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MINISTRY OF AGRICULTURE AND PEASANT AFFAIRS (MACA)
AGENCY FOR INTERNATIONAL DEVELOPMENT (AID)
RURAL DEVELOPMENT SERVICES (RDS)

OUR KNOWLEDGE

TRADITIONAL FARMING PRACTICES IN RURAL BOLIVIA

VOLUME I: ALTIPLANO REGION

A TEXTBOOK BY SUBSISTENCE HOUSEHOLDS
EDITED AND ILLUSTRATED BY JOHN K. HATCH

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This very large book is the final product of an immense investment of effort by many people. The primary contributors, of course, were the members of some 140 rural households who participated actively in providing the information contained in these volumes. Just to keep daily records of their subsistence activities, it is estimated that the average family gave no less than one hour per week, which totals more than 6,760 hours (845 days of work) per year by all households combined. In addition, many families gave generously of their valuable time on repeated occasions to write special narratives, to be interviewed and photographed by project field staff, and to teach these outsiders how they conduct different subsistence tasks. Finally, the great generosity of so many rural families in preparing meals, beverages, and even artisan gifts for project staff must be acknowledged here with deepest gratitude.

The single individual who was most responsible for the continuity and success of the Traditional Practices Project was Dr. Aquiles Lanao Flores of Ayacucho, Peru. As External Supervisor and Primary Researcher under this project, Aquiles made at least 15 separate visits to Bolivia during the 40-month period of on-going field activities. Most of these trips were of 3-4 weeks duration apiece. On each trip he visited every one of the 13 participating communities and managed to work both individually and in groups with practically all project participants. He spent hundreds of hours training and supporting Bolivian field staff, community-level supervisors, and helping individual record-keepers to improve their annotation skills. Furthermore, on every trip he worked diligently to maintain the closest of working relationships between the project contractor--Rural Development Services--and the sponsoring institutions of the Ministry of Agriculture (MACA) and the Agency for International Development (USAID). At both the community and government levels, Aquiles demonstrated the highest professional skills combined with his great gifts for working with people. He endured heavy physical hardships and an exhausting travel schedule to honor his responsibilities to the project. Moreover, several members of Aquiles' family--particularly his wife Lucinda, daughter Rocio,

and son-in-law Juan Arce--contributed many weeks of service to the project on a voluntary basis.

To each Bolivian staff member--to Mauricio Mamani, Teodocia Villanueva, Rosalía Quelca, and Julia Siñani of the Altiplano region; to José Morales and Marina Ortuño of the Valles region; and to Jaime Mendoza and Aquilina Tuco of the Tropico region--Rural Development Services expresses its deepest gratitude for their loyalty, spirit of abnegation, endurance of hardship, and exceptional productivity in recording the words and knowledge of rural households. If this book is a monument to the knowledge of rural households, it is also a monument to the staff that gained these families' respect, trust, and friendship, and who also provided the essential service of taking verbally-communicated knowledge and getting it recorded on paper.

From the beginning, the Traditional Practices Project was blessed with outstanding support from its sponsoring institutions. To MACA, the contractor expresses its deep appreciation to three Director Generals of Agriculture: Gober Barja, Osvaldo Antesana, and Jaime Cejas. A special debt of thanks is owed to Hector Nogales, Director of MACA's Department of Statistics, who accompanied Aquiles Lanao on many of his field trips and provided the project with generous logistical support on several occasions. Rural Development Services likewise is grateful to the National Community Development Service (SNDC) for assisting the project in selecting communities, recruiting field staff, and in making available its training centers at Pillapi and Paracaya to hold regional and nation-wide conferences of project participants.

In addition to a counterpart contribution from MACA, and voluntary contributions of time and money by RDS, the Traditional Practices Project was mainly financed by two generous donations from the Agency for International Development. While the money itself was critical to project implementation, so too was the excellent logistical and moral support that came along with it. We were particularly fortunate to have two outstanding project monitors: Harry Wing and Loyd Brown. Loyd in particular has made repeated visits to the field, attended several conferences, and made many friends among project participants: his office has become a national communications and administrative center for the network of rural leaders created as a result of the project. Elsewhere in USAID, the project received further support from two extremely capable Rural Development Officers, Dan Chaij and Robert Thurston, as well as the superb secretary that served both of them, Elfy Vasquez. In fighting to obtain additional funding to finance women's participation under the project, several other AID employees in La Paz and Washington D.C. played key roles--Malcolm Butler, Leticia Kelley, John Harbeson, and Roma Knee.

During the final year of the project, most of its funding support had to be channeled through Cornell University rather than USAID/La Paz due to a cut-off in U.S. economic aid to Bolivia. In establishing alternative arrangements, the administrative cooperation of Norman Uphoff and the Center for International Studies at Ithaca was very much appreciated. Thanks also to the interest of Billie Jean Isbel of the Department of Anthropology, many materials generated by the project have been made available to graduate students conducting primary research on Andean farming systems. One graduate student in particular, Richard Ameral, was able to visit all participating communities in Bolivia and assisted in obtaining photographs of many participants for this book.

The editing, write-up, translation, and publication of Our Knowledge proved to be a terribly demanding assignment. Many people provided assistance at this stage which proved critical. Particular thanks must go to Lidia de Novillo and her team in Bolivia for their competent and efficient translation services. For typing, proofing, and research assistance, the work of Vivian Falk, Renée Santer, and John Lawrence are remembered with special gratitude. Finally, to the dozens of people who at different times made key contributions to the success of this undertaking--simply by the gift of their enthusiasm and encouragement--Rural Development Services expresses its sincere gratitude.

New York City
November 8, 1982

PREFACE

Dozens of books have been written about subsistence farmers in Bolivia, but this one is unique. Our Knowledge is the first book about farming written mostly by subsistence households themselves.

Exactly 139 rural households--representing 13 communities from the three major geographical regions of Bolivia--participated actively in the preparation of this book. The information contained in these pages took three years to record and compile. Some of that information came from diaries kept by 110 male and 123 female household heads. These journals describe their day-to-day subsistence activities--for example, crop tasks, herding livestock, gathering water and fuel, preparing meals, washing and mending clothes, making artisan products, barter and other market transactions, treating health problems, family or community celebrations, and many others. Additional information for this book was taken from interview transcripts of conversations between diary-keepers and external Bolivian field staff--all of whom were born and raised in indigenous rural communities and are native speakers of Aymara or Quechua. Still other information was gathered from written narratives prepared by rural men and women--both individually and in groups--about specific topics they had been asked to describe.

Most of the co-authors of Our Knowledge only speak Aymara or Quechua, yet they learned to read and write in Spanish in elementary school; thus they made all journal entries in this adopted language. More importantly, at least one-third of all record-keepers are illiterate. Nevertheless they were able to keep diaries and produce written narratives by using school children or project staff as their scribes and translators.

This book, then, represents the viewpoint of rural families, not outside observers. Its information was provided by people with little or no formal education, not social scientists or academicians. For this reason, the content of Our Knowledge is not restricted to one specialized field of

study but rather attempts to embrace as many aspects of rural subsistence as possible. Subsistence is a profession requiring almost total self-reliance. As such, it demands considerable knowledge and a very diversified set of practical skills. This is because the campesino household must provide its own food supply, shelter, clothing, blankets, furniture, tools, fuel supply, animal traction, transport services, water supply, police protection, medical attention, recreation, social security, and unemployment compensation--all this without a steady cash income, only a few hectares of land, and in the face of severe climatic risks.

That subsistence is even possible under such conditions is itself dramatic testimony to the talents and ingenuity of campesinos. Our Knowledge describes their capabilities in considerable detail. These chapters tell of the many survival activities of rural households, how they are carried out, and the reasons why they are done the way they are. For the most part, such information is presented without value judgements as to which practices are good or bad, rational or superstitious, appropriate or inadequate. The primary task of this reference book is descriptive, not analytical. The choice of topics was largely left to the farmer co-authors. The contents generally reflect what farmers consider to be important, not what outsiders may be most interested in learning. As a result, this book is likely to frustrate many readers by not answering their specific questions, or by raising more additional questions than it answers. On the other hand, this book will reward patient readers with innumerable new insights into subsistence farming systems and perhaps lead them into new directions of inquiry that never before had occurred to them as relevant. If nothing else, this book offers a fresh, totally non-theoretical and non-professional perspective on the lives of Bolivia's rural poor.

For Whom and Why This Book Was Written

Our Knowledge was created for two different reasons and for two very separate audiences: farmers and non-farmers.

The first reason for this ambitious undertaking was simply to demonstrate that it could be done--to prove that even illiterate rural households could actively participate in the writing of a textbook about themselves. Such an undertaking is intrinsically valuable for both humanitarian and methodological reasons. For the subsistence farm family, learning to keep written records serves to generate feelings of self-worth and pride. As one record-keeper expressed it: "We now have our history." It must be remembered that even if members of the rural household manage to complete several years of formal schooling, it remains extremely difficult for them to maintain or use their literacy skills. Without electricity, without a library, without newspapers and magazines, it is nearly impossible to establish a reading habit. Without postal service, most rural families have

never mailed or received a letter. Even the births and deaths of family members usually go unrecorded. These circumstances effectively render such households insignificant and "invisible", which only perpetuates feelings of inferiority or powerlessness--a root cause of poverty itself.

Teaching farm record-keeping creates an incentive and a convenient means of maintaining or improving household literacy skills. The journals themselves can serve important family decisions. For example, the calculation of labor use, net income, or yield performance for individual crops can help the family decide how to redistribute its available resources more productively. Furthermore, farm journals can lead to other writing skills that are important to the process of community development. For example, farmers who are experienced in keeping written records can also easily learn to conduct a census or survey of community needs, draft project plans and budgets, prepare proposals or letters to solicit external resources, manage project financial records, or evaluate project results. Until now, these skills and services have been provided almost exclusively by external technicians, by "outsiders". But this is not truly necessary. Worst still, it results in domination and control by people who live in the cities. Until the rural poor learn to participate in the management of written information, they will never free themselves from their poverty nor from the paternalism of government and private sector institutions offering development assistance.

A final point to be made regarding the farmer audience for this book is that Our Knowledge is first and foremost a textbook by farmers written for other farmers. Each rural household which contributed to this book will receive its own three-volume copy, translated into Spanish. Families from widely separate rural communities and regions will now be able to compare the similarities as well as the differences between their subsistence skills and activities. Hopefully they will discover new ideas and insights applicable to their own subsistence. But even if this book is not read--even if it is too lengthy to be read in its entirety by most farm households--this document will nevertheless stand by itself as a first-of-its-kind achievement by subsistence farmers, and as a testimonial to themselves and future generations regarding the importance of rural knowledge.

The second reason this book was written was to educate outsiders or non-farmers about what campesinos know. The need for such education is absolutely urgent. In the most negative context, there exist many non-farmers (students and professionals among them) who mistakenly believe that subsistence farmers are ignorant and stupid people who have little useful knowledge of their own. More positively, a growing number of students and practitioners of rural development have convinced themselves that subsistence farmers indeed are very knowledgeable, and that this knowledge must be consulted and mobilized on behalf of program decision-making if increased food production and rural income are to be achieved. However, such

people usually lack the time to collect the knowledge they seek by spending hundreds of hours listening to farmers.

Our Knowledge provides a handy reference book for both kinds of non-farmers. It can be consulted by those who wish to learn more about subsistence households in Bolivia but are unable to travel to that beautiful country; or by those who visit or reside in Bolivia but are unable to leave the city; or for those who travel frequently to the countryside but do not have time to spend hours, days, or weeks learning about what farmers do and what they know. In particular, it is hoped that this book will prove useful to university students (in Bolivia and abroad), farm extension agents and researchers, community development agents, national planners, consultants to rural development programs, government policy-makers, the staffs of international development assistance agencies, and personnel of the broad array of private sector voluntary institutions (domestic and international) which sponsor programs seeking to assist the rural poor. Finally, it is our fervent desire that the methodology which produced this book will be widely imitated and improved upon so that similar textbooks of traditional knowledge will make their appearance in other countries of the Third World.

How the Information for This Book Was Collected

Having identified the purposes and intended users of Our Knowledge, it remains to be clarified the methodology that produced the book. To provide this clarification it is necessary to describe an undertaking known as the Traditional Practices Project. This will be a very succinct summary, however. Readers interested in more detail are urged to directly contact Rural Development Services.

In early 1979 the Agency for International Development (AID) and the Bolivian Ministry of Agriculture and Peasant Affairs (MACA) approved a proposal by Rural Development Services (RDS) to implement a two-year research project to document the agricultural and livestock practices of indigenous peasant farmers. The study was to cover the three principal geographic regions of Bolivia: Altiplano (highland plateau), Valles (temporate valleys), and Trópico (tropical lowlands). The project's ultimate goal was to produce a detailed, illustrated textbook describing the farming techniques of subsistence households, but from the perspective of the farmers themselves.

The Traditional Practices Project initiated field activities in April 1979 and was carried out in three one-year stages. During the first stage (April 1979 to March 1980), the project was begun and its procedures tested in only two regions: Altiplano and Valles. During the second stage, the project was expanded to the Trópico region. Simultaneously its focus was expanded from only crops and livestock to all aspects of

rural life, and female staff was added to allow the project to work with rural women. During the third stage (July 1981 to June 1982), record-keeping skills were introduced to female participants for the first time, and additional emphasis was placed on collecting information about rural nutrition, health, hygiene, and artisan crafts.

In each region the procedures followed by the project were roughly the same. First, a Bolivian professional (rural background, native speaker of Aymara or Quechua) was selected as the full-time supervisor of project activities. Second, a reconnaissance of rural communities, including a general meeting with residents in each community, was completed. The purpose of the project was explained in each locality using the indigenous language. It was explained that project participation was strictly voluntary and required a community-wide decision. Depending on the size of the community, and intensity of resident interest, anywhere from six to 15 families were invited to participate as record-keepers, but these had to be elected by democratic vote of the community-at-large. These commitments were subsequently formalized in a legal document signed by all parties.

Next, all participating households were taught--by their respective Bolivian professional--to keep diaries of their subsistence activities. One representative from each community was selected (by participating households) to supervise this record-keeping and to make sure--via twice-monthly farm visits--that farm records remained up-to-date. Each household was paid the equivalent of US$5 for each month of up-to-date records, and each community supervisor received US$12-25 per month (depending on number of households covered) for local supervision.

After the first year, a female staff member was added to each region to work with participating rural women. Again, all were of indigenous origin and speakers of Aymara or Quechua. These regional supervisors, as well as the Bolivian professional assigned to work with male participants, were responsible for conducting the following tasks: (1) to visit each participating community at least twice a month and each household at least once a month; (2) to supervise farm records and make suggestions for improvement; (3) to participate with members of rural households in different farming activities (with the supervisor as student and the farmer as teacher); (4) to document these activities through interviews and observation; (5) to prepare at least ten interview transcripts or activity descriptions per month (2-5 pages each); (6) to extensively photograph or sketch illustrations of the activities described; and (7) to pay monthly stipends to participating households.

