, 29, 30, 34, 37, 42, 45, 46, 51, 84, 134, 136-139, 143, 145, 147, 149, 162. (PL 3, c.)
 Santo Tomas, Chichicastenango, see Chichicastenango.
 Santo Tomas la Union, v, 2, 16, 23, 37, 39, 45, 48, 78, 79 & 90, 95, 146, 147, 162. (PL 4, d.)
 Santo Tomas Perdido, 90.
 Santo Tomas, volcano, 3, 162, 17a (Pis. 3, f; 45, a.)
 Senahu, 24.
 Sibilia, 71, 98.
 Sigiilla, 44, 78.
 Sipacate, 73.
 Soconusco, 5, 10, 11, 14, 33, 34, 97, 143.
 Solola, v, vi, vni, 3, 13, 15, 16, 19, 20, 22, 25, 29-32, 37, 39, 41, 44, 45, 48-51, 53, 63, 66, 68-71, 73-81, 83-87, 89-91, 93, 94, 96-122, 124-126, 128, 138, 147-149, 163-170, 176, 178 (Maps 21, 22; pis. 6; 7, a, b, c) 10-17; 21, a; 22, e; 45,f 46, a.)
 Solola Dept., 88, 98.
 Soloma, 39, 73, 78.
 Sonsonate, 11, 14, 34.
 Suchitepequez, 14, 33, 41, 78, 88, 90, 91, 93, 98, 143, 180.
 Tactic, 27.
 Tahuesco, v, vi, 2, 4, 13, 14, 22, 41, 58, 73, 110, 133, 161. (PL 1, a-d; 2, a.)
 Tajumulco, 61, 72, 131, 162.
 Tapachula, Chiapas, 79, 134.
 Tecpan, v, vm, 3, 49, 53, 64, 71, 73, 75, 78, 83, 87, 91, 99, 120, 125, 126, 136, 165-167, 169. (Pis. 6; 8, d; 14, e; 44, b)
 Tecpanatitlan (Solola), 86, 92.
 Tejutla, 65.
 Todos Santos Cuchumatán, 15, 20, 50, 51, 75, 76, 140, 143, 172 (PL 31, a, /, fir.)
 Toliman, volcano, vm, 6, 27, 92, 97, 165, 166, 168-170, 175 (Pis. 10, o; 12, d; 22, c; 23, b; 24, a, c; 26, a; 46, d, e, f 47.)
 Torlon, 73.
 Totonicapdn, v, vx, vn, 3, 4, 9, 15, 16, 19, 25-29, 46-48, 50-57, 61, 62, 68-70, 73, 74, 76-81, 85, 86, 88, 90, 93, 97, 98, 101, 102, 104-106, 109, 111-119, 123, 126, 127, 138, 140, 145, 161-166, 175, 176. (Pis. 13, b, c; 14, a, c, d; 32, a, b 40, c; 41, c, d, f, g.)
 Totonicanpan Dept, 98.
 Tulate River, 2.
 Tzanjuyu, vx, 122, 123, 167, 168, 178. (Pis. 18; 46, a.)
 Tzununa, vi, vm, 13, 24, 30, 77, 89, 103, 104, 121, 137, 138, 148, 162, 168, 171, 178. (Pis. 27, d, e; 45, c, d, e.)
 Veracruz, 71, 150, 148.
 Vera Paz, 24, 66, 72, 123.
 Xelaju (Quezaltenango), 10, 126.
 Xep4c, 90, 91, 98, 123.
 Yucatan, 2, 42, 44, 47, AS, 59, 135, 137, 138, 140, 142, 144, 154
 Zacapa, 44, 45, 147, 178.
 Zacaupla, vi. (PL 19, d.)
 Zambo, 14, 43, 120.
 Zapotitlan, 10, 11, 34, 91, 93, 143, 146.
 (See also Qapotitlan.)
 Zaragoza, 16, 46.
 Zunil, 52, 55, 90, 98, 126, 127, 146, 149.
 Zunil, volcano, 3, 4, 31, 44, 162, 178. (Pis. 3, f; 45, a.)
 Zunilito, 90.



PACIFIC LITTORAL.

a, Dugout canoes at Tahuesco. b, Fresh-water well in the high sand barrier beach of Tahuesco. c, Washing clothes with well water carried in a gasoline can. d, Salt extraction from *playa* deposits at Tahuesco. e, Sun evaporated salt at Puerto San Jose.

(For explanation, see p. 161.)

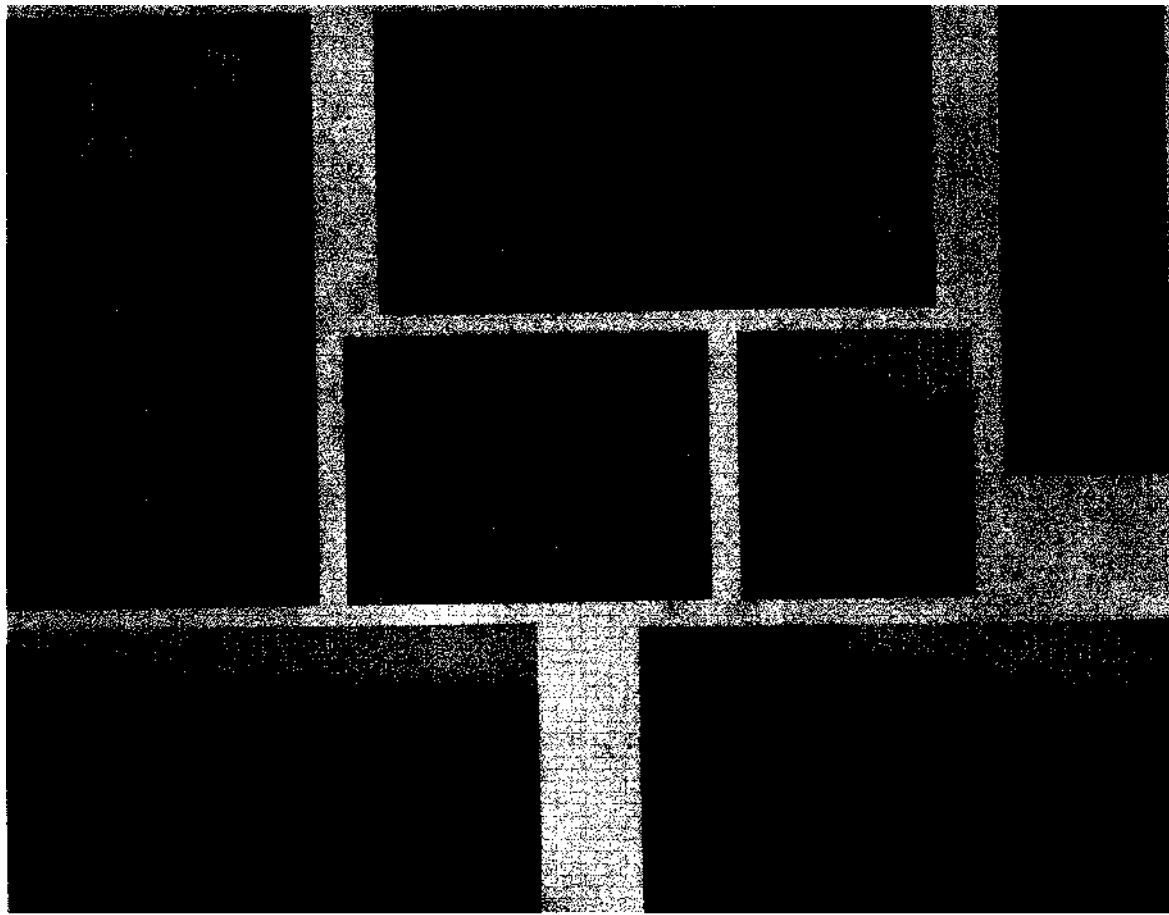
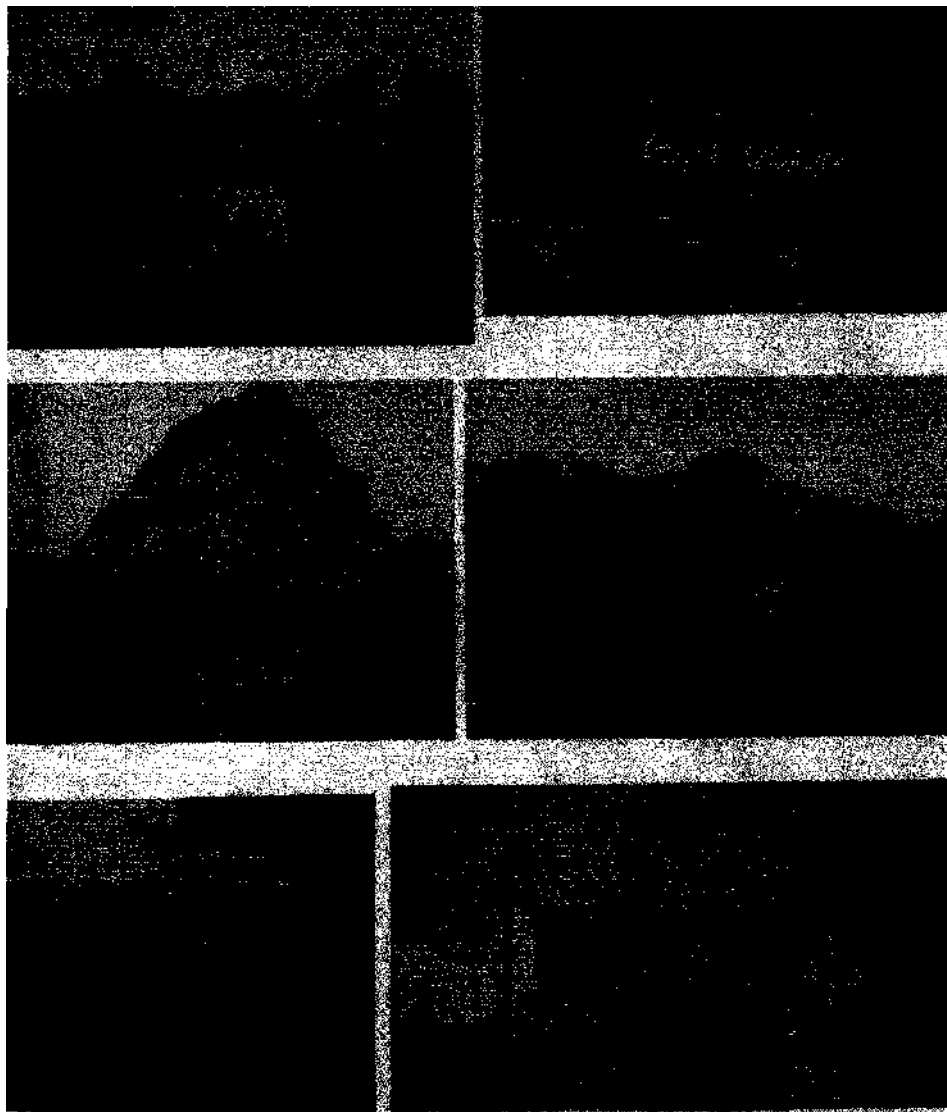


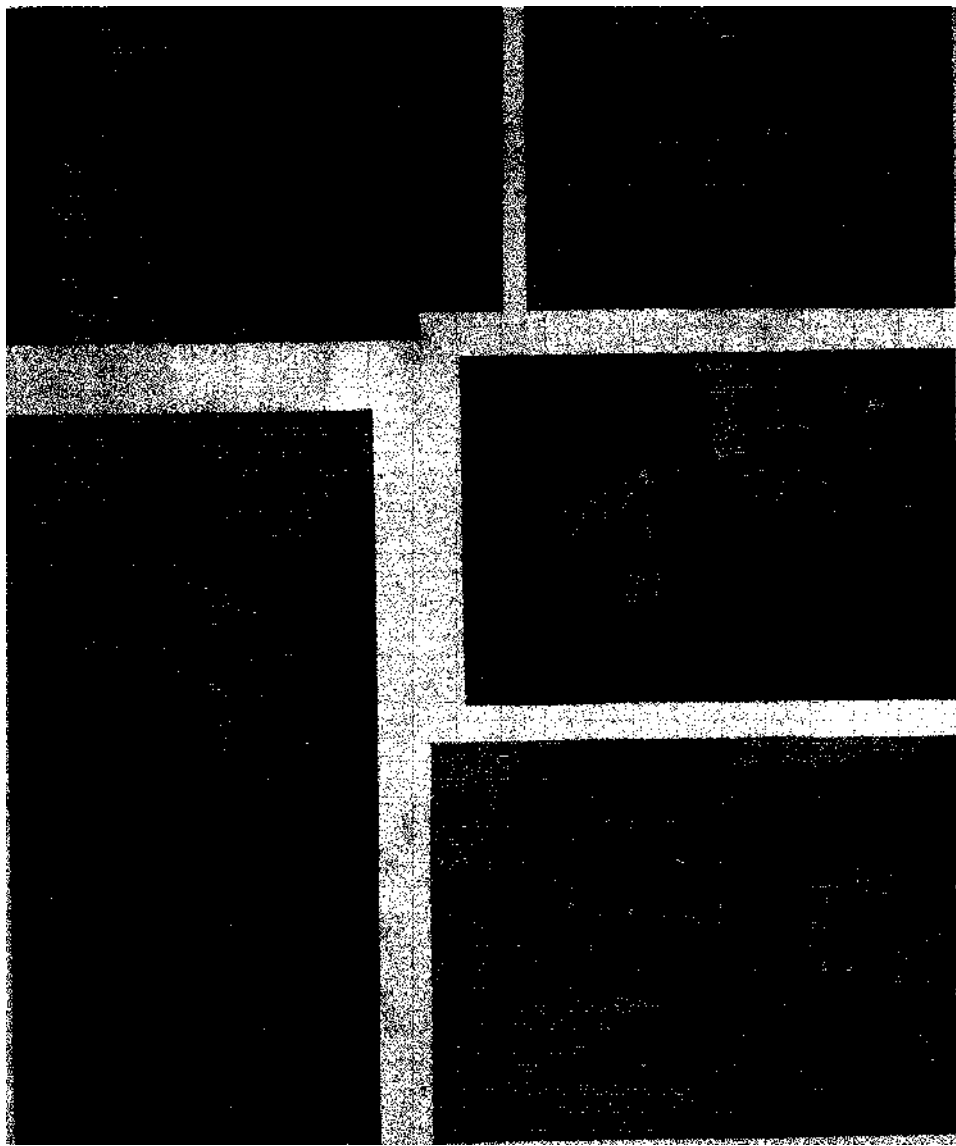
PLATE 2.—Pacific Coastal Landscapes and Architecture. a, Coconut palm (*Orbignya coarctata*) forest about 5 miles inland from Taharoco. b, Sewing a sugarat (coconut palm-leaf raincape) at San Sebastián Rata-
 huco. c, San Sebastián sugarate for sale at School by San Sebastián Churchyard. d, San Sebastián girl of 16 years carrying a water jar (tinaja). e, Aerial top of an interior coastal thunderhead.
 f, San Sebastián sugarate from San Sebastián Churchyard. g, San Sebastián Church. h, San Sebastián Church. i, San Sebastián Church. j, San Sebastián Church. (For explanation, see p. 181.)