In turn, the Bolivian field staff was supervised by an external staff member of RDS--a Peruvian professional with over 20 years of field experience with subsistence farmers, and a native speaker of Quechua. Known as the Principal Researcher, this individual visited Bolivia at 3-4 month intervals throughout the duration of the project. Each visit lasted 21-28 days and involved visits to all communities and meetings with all participants. The responsibilities of the Principal Researcher included: (1) supervision of journals, (2) training of community supervisors, (3) training of Bolivian regional supervisors, (4) organization of regional and nation-wide conferences of participants, (5) general logistical support of RDS field staff, and (6) maintenence of institutional relations with sponsoring agencies.

The ultimate responsibility for project design, choice and modification of methodology, compilation of materials, editing and final write-up of the book, and general project administration was in the hands of the so-called Principal Analyst, based at RDS headquarters in New York. During the project he visited Bolivia twice a year.

The evolution of the participation of rural women in the Traditional Practices Project deserves to be highlighted. During the project's first year only male household heads were involved. In the second year, rural women were included in the research design. However, their participation was limited to that of interview respondents; they did not keep diaries and did not receive monthly stipends. In July 1981, funding for male record-keeping expired. Even so, more than 100 out of 110 male participants chose to continue keeping journals on a voluntary basis. But more important, their wives now began to clamor for the opportunity to keep diaries of their own (and earn a monthly stipend as well). This prospect had not been considered feasible earlier in the project because most of the female heads-of-household were either illiterate or near-illiterate. Nevertheless, a decision was made to experiment. With the administrative cooperation of Cornell University, a follow-on grant was obtained from AID/Washington to finance an additional year of record-keeping, this time by women. Experience demonstrated that the diaries kept by women were even more detailed than those of their husbands in most instances. More significantly, even though the majority of rural women were unable to read and write, they relied upon school children or other literate family members--serving as scribes--to translate their commentaries into Spanish and to enter them in their journals. Thus the Traditional Practices Project was able to demonstrate conclusively that illiteracy is not a serious obstacle to the participation of rural households in recording information about themselves.

Writing the Text

Field activities under the project terminated in July 1982. Since the early months of the undertaking all written and visual materials were gradually being assembled and organized at RDS headquarters in New York. Personal diaries of participating households were reviewed, summarized, and returned to their owners. The most detailed and informative of these diaries (several from each region and at least one per community) were transcribed into typed, more easily readable Spanish. Of these journals, over 1,000 pages have now been translated into English. These constitute the core of a "Poverty Library" managed by RDS. These materials are being made available to students and scholars wishing to do research from primary sources and data generated by the Traditional Practices Project. Other materials include maps of subsistence farm layout, crop summaries (labor use, yields, net income) from 1978 to the present, and hundreds of slides awaiting organization into filmstrips. Unfortunately, two-thirds of all project photographs were accidently lost in the diplomatic pouch between La Paz and New York.

Editing and write-up of the final manuscript began in earnest in May 1982. Volume I was completed in the period May to November 1982, Volume II from November 1982 to March 1983, and Volume III between March and June 1983.

The volume of material generated by the project runs into tens of thousands of pages of written narrative, in Spanish. This abundance resulted in difficult editing problems. Many narratives on the same topics were prepared in different communities and by different farmer-authors or field staff; most have pieces of great interest while also providing much repetitious material. Since the narratives themselves have, in most cases, been translated twice--from Quechua or Aymara to Spanish, and from Spanish to English--direct quotes have been kept to a minimum. The most convenient way to distill the collective information and at the same time keep it within manageable volume was to paraphrase the material. Inevitably, such paraphrasing obscures the boundary between content contributed by farmers and content originating with the editor's consensus interpretation of what he has read. Furthermore, some rural households contributed much more information and detail than others. However, for reasons of equity, all project participants have been listed as co-authors of equal importance in Chapter I. These decisions will not satisfy the purist researcher, but in the editor's opinion they were made necessary by the nature of the book and the material upon which it is based.

As for illustrations, some are based on slides. Others are based on sketches made by RDS field staff and submitted with their narratives. In a few instances, the illustrations are the editor's best recollection of scenes or tools he has witnessed personally in Bolivia. The original concept for this

book was to profusely illustrate it with many more pictures than it currently has. Budget limitations prevented the inclusion of a large number of photographs, and the tragic loss of two-thirds of the project's photographic material seriously restricted the raw material on which pen-and-ink illustrations might be based.

The final draft of this book was compiled and written in New York--thousands of miles distant from the sources of information. Since the editor could not contact his many co-authors by phone, and since he is not a subsistence farmer himself, it is very possible that his interpretations of the original Spanish narratives and journal entries--when their precise meaning was not entirely clear--may have occasionally done violence to the true facts. For these errors, the editor asks the indulgence of both the co-authors and the readers.

All values in Bolivian peso currency given in this book have been converted to U.S. dollar equivalents at the following exchange rates:

-Before Nov. 1979 :	20 pesos = US$1
-Nov.1979 to Jan.1982:	25 pesos = US$1
-After Jan. 1982 :	44 pesos = US$1

●

In the English text, all terms in Spanish, Aymara, or Quechua are underlined only the first time they appear in a given section. Where the meaning of these foreign words is unclear, the reader is referred to the Glossary at the end of each volume.

CHAPTER I.

THE CO-AUTHORS OF THIS VOLUME: FIELD STAFF, COMMUNITIES, AND RURAL HOUSEHOLDS

From the Altiplano region of Bolivia, five rural communities were selected to participate in the Traditional Practices Project. Three of these communities--Yuka, Huacuyo, and Killay Belen--are located in the immediate vecinity of Lake Titicaca, in the more humid northern districts of the highland plateau. However, Huacuyo and Killay Belen are located on the Copacabana peninsula on the Lake's western shore, while Yuka is found across the water near the eastern shore. Thus, it requires over a day's travel to reach all three communities. The remaining two communities--Chiarhumani and Jaruma--are located 50-75 kilometers southeast of Lake Titicaca and almost directly south of the city of La Paz. They occupy a considerably more arid location of the Altiplano. Jaruma, which is actually a cluster of four smaller communities, is perched on the very rim of the Altiplano, where the plateau falls sharply into the temperate valleys region. In total, these five communities contributed 82 participants to the Project. Of these, 37 men and 45 women kept daily records of their subsistence activities. In all, a total of 51 households were represented.

To supervise this record-keeping effort--and to collect abundant additional information through observation and personal interviews with participating households--the Project employed one Bolivian professional to work with the male participants and eventually three paratechnicians to work with the female participants. All field staff were born in indigenous communities, and all were native speakers of Aymara. Between them, this field staff generated over 800 pages of descriptive material and interview transcripts on the subsistence activities of rural households.

In this chapter, we first present a brief biographical sketch of each of the field staff members who contributed so importantly to gathering the information contained in this volume. Next, each participating community will be presented in a two-page description, followed by photographs and personal data about each record-keeper and their household.

BOLIVIAN FIELD STAFF FOR THE ALTIPLANO REGION

Mauricio Mamani Pocoata

From April 1979 through July 1981, MAURICIO MAMANI POCOATA served as the Bolivian Supervisor of the Traditional Practices Project for the Altiplano Region. Mauricio was born in 1935 in the Aymara community of Irpa Chico, Ingavi Province, Department of La Paz. After completing primary school, he was forced to leave his community in order to continue his studies. In 1958 he graduated from the Warisata Normal School (Omasuyos Province) and became a rural school teacher. Two years later he became involved in anthropological research as the field assistant of Dr. William E. Carter (University of Florida, Gainesville). This was the beginning of nearly two decades of distinguished participation in field research projects conducted with international and national institutions including the Interamerican Agricultural Service, Columbia University, Cornell University, University of Wisconsin, University of Florida, the Canadian International Development Agency, the National Council of Agrarian Reform, and the National Museum of Ethnography and Folklore. In 1974, Mauricio obtained a degree in Social Anthropology from the Pontifica Universidad Católica of Lima, Peru; as such, he is one of the first members of the Aymara race to have completed professional studies at the university level. An internationally respected authority on Andean culture, he has written or co-authored more than a dozen books and articles on such subjects as traditional Aymara farming practices, case studies of individual indigenous communities, and traditional use of coca He has made delivered papers at anthropology conferences in Peru, Colombia, Panama, United States, Spain, and Japan. At present, Mauricio directs the Division of Prevention, Rehabilitation, and

Research of the National Council Against Drug Abuse (CNLCN), a dependency of the Presidency of the Republic. Mauricio is married to Dominga Callisaya, also of Irpa Chico. The couple has four sons.

Rosalía Quelca Ayala

ROSALIA QUELCA AYALA, age 35, served as as a field supervisor of female participants in the Traditional Practices Project from July 1981 to August 1982. She was responsible for the communities of Yuka, Huacuyo, and Killay Belen. Rosalía is an Aymara, born in the indigenous community of Rosapata Huancarama, Pacajes Province. After completing nine years of formal schooling, she became a promotora social (community change agent). In this capacity, she was worked in the promotion of women's groups in more than 16 communities since 1970. Rosalía also participated as a field researcher in evaluating the impact of the Bolivian Food for Development Program (PL480-Title III) in January 1982. She has a daughter, Solar, born in May 1982.

Teodocia Villanueva Solares

TEODOCIA VILLANUEVA SOLARES, age 24, also served as a field supervisor of female participants in the Traditional Practices Project from July 1981 to August 1982. She was responsible for the communities of Chiarhumani and Jaruma. Teodocia is an Aymara, born in the indigenous community of Eucaliptus, Department of Oruro. Upon completing her primary and secondary schooling in Eucaliptus, Teodocia joined the National Community Development Service as a promoter of rural women's groups. She too participated as a researcher in evaluating the impact of the Bolivian Food for Development Program (PL480--Title III) in January 1982. In the short space of one year, Teodocia prepared over 75 narratives describing the subsistence activities of rural women.

JULIA SIÑANI ARUQUIPA, age 27, served as the first supervisor of female participants of the Traditional Practices Project. For a full year--from July 1980 to June 1981--she was responsible for covering all five communities of the Altiplano region. Upon her departure from the project, this difficult supervision responsibility was divided between Rosalía and Teodocia.

Julia is an Aymara, born in the city of La Paz. She completed seven years of formal schooling, followed by specialized training in manual arts and cooperatives. Before joining the project she served as a promotor of rural women's groups for the National Community Development Service.

COMMUNITY OF YUKA

The community of Yuka belongs to Canton Escoma, of the Province of Camacho in the Department of La Paz, and is located only about five kilometers north of the town of Escoma. Yuka occupies a broad plain about two kilometers long by one kilometer wide, and is flanked on three sides by gently sloping mountain ridges. To the north Yuka is bordered by the ex-hacienda Cala Cala, to the south by the community of Tihuanacu, to the east by the ex-hacienda Tutucucho, and to the west by the community of Yocallata.

Yuka is known as a comunidad originaria or native community, with land holdings controlled by its resident families that were legalized over a century ago. This community was never an hacienda. Its residents never labored for a patrón. As certified by the circuit land judge in 1883, Yuka's land holdings total 790 hectares, which were distributed among 17 originarios, or original families, and 24 agregados or non-locally born household heads. Today the community has 64 resident families, some of them landless. About half the community's land is located on the plain and the adjacent hillsides in close proximity to the homes of the residents. In this settled agricultural district there exist about 75 hectares of cultivable land, most of which is quite fertile and can support intensive farming. The other half of community property is known as the apacheta or annex. It is located several kilometers from Yuka itself and is used primarily for livestock grazing.

Until the early 1950's, Yuka was considered an ayllu or indigenous community and was governed by traditional authorities known as jilacatas or mallcus. But following Bolivia's Agrarian Reform, this ancient leadership structure was replaced by the Agrarian Syndicate. The Syndicate is composed of 13 separate positions--or secretaryships--covering the posts of Secretary General, Finances, Agriculture, Livestock, Justice, Conflicts, Roads, Education, Syndicate Organization, Communications, Cooperatives, and Female Participation. Within the education area there exists a School Assistance Committee or Junta Auxiliar with three alcaldes or mayors entrusted with the care of school classrooms and the residences of teachers. All the above posts are rotational and officers are changed annually.

Yuka has a primary school which offers instruction through the fifth grade. There are three teachers and 120 students. Yuka also has an agricultural cooperative society with a total of 60 members. A cooperative potato plot is cultivated each year using improved seed varieties, fertilizers, and insecticides. To facilitate the marketing of its joint potato crop, the cooperative has constructed a modest all-weather silo. About one half of

the residents are Catholics while the other half belong to the Adventist Church, which has constructed a place of worship within the community proper.

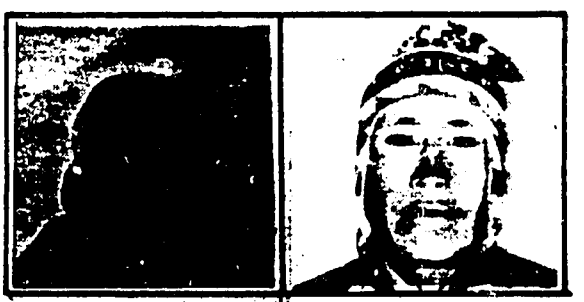
The economy of Yuka is based on fairly diversified agricultural production. The community's bottomland is protected on three sides. Although located at an altitude of 3,655 meters (11,991 feet) above sea level, and even though it has no permanent access to irrigation water, the flat agricultural zone of Yuka is humid and temperate enough to grow a wide variety of crops: potatos, broadbeans, peas, oca, papaliza, barley, oats, quinua, and tarwi. Continuous cultivation cycles of 4-5 years without returning to fallow are commonplace. The typical farm household cultivates about 1.5 hectares in as many as two dozen scattered plots.

With regard to livestock holdings, Yuka is known as a production center for pigs and growing numbers of dairy cattle. The typical family also raises 15-25 head of sheep, at least one burro for transporting fodder and produce, and minor flocks of poultry. Because of the community's close proximity to the Peruvian border, local residents are faced with abundant opportunities for barter, for the purchase of Peruvian factory-made goods (often contraband) for resale, and for the marketing of livestock and animal byproducts. Nearby Escoma hold a Sunday livestock market that attracks many hundreds of buyers and sellers every week. Yuka has a reputation in the northern Altiplano districts as a supplier of costumes used in the traditional festivals held on both sides of the border.

As part of the Traditional Practices Project, ten women and 11 male participants learned to keep daily records of their farming activities, and several prepared written narratives of their farming practices.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF YUKA

JULIO CONSTANTINO MAQUERA, age 32, has 7 years of schooling and served as the community supervisor of record-keeping. He is married to DOMINGA PATZI, age 28, who completed 6 years of school. The couple has 3 children, ages 1-5 years. They cultivate 3 hectares of varied crops. Livestock holdings include 1 cow, 10 sheep, 4 pigs, 1 burro, and poultry. Julio sews costumes for rent and sale.



JUSTO YANARICO CALLE, 37, and HILARIA QUENALLATA, 43, have two children aged 12-14. Only Justo has formal schooling (5 years). The family cultivates 1 hectare devoted mostly to potato and barley crops. They raise 15 sheep and 3 pigs.