PACIFIC COASTAL LOWLANDS AND PIEDMONT.

a Cartload of *hoja de sal* (*Calalhea*) leaves for thatch, *b*, Thatching a house with *hoja de sal* at San Pablo Jocopilas. *c*, Dwelling at Santo Domingo Suchitepequez. *d*, Clearing weeds for planting milpa at San Bernardino, *e*, Load of Aguacatan (Highland) baskets near Pueblo Nuevo, headed for San Felipe market. *f*, Mazatcnango, looking north from railway station.

(For explanation, see p. 162)



PACIFIC COASTAL LOWLANDS AND PIEDMONT.

Ladino fisherman making a net at Dolores Apulo, on Lake Ilopango, El Salvador. *b*, Men fishing with small hand nets in the Tarro River, San Pedro Cutzan. *c*, Load of Totonicapan tinware near Chicacao carried by an itinerant merchant. *d*, Young cattle from eastern Guatemala sold at Santo Tomas la Union by an Indian of Santiago Atitlan. *e*, Chicacao market scene.

(For explanation, see p. 1(12))

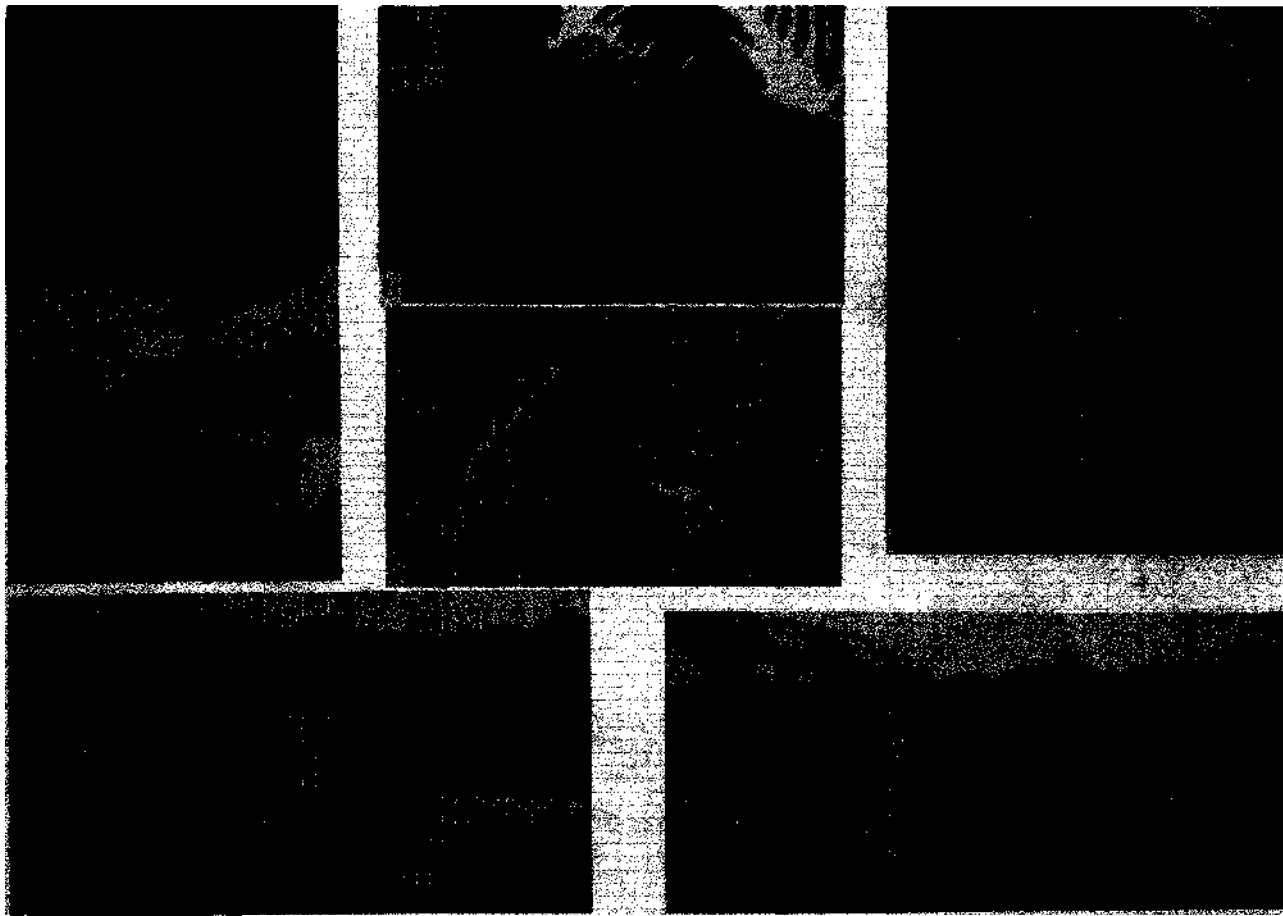
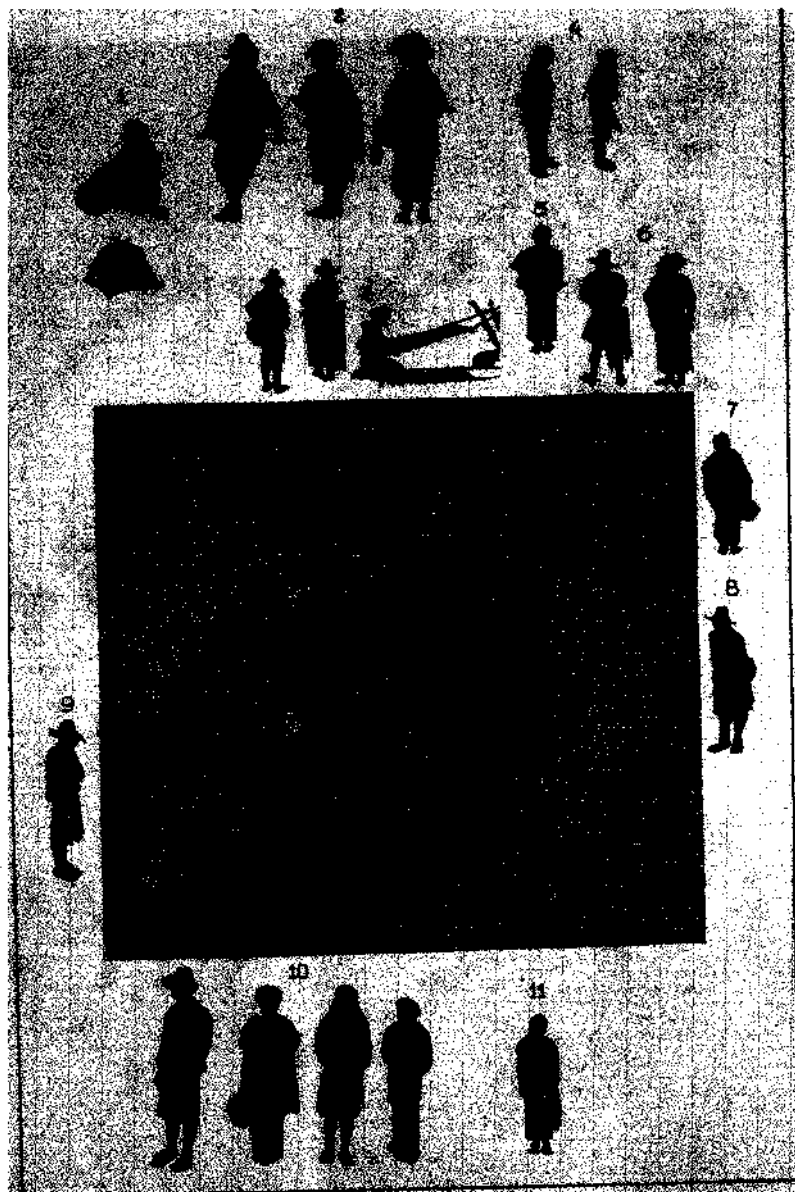


PLATE 5—Guatemala Lowlands and Piedmont. *a*, Market of San Antonio Husita (Department of Huehuetenango). *b*, Atitlan volcano viewed from Finca Moca, elevation about 1,000 m. *c*, Heavy vegetation in the rainy monsoon area of the Pacific versant. *d*, Finca Helvetia, coffee drying in foreground. *e*, Cutting bananas at Finca Santa Adela, just east of Mazatenango. *f*, Indians loading bananas on freight cars for rail shipment to east-coast Puerto Barrios. (For explanation, see p. 162.)



LAKE ATITLÁN REGION MAP AND INDEX OF COSTUMES WORN IN LAKE MUNICIPALITIES.

- 1, Santa Catarina Ixtahuacán-Nahuatlá; 2, Sololá, San José Chacayá, and Concepción; 3, Panajachel; 4, Santo Tomás Chichicastenango (Panimaché); 5, San Andrés Semetabaj; 6, Santa Catarina Palopó; 7, Tecpán; 8, San Antonio Palopó; 9, San Pedro la Laguna, San Juan la Laguna, and San Pedro Cutzán; 10, Santiago Atitlán, Chicacao; 11, Cerro de Oro.

(For explanation, see p. 162.)



COSTUMES OF LAKE ATITLÁN REGION.

(From water colors by Frances Van Winkle McBryde.)

- a, Sololá man (Sololateco). b, Sololá man wearing coat. c, Sololá woman (Sololateca). d, Panajachel man (Panajacheleño), new style. e, Panajachel man, old style. f, Santa Catarina Palopó man (Catarineco). g, Santa Catarina Palopó woman (Catarineca). h, San Andrés Semetebaj woman (Sanandresana). i, San Pedro la Laguna man (Pedrano). j, Santiago Atitlán man (Atiteco), old style. k, Santiago Atitlán woman (Atiteca), old style. l, Santiago Atitlán man, new style. m, Santiago Atitlán woman, new style. n, Cerro de Oro woman. o, San Antonio Palopó man (Antoñero).

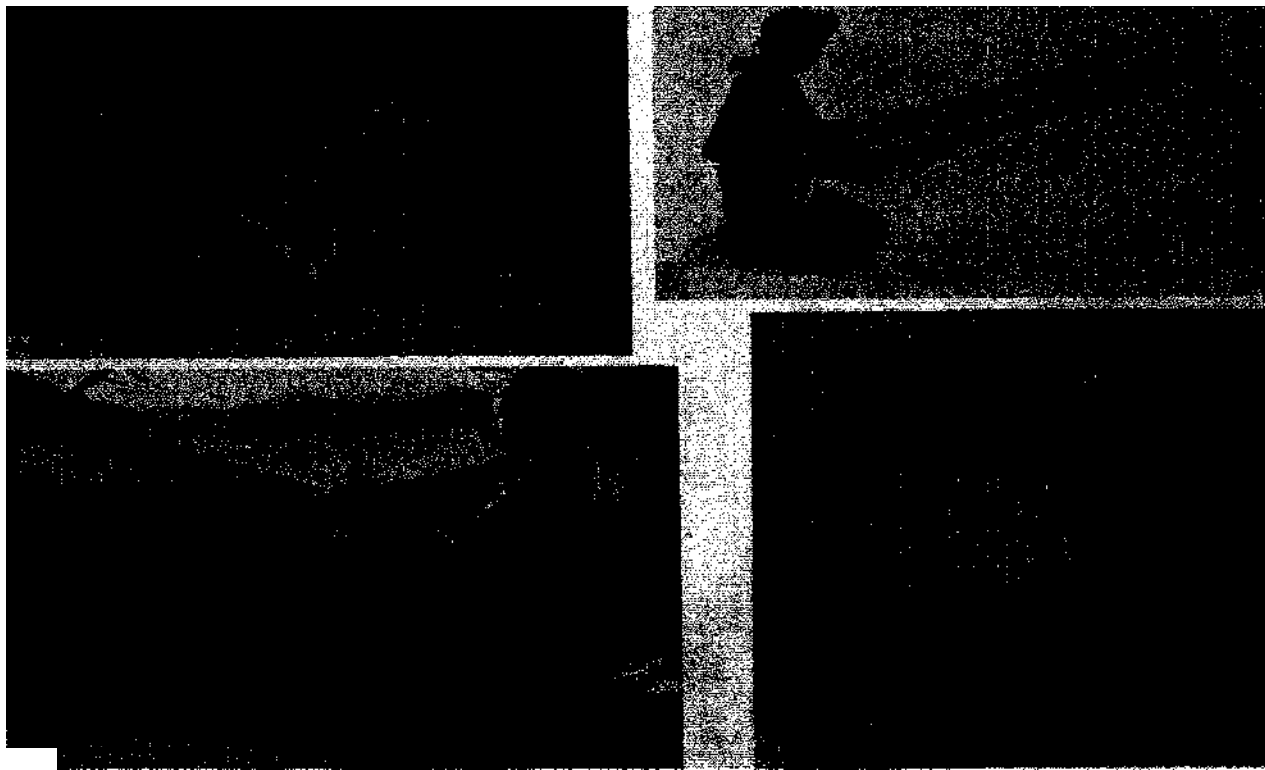
(For explanation, see p. 163.)