PEDRO MAQUERA YANA, 29, completed 8 years of school. His wife MODESTA YANARICO, 29, studied for two years. They have three children, ages 3-10. The family cultivates 1.6 hectares. Livestock includes a team of oxen, 7 sheep, and 3 pigs. Pedro has served the community as a School Mayor.

SOTERO PATZI, 49, and ANGELICA LAIME, 40, have four children, ages 4-15. Only Sotero received formal schooling (3 years). The family cultivates one hectare of assorted crops. Its livestock holdings include 3 cattle, 16 sheep, and 2 pigs. The oldest daughter, LIDIA PATZI, with 7 years of school, keeps her mother's journal (as her scribe).

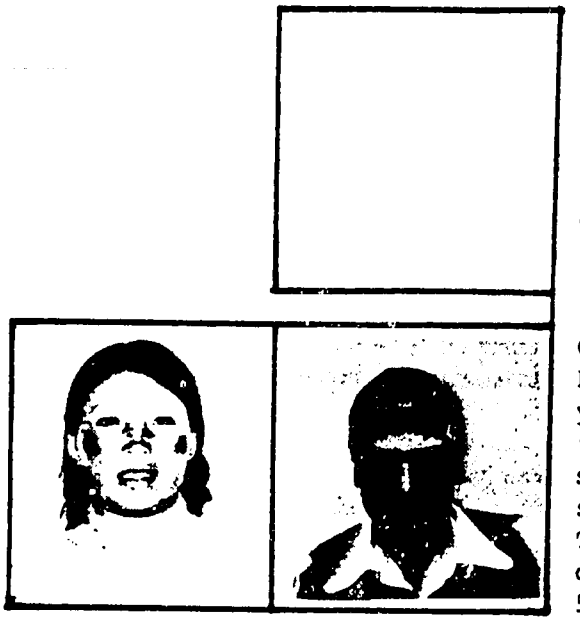
PAULINO PATZI CALLATA, 23, with 7 years of schooling, died from an accident in 1981. His wife URSULA MAQUERA, 26, became a record-keeper after Paulino's death. She has a daughter, age 1 year. The household (with assistance from relatives) farms nearly 2 hectares. Its livestock holdings include a team of oxen, 25 sheep, 5 pigs, and a burro.

CALIXTO YANARICO SURCO, 41, and VALERIANA, 40, both completed two years of school. They have three children, ages 8-13. Their oldest daughter, SIMONA YANARICO, with 8 years of school, keeps her mother's journal (as a scribe). The family cultivates 1.4 hectares, mostly planted to potatos and barley. Livestock includes a team of oxen, 18 sheep, 8 pigs, and a burro.

TOMAS YANARICO SURCO, 47, is married to AGUSTINA PATZI, 49. Tomás received one year of schooling. The couple has one remaining dependent, a son age 6. The family farms 3 hectares. Its livestock include 2 cattle, 12 sheep, 12 pigs, and 2 burros. Tomás has served as President of the Cooperative.

SANTIAGO YANARICO, 47, and MANUELA PATZI, 32, have four children ages 8-13. Only Santiago has formal schooling (4 years). Their household farms 2.9 hectares of crops, while raising 3 cattle, 25 sheep, 10 pigs, and 2 burros. TORIBIA YANARICO, 13, with 8 years of school, keeps her mother's journal.

PONCIANO CALLE LARUTA, 39, and JUANA YANARICO, 50, have three children ages 10-19. Ponciano received 4 years of schooling, his wife none. The family farms 1.2 hectares of crops. Its livestock includes a team of oxen, 16 sheep, 4 pigs, and 1 burro.



LORENZO PATZI QUENALLATA, 61, has no formal schooling. He has served his community as Secretary General of the Agrarian Syndicate. He is married to Casimira Trujillo, 60. The couple has five children, ages 6-19. The family cultivates 1.4 hectares of crops. It raises 3 cattle, 10 sheep, 9 pigs, and 2 burros.

CALIXTO PATZI MAQUERA, 32, and JULIA LARUTA, 31, have both received two years of formal schooling. They have two children, ages 10-15. The oldest son, JUSTINO PATZI, with 11 years of school, keeps his mother's journal. The family cultivates 1.4 hectares of crops. Its livestock includes 2 cattle, 5 sheep, 3 pigs, and a burro.

COMMUNITY OF HUACUYO

The community of Huacuyo belongs to the Canton Tituo Yupanqui, of the Province of Manco Kapac, in the Department of La Paz. The entrance to the community is about ten kilometers south of the town and shrine of Copacabana, which is situated on the tip of a peninsula jutting out into Lake Titicaca from its southern (Peruvian) shore. A line drawn due south across the lake between Escoma and Copacabana would pass through Huacuyo, which is located an easy walk from the border with Peru.

Huacuyo is an ex-hacienda which was expropriated by the agrarian reform. The former property of the hacienda was extensive, reaching across the mountains and down to Lake Titicaca itself; and following expropriation, hacienda lands were divided up among a number of indigenous communities of which Huacuyo is one and Killay Belen (also a project participant) is another. Under the process of agrarian reform, the former colonos of the Hacienda Huacuyo--some 202 families--were collectively given title to 3,516 hectares, of which 1,614 hectares (46 percent) were assigned for exploitation by individual families, 1,876 (53 percent) were designated as communal pasture, and the balance allocated for a cooperative farm, a public school, and a playing field.

Aside from the property distributed above, an additional 3,846 hectares of the former hacienda lands reverted to the Bolivian Government for purposes of subsequent agrarian reform distribution. On these lands some 51 new families have settled, but without title. Most are sons of the original hacienda workers who were too young to qualify for property at the time the land was distributed. Today they are actively seeking to legalize their actual tenure arrangement with the Agrarian Reform Agency. Of the government lands, 1,169 hectares (30 percent) are classified as cultivable and 2,677 hectares (70 percent) as pasture and areas with no productive use.

The old hacienda house, now converted into a school, remains the center of the very extensive community of Huacuyo. It is administered by three organizations. The first is the Agrarian Syndicate with its 13 positions that follow a standard model throughout the country. The second organization is the Education Committee, which consists of eight members including the President, the Apoyo Escolar, School Mayor, Secretary of Education (of the Agrarian Syndicate), and four representatives or vocales from each of Huacuyo's four districts which are known respectively as Sopocachi, Ajanani, Callamani, and Calamarca. The third communal organization is the agricultural cooperative, which has a four-member Administrative Council and a four-member Vigilance Committee.

The public school in Huacuyo is categorized as a núcleo escolar campesino or rural education center offering complete primary instruction (five grades) and one year of intermediate schooling. The local student population is roughly 225 children who are taught by five professors. The community has built a brand new school beside the old hacienda house. Additionally, for the most distant district of Ajanani a zonal school has been established. Through collective community action, residents of Huacuyo have also completed the construction of a health post. The community also has a limited instalation of electricity.

The majority of the residents of Huacuyo are Catholics, but about 190 people claim to be Mormons and 150 more to be Baptists. While there exists mild separatism among these groups, there is little sign of outright conflict as is true in other Altiplano communities. Of course, regardless of religious affiliation, all residents are required by the Agrarian Syndicate to share equally in the burdens of community work projects.

In addition to being very extensive, the community of Huacuyo is characterized by very broken terrain. Seven separate mountain peaks surround the community, three minor streams run through it, and there is even a small lagoon which provides Huacuyo residents with an abundant supply of totora reeds for a variety of basketry and roofing needs. While the lowest part of Huacuyo rests at 3,730 meters (12,123 feet), the highest elevations reach 4,000 meters (13,000 feet). These characteristics provide local residents with a rich diversity of micro-climates for supporting different crop varieties and rotations. The steepness of the terrain in many parts of the community makes even the use of animal traction impracticable. As a result the use of the huiso or Andean footplow, combined with very labor-intensive soil tillage practices, is quite common in Huacuyo.

The typical participating household from Huacuyo cultivates about 2.8 hectares of land, of which usually more than one hectare is planted to potatoes and one-half hectare to barley. Other crops include broad beans, ocas, and tarwi. With its extensive pasture resources, livestock raising is well developed, and indeed the former hacienda was predominantly a livestock and particularly dairy operation. On the average, a Huacuyo family raises about six head of cattle, fairly large flocks of sheep (average 45 head), about 5 pigs, at least one burro or several llamas for transport, and a few chickens.

As part of the Traditional Practices Project, at least five male household heads learned to keep daily records as well as provide narrative descriptions of their practices. In the project's second stage, the wives of four of these men also learned record-keeping together with two women from new families. Brief descriptions of the participants follow.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF HUACUYO

ANDRES COAQUIRA QUISPE, 42, has served as the community supervisor of record-keeping. He has 5 years of schooling. His wife PETRONA COAQUIRA, 38, has completed 4 years of school. The couple has two children, ages 9-11. Andrés lived 8 years in Lima, Peru; he is a skilled carpenter, tailor, and radio technician. The family cultivates 4.5 hectares of crops. It raises 4 cattle, 45 sheep, 3 pigs, and a burro.

RAMON MAMANI, 48, has two years of schooling. His wife ANTONIA RAMOS, 43, has none. The couple has a daughter, age 13. Ramón is a costume maker, tailor, and musician. His family farms 4 hectares of crops. Its livestock include 3 cattle, 35 sheep, 2 pigs, and a burro.

MARIANO VELASQUEZ CHOQUE, 55, and his wife JOSEFA MAMANI, 57, have no formal schooling. Three of their four children are now independent. The family cultivates 5.5 hectares of land. It raises 13 cattle, 36 sheep, 5 pigs, 3 llamas, and a burro. Mariano has won awards in agricultural fairs for his high quality potatoes.

VALENTIN QUISPE TITO, 41, and his wife SABINA NINA, 45, have four children ages 11-19. Valentín received 5 years of schooling, his wife none. The family grows 6 hectares of crops and raises 4 cattle, 30 sheep, and 2 pigs.

MODESTO PAREDES QUISPE, 29, is married to Celedonia Velazco, 21. Modesto has nine years of school and his wife has four years. The couple have no children. Modesto is skilled as a tailor and a weaver. His household grows 3.5 hectares of crops. Livestock holdings include 6 cattle, 50 sheep, and a burro.

PASCUALA VELASQUEZ UCEDO, 29, has four years of schooling. She has two children, ages 1 and 7. Pascuala is skilled as a weaver. She also serves her community as a traditional healer. The family has 16 hectares of land. Its livestock includes 3 cattle, 15 sheep, 1 pig, and 2 horses.

VICTORIA PARI QUISPE, 21, is single. She has completed 9 years of school. Victoria is skilled as a weaver and has considerable experience in the marketing of agricultural products. She owns no land or livestock. Victoria prepared an album of over 50 medicinal plants for the Traditional Practices Project.

COMMUNITY OF KILLAY BELEN

The community of Killay Belén belongs to the jurisdiction of the pilgrimage town of Copacabana, of the Province of Manco Kapac, in the Department of La Paz. Its lands run down a steep mountainside into a protected valley that broadens out until it reaches the shore of Lake Titicaca. Killay Belén formerly belonged to the Hacienda Huacuyo, and its residents as well as those of Huacuyo proper were colonos of the Bedoya family.

With the expropriation of the hacienda, however, the residents of Killay Belén did not fare as well as their counterparts in Huacuyo. To begin with, the former patrón managed to get the choice bottomland classified as a a medium-sized farm. This result was challenged by the community but the issue divided Killay Belen: some residents sided with the ex-landlord in hope that he would sell his remaining property to them; the others demanded full expropriation and equitable redistribution. The final outcome favored those who sought to purchase the property. Subsequently the patrón sold out, which engendered considerable confusion and inequity of land tenure among the residents, with some families ending up with more and better quality land than others; further exchanges of land use rights to redress some of the imbalances has resulted in considerable inconsistency between official title surveys and actual occupancy. Furthermore, some of the key documents in agrarian reform archives have been lost or misplaced so that it is currently impossible to estimate with precision the total area belonging to the community.

Under the agrarian reform some 66 families were registered as beneficiaries of the communal distribution, but of these 22 have left Killay Belen and migrated to the city of La Paz and elsewhere. Most reappear on September 14 when Killay Belen celebrates one of its most important festivals. Meanwhile they allow their holdings in the community to be farmed by relatives on a partnership basis.

Killay Belen is administered by the Agrarian Syndicate, but unlike other Altiplano communities, this one has only eight instead of 13 positions due to the small number of resident families and the fact that the leadership posts must rotate annually. A second leadership organization involves the school assistance group composed of three mayors who supervise the attendance of the students as well as the teacher, do errands for the school including the delivery of messages to the nucleo escolar, and coordinate school support tasks in general. Their responsibilities last for the entire ten months of the school year. Finally, Killay Belén has a religious authority known as the Regidor which rotates to a new individual every four months. The regidor's responsibilities include attendance at Sunday mass in Copacabana, to serve as a liaison between the church and the

community, and, to have a mass said in the community's name once each semester at the completion of the regidor's tenure.

The majority of Killay Belen's residents are Catholics, but at the same time they practice their traditional religious rites with many rituals of worship to the Pachamama and to the mountain peaks surrounding the community (five major and two minor ones), which are regarded as protective dieties. Killay Belen has a large chapel which most local Catholics regard as a sanctuary of the Virgin Mary. For this very reason many pilgrims visit the community each year; it is said that some have come from as far away as Lima, Peru. Communal masses are held at the chapel several times each year. Nonetheless, there are three resident families which have joined the Evangelical religion.

With the exception of its apron of flat bottomland leading up to Lake Titicaca, the land of Huacuyo is located on extremely steep hillsides. The cultivable land is extensively terraced to prevent erosion, and while most families employ some animal traction, soil tillage is predominantly conducted with the footplow, as is the case in Huacuyo. Two small spring-fed streams descend into the community from the mountains above, but the supply is insufficient for extensive irrigation, so dryland farming remains the norm.

What makes Killay Belén truly unique among its Altiplano neighbors is that it is extremely well-protected from the generally inhospitable weather conditions--such as sudden winds and temperature variations--that characterize so much of the highland plateau. Facing toward the lake with the steep mountains at its back, Killay Belén enjoys a climate sufficiently temporate to grow corn. At the Titicaca shoreline, the altitude is 3,655 meters (11,880 feet) above sea level. Even so the locals cultivate extensive plots of a stubby corn known as the "maize of the Incas". However, the dominant staple crop of the community remains potatoes, followed by barley grown mainly for the fodder of draft animals, and finally the traditional crops of broad beans and ocas. Cultivated area ranges from 1-3 hectares per family and distributed in many scattered plots of varying size and quality.

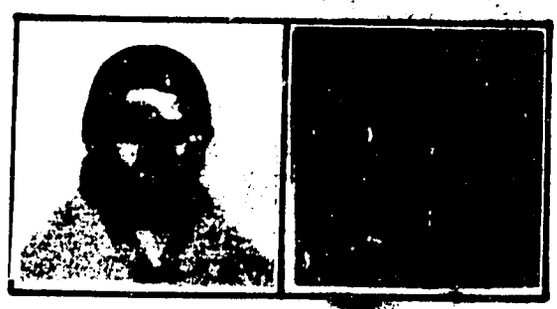
Most resident households manage fairly large flocks of sheep, usually exceeding 35-40 head. The typical family also has a team of oxen, a few pigs, and one or more transport animals (burros or llamas). Chickens and guinea pigs provide the household with its principal meat source for special occasions. Despite the proximity to the lake, fishing is not a primary activity in Killay Belén.