INDIAN TYPES IN THE LAKE ATITLÁN REGION.

a, Nahualá woman (Nahauléña, Xancatú). *b*, Santo Tomás Chichicastenango man (Maxeño). *c*, Santo Tomás Chichicastenango woman (Maxeña). *d*, Tecpán woman (Tecpaneca). *e*, San Juan Comalapa woman (Comalapeña), in Tecpán market.

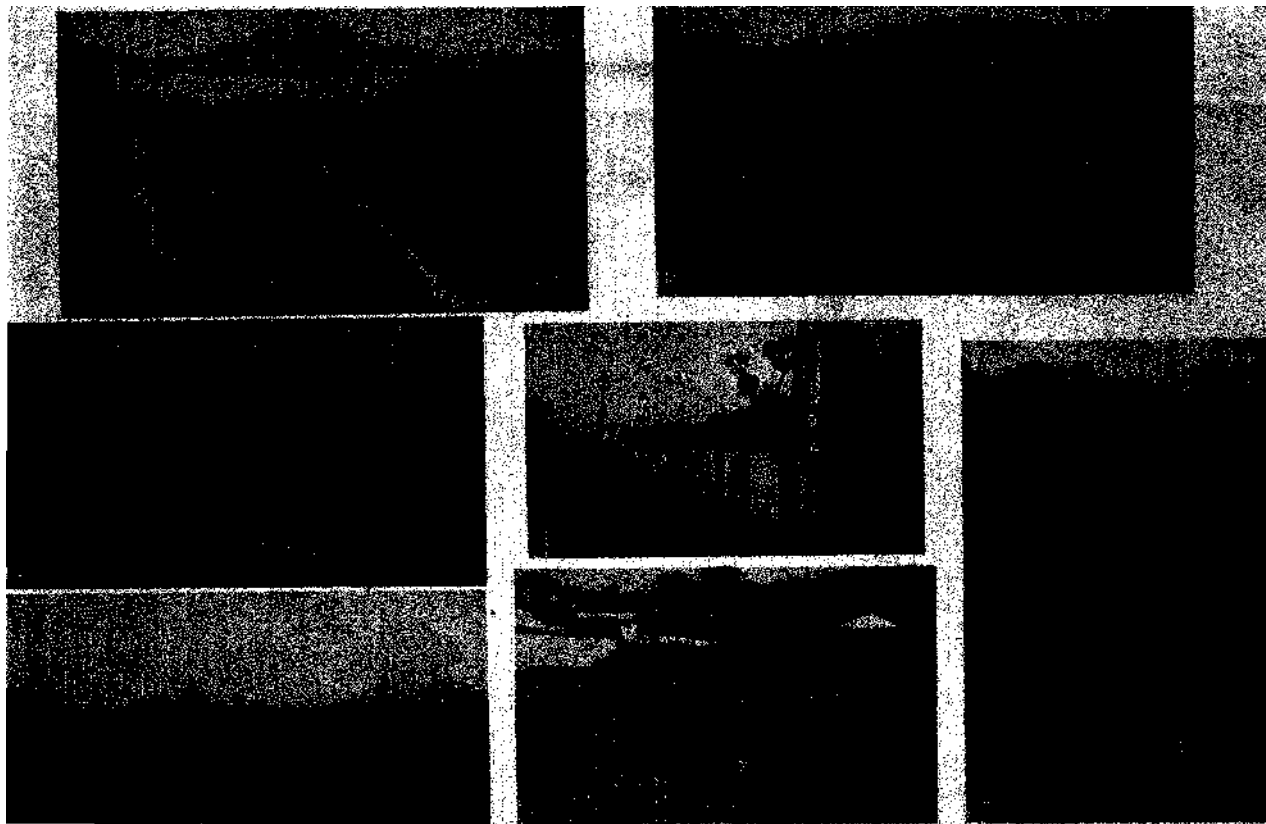
(For explanation, see p. 104.)



STICK-LOOM WEAVING AND SPINNING.

a, Panajachel woman weaving: tilting heddle and pushing batten through, b, Panajachel woman weaving: packing down weft thread with batten, c, San Antonio Palopo woman weaving: lifting heddle and pushing up reeds which maintain warp cross, d, San Pedro la Laguna girl spinning white cotton.

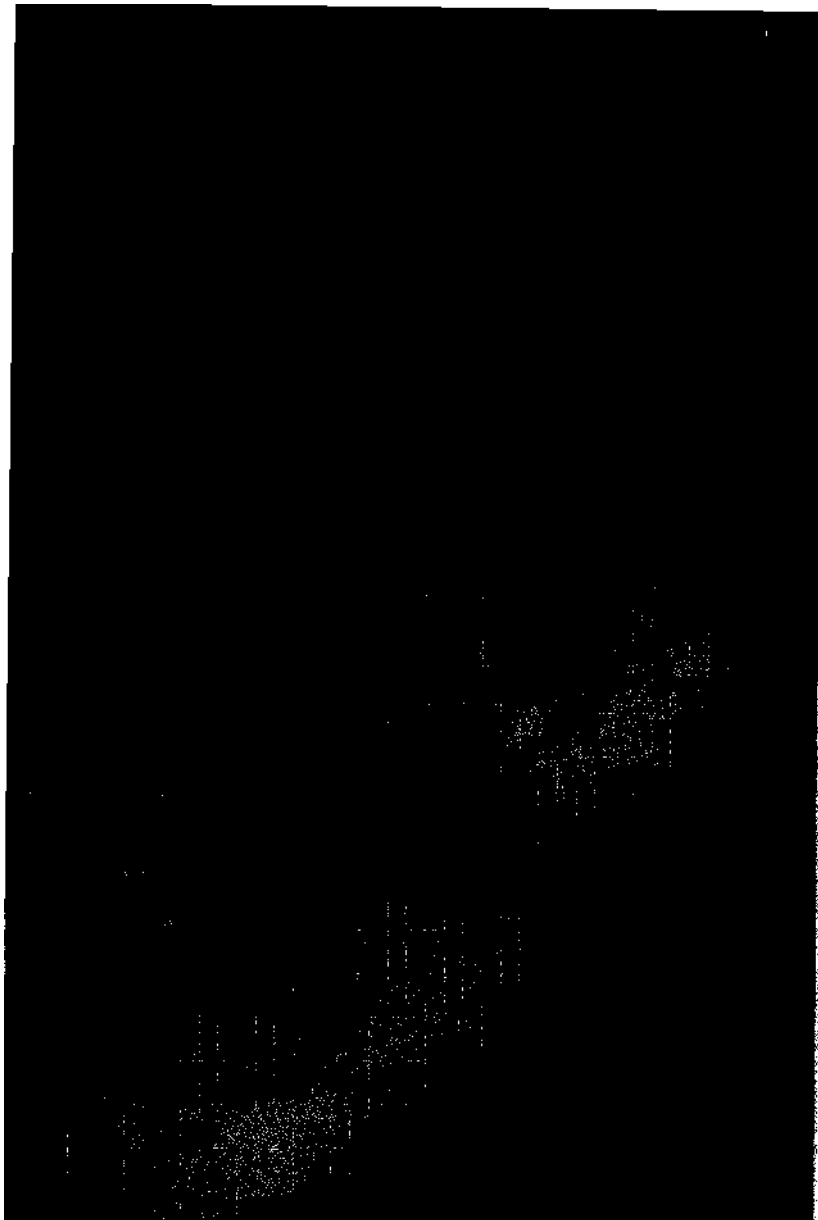
(For explanation, see p. 165.)



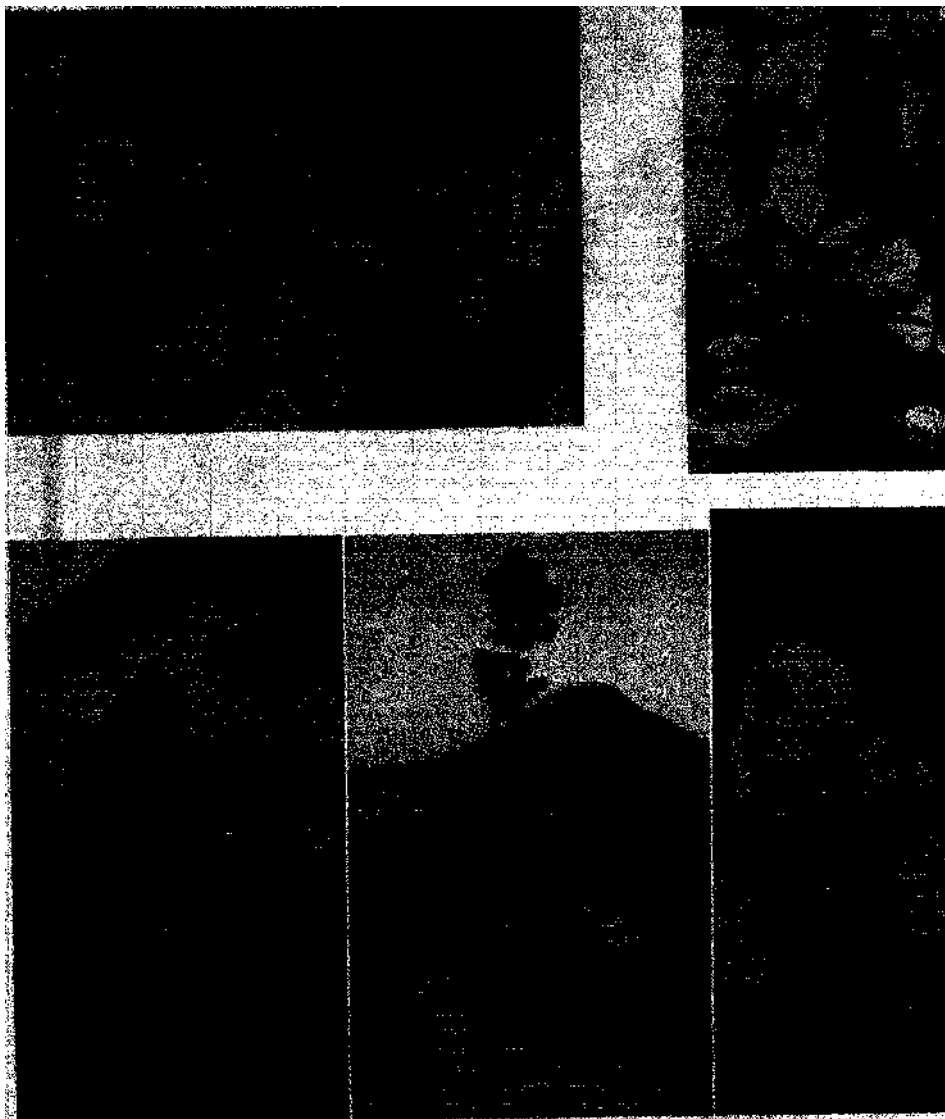
SOLOLA AND VICINITY.

Solola seen from steep slope to north, looking due south, *b*, Adobe and thatch Indian dwelling in east central Solola. *c*, Lower course and delta of Quixcap River, flowing into Lake Atitlan. *d*, Looking south along a Solola street, *e*, Cornfield about 4 miles north of Solola; elevation about 2,500 m. *f*, Father and son making adobe blocks in the lower part (south) of Solola, looking northwest, *g*, Northwest edge of Solola (Quixcap River valley). March 1932.

(For explanation, see p. 165)



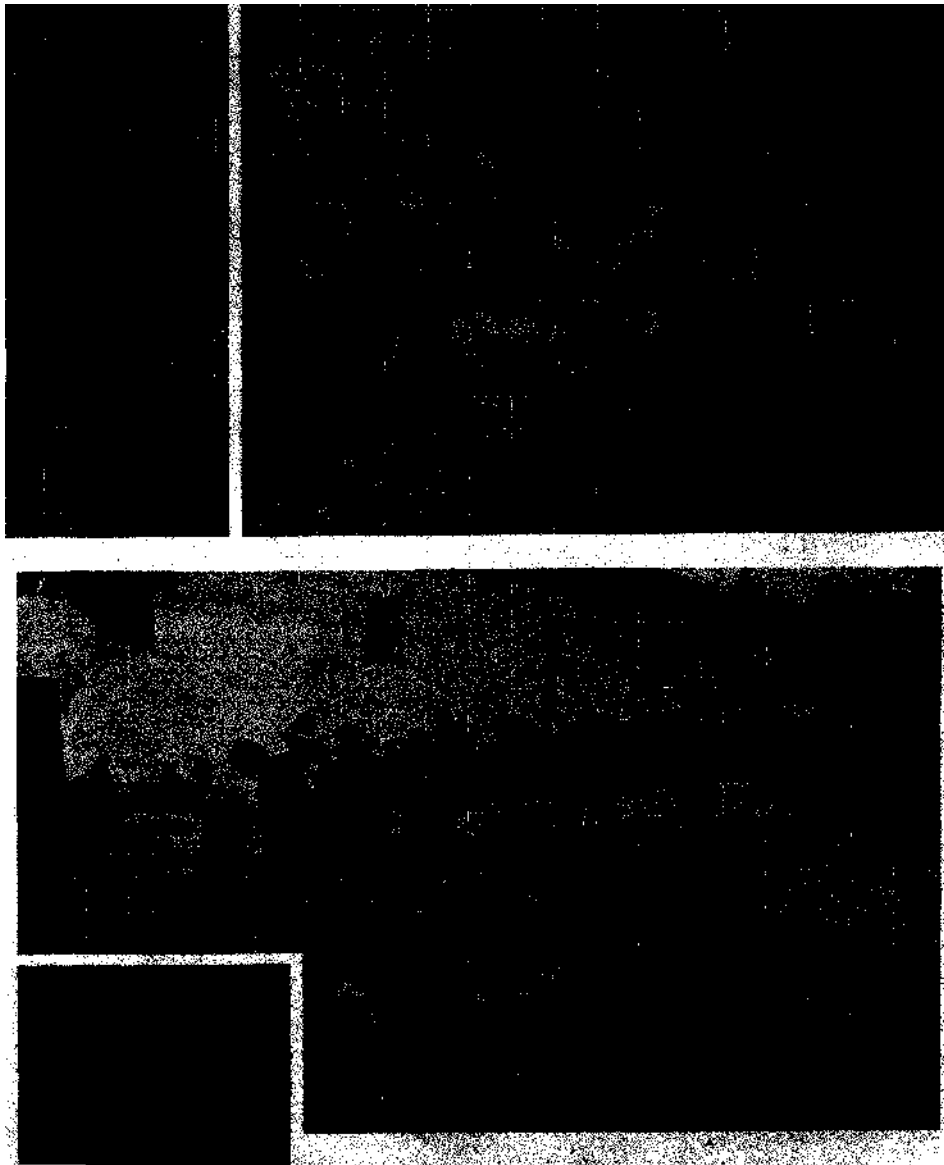
INDIANS GOING TO THE SOLOLA MARKET. ANCIENT TRAIL TO CONCEPCION JUST EAST OF SOLOLA.
(For explanation, see p. 166.)



INDIANS GOING TO THE SOLOLA MARKET.

a, Adjusting a muleload of onions at Paiiajachel. *b*, Selling honey from Antigua at Solola during the Semana de Dolores fair. *c*, Santiago Atitlan men arriving at Solola with Lowland cargoes in carrying frames (*cacastes*). *d*, San Jorge (Solola) man climbing trail to Solola market with a gasoline-box load of panela. *e*, Load of iguanas from Chicacao passing through Paiiajachel en route to the Highlands.

(For explanation, see p. 166)



ANIMALS BEING TAKEN TO MARKET.

a, Two iguanas, a parrot, and tropical fruit on the trail just below Solola, (from a water color by the a Friday market with a turkey and two chickens for sale, c, Chichicastenango and Quiche (extn from Chiche at Solola. Inset shows manner of driving pigs.

or), b, Solola women in their left) men selling young pigs

(For explanation, see p. 166.)

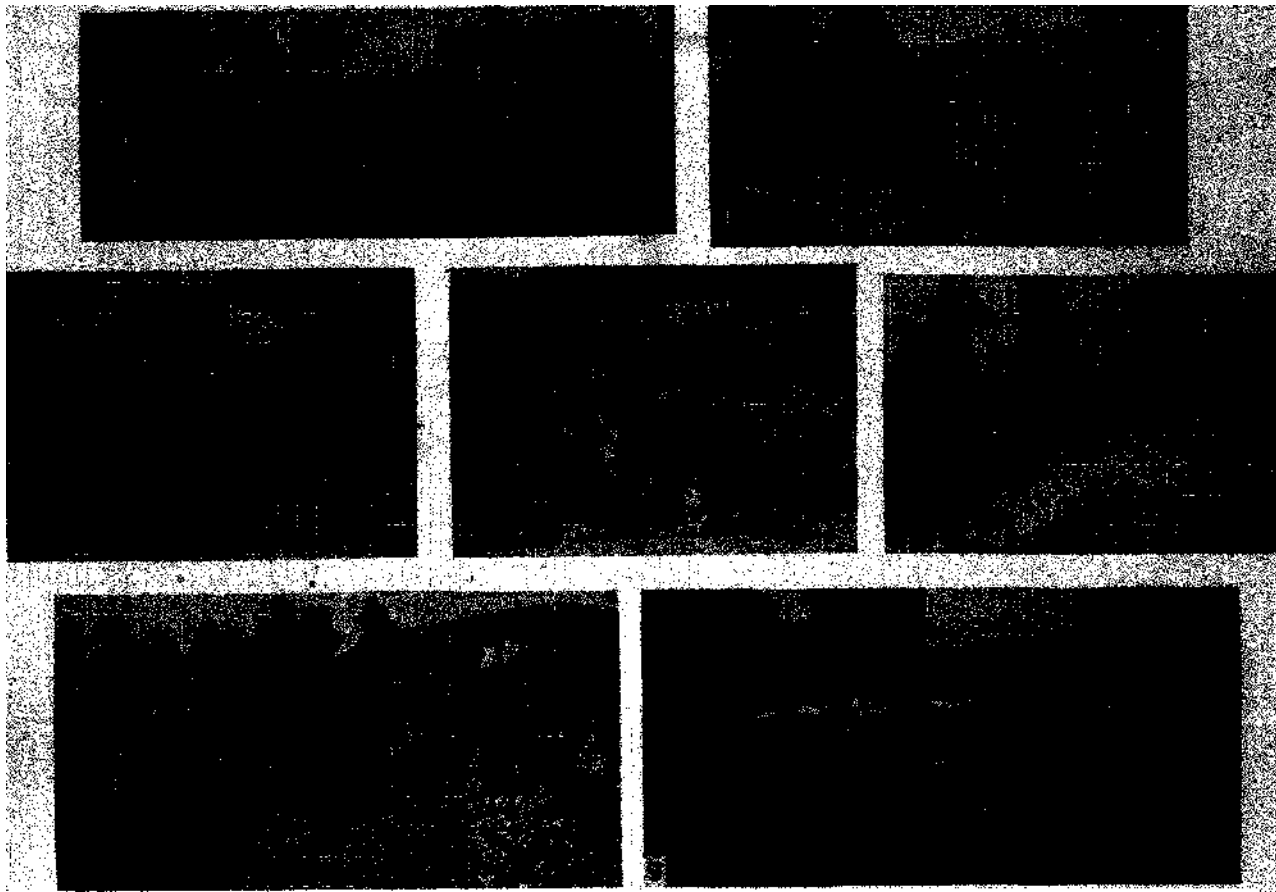
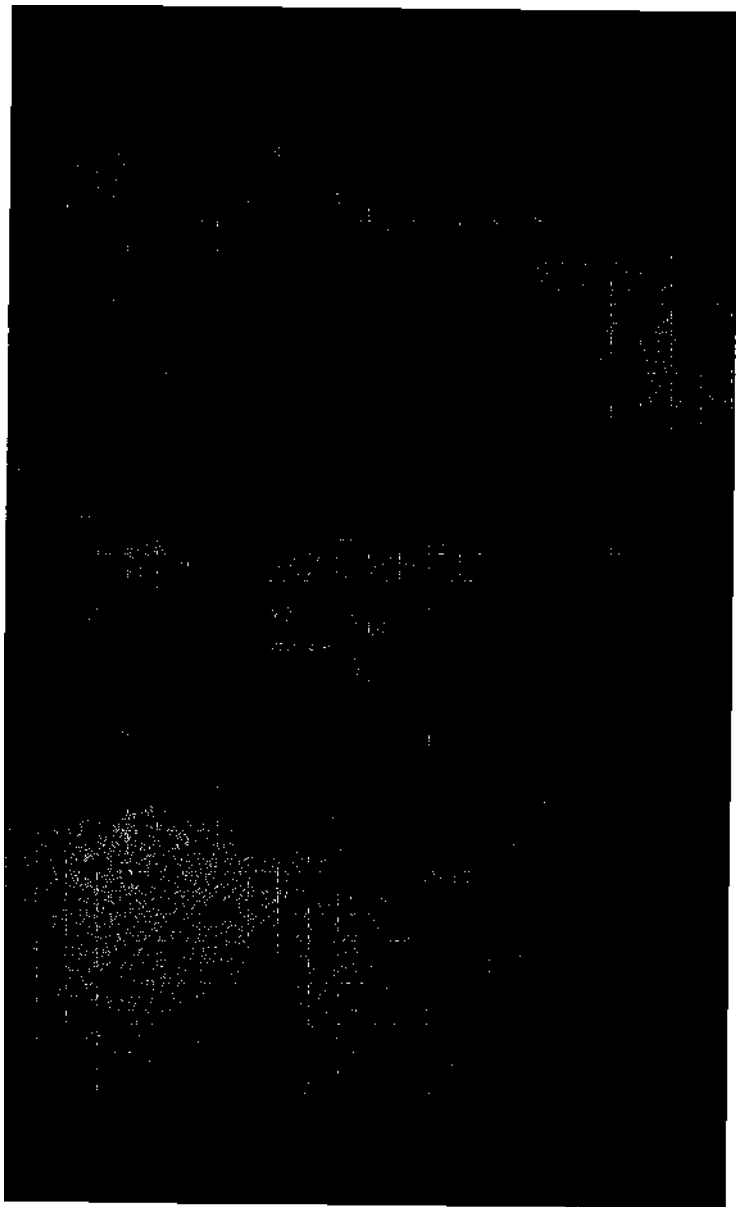


PLATE 14.—Sololá Market and Vendors. *a*, Argueta (Totonicapán) pottery vendors, headed for Guatemala City, pause for lunch on the central square. *b*, Santo Tomás Chichicastenango merchant selling miscellaneous "ten-cent-store" items. *c*, Totonicapán man selling meats to a Sololá woman. *d*, Argueta woman, left, selling vegetable peas (*gülesitas*); two Chichicastenango men with roast turkey (center) from near Tehuacan and plantains from Mazatenango; San Antonio Palopé man (right) selling animals. *e*, Patanatic (Chichicastenango) men selling quicklime. *f*, Local onion vendors. *g*, In front of the hot-lunch booths during the Semana de Dolores fair, 1932. (For explanation, see p. 156.)



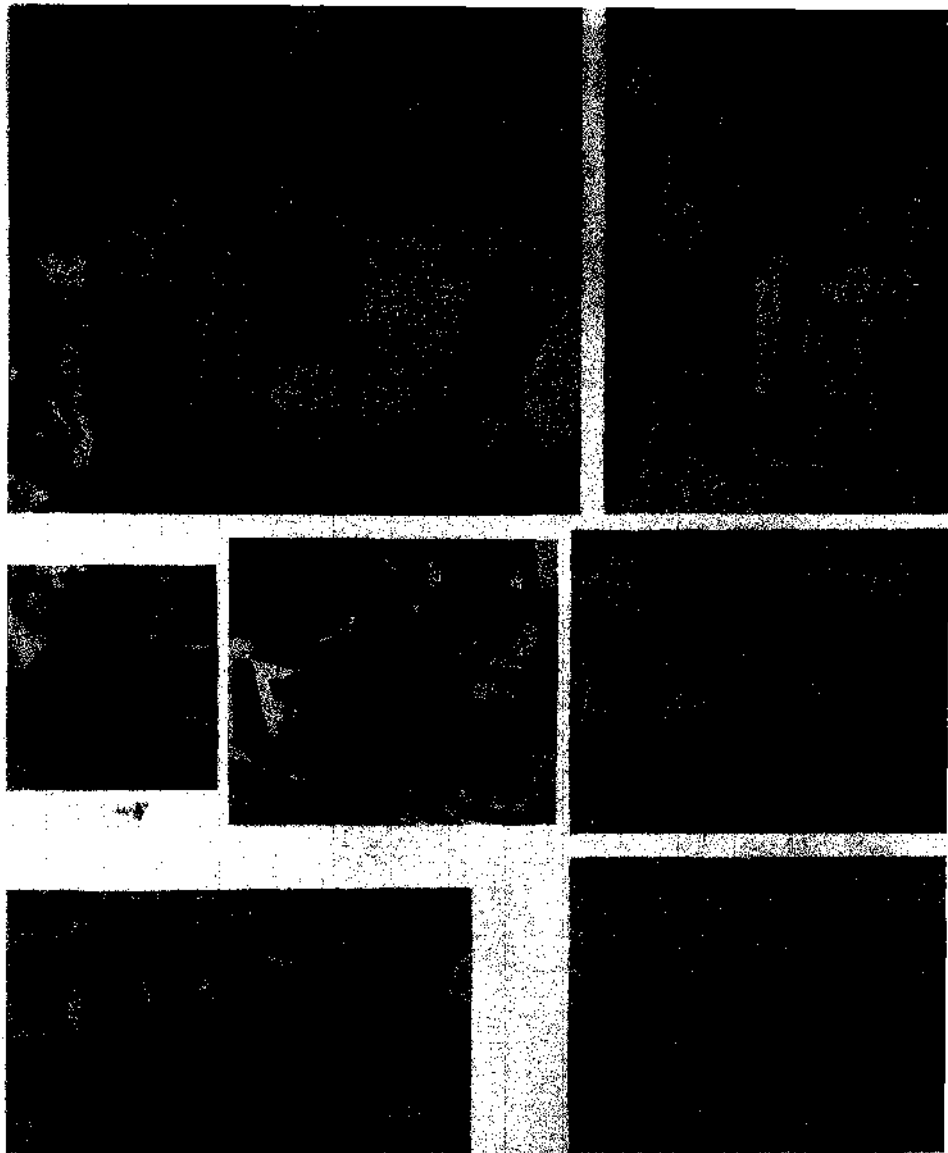
SOLOLA EASTER PROCESSION.

"El Señor de las tres caídas" (image of Christ carrying His cross) moving down east side of central park on hooded men's shoulders.]
(For explanation, see p. 167.)



PATRON-SAINT'S DAY PROCESSION AT SAN JORGE, BELOW SOLOLA.

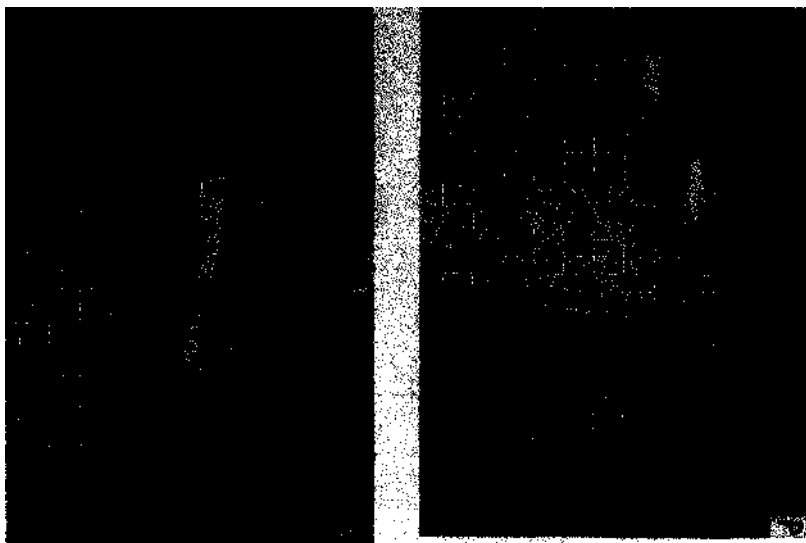
(For explanation, see p. 167.)