Killay Belen contributed six male and six female record-keepers to the Traditional Practices Project, as described in the following profile.

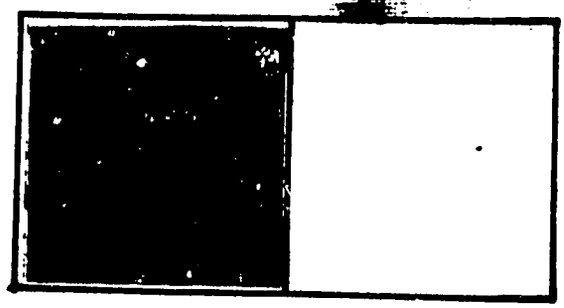
A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF KILLAY BELEN

TOMAS HOYO SOTO, 42, and his wife MAXIMA CACHICATARI, 36, have a daughter, 16. Tomás has 3 years of schooling. He has served his community as Secretary General. The Hoyo household cultivates 6.5 hectares. Its livestock holdings include 3 cattle, 50 sheep, 2 pigs, and a burro.

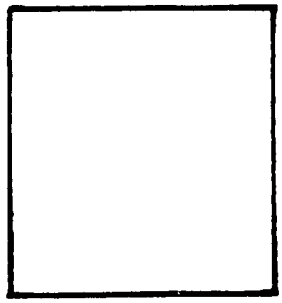
PEDRO ILLA COLQUEHUANCA, 65, is a widower with his two daughters, ages 16-32. Pedro has no formal schooling. His household owns 5.5 hectares and grows potatoes, corn, wheat, barley, oca, and quinua. Livestock holdings include 3 cattle, 50 sheep, 4 pigs, and 1 burro. Pedro's household has completed five farm journals in two years.



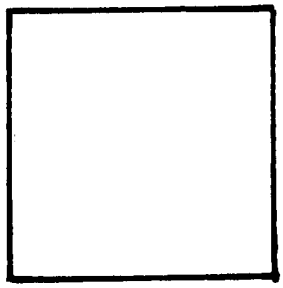
SEVERO RAMOS QUERA, 36, and VALENTINA MAMANI, 31, have three children ages 5-13. Severo received two years of schooling, while Valentina studied for one year. The family owns 4 hectares. Its livestock holdings include a bull, 48 sheep, 4 pigs, and a llama. Between them, Severo and Valentina have completed five farm journals.



FELIPE ROJAS APAZA, 37, and his wife RICARDA ILLA, 32, have five children ages 1-14. Felipe has 3 years of schooling and Ricarda completed 5 years. The household controls 4.5 hectares of land, of which half is farmed by Ricarda. Livestock holdings include 4 cattle, 26 sheep, 5 pigs, and a burro.

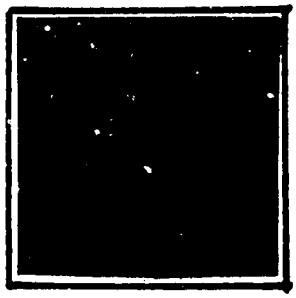


TOMAS COLQUEHUANCA, 61, has no formal schooling. He is married to Juana Aruquipa. The couple has three children ages 15-22. The Colquehuana household farms 3 hectares planted to potatoes, corn, oca, broadbeans, peas, barley, and quinua. The family's livestock holdings are not known.



FELIX QUISPE, 25, has four years of schooling. Felix is an instructor of religious doctrine as his secondary occupation. He is not married. Felix cultivates 1.5 hectares of potatoes, corn, barley, and oca. He also raises 12 sheep.

MICAELA OSCO DE CACHICATARI, 57, has no formal schooling. She is married to Antonio Aruquipa, 60, who has one year of schooling. The couple raised seven children, ages currently 22-40. Micaela's household cultivates 3 hectares planted to potatoes, oca, broadbeans, peas, corn, papaliza, wheat, barley, and tarwi. Livestock holdings include 2 cattle, 10 sheep, and 5 pigs.



MICAELA MAMANI DE ARUQUIPA, 57, has no formal schooling but at present is receiving literacy classes. She is married to Antonio Aruquipa Mamani, 56, who received two years of schooling. The couple has seven children, ages 12-35. The household cultivates 3 hectares planted to food and fodder crops. Livestock raised by the family include 2 cattle, 20 sheep, and 3 pigs.

COMMUNITY OF CHIARHUMANI

The community of Chiarhumani belongs to Canton Patacamaya, Aroma Province, in the Department of La Paz. It is located about 100 kilometers south of the city of La Paz, and lies 10 kilometers east of Patacamaya and the paved highway from La Paz to Oruro.

The settlement of Chiarhumani refers to a small populated center of about 100 families which nestles at the foot of a mountain range. However, Chiarhumani itself is actually only one of eleven zones that comprise a much larger indigenous community known as Colchani, which dates its legal origins back to 1718. Colchani's original property holdings can not be determined today, but extant records indicate that land use rights were assigned to 85 native-born resident families or originarios and to 132 agregados or settlers from other communities. Portions of Colchani's original land grant were reportedly ursurped during the colonial and republican periods. Following the Agrarian Reform Law of 1953, the community initiated two legal actions to recover a total of 144 hectares of its original property, but both cases were lost.

Today, Chiarhumani functions as a community unto itself, with about 100 resident families in the town itself and some 80 additional households located in three adjoining zones known as Tiracoma, Machacuyo, and Huañajawira. Chiarhumani has a corregidor, a municipal agent, a small claims judge, and a registrar--all canton-level authorities. The community is further governed by its Agrarian Syndicate with its 13 secretaryships. As in other highland communities, there are several school mayors entrusted with support and supervision of school property and dwellings of teachers. There are two schools in Chiarhumani: a public school (primary-secondary) with 100 students, and a private school of 150 students for children of families who are members of the Evangelical faith. Both schools offer instruction through the third year of secondary education.

The lands of Chiarhumani include lowland plains and fairly steep mountain slopes. Cultivable land is located within a range of 3,800-3,900 meters (12,350-12,675 feet), but pasture lands climb much higher. A series of mountain peaks overshadow the community in a protective semi-circle. There exist several small irrigation systems which serve the community, but their supply is generally insufficient to last the dry season. A number of families have been able to take advantage of small springs in order to construct wells and holding ponds for the limited irrigation of vegetable and flower crops grown in the vecinity of the homestead.

The primary commercial crop of Chiarhumani is onions. For subsistence requirements the primary crops are potatoes and barley. Potatoes are grown in widely scattered lowland as well as highland plots, using different varieties and planting dates to reduce the risk of hail and frost. In terms of area planted, the largest single crop is barley. Broadbeans and oca are also planted but on a very small scale. The typical household in Chiarhumani plants about 2.5 or 3 hectares in crops in a fairly fixed three-year rotation sequence of potatoes-barley-barley before being returned to fallow for a period of 5-8 years. Most community residents plant crops in protected production zones known as aynocas, where all plots are contiguous and all must be planted to the same crop. With regard to livestock, the typical family will raise 2-3 cattle and a flock of 25-30 sheep. The raising of pigs is not popular in Chiarhumani.

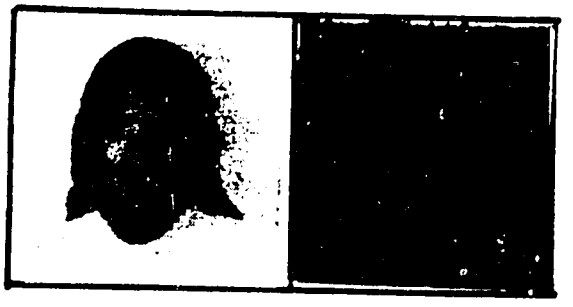
During the Traditional Practices Project a total of 5 men and one woman kept daily records over a two year period. In addition, 12 women learned to keep records in the final year of the Project.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF CHIARHUMANI

DANIEL MORANTE, 31, was the supervisor of record-keeping for the community. He has completed 8 years of schooling. Daniel is married to MARTA MEJIA, 24, also with 8 years of schooling. The couple has two children, ages 1 and 3. The Morante family has 3 hectares of land, cultivating one third in any given year. Their crops include potatoes, barley, papaliza, onions, and lettuce. Livestock include 2 cattle, 25 sheep, and 1 burro.

FRANCISCO QUISPE, 62, completed 4 years of school. He is married to VICENTA MAMAMANI. The couple has 6 children, all of them independent. Francisco plants 2.8 hectares in crops, one-half in barley. Livestock holdings include 2 cattle, 34 sheep, 10 llamas, and 2 burros.

PAULINO MORANTE RAMOS, 29, and his wife FELIPA CHIPANA, 26, have two children ages 1 and 3. Paulino completed 7 years of school and Felipa 8 years. The family plants 2.7 hectares of crops. Its livestock holdings include 4 cattle, 30 sheep, and 2 burros.



MANUEL APAZA MARCA, 62, and his wife ISADORA MAMANI, 67, both keep farm records. Manuel received 6 years of schooling, Isadora none. Manuel serves as the Public Registrar in Chiarhumani. He owns 5 hectares of land, of which 1.5 is planted each year to potatoes, barley, and onions. Livestock holdings include 4 cattle, 25 sheep, and 2 burros. A son, TEODORO APAZA, age 15 with 7 years of school, helps his mother keep her daily records.

BENEDICTO APAZA MARCA, 64, has 7 years of school. His wife LUCIA QUISPE, 60, has none. Benedicto serves his community as the Parish Judge. The couple plants 3.6 hectares of crops, of which two-thirds is barley. Their livestock holdings include 5 head of cattle and a flock of 30 sheep.

LIDIA RAMOS DE MAMANI, 25, has kept records from the beginning of the Project. She is married to Alejandro Mamani. The couple has four children, ages 1-7 years. Lidia has completed 5 years of school. Her household cultivates 2.8 hectares, including 2 of barley. The family raises 22 sheep.

ROSA MAMANI DE APAZA, 27, has seven years of school. She is married to Raul Apaza Quispe, 33, with 8 years of schooling. The couple has three children, ages 1-10 years. The family cultivates 3 hectares planted to potatoes, barley, broadbeans, onions, carrots, and lettuce. Their livestock includes 2 cattle and 7 sheep.

ELUMENARIA RAMOS DE APAZA, 23, completed 8 years of school. She is married to Epifanio Apaza Ramirez, 23, with five years of school. The couple has one son, age 2. The family owns 12 hectares, of which 1.5 hectares are cultivated in any year. Their livestock include 4 cattle, 30 sheep, and 2 burros.

ALBINA CHIPANA DE APAZA, 38, completed four years of school. She is married to Pascual Apaza, 40, with 8 years of school. They have 6 children, ages 1-11. They own 20 hectares, of which one-third is cultivated in any given year. Their livestock includes 2 cattle, 35 sheep, and a pig.

REYMUNDA MAMANI DE ROJAS, 38, completed 3 years of school. She is married to Pastos Rojas, 39, with four years of schooling. The couple has three sons, ages 17-20. The family has no land of its own. Raymunda works as a weaver and her husband as a hired laborer. The family raises 8 sheep, 27 chickens, and 2 burros.

ANATOLIA RAMOS DE APAZA, 39, studied 7 years of school. She is married to Alberto Apaza, 37, who completed 10 years of school. The couple have seven children, ages 1-15. They own 4.5 hectares, cultivating one-half each year in potatoes, barley, wheat, oca, papaliza, broadbeans, and onions. They raise 10 sheep and a burro.

JUSTINA MEJIA DE MORANTE, 31, completed 7 years of school. She is married to Gregorio Mamani Ramos, 38, with 8 years of schooling. They have five children, ages 1-10. The family owns one-half a hectare planted mainly to vegetables. Their livestock include 3 cattle, 53 sheep, and 3 burros.

COMMUNITY OF JARUMA

The community of Jaruma belongs to the Canton Manuel Isidoro Belzu, of the Province of Aroma, in the Department of La Paz. It is located southeast of Patacamaya about 20 kilometers on the road connecting to Luribay and the temperate valleys region. Like Chiarhumani, Jaruma refers to a population center which serves a far more extensive number of communities. In fact, the 12 rural households representing Jaruma in the Traditional Practices Project actually come from four smaller ex-haciendas known as Iquiaca, Aroma, Cayaca, and Ojtaya. These four communities constitute a total population of some 600 inhabitants. Each of these smaller communities have their own administrative organization. Their residents utilize the settlement of Jaruma mainly as a commercial center, where each week a market is held on Friday and Saturday. Also located in Jaruma is a primary school with 200 students and a secondary school (through grade 8) with about 60 students. There exist no health services, nor potable water, nor electricity in this settlement despite its commercial importance to the surrounding region.

IQUIACA

Four of the 12 participating Jaruma households reside in the ex-hacienda of Iquiaca. It is located seven kilometers southeast of Jaruma. The hacienda was expropriated as a property of 552 hectares by the Agrarian Reform in 1953, of which 258 hectares were distributed to 13 resident families in 1960 while the balance passed into the government reserve. Of the 258 hectares adjudicated, exactly half are categorized as cultivable land, with most of the balance assigned to grazing land. The cultivable land is distributed between plains and hillsides, with resident families enjoying use rights to a variety of plots in each zone. Contiguous plots in either of these zones are further organized into protected production areas known as aynocas in which all cultivation follows an identical crop rotation followed by community-mandated fallow-periods of six years or more.

Five mountain peaks delimit Iquiaca, and much of the ex-hacienda lands are steep and rocky. During a portion of the year the property is served by four small streams. By taking advantage of both surface and groundwater supplies, families in Iquiaca are able to grow small onion plots on an irrigated basis. Additionally, the typical household cultivates some two hectares divided in roughly equal proportions between potatoes and barley. Minor plots of oca, papaliza, broadbeans, cañagua, and quinua are also grown. In general, soil fertility does not permit more than a three-year crop rotation cycle--usually potatoes-barley-barley--before being returned to fallow. Livestock holdings per family usually include 4-5 head of cattle

(two oxen teams per household are not uncommon), flocks of 30-35 sheep, a small flock of llamas raised for meat, a few pigs, and 1-2 burros for transport of produce, fodder, and supplies. Most families engage in weaving of textiles for home consumption and market sale.

Despite the reduced number of residents, Iquiaca has its own 13-member Agrarian Syndicate. Each year every male household head is virtually guaranteed a post.

AROMA

Two more participating households are residents of the ex-hacienda of Aroma, which is located three miles south of Jaruma along the road to Luribay. Following a contentious legal action initiated by the hacienda's former colonos (resident laborers) in 1954, the property was eventually awarded in collective title to 62 families. The ex-hacienda is bounded on the east and west by steep mountain ridges. Lack of water resources prevents the cultivation of onion and other vegetable crops, so crop activities are conducted strictly on a rainfed basis and are mainly limited to potatoes and barley. Livestock holdings follow the same pattern as in Iquiaca. Aroma residents also have their own Agrarian Syndicate. All families profess Catholicism.

CAYACA

The ex-hacienda of Cayaca is located seven kilometers northeast of Jaruma. This property consists of 745 hectares distributed among 33 resident families. However, there are now 17 additional families settled at Cayaca which are officially without titles but are permitted to farm small properties assigned by the community. The expropriation and redistribution of Cayaca was also the subject of a bitter legal battle, but in this case the colonos eventually settled with their former patrón by buying his property outright. The lands of Cayaca are very steep because they occupy the very rim of the Altiplano where the plateau falls sharply into the temperate valleys region. For this reason, the ex-hacienda contains a wide variety of micro-climates favoring both highland staple crops and vegetable production, particularly onions. Livestock holdings follow the Jaruma pattern. Most Cayaca residents are members of the Adventist religion, and a house of worship has been built.

OJTAYA

The final three participating households reside in the ex-hacienda of Ojtaya, which is located five kilometers west of Jaruma. This property was also the subject of a bitter and prolonged legal action which lasted from 1959 to 1969 when the hacienda was finally purchased from the former owner by his ex-colonos. Ojtaya consists of 1,400 hectares of steep and rocky terrain, of which only about one-quarter is considered cultivable with the remainder in pasture. The property is owned in collective title by 39 families. The residents mainly grow potatoes and barley. They raise draft animals, sheep, pigs, and a few llamas. There religious preferences are split three ways between Catholic, Adventist, and Evangelical faiths.

A PROFILE OF PARTICIPANTS FROM THE COMMUNITY OF JARUMA

SANTIAGO TORREZ QUISPE, 33, has eight years of school. His wife VICTORIA DEHEZA studied for 5 years. The couple has two children, ages 1-5. Santiago is the supervisor of record-keeping in Jaruma; he is also known as the "lawyer" because he can use a typewriter and prepare contracts. His family farms 3.5 hectares, including onions and other vegetables. Their livestock include 2 cattle, 23 sheep, 20 llamas, 3 burros, and 2 pigs. Residence: Iquiaca.

LEONARDO TORREZ, 26, and FRANCISCA QUISPE, 22, received six and five years of schooling each. They have a son, age four. The family cultivates 3.5 hectares in potatoes, barley, oca, and onions. Livestock holdings include 4 cattle, 37 sheep, 6 pigs, and a burro. Residence: Iquiaca.

LUCIANO CONDORI, 36, and PETRONA MARCA, 32, have five children aged 3-12. Luciano received four years of school, and Petrona studied for one year. The family cultivates 3 hectares planted to potatoes, barley, and onions. They raise 4 cattle, 42 sheep, and 2 pigs. Residence: Iquiaca.

MAXIMO MAMANI COLQUE, 23, and ANCELMA TRUJILLO, 22, have three children ages 6-10. Máximo studied for six years and ANCELMA for three years. The family cultivates 3 hectares of potatoes and barley. They raise 2 cattle, 20 sheep, and a burro. Residence: Aroma.

VIDAL APAZA TRUJILLO, 22, has six years of school. He is married to Elena Quispe and has a son, age 1. The family plants 3.5 hectares of crops, mainly barley. Its livestock include 8 cattle, 280 sheep, 4 llamas, and 6 burros. Residence: Aroma.

FELIX ARUQUIPA, 23, has six years of school. He is married to PANFILA LOZA, and has one son, age 5. The family cultivates 2.75 hectares in barley, potatoes, and oca. It raises 3 cattle, 25 sheep, 3 pigs, and a burro. Residence: Aroma.

ELEUTERIO HUALLPA, 37, has eight years of schooling. His wife PACESA QUISPE, 37, completed six years of school. The couple have three children ages 6-11. They cultivate 4.4 hectares of potatoes, barley, and onions. Their livestock holdings consist of a flock of 22 sheep. Residence: Cayaca.

EUSEBIO NINA CUBA, 26, and his wife VENANCIA TRUJILLO, 23, have four children, ages 2-7. Eusebio completed seven years of school and Venancia studied for two years. The family owns 4.4 hectares, usually planted to potatoes, barley, oca, and onions. They raise 3 cattle, 21 sheep, and 3 burros. Residence: Cayaca.

FELICIDAD CALLE DE APAZA, 28, has kept a farm journal from the beginning of the Project. She has two years of formal schooling. Felicidad is married to Juan Calle, and has a son age 5. The family owns 4.1 hectres. It plants potatoes, barley, and oca. Its livestock include 7 cattle, 35 sheep, 3 pigs, and 2 burros. Residence: Ojtaya.

ELEUTERIO HUALLPA

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ELEUTERIO HUALLPA

EUSEBIO HUALLPA ALEJO, 27, and his wife LEANDRA TRUJILLO, 30, have two children, ages 1-2. Eusebio received six years of school while Leandra studied for two years. The family owns 15 hectares, cultivating about 2 hectares each year in potatoes, barley, and quinua. Livestock holdings include 3 cattle, 12 sheep, 2 llamas, and 2 pigs. Residence: Ojtaya

HILARION MAMANI HUANCA, 30, and JUSTINA ORUÑA, 28, have five children ages 3-10. Hilarión completed seven years of school. Justina studied for two years. The family cultivates 3 hectares of potatoes, barley, and oca. They raise 3 cattle, 15 sheep, and 3 pigs. Residence: Ojtaya.

ALEJANDRINA VILLANUEVA MAMANI, 22, received three years of schooling. She is single with no children, and works land belonging to her father. The family cultivates 5 hectares in potatoes, barley, oca, papaliza, and izaño. Residence: Aroma

OTILIA DE HUALLPA, 21, studied for three years. She is married to Epifanio Huallpa. They have two children, ages 1-2. The family cultivates 3.5 hectares in potatoes, barley, onions, and lettuce. They raise a flock of 22 sheep. Residence: Cayaca

CHAPTER II.

GENERAL ASPECTS OF AGRICULTURAL ACTIVITY

This chapter attempts to review many of the general aspects of agricultural activity common to most subsistence farming operations in the Bolivian Altiplano. It begins with a brief but important caveat regarding the endless variety of farm strategies that may be observed between communities, between families of the same community, and within individual families from one year to the next in accordance with the ebb and flow of their available resources. The following sections review the components of the resource endowment available to most rural households. These cover farming tools, land, labor, and irrigation arrangements. The subject of land use--including crop rotations, multiple plots, and associated plantings--is treated in considerable detail.

The reader is then introduced to a calendar of climatic and other risks of nature--the warp against which the rural household weaves its subsistence activities. A number of traditional indicators used by campesinos to predict the weather and harvest outcomes are presented. The following section describes how farm families store their tuber and grain crops once they are harvested.

The chapter concludes with a detailed description of rural marketing and barter practices, together with a listing of weights and measures commonly used in the Altiplano.

DIFFERENCES BETWEEN HOUSEHOLDS AND BETWEEN YEARS

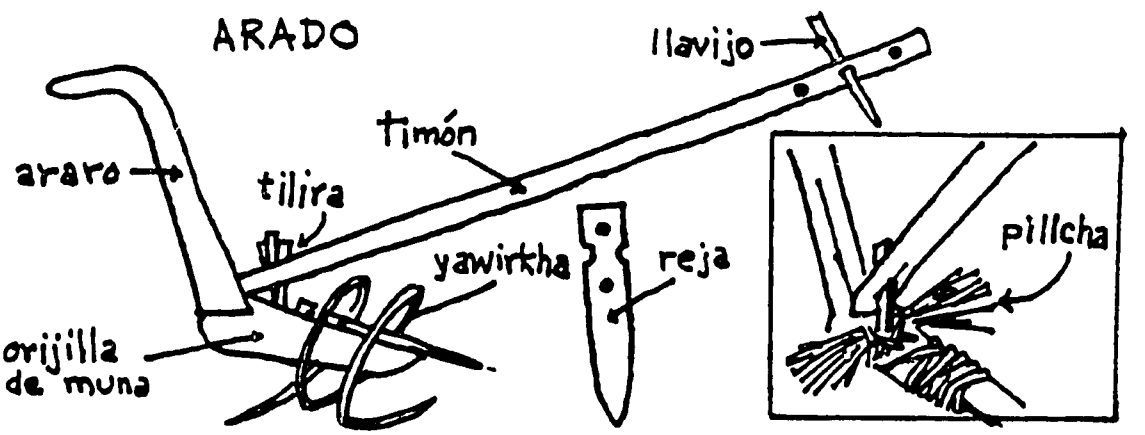
Subsistence agriculture in the Bolivian highlands is characterized by endless variety and complexity. However, these features are not readily observeable by outsiders. For each rural community as a whole, or from one village to another, the similarities in production practices and crops grown appear to far exceed the differences. But where the differences become most apparent is within the community, between one farm household and the next, and within the same family between one year and the next. All village residents may share a common knowledge of traditional farming skills, and all may display similar social and economic characteristics. Yet the differences between them in how they use productive resources, or the yields and net income they obtain, can be enormous even for the same crop grown in the same year.

This is because each rural family must adapt its farming endeavors to a unique resource endowment. It must work within the limits of its available supplies of land, labor, draft animals, tools, seed, manure, fodder, and other assets. Within the same community, no two households will possess land holdings of equal size and quality. Some have many more plots than others, or better access to irrigation water, or more fertile soils, or will be renting some of their land to other farmers, and such factors will result in very different patterns of land use. Similarly, no two households have exactly the same number of family members of the same age and sex, or have children in school, or have equal opportunities for earning cash income in off-farm employment, yet these factors have a major effect on labor use in agriculture and production costs. Furthermore, families with different resource endowments--which have an abundance of some resources but a scarcity of others--will establish many different resource exchange arrangements. Some may swap labor, or seed, or even cash in exchange for land; others may exchange use of draft animals, or irrigation turns, in exchange for land or labor; still others will exchange labor services today for labor services next week. In sum, each household is different and behaves differently.

Such differences are only multiplied when subsistence behavior is observed over periods of two or more years. Not only is each household's resource endowment different, but its quantity and quality changes every year. The stock of resources grows during good years and declines during bad. Following either an excellent harvest or a disaster in which not even the seed is recovered, the subsistence strategy of the farm family may change abruptly. In one year crops may be ravaged by hail or excess rain; the following year by drought, frost, and high winds; while during a third year a post-harvest snowfall damages produce but is a blessing for land preparation and early planting the following season. Thus, even for the same household, no two consecutive years will see an exact repetition of the same farming pattern.

FARMING TOOLS

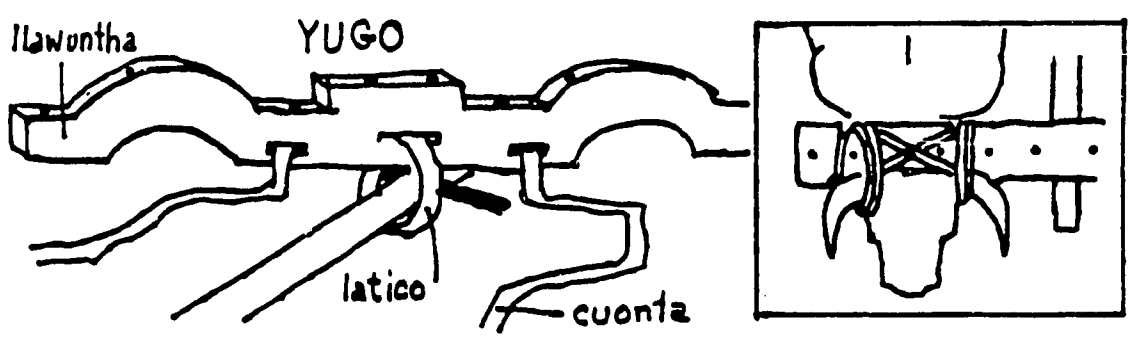
The typical farm family of the Bolivian highlands requires over a dozen different types of tools for conducting its agricultural activities. Depending on the size of the family, at least two or more of most types of tools are normally required. It is customary for each working member of the household to have their own tools. When labor services are supplied to other farmers, it is the worker's obligation to provide the tools required to complete his or her assigned tasks. A household with five working members (say two adults and three school-age children) would probably require the following equipment: (1) two wooden plow sets, (2) two sets of wooden oxen yokes, (3) two whips, (4) two footplows (for families farming small and steep hillside plots where animal traction is impractical), (5) three crowbars, (6) three wooden mallets, (7) one sod-busting post, (8) five digging-hoes, (9) two pick-axes, (10) four sickles, (11) four woven wool cargo sacks, (12) five leather ropes, (13) two woven wool ropes, and (14) an assortment of threshing poles. In the following pages we present a brief description of each tool--what it looks like, what it costs, and for what it is used.



(1) THE WOODEN PLOW or arado (also known as arma or "weapon") consists of six and frequently seven parts. These are (a) the wooden handle or araro, (b) the wooden plowshoe or orijilla de muna, (c) the plowshaft or timón, (d) the yokepin or llavijo, (e) the metal plowshare or reja, and the leather strip or yawirkha for binding the plowshare to the plowshoe. Most plows also have a support brace or tilira to stabilize the plowshaft against the plowshoe and handle. Finally, when using their plow it is customary for the farmer to attach a bundle of stiff weed stalks, called pillcha, at the base of the plowshare just in front of the brace. The purpose of this improvisation is to cause the dirt heaped by the plow to fall further to one side or the other, thereby broadening the cut furrow.

The wooden plow is used for a variety of tasks: primary tillaging (land preparation for planting), furrowing (to open seedbeds or cover them again once they are planted), hilling and cultivating (when plants are still young), and sometimes pre-harvest plowing (to loosen the soil for digging up root crops). Accordingly, the wooden plow has three adjustable parts which allows it to be adapted to different plowing depths, soil conditions, topography, and quality of animal traction. The first of these adjustable parts is the plowshare itself, which consists of a narrow blade fashioned from the leafspring of an automobile or truck. When placed and bound high up the plowshoe, the plowshare provides a shallow cut; or it can be moved down the shoe to extend the blade for deeper plowing requirements. Next, on most plows the tilira or support brace is not a single piece but a set of wooden wedges. These can be shifted to adjust the plowshaft slant, which in turn alters the plowing angle and changes the weight which draft animals must pull. The third moveable part is the llavijo or yokepin, which can be inserted in any of three holes perforated at the end of the plowshaft. The yokepin adjustments allow the farmer to adapt the same plow to oxen teams of different age and size. In summary, the seemingly primitive wooden plow is a complex tool which must be assembled every time it is used, and can be modified to perform in a variety of different and subtle ways.

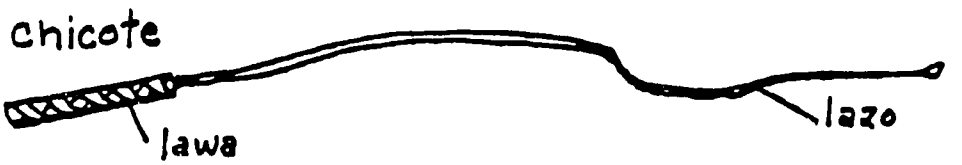
A wooden plowset cost about 500 pesos (US$20) in mid-1981. The handle and plowshoe cost 120 pesos, the plowshaft another 120 pesos, the plowshare 80 pesos, the leather binding 20 pesos, and the yokepin 10 pesos. Labor costs for the carpentry to fashion the wooden pieces and perforate holes is estimated at an additional 150 pesos. In case one plow is damaged during a critical task, or sometimes to allow tasks to be completed in a hurry, the average household will own two plow sets, which raises its total investment for this type of tool to 1,000 pesos (US$40).