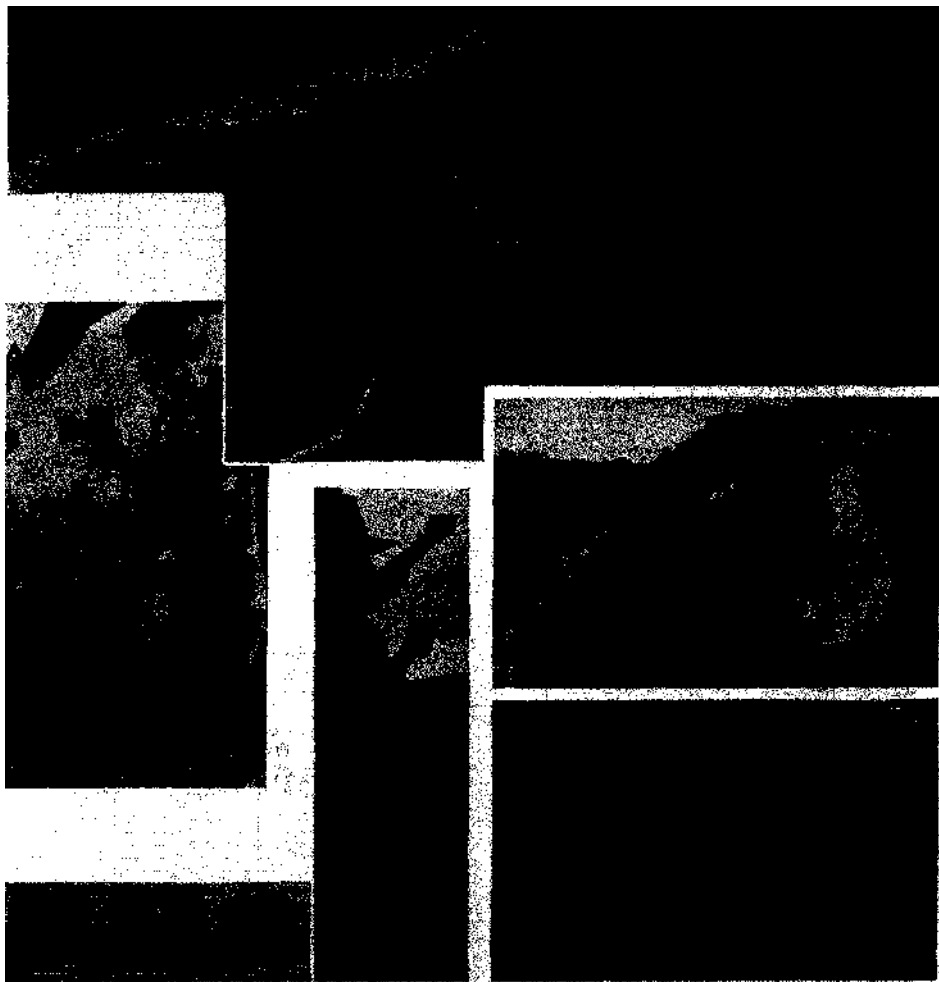


CEREMONIAL SCENES.

- a, Maize-planting mass inside a leaf-covered shelter near San José Chacayá. b, Close-up of an altar for a planting ceremony, with corn ears dressed as saints. c, Sololá *chirimía* player and his drummer son during a *fiesta*. d, Sololá marimba players at a small modern instrument. e, Chichicastenango man playing old-type marimba with gourd sound-boxes. f, Ceremonial dance masks at Sololá, en route to a *fiesta*. g, Conquistador masked dance at San Andrés Semetabaj.

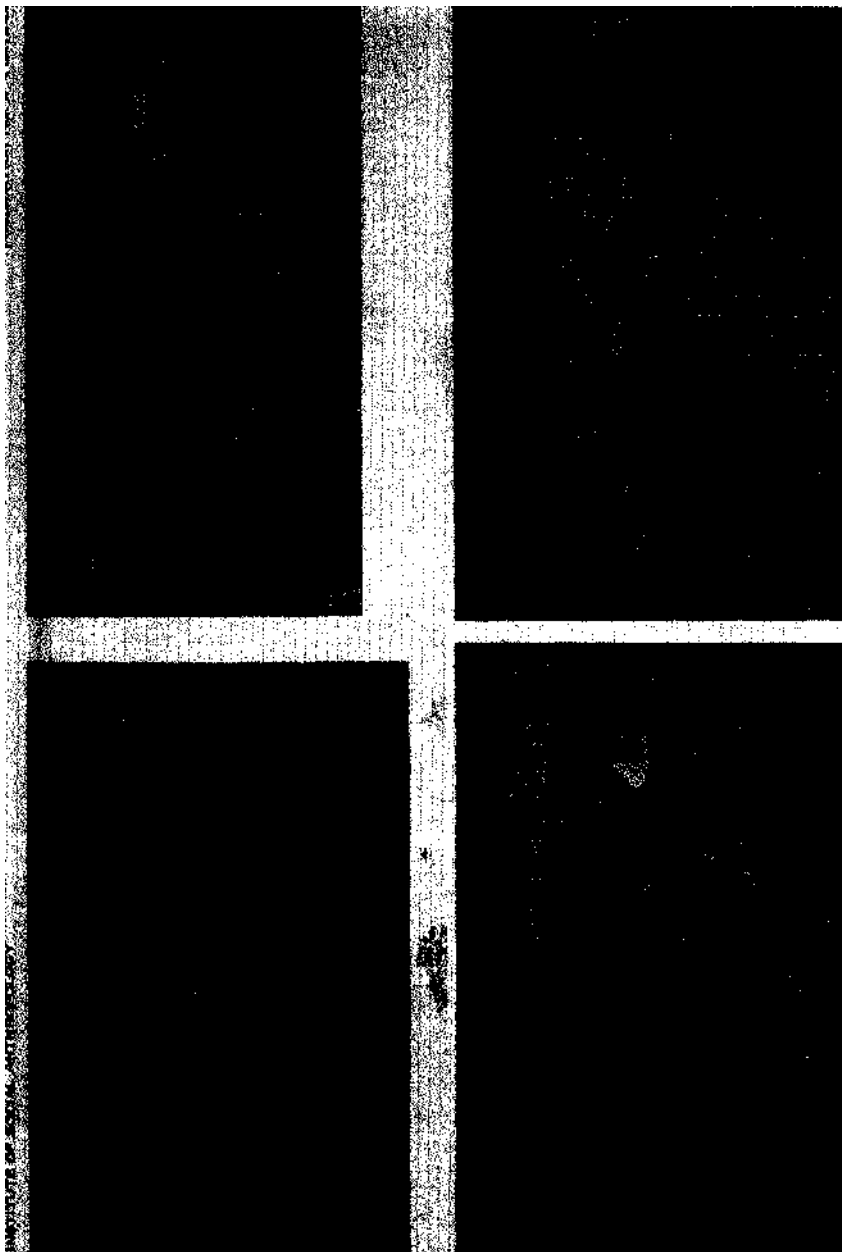
(For explanation, see p. 167.)

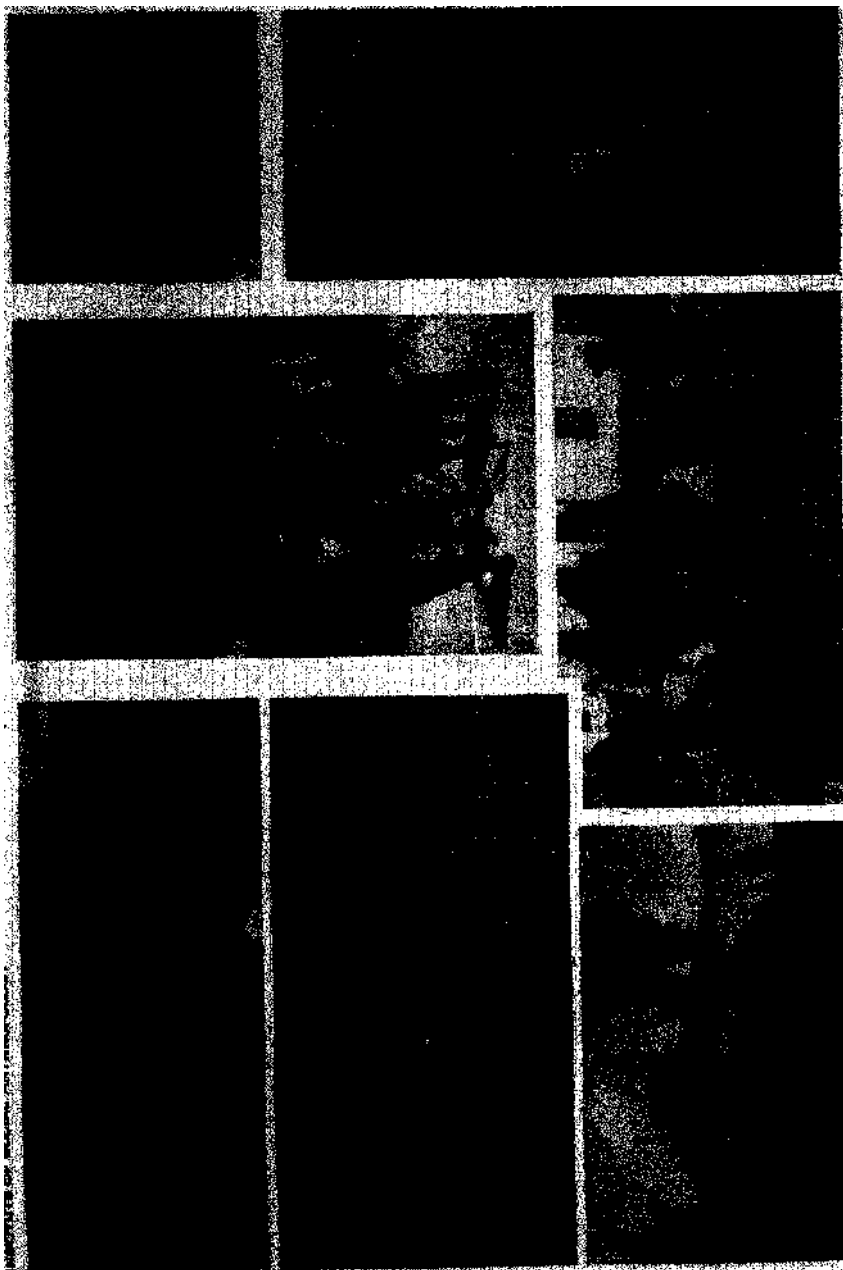


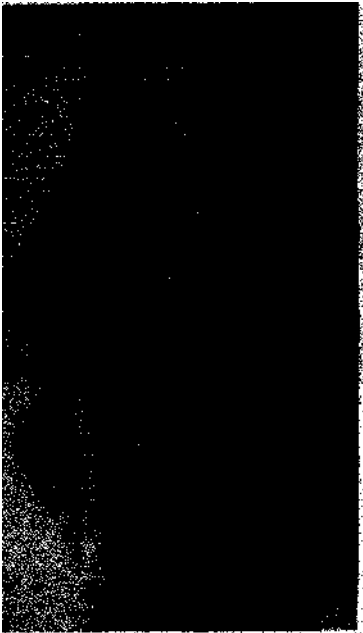


PANAMA

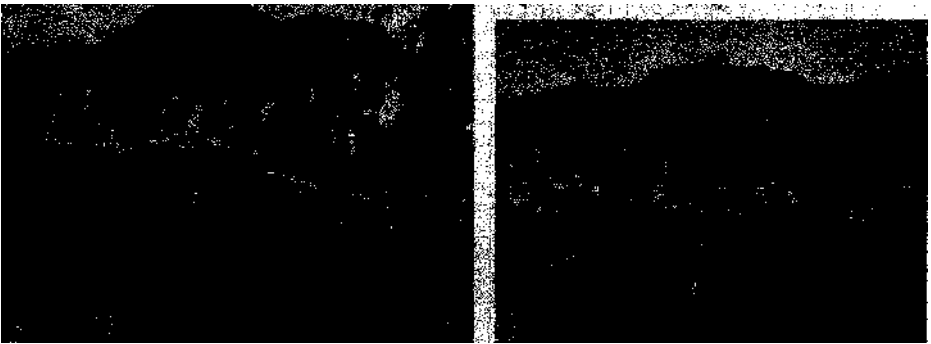
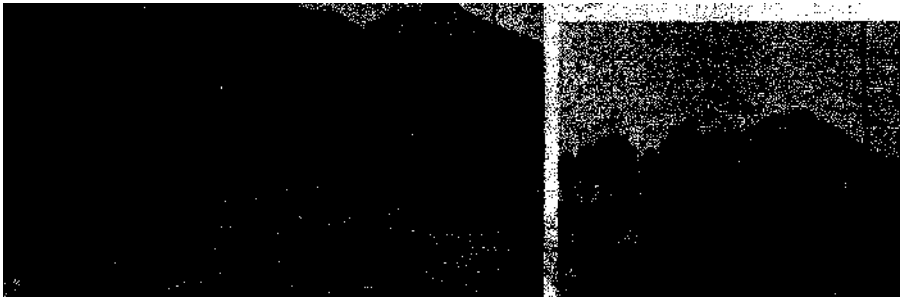
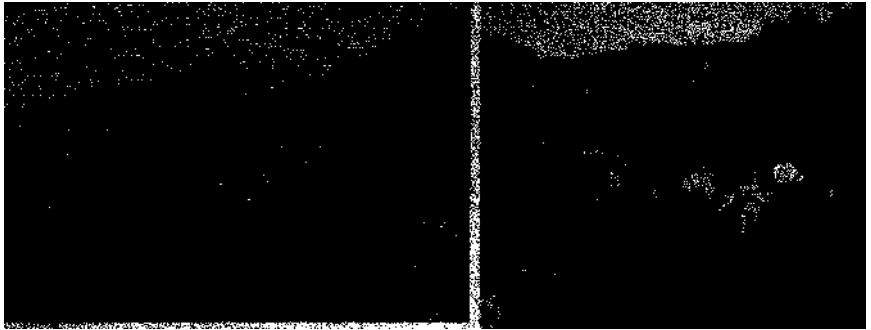
1. Mosaic panorama of Panama as seen from a 200-foot cliff at the northern edge of the village.
2. Indian looking through a 2-foot-old door (at his right) and shade trees at Finca Jolly, west of Panama.
3. Zancarpa Indian youth on his way to work on a banana plantation, spinning black wool while waiting for a horse launch.
4. Large gully, caused by a flood in 1933, just east of the Panama Canal, below San Andrés Cemetery.
5. View of the gully shown in 4.

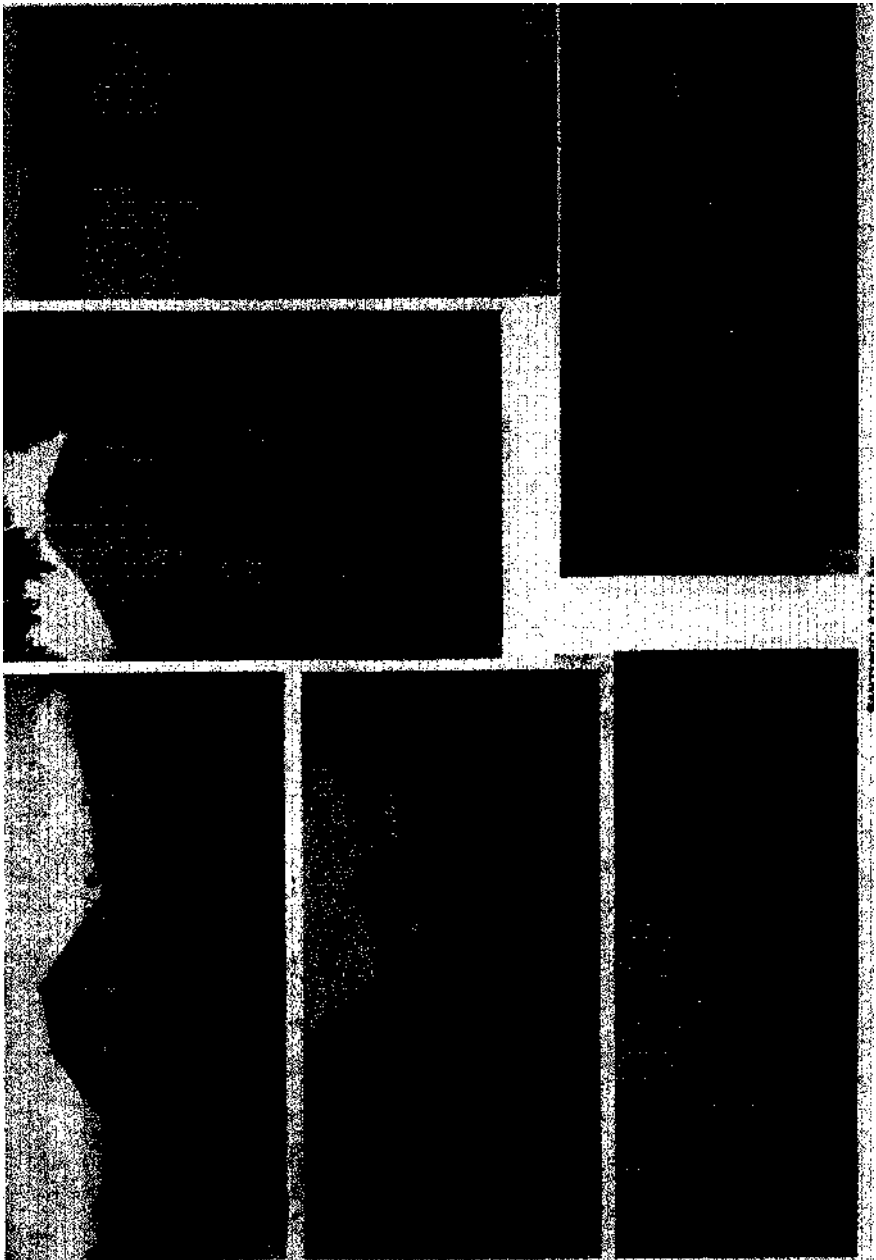


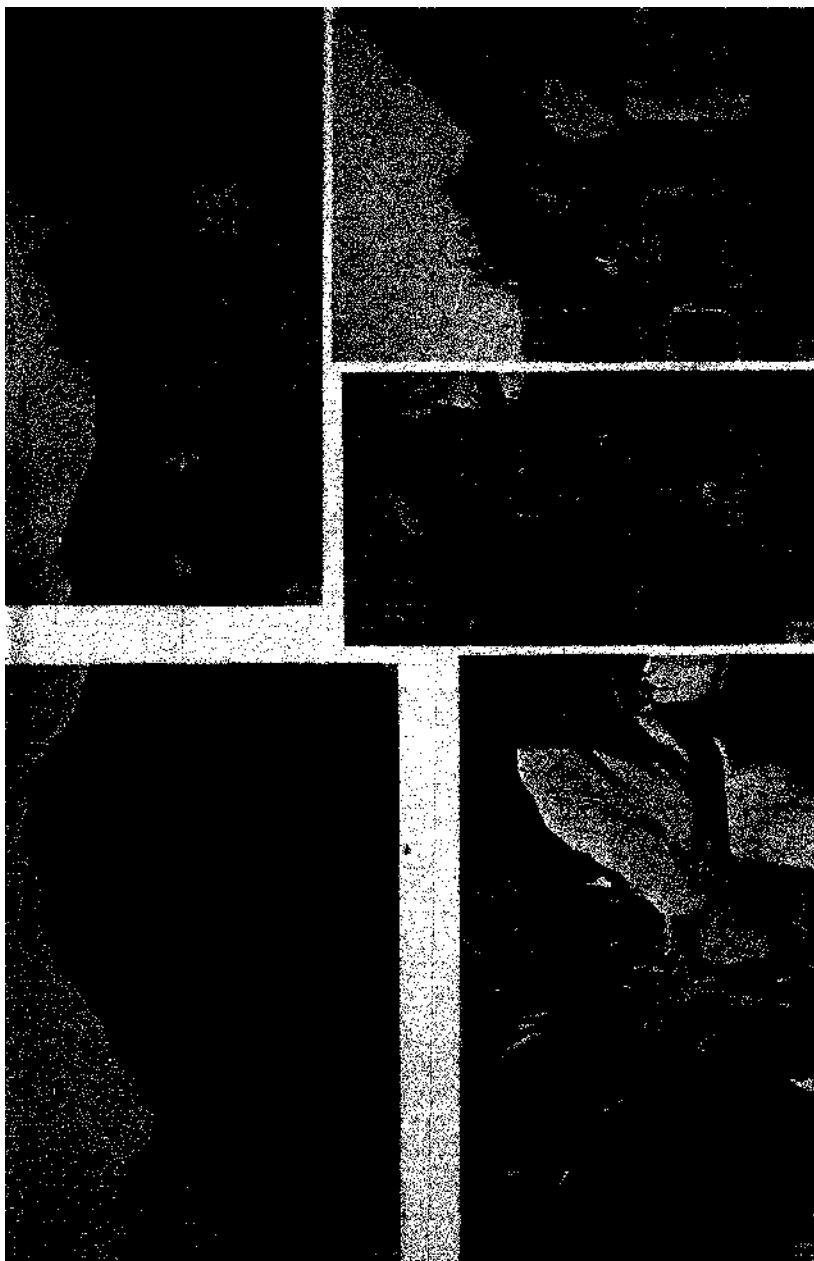


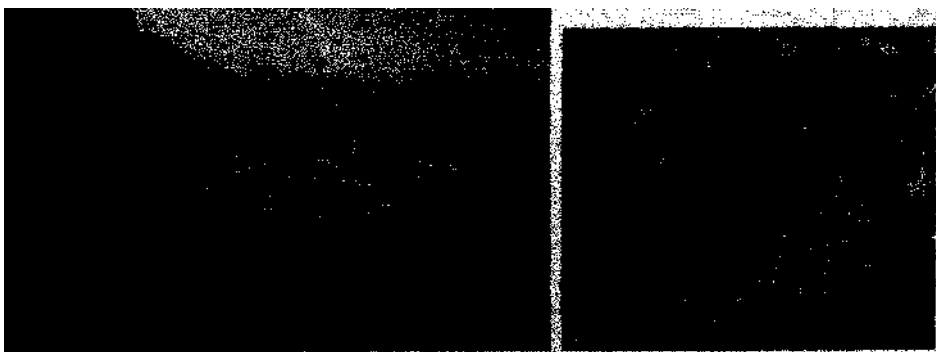
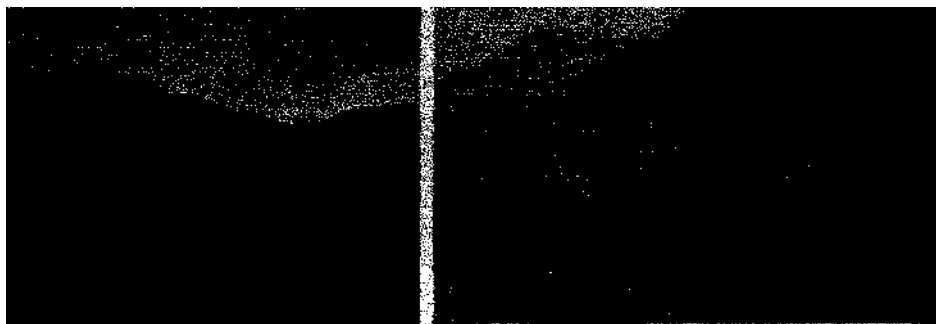