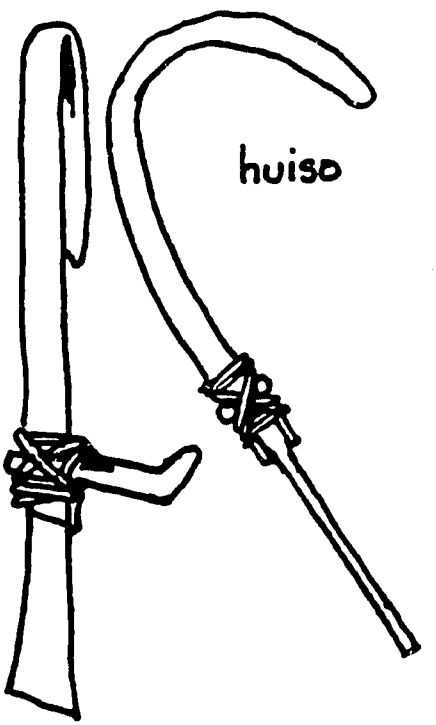
(2) THE WOODEN YOKE or yugo is required to attach the plow to a team of draft animals. Most households have two yokes, one for large oxen and one for smaller ones (or even cows). The yoke beam is a single piece, with two semi-oval cuts which fit over the neck of each draft animal, and beyond these two somewhat tapered butt ends known as llawuntha. Just inside the neckbrace for each ox is attached a flat strap known as a cuonta, which is four meters long. These are used to bind the yoke to the horns of the draft

animals. Hanging from the middle of the yoke is a leather ring known as the latico. Designed to secure the plowshaft to the yoke, this ring is made from the neck hide of the llama and is extremely tough yet flexible. Once the plowshaft is slid through the ring, the yokepin is inserted to keep the shaft in place. Along the top of the yoke beam will be found a series of small holes. These are used to insert skinny flagpoles carrying brightly colored paper banners—a widely practiced custom at planting time which amounts to a ritual celebration of the bountiful harvest to come.

A complete yoke set cost 150 pesos (US$6.00) in mid-1981, of which 100 pesos went for materials and 50 pesos for the labor of a carpenter. Needing two yokes for larger and smaller animals, the typical household would therefore have to spend 300 pesos for this type of equipment.



(3) THE WHIP or chicote is extremely important for the plowman. Without it he would be unable to dominate his team of oxen, unable to signal them to slow down or speed up, or when to correct their direction. Oxen accustomed to the whip will simply not obey the plowman who does not use it. The whip is normally made of braided leather. It cost 20 pesos (US$0.80) in 1981.



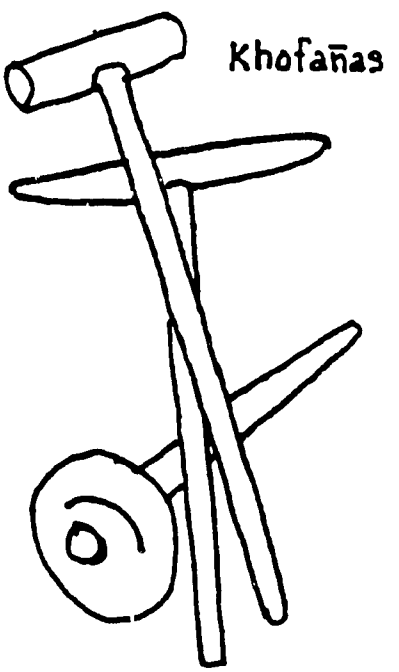
(4) THE FOOTPLOW or huiso is one of the oldest farming implements in the Andes, It is used in narrow terraces and steep hillside plots where it is too cumbersome or dangerous to use animal traction. The first and primary use of the footplow is for land preparation tasks, particularly the digging and turning of sod in fallowed land to prepare for planting. Footplows are normally used in four-person work teams consisting of two plowmen (aradores) and two women (chapulliri) who lift and turn the sod upside down. A day's work of such plowing is called a ma huma, and is used as a basic unit of land measurement by some communities. The huiso is also used in planting tasks to open seedholes. It is estimated that a ma huma requires five arrobas (125 lbs) of potato seed, which is equivalent to about 2/5ths of a hectare.

The curved handle of the footplow is made of wood. It is constructed by taking a young

sapling, bending it into a desired curve and securing it with rawhide, and then leaving the tree to grow for several years until the trunk is thick enough for a plow handle. Attached to the huiso handle is a foot brace, but on one side only. The plowshare in modern times is made from a truck or automobile leafspring, flattened and widened at one end and filed to a sharp edge. The mid-1981 cost of a huiso was 350 pesos (US$14). The typical family requiring footplows would need to construct or purchase two of these implements, for an investment of 700 pesos or US$28.

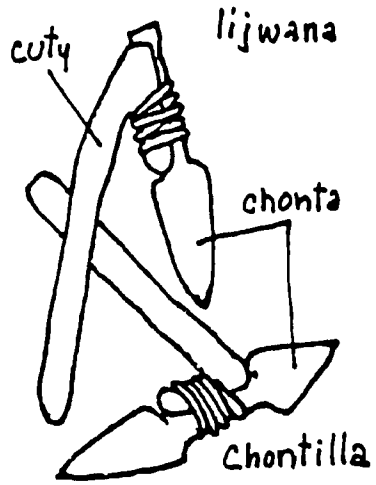
(5) THE CROWBAR or barreta is made of heavy steel and is about two meters long. It is used to move heavy stones in fields which are being plowed or readied for plowing. Removing stones is a critically important task for highland farmers, because a plow which collides with a boulder not only may be broken, but such an accident can also cause serious damage to the team of oxen. Crowbars are also used to help lift heavy sods as part of land preparation tasks conducted with the footplow. A single crowbar is an expensive investment for a subsistence household. It cost 300 pesos (US$12) in 1981, or twice as much as a wooden yoke. Three crowbars would signify an investment of 900 pesos or US$36, almost as much as two wooden plow sets combined.

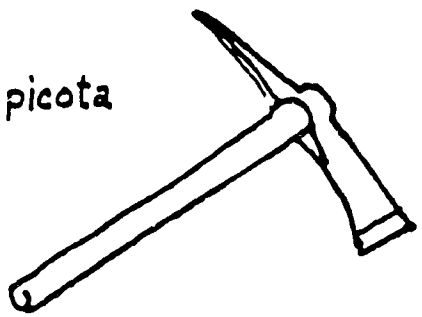
(6) THE WOODEN MALLET or khofaña is a tool used to destroy dirt clods in preparation for planting (after primary tillage), and for beating, leveling, and compacting the soil surface following planting. Sod-busting is a task known as khofada. There are a variety of different kinds of sod-busting tools. The most common resemble wooden mallets--some with a thick but short head, others with a long, slender head. The wooden models are the lightest and therefore are used by women and children. Heavier khofañas will have a stone head. Also, the metal pickaxe (see picota, below) can be used for busting sod. The cost of a single wooden mallet was about 100 pesos in 1981, half for the materials and half for labor. The typical household with at least three khofañas would have to invest some 300 pesos (US$12) for this kind of tool.



(7) THE SOD-BUSTING POST or lasraña lawa is a heavy post about 3.5 meters long and a diameter of about 20 centimeters. It is designed to be dragged by a team of oxen following initial land preparation to crush dirt clods. In some communities the post is replaced by a large boulder, but the purpose is the same: to facilitate seedbed preparation and reduce the relatively large labor investment required to bust sods with hand implements. The sod-busting post is given an estimated value of 50 pesos (US$2.00).

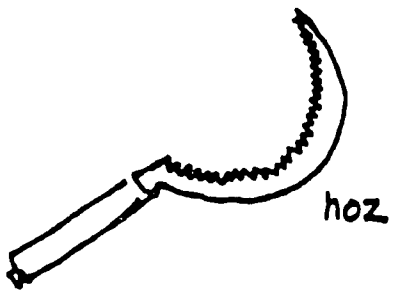
(8) THE DIGGING-HOE or lijwana (also called chontilla) is a widely used tool for harvesting potatoes, ocas, papalizas, izaño, and other root crops. It is also used for weeding and hilling tasks. The tool consists of a crooked wooden handle known as cuty, a one- and sometimes two-pointed metal blade called the chonta, and a strip of rawhide binding the blade to the handle. Farm households buy the handles and blades in the market and assemble the tool to their own taste. In 1981 a lijwana handle was valued at 20 pesos (US$0.80) and the blade for 25 pesos (US$1.00). The typical household will have five of these implements, representing a total investment of 225 pesos or US$9.00.



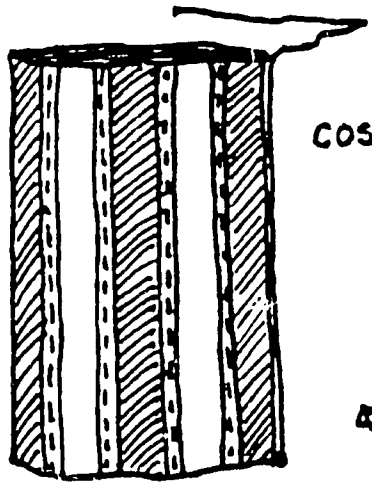


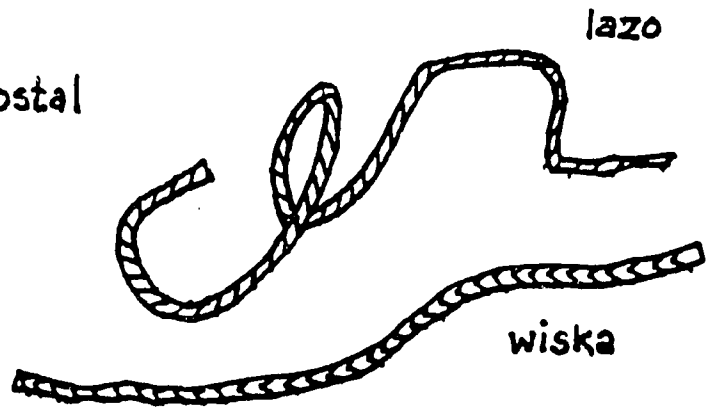
(9) THE PICK-AXE or picota is used for a variety of tasks, and sometimes in place of the lijwana. For example, it is used to remove rocks from a field prior to plowing. It can be used (sideways) to bust sods. The picota is also employed in weeding tasks and occasionally at harvest time to assist in loosening the soil. The pick-axe is usually purchased as a manufactured tool. In 1981 its cost was 150 pesos or US$ 6.00.

(10) THE SICKLE or hoz (also called jusi) is used to harvest barley, oats, wheat, quinua, tarwi, wild straw, broadbeans, and peas. The sickle has a wooden handle and a serrated metal blade. In 1981 the value of a sickle was 80 pesos or US$ 3.20. The typical household will require at least four of these implements, for an investment of 320 pesos (US$12.80).



(11) THE WOVEN WOOL CARGO SACK or costal is used to haul agricultural produce of any kind, particularly root crops and grain. Another important use is to carry loads of animal manure from the farmhouse to the planting sites. Costales can also be used for storage of produce inside the farmhouse. The cargo sack is woven from the wool of sheep and llamas in their natural colors in a vertical pattern of stripes. Well-made cargo sacks will last many years, but they are also relatively expensive. In 1981 they were valued at 300 pesos (US$12.00) apiece, and the typical family will require at least four of these items, which suggests a total investment of 1,200 pesos or US$48.00 and constitutes the single most valuable set of items in the tool inventory of the rural household.

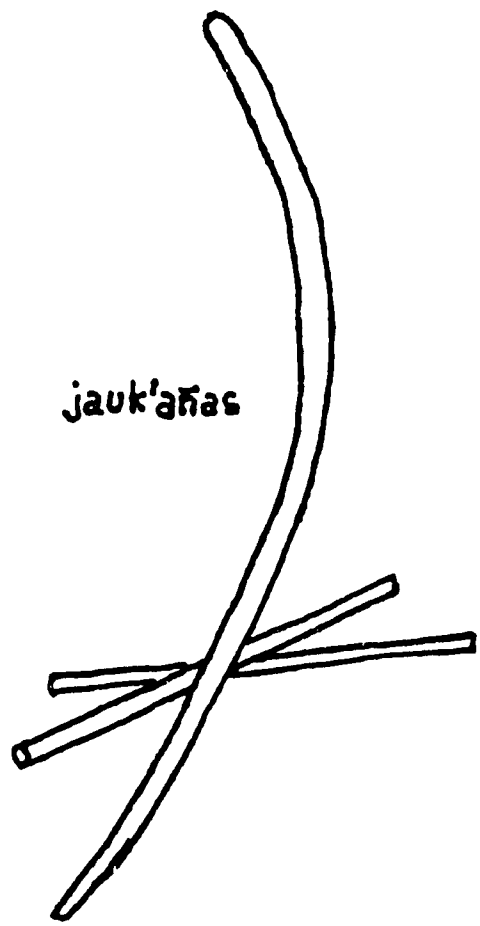




(12) LEATHER ROPES or lazos are made from strips of cowhide which measure 4 cm wide and vary in length from 4 to 6 brazadas (about 8-12 meters). The lazo is used to secure cargo sacks for transport. A single lazo sold for 70 pesos in 1981. Thus, the typical family with five such ropes will have invested about 350 pesos or US$14.00 in these items.

(13) WOVEN WOOL ROPES or wiskas are constructed from plaited strands of sheep or llama wool. They are usually about 2 cm thick and 8-10 meters in length. Wiskas are used to secure light loads for transport. A single wool rope sold for 50 pesos (US$2.00) in 1981, and the typical family requires at least two of them.

(14) THRESHING POLES or jauk'añas come in two sizes. The large poles are about 5 cm in diameter, over 2 meters long, and are gently curved throughout their length. They are used for beating large quantities of grain crops or peas and beans to separate heads and pods from their stalks. A large jauk'ana had a value of 100 pesos (US$4.00) in 1981. The small threshing poles are about a



meter in length and 3 cm in diameter. They are used when only a small quantity of grain is to be threshed. A small threshing pole had a value of 10 pesos in 1981. Taken together, a typical family with two large and two small jauk¡añas will invest about 220 pesos (US$8.80) in these threshing implements.