2025 RELEASE UNDER E.O. 14176

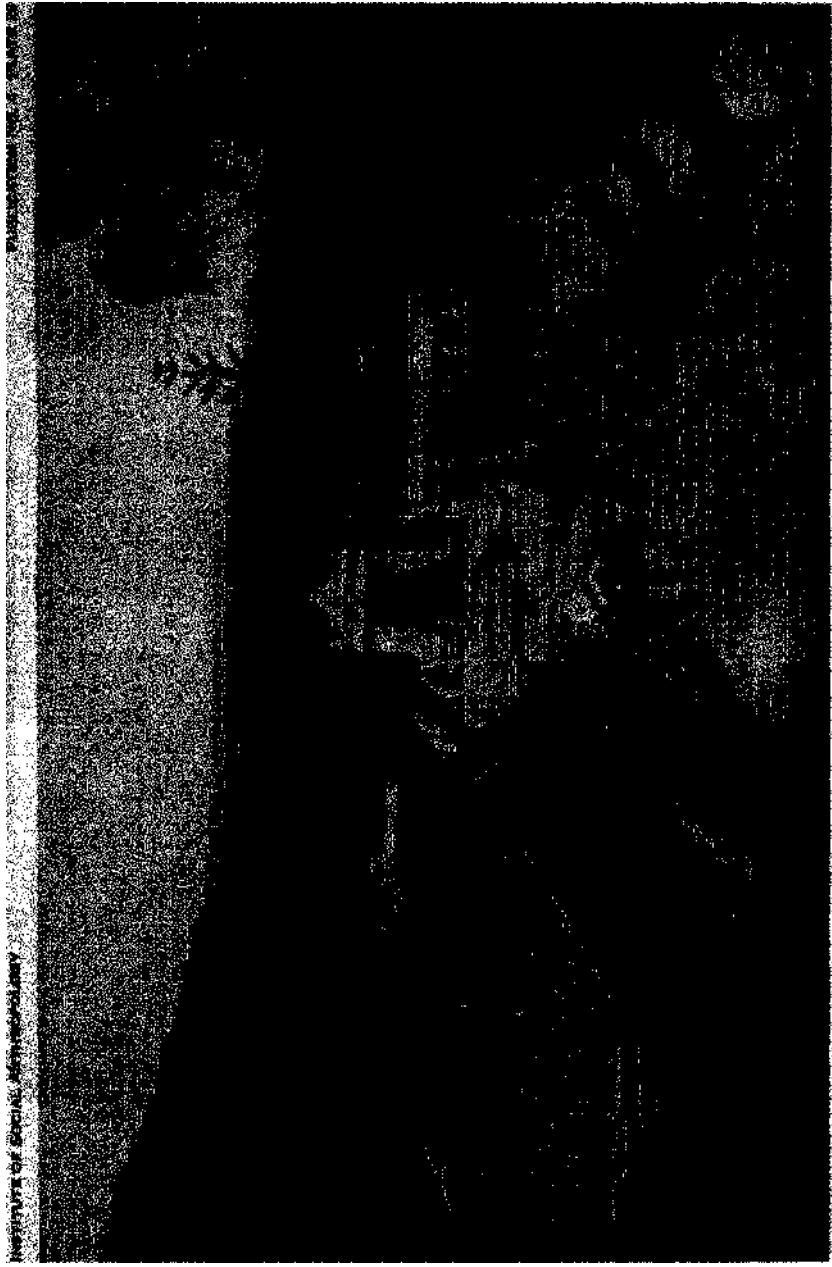




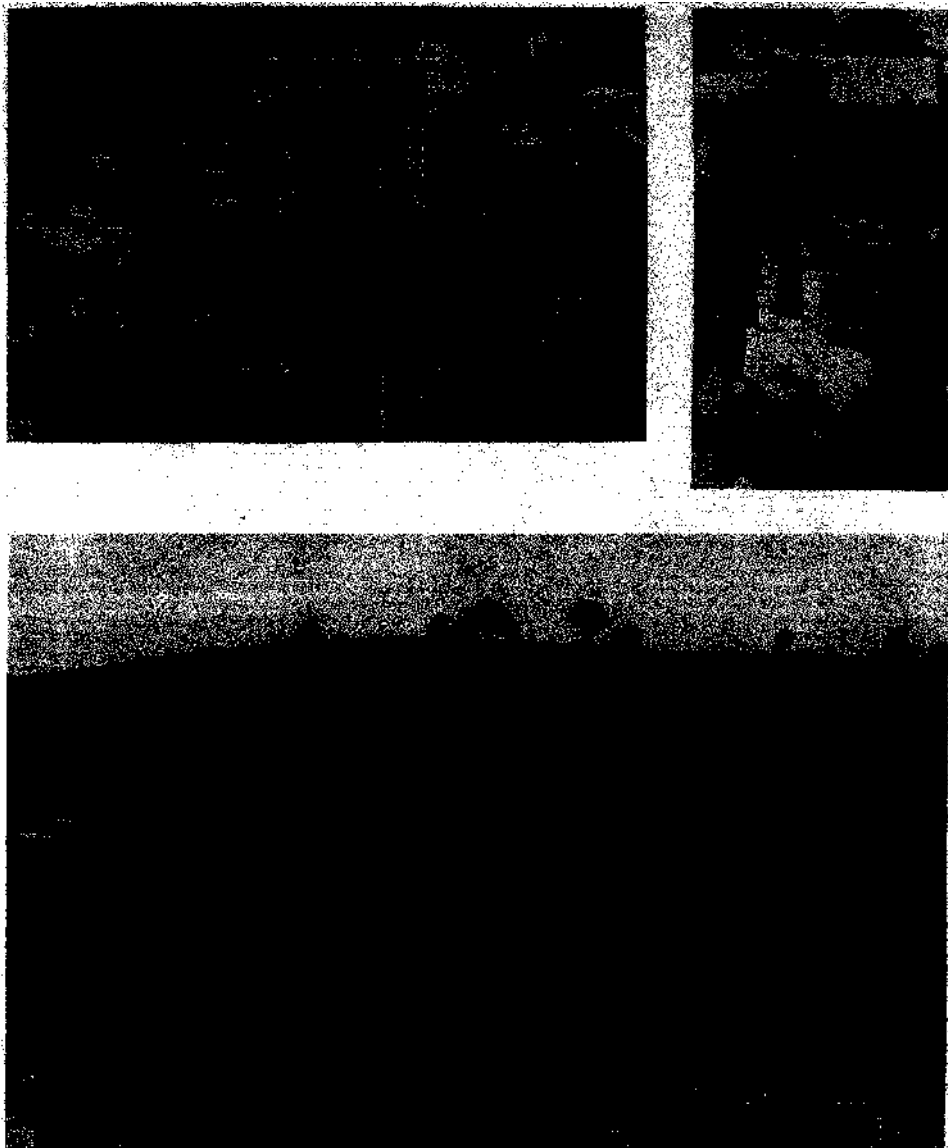




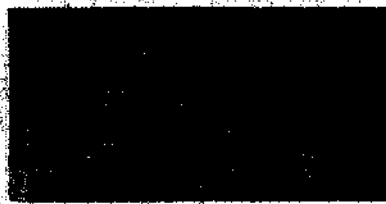
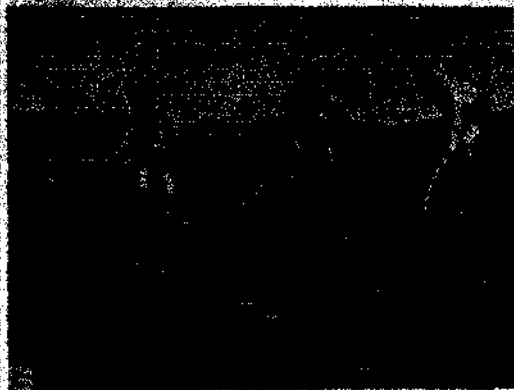
SANTA CRUZ AND TERNERIA (ON LAKE SUPERIOR)



SANTO TOMÁS CHICHICASTENANGO

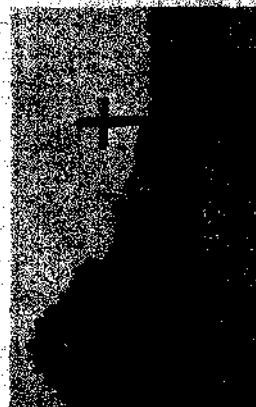
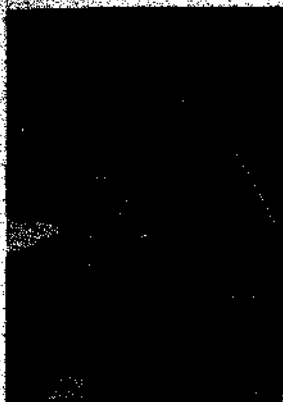


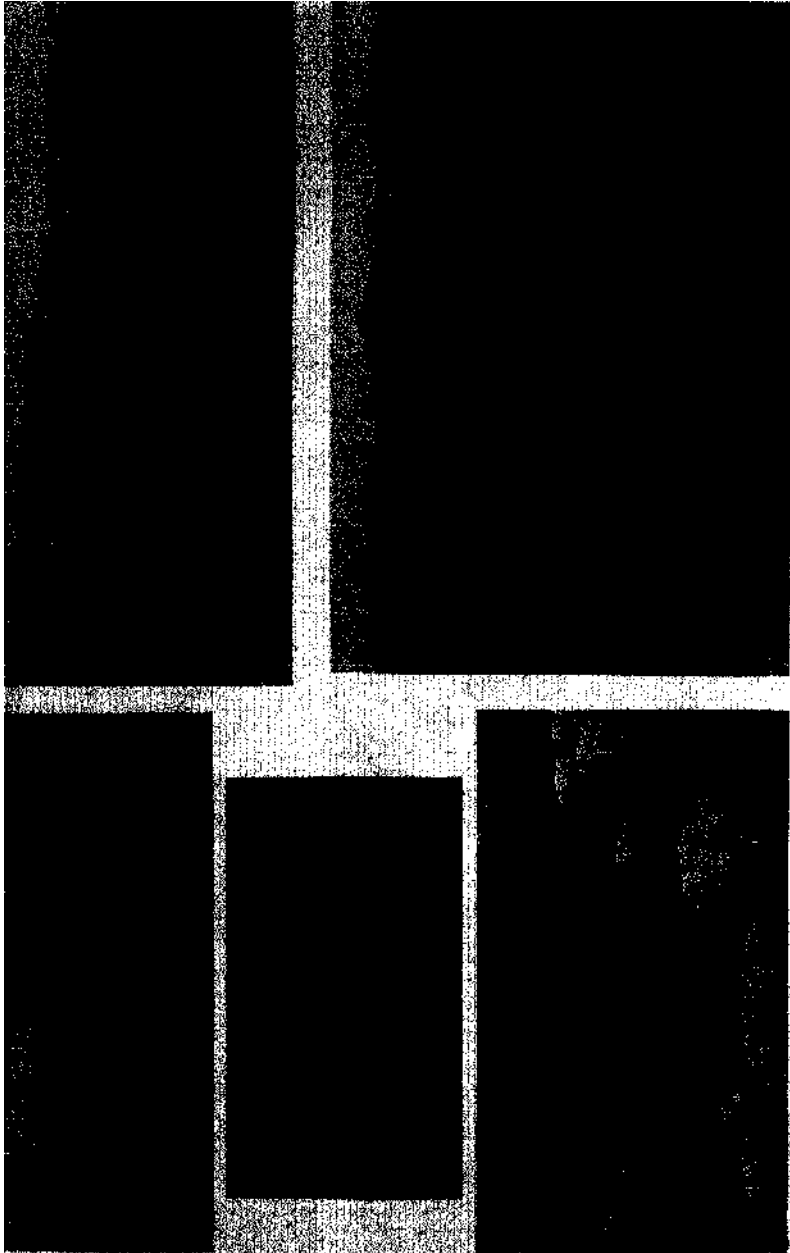
CHICHICASTENANGA AND VICINITY

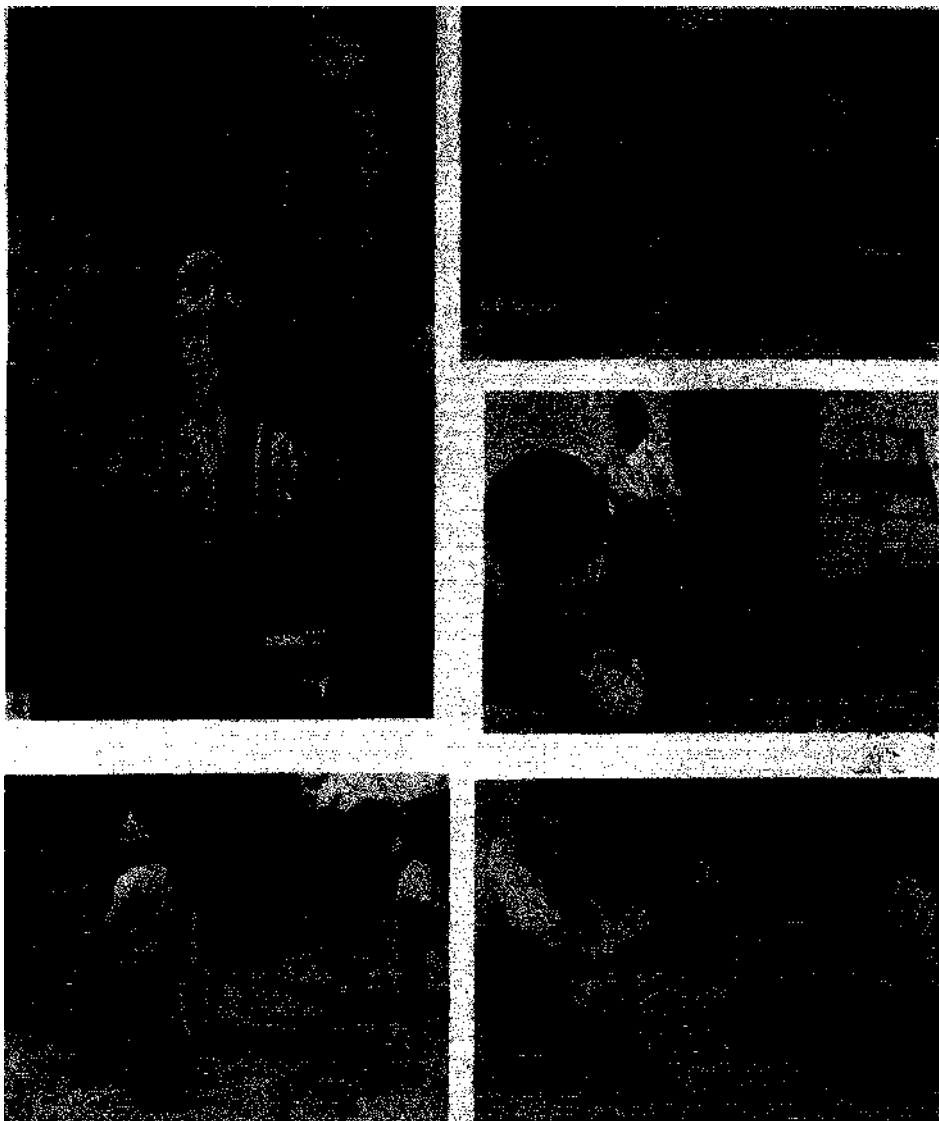


MALES, COMING TO THE MARKET, AND ENDING

4. Clustering high mountains with a lake, in the Cochimatanes Mochales between San Pedro Toluca and Santa Eulalia. 5. Cornfield and road leading to the market of Mochimingo. 6. Dipping deep forests of a cornfield between San Pedro Toluca and Sacapulas. 7. Males coming from Santa Cruz (Lake Atlix). 8. Head of a large, galled ox (Bovine) by the male road just south of Santa Cruz del Quiché. 9. Unhatched broken bones, locally called "los huesos" at Mochimingo.



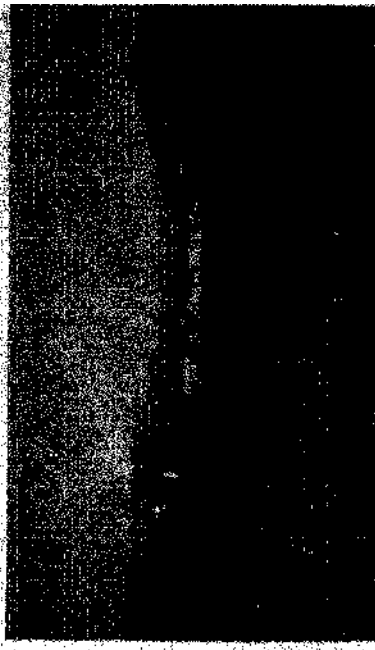
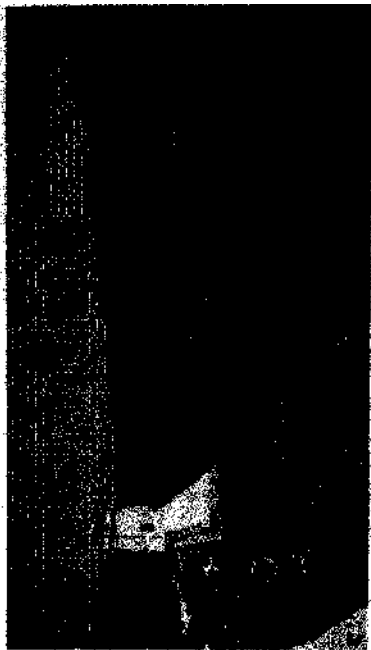




WOOL WEAVING IN MOROSTENANGO

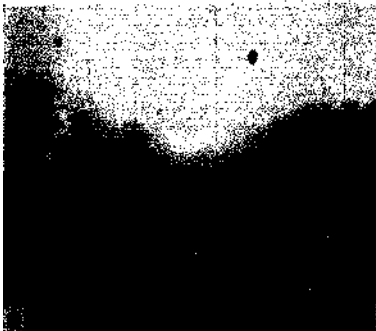
1. Weaver spinning 'black' (natural brown) wool in a. Weaver and his grandson carding and spinning white wool. 2. Spooling black wool thread from Ucd. 3. Spinning (painted in in) and setting warping frame (left) from the wool (right). 4. Three generations of weavers twisting fringe ends of a finished blanket.