SUMMARY: Adding up the value of the typical family's agricultural tools inventory described above, the total investment amounts to an estimated 6,000 pesos or US$240, as follows:

AGRICULTURAL TOOLS INVESTMENT OF TYPICAL FAMILY

Tool	Unit Value (pesos)	No. Units	Total Value (pesos)
1. Wooden plow	500	2	1,000
2. Wooden yoke	150	2	300
3. Whip	20	2	40
4. Footplow	350	2	700
5. Crowbar	300	3	900
6. Mallets	100	3	300
7. Sod-busting post	50	1	50
8. Digging-hoe	45	5	225
9. Pick-axe	150	2	300
10. Sickle	80	4	320
11. Cargo sack	300	4	1,200
12. Leather rope	70	5	350
13. Wool rope	50	2	100
14. Threshing poles	-	4	220
TOTAL (pesos)			6,005

LAND TENURE AND INHERITANCE

Land is the one resource coveted above all others in the rural community. It is the most valuable of all productive resources for agriculture, the one with which all others are combined. In general, the more land a family can command, the greater its economic security, its freedom from subsistence risks, its production options and opportunities, and its social prestige within the community.

Of course, land resources are seldom distributed equitably within the highland village, and even if an equitable distribution were made land holdings per family would begin to vary widely within a single generation. In the case of indigenous communities such as Yuka and Chiarhumani, where property rights were legalized almost a century before the Bolivian Agrarian Reform which began in the 1950's, original land holdings were unequal from the beginning. Resident families born in these communities, known as originarios, were allowed twice as much land as non-native-born residents, or agregados. Such initial differences in holdings were further formalized through Bolivia's system of rural land taxes which has been enforced at the departmental level since 1888. Those who pay the tasa or land tax, known as taceros, also have the right to a double irrigation turn, if such water exists, while the non-payers of land tax or sobrantes literally receive the "leftovers".

In contrast, communities which e former haciendas, like Huacuyo and Jaruma, were expropriated under the Agrarian Reform and reorganized so that all former hacienda laborers or colonos received an equal land share. However, less than two decades later there already exist significant numbers of landless and near-landless families in these communities. Many of the land-poor families are not outsiders but rather native born residents, the sons and daughters of colonos who have established independent families from those of their parents but have yet to receive their inheritance or whose inherited share is very small.

Under the customs of Aymara society, land is inherited in equal shares by male heirs (sons). Female heirs (daughters and widows) can not receive a share equal to a male heir, if one exists, but can divide inherited property equally if there is no son or brother. Land is generally inherited through the male heirs because it is expected that upon marriage a daughter will join her husband's family and share in their holdings. It is also Aymara custom that the oldest son leave the parents' homestead and form his own family. The youngest son inherits not only an equal land share but also his parent's house, tools, and equipment.

THE AYNOCA SYSTEM

Many highland communities such as Chiarhumani and Jaruma have organized large portions of privately-held cultivable land into production districts known as aynocas. An aynoca consists of a cluster of contiguous plots that are farmed individually by most, if not all, the resident families in the community. All land within the aynoca must be cultivated, and during the same year all plots must be planted to the same crop following a specified rotation. After 4 or 5 years of cultivation, the entire district is returned to fallow. The purpose of the aynoca is to organize crop areas into concentrations of perhaps 10-20 hectares, containing possibly 100-200 separate plots, which consequently permits large extensions of fallow land to be opened up to livestock grazing. The aynoca enables the community to better protect its crops from flocks of sheep and other grazing animals.

Chiarhumani, for example, has six aynocas. They are separately known as Viatapampa, Kalani, Tanka-tanka, Huallapoqo, Churuma, and Paria. Each of these aynocas is cultivated for a four-year period. Potatoes are always planted the first year, usually quinua in the second, then barley in the third and fourth years. Now and then an aynoca with better than average fertility will be planted for a fifth year, again with barley, an extra year known as cutirpu. Usually every year land preparations and potato planting begins in a new aynoca, while an exhausted aynoca completes its cycle and returns to fallow.

Supervision and protection of the aynoca is in the hands of an agricultural authority known as the kamana. In the event that grazing animals manage to stray in and damage some plantings within an aynoca, it is the kamana's duty to remove one animal from the offending herd until its owner reaches settlement with the family whose plantings were damaged. The kamana is a rotational position, held for the space of one entire crop year--from planting through harvest.

Within any particular aynoca, soil quality and topography will vary at least slightly from one area to the next. For this reason a single family will seek to cultivate two or more plots within that aynoca, and 5-10 plots per family in each aynoca may be considered a norm. Of course, plot size varies considerably. Because aynocas are composed of privately-held property, tenure to individual plots can be divided and sub-divided through the process of inheritance. Thus, with the passing of the years the aynocas are becoming increasingly fragmented, with the number of plots growing and their average size diminishing. Even so, the boundaries of each plot are well known and respected among community residents. In fact, families assign each of their plots its own name, or at least a number.

Some households may have more plots than they are capable of cultivating with their available labor resources (or others such as seed and manure). But under the aynoca system, any family with a land surplus does not enjoy the right to withdraw this excess property from cultivation. Rather, it is required to make rental or share-cropping arrangements with other members of the community who are sobrantes or land poor.

DISTRIBUTION OF LAND IN MULTIPLE PLOTS

Highland farmers face serious risks from hail, frost, drought, flooding, and other climatic contingencies. Fortunately, these phenomena tend to be somewhat localized. Hailstorms tend to fall in narrow belts which seldom are wide enough to simultaneously damage all plantings in a rural community. Frost risks are higher in bottom land than in upland hillsides. Similarly, hillsides provide the advantage of good drainage combined with the disadvantage of diminished fertility through topsoil erosion. And even within the boundaries of a single plot it is not uncommon to find patches of distinctly different soil type and quality.

For those reasons it is customary for highland farmers to "average" their climatic risks as well as the productive potential of their land holdings by distributing their parcelas or crop plots as broadly as possible. The ideal is to own plots at high, intermediate, and low elevations within the community. Indeed, carrying the ideal to its extreme, some families have properties in more than one highland community and even in adjacent colonization areas in the tropical lowlands. Furthermore, some plots will be located on flat terrain, others on hillsides, and still others in protected ravines. Collectively, these plots should cover a variety of soil types with characteristics ranging from well-drained to humid, clay to sandy loam. While the number and size of plots controlled by each family will be highly variable, most households will manage at least 20 plots, while those managing more than 30 plots are by no means uncommon.

Presented below is a brief review of the number and use of crop plots among six representative farmers from four highland communities. Their respective holdings, which range from seven to 34 plots, were monitored over three consecutive agricultural years: 1978-9, 1979-80, and 1980-81.

Julio Constantino Maquera, from the community of Yuka, has 27 plots. When the use of these plots is averaged over the three year period, it is seen that the Maquera household--on a yearly basis--cultivated 7 plots of potatoes, 8 of barley, 2 of oats, 2 of oca, 2 of broadbeans, 2 of peas, 1 of papaliza, and kept 3 plots in fallow. The Maquera holdings are the only ones for which plot size was calculated. Out of 27 plots, the average area per plot was 1,148 square meters (.11 hectare), with the smallest being 200 m^2 and the largest 3,612 m^2. Total holdings came to slightly more than three hectares.

Roberto Tito, from the community of Huacuyo, has 20 plots. On the average, his household cultivated 7 plots of potatoes, 3 of oats, 2 of oca, 2 of broadbeans, and 6 were kept in fallow. Andrés Coaquira, also of Huacuyo, has 25 plots. Of these, there were 6 plots of potatoes, 4 of oca, 3 of broadbeans, 2 of oats, 1 of papaliza, 1 of tarwi, and 8 were kept in fallow.

Felix Quispe, from the community of Killay Belen, has 13 plots. On the average, 2 were planted to potatoes, 3 to broadbeans. 2 to corn, 1 to oca, 1 to barley, 1 to wheat, and 3 were kept in fallow.

In the community of Jaruma we present examples of households with very large and very small land holdings. Hilarion Mamani has 34 plots. On the average, in a given year he planted 12 plots of potatoes, of which 7 were so-called "sweet" or delicate varieties and 5 were bitter or frost-resistent varieties. Additionally, the Mamani household planted 8 plots of barley and kept 14 plots in fallow. In contrast, Luciano Condori, has only 7 plots. On the average, he planted 2 plots of potatoes, 2 of barley, and kept 3 in fallow.

It bears repetition that the above figures are averages taken over a three-year period; as such, they disguise important differences in plot management from one year to another. For example, the number of potato plots can vary significantly with the same family from one year to the next. In 1978-79, Roberto Tito planted 11 plots of potatoes while the following year only five. Andrés Coaquira planted 6 potato plots in 1978-79, only one the next year, and then 12 plots in 1980-81. Important variations can also be observed in the number of plots kept in fallow. Both Julio Maquera (with 27 plots) and Felix Quispe (with 13 plots) each kept 5 plots in fallow the first year, 3 in the second, and 2 in the third. From the very limited evidence available here, it appears that there exist cycles of intensity of production for certain crops from one year to the next. The explanation of these cycles could be linked to weather factors, seed supplies, abundance of the previous harvest, restrictions imposed by the aynoca system, availability of animal traction for soil preparation, and possibly additional factors. The important conclusion to be drawn, however, is that the production pattern in terms of plot use and crop mix can be very unstable for the same household from one growing season to another.

CROP ROTATIONS

In the Bolivian highlands there are very few generalizations that can be made about crop rotation patterns, because these can vary considerably from one community to another, and from one farmer to the next. To begin with, the length of time land is left in fallow depends on each community's supply of land relative to both its human population and probably its livestock herds as well. There now are many highland communities which as recently as a generation ago observed fallow periods of 8-10 years or more, but now only allow their land to rest 4-6 years. In turn, as fallow periods shrink, the length of the crop rotations which follow them also are shortened. It is not uncommon to find farmland that must be returned to fallow after only 2-3 years of cultivation. However, at the other extreme are the sayañas or properties located next to rural homesteads that are cultivated intensively and sometimes never rest. These plots require considerable investments in manure to maintain their fertility, and often they are located beside livestock corrals where they can benefit from nutrient rich drainage. Finally, climate exercises an important influence on crop rotations as well. Where rainfall is more abundant, a wider variety of crops can be grown. Of course, the greater the number of crops, the larger the number of potential crop sequences.

There is only one crop rotation practice that appears to be followed by all highland farmers, namely: potatoes are always planted as the first crop following a period of fallow. After that, rotation patterns display considerable diversity. To dramatize this variety, we present an analysis of 128 crop lots which were monitored over three agricultural years: 1978-79, 1979-80, and 1980-81. These plots are representative of the communities of Yuka (27), Huacuyo (45), Killay Belen (15) and Jaruma (41).

COMMUNITY OF YUKA

Out of 27 plots monitored in Yuka, 25 were subject to cultivation during the three-year period. Of these, 20 unique sequences were observed involving a total of 8 crops: potatoes, barley, broadbeans, oca, peas (the five crops appearing every year) plus oats, papaliza, and quinua (not present during all years). The observed rotations were the following:

fallow-potatoes-potatoes (4 plots)
potatoes-barley-barley (3 plots)
potatoes-barley-broadbeans
potatoes-oca-papaliza

peas-barley-potatoes
peas-barley-oca
peas-potatoes-oca

broadbeans-oca-broadbeans
broadbeans-potatoes-barley

oca-oca-barley

barley-barley-barley
barley-barley-oats
barley-barley-peas
barley-peas-oca
barley-peas-barley
barley-broadbeans-potatoes
barley-potatoes-potatoes
barley-quinua-potatoes

oats-papaliza-oats
oats-barley fallow

Out of this apparently random variety of crop rotations a number of conclusions can be drawn. (1) Only five (of 25) plots involved a fallow year, which suggests that the average length of the crop rotation following a fallow period is considerably longer than three years and perhaps exceeds 5-6 years. (2) The two crops which most frequently appear in crop rotations are barley (14 cases) and potatoes (10 cases). (3) The crop most likely to follow barley is again barley (6 cases). (4) The crop most likely to follow potatoes is barley (5 cases) or once again potatoes (4 cases). (5) It would appear that in Yuka the liklihood that the same crop will be repeated in the same plot at least twice during a three-year period is quite high. Out of 25 plots cultivated, 14 grew repeat crops.

COMMUNITY OF HUACUYO

Out of 45 plots cultivated during the three-year period, 17 unique rotation sequences were observed involving 7 crops: potatoes, oca, broadbeans, oats, papaliza, tarwi, and barley (the last three not present during all years). The observed rotations were the following:

fallow-fallow-potatoes (14 plots)
potatoes-potatoes-Oca
Potatoes-Potatoes-broadbeans
potatoes-potatoes-oats (2 plots)
potatoes-oca-broadbeans (3 plots)
potatoes-oca-oats (2 plots)
potatoes-oca-papaliza
potatoes-oca-tarwi
potatoes-oats-fallow (4 plots)
potatoes-barley-fallow (2 plots)

oca-broadbeans-potatoes (4 plots
oca-broadbeans-oats
oca-broadbeans-fallow (4 plots)
oca-oats-fallow (2 cases)
oca-fallow-fallow

broadbeans-potatoes-broadbeans

papaliza-tarwi-fallow

It will be noticed that 28 of 45 plots monitored involved a fallow year. This would suggest a crop rotation sequence of 3-4 years in length in the community of Huacuyo. Potatoes were involved in 80 percent (36 cases) of all crop sequences observed, followed by oca (10 cases), broadbeans (6

cases), and oats (5 cases). The crop most likely to follow potatoes is oca (7 cases), while oca is most likely to be followed by broadbeans (12 cases). The final crop in the rotation before a plot reverts to fallow is most likely to be oats (6 cases). In Huacuyo it is customary to plant a different type of crop in each consecutive year of the rotation for any given plot. Out of 45 plots, repeat crops were observed in only five cases.

COMMUNITY OF KILLAY BELEN

Out of 15 plots cultivated over the three-year period, 10 unique rotation sequences were observed involving 6 crops: potatoes, broadbeans, and oca, corn, wheat, and peas, of which only the first three were present during all years. The observed rotations were as follows:

fallow-potatoes-oca (4 plots)
fallow-potatoes-corn
potatoes-oca-broadbeans

corn-broadbeans-corn (3 plots)
corn-oca-corn

broadbeans-broadbeans-broadbeans
broadbeans-wheat-potatoes
broadbeans-wheat-fallow
broadbeans-barley-fallow

peas-wheat-broadbeans

The crop sequence begins with potatoes following a period of fallow, but the single crop most likely to appear in a rotation sequence is broadbeans (9 cases), followed by potatoes (7 cases) and oca (6 cases). Repetition of the same crop on the same plot is fairly common (5 out of 15 cases) but is done only with corn and broadbeans. An average crop rotation sequence of 4-5 years is suggested by the above data.

COMMUNITY OF JARUMA

Out of 41 plots cultivated over the three-year period, only three unique rotation sequences were observed involving three crops: potatoes, barley, and quinua, as follows:

fallow-potatoes-barley (27 plots)
potatoes-barley-fallow (8 plots)
potatoes-barley-barley (5 plots)
fallow-potatoes-quinua

There exists very little flexibility in the case of Jaruma, where the crop sequence for the most part lasts only two years following a fallow-potatoes-barley-fallow rotation. A minor three-year rotation involving two consecutive years of barley is also present. Potato cultivation in the same plot is never repeated during the same cultivation cycle. This pattern reflects the greater aridity of the Jaruma region, less fertile soils, and the strong influence of the aynoca system, where all farmers must follow the same rotation.