OF ANTHROPOLOGY, Vol. 9, 1951



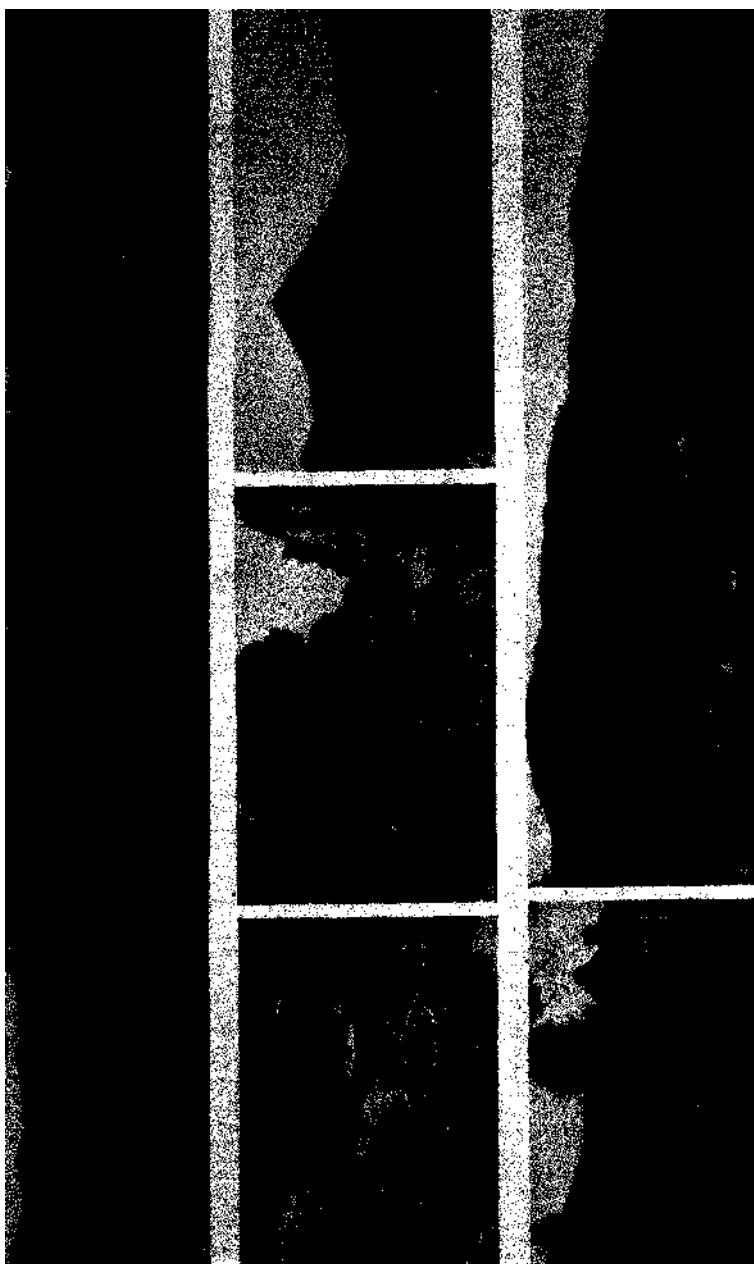


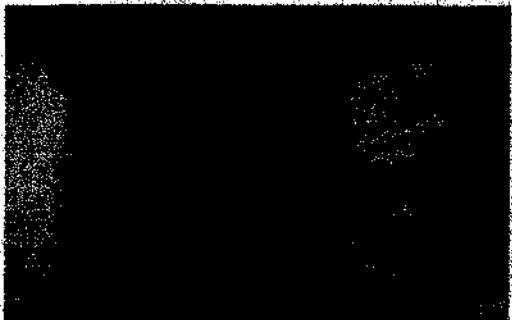
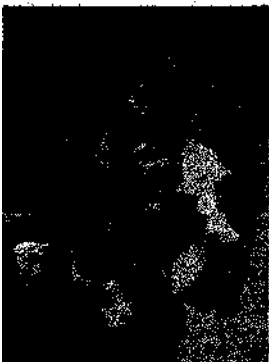
SAN FRANCISCO EL ALTO MARKET IN THE CENTRAL SQUARE, AS VIEWED FROM THE ROOF OF THE CHURCH.
(For explanation, see p. 172.)



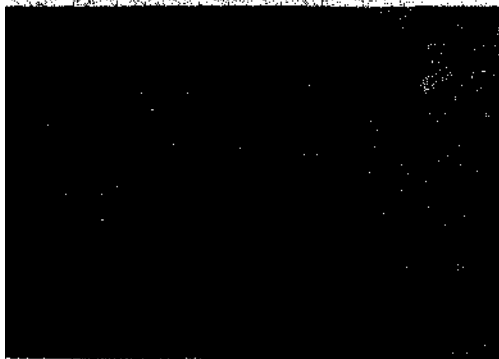
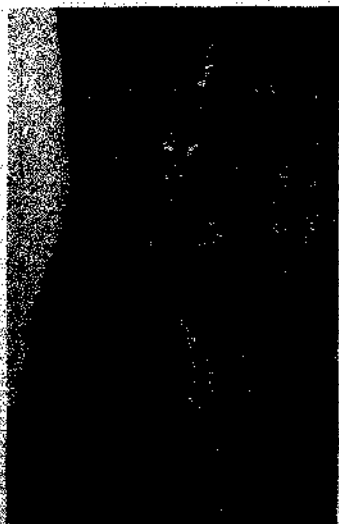
SAN SEBASTIÁN COATÁN AND THE WEAVING OF SHAGGY WOOL RUGS (Peyocoms).

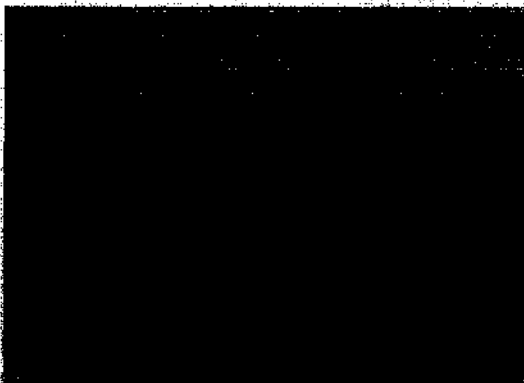
1. Home and surroundings of one of three related families of weavers, above San Sebastián Coatán, at about 2,600 m. elevation in the Cuchumatanes Mountains. 2. Spinning and weaving beside the house at left in a r. Summit (2,800 m.) meadow and forest of pine and cedar shrouded in fog, and five wooden crosses mark a wayfarer's station (right), between Santa Rita and San Sebastián Coatán. 3. Close-up of weaver beating warp loops in shaggy to be cut later, leaving loose ends 3 to 4 inches long. 4. Pulling warp thread through the loom.

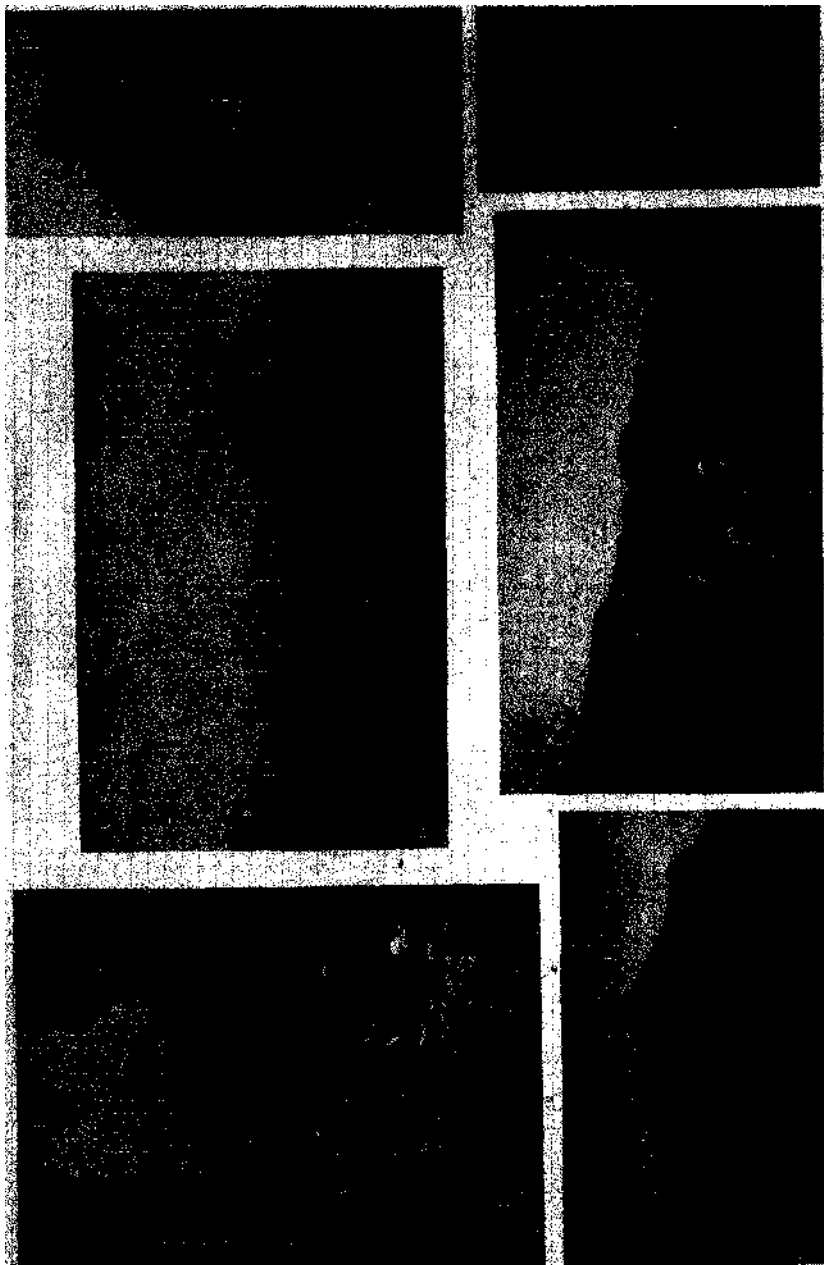


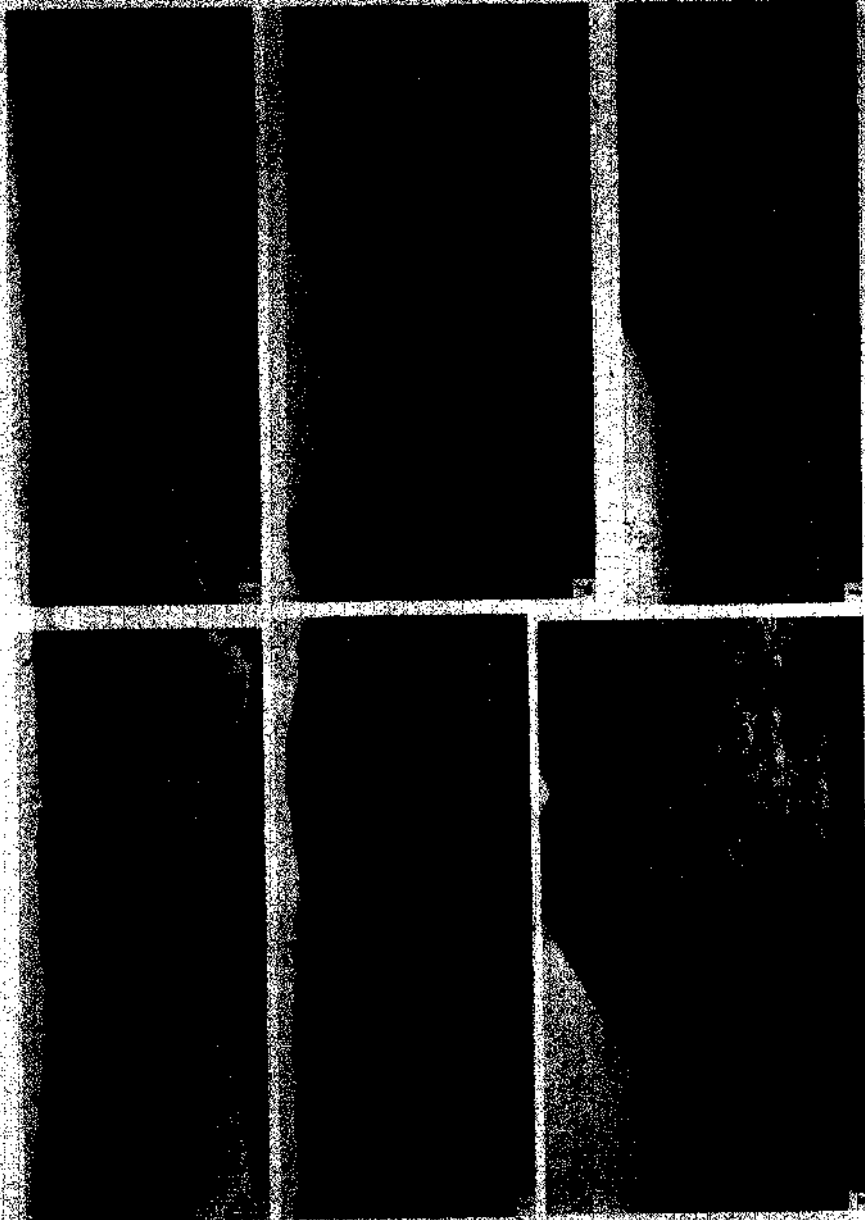










[illegible]