CROP ASSOCIATIONS

While it is customary for highland farmers to plant crops in pure stands, crop associations within single plots are also commonplace, although much more so in certain communities than in others. Each associated planting has a specific rationale; to understand why crops are planted together greatly enhances one's appreciation of the sophistication and complexity of traditional farming practices in the highlands region. Examples of crop associations are presented below from the five communities of Yuka, Huacuyo, Killay Belen, Chiarhumani, and Jaruma.

In the community of Yuka there exist at least seven important crop associations. These are (1) oats with barley, (2) broadbeans with quinua, (3) barley with peas, (4) peas with oats, (5) potatoes with quinua, (6) oca with quinua, and (7) quinua with peas. Oats and barley are planted together to stimulate competition between these two grain crops. The seed of both is mixed together in the seed bag at planting. Broadbeans or habas and quinua are reported to have highly complimentary nutritional requirements, and therefore both appear to grow better when planted together. Barley with peas, peas with oats, and peas with quinua are planted in association so that the stems of the grain crop will provide a trellis for pea vines to climb. Peas and broadbeans are always harvested first, then the grain crop second. Potato plots are frequently associated with thinly seeded transverse rows of quinua in a pattern known as jufa chaaca or bridge of quinua. Because potatoes are planted in well-rested soils to which large quantities of animal manure have been applied, quinua planted with this crop produces excellent yields. The oca and quinua as well as peas and quinua associations are justified for the same reason since both oca and peas appear early in the rotation, following potatoes. In both cases the quinua is seeded very lightly following the bridge pattern. Nevertheless, pure stands of potatoes and oca are preferred whenever possible, and quinua is associated with them only in those instances where families are too land-poor to grow quinua crops separately.

In Killay Belen there are only three major associations: (1) oca with izaño, (2) oca with papaliza, and (3) habas or barley with quinua. The first two associations are customary only in plots which have been furrowed with oxen. In such cases, the furrow ridge is densely planted to oca, while the furrow trough is thinly planted to izaño or papaliza. The rationale for this association is to make better use of what is considered to be still-fertile soil since ocas are usually planted (after potatoes) in the second year of a crop rotation.

Habas (or barley) and quinua are associated in different ways depending on whether the seedbed is prepared with the ox-drawn wooden plow or with the footplow. In the first instance, the field is thinly seeded to quinua by the broadcast method. Then the furrows are plowed and the broadbeans (or barley) seeded in neat rows. The process of plowing and closing the furrows simultaneously buries the seed of both crops. However, if a rainy year is expected, the furrowing and planting of broadbeans is concluded first, after which the quinua seed is broadcast and left unburied on the soil surface. In both cases the haba (or barley) crop sprouts in straight rows while the quinua crop sprouts indiscriminately both within and between rows. However, when quinua and habas are planted with the footplow, the opposite pattern occurs. First, quinua is planted in broadly separated rows which resemble plot boundaries or delineated task areas. The habas are then planted within these areas, in seed holes opened by the footplow. Once the haba seed is in the ground the soil surface is leveled and compacted to leave no trace of a furrow. Aside from the crops mentioned above, all others in Killay Belen--and particularly potatoes, corn, and peas--are always planted in pure stands, never in association.

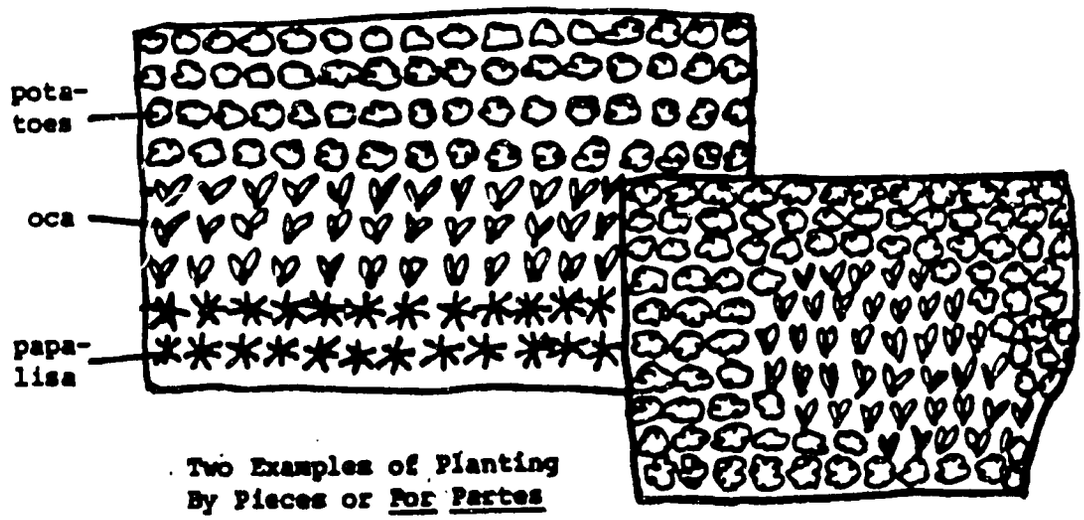
In Huacuyo, potatoes are never associated with other crops. However, farmers frequently grow several different varieties of potatoes (in separate rows) within the same plot as an experiment to determine which variety seems to do best under local soil conditions. Where associated planting <u>is</u> practiced is with (1) peas with broadbeans, (2) papaliza with izaño, (3) oats with barley, and (4) oca with quinua. Peas and broadbeans are planted in equal proportions—one row to peas, the next to broadbeans, etc.--and then all furrows leveled and the soil surface compacted. This association uses the stalks of the broadbeans as trelises for pea vines. No hilling of either crop takes place, only light weeding, and both are harvested almost at the same time during April.

Papaliza and izaño are planted in the same furrow, with papaliza being seeded first and izaño seeded inbetween. The izaño plant grows tall and is resistant to cold and frost, while papaliza is a low growing, delicate plant. Thus, izaño is used to protect its companion planting. Both crops are hilled and weeded simultaneously. The harvest occurs quite late, in August, because there are so soil pests or rodents which care to attack either crop.

As for oats and barley, these are mixed together in the seedbag and then planted together, furrow by furrow. Once again, the rationale for this association is to stimulate competition between the two crops. Generally, mixed plantings of oats and barley are used as fodder crops--and therefore harvested green--rather than for grain. As for the oca-quinua association, the oca crop is planted first, and then two months later--following weeding, when the soil is freshly worked--quinua is planted in transverse rows. The quinua thus serves the purpose of creating a windbreak which will help protect the oca plants from cold. Quinua is harvested first, in February, followed by oca in May.

Farmers of Chiarhumani prefer not to grow associated crops because it complicates harvest operations. However, exceptions are made. A family with insufficient land to grow all the grain and fodder crops it needs will often plant barley with quinua. The barley is planted in rows followed by broadcast quinua. Another form of contingency association consists of potatoes with barley. In this case, if the potato crop meets with disaster--for example, it is destroyed by hail or frost during its second or third month--the farmer will replant the field with barley so as to avoid a total loss and to take advantage of the investment in manure fertilization intended for potatoes. Furthermore, farmers with scarce fodder supplies sometimes thinly seed barley between potato rows following the last hilling or weeding task. This barley will be used to feed the team of oxen employed in the harvesting of the potato crop. Still another exception involves the association of onions and lettuce. When the onions are transplanted and the soil is freshly worked, lettuce seed is sometimes planted. Since lettuce has a short growth period, it is harvested first and therefore does not hamper the onion harvest. Finally, what might appear as a crop association is something quite different --what Chiarhumani farmers call planting por partes or by pieces. Within a single plot two or more crops may be grown, but each is confined to a separate set of rows. For example, in a single plot one might encounter 5 rows of potatoes, followed by 3 rows of oca, then 4 rows of papaliza, and 4 more of izaño.

In Jaruma, associated cropping is quite rare. Not only is each plot devoted to a single crop, but often not even mixed varieties of the same crop will be found. Jaruma farmers do, however, occasionally plant using the por partes system. This is usually done to take advantage of patches of different soil type within the plot, patches which favor one crop more than another.



Two Examples of Planting
By Pieces or Por Partes

IRRIGATION ARRANGEMENTS

The large majority of highland communities have no permanent source of irrigation water, and most crops are grown under dryland farming conditions. However, it is not uncommon to find communities with small irrigation systems which provide water to a portion of community lands for several months each year, thereby supplementing natural sources of moisture (rain, snow, even hail) and providing a measure of security from drought. Two such communities are Chiarhumani and Jaruma.

Chiarhumani has five irrigation canals which draw water supplies from five separate ponds of varying size that are located at distances up to 15 kilometers from the community. Each canal has a list of resident families with rights to a water turn or mita. Each user is known as a mitani. The mitani heading the list represents the household located nearest to the holding pond and enjoys the first water turn; the next nearest user gets the second turn, and so on down the canal by consecutive location. The length, frequency, and schedule of mitas will vary from one canal to another depending on the capacity of the holding pond, the volume of flow, and the number or type of participating users. A landed resident family or tacero, which pays the departmental land tax, is entitled to a complete mita, while land-poor residents or sobrantes are only entitled to one-half a mita. Users located on the Machacuyo canal receive a low-volume mita which lasts two days and two nights. A two-day delay between one mita and the next is required to allow the holding pond to refill, while a 30-day wait is required before a user is allowed their next mita. In contrast, users on the Chiarhumani and Toyoco canals have only a three hour mita, from 2-5 P.M. and 3-6 P.M. respectively, with a 24 hour space between mitas. Depending on the location of the user, it can take up to three hours for the water to travel down the earth canal from its holding canal. Thus, the water should be released hours before the time designated for the mita to begin, and turned off well before the time the mita must end.

The control and supervision of water use is in the hands of kamanas or agricultural authorities (the same individuals who monitor the aynocas). These are rotational positions, changed each year, and there exists one kamana for each irrigation canal. The kamana is responsible for notifying water users of the day and time of their mitas. They also enforce fines against water use violations such as excess water use or outright theft of water during non-authorized mita hours. Depending on the gravity of the violation, fines may vary from loss of a single monthly water turn to loss of use rights for an entire irrigation season. However, such punishments are rare because water use necessities can be resolved through ayni or exchange arrangements.

For example, if a mitani is in desperate need of water he can negotiate with another user to cede him their mita, a favor he will repay at a future date either with his own water turn or some other service. The kamana is also responsible for organizing annual canal cleanings and other required maintenence of the irrigation system. These tasks require the equal participation of all residents in the community, irregardlesss of the size of their mita, and even including young households who do not yet have a mita.

Irrigation systems in Jaruma are also based on holding ponds. Both individual and community systems exist. In the highland district of the ex-hacienda Cayaca, the 25 resident families all have access to their own supplies of water. Normally, 2-4 households with contiguous plots organize themselves to construct a holding pond and canal system for their own use served by a local spring. Such ponds also serve family domestic water requirements. In these cases there exist no formalized mitas; water is used as needed and available, but for irrigation of very small areas (each pond serving an area less than a hectare). However, in the lowland district of Cayaca, where no frost danger exists, cultivation of onion crops and their nurseries is continuous throughout the year because local residents are supplied by four separate holding ponds, each with a 24-hour mita capacity. In this district there exist 31 mitanis, including six new households. Each mita lasts from dawn to dawn with a one-day interval between mitas. In the case of rain, any mita in progress at that time is immediately stopped. Then, when conditions warrant irrigation again, the mita will be resumed with the user whose service was interrupted. Water use is controlled by the Secretary of Agriculture of the Agrarian Syndicate of Cayaca. Canal maintenence is a community responsibility, with tasks and dates determined by all residents meeting in general assembly. Any resident failing to make his personal labor contribution is fined the equivalent of a daily wage for each day of canal maintenence work missed.

Until 1980, the ex-hacienda of Aroma, also belonging to the community of Jaruma, was without irrigation of any kind. In that year both drought and frost severely damaged the barley crop on which the livestock of Aroma residents greatly depends. Faced with the choice of selling their herds or watching them starve, local households resorted to emergency measures. Their first attempt to cope with the disaster was to make trips of 15-20 kilometers to the natural pasture lands of other communities, and under the cover of night they would steal huaylla, a natural hay which grows wild in parts of the Altiplano. But these thefts proved so embarassing to local pride (particularly after several residents were caught in the act and fined) that the community undertook the construction of a holding pond and canal system to serve two of its aynocas and thereby guarantee its future fodder crops. This project was undertaken and completed in 1980 (August) prior to the planting season. The beneficial effect of irrigation on barley harvests was immediate and dramatic. During the 1980-81 agricultural year, Aroma residents managed to grow two crops of barley in a single year. They planted in September and harvested the first crop in December and January.

then, by irrigating the stubble of the first crop, a second sprouting known as pillillidos was obtained. This resulted in another harvest of barley for fodder in February and March.

HIRED AND EXCHANGE LABOR ARRANGEMENTS

The two dominant ways in which highland families obtain additional labor services is through ayni and minka agreements. The ayni is a simple exchange of labor services between two households, or as seen in community terms, an exchange of "favors". The concept of a favor is important, because ayni services are never offered voluntarily. A farmer seeking ayni labor must approach a neighbor or relative and formally request the service, even implore the other party, no matter how poor the supplying household may be, nor how many times such favors have been exchanged before. No payment for ayni services is made, neither in cash nor in-kind. Instead, the recipient of ayni labor must return the favor at a future date to be determined by the person to whom he has become indebted. Ayni labor does not always involve exchanges of the same service. For example, if a man loans his team of oxen in ayni, the recipient may repay the obligation with two days of manual labor for every day of oxen use. Similarly, ayni labor for an agricultural task might be repaid in a non-agricultural activity, like constructing a house.

Minka is the term for hired labor service. Such labor must be paid for in cash or in-kind, usually with harvested produce. The agreed wage payment will vary in accordance with the labor service performed and the sex of the laborer. These variations can best be understood by using a single community as an example.

In the community of Huacuyo, all labor services are provided by community residents. The use of outside laborers is virtually unknown, not because they are unwanted but apparently because they are simply not available. As a result, nobody offers their labor services voluntarily in Huacuyo. Instead, the farmer in need of labor must seek out potential workers and request--sometimes implore as if it were an ayni transaction--their assistance 3-4 days in advance of the date of their employment.

Minka labor is first utilized in the task of kholly or the plowing of fallow land for potato planting. All laborers must provide their own tools, which consist of footplows, bars or picks for turning sods, and wooden mallets for beating and leveling the soil surface after plowing. Male laborers are always the plowmen--digging up the rectangular sods with the huiso or foot plow--while female laborers turn the heavy sods and level or beat the soil surface. The respective wage rates for these tasks in 1980 were 80-100 pesos (US$3.50--4.00) per day for men, and 60-70 pesos (US$2.40--2.80) per day for female workers. The range in wage payments for both sexes is caused by

different weather conditions. Demand for labor (and thus the wage rate) goes up during periods of dry, sunny weather because the soil surface is baked hard and difficult to work. The opposite is true when soil conditions are humid.

Minka labor is next utilized for planting tasks, particularly for crops such as potatoes, papaliza, and oca which also employ the use of the foot-plow. Again, the male laborer always works as plowman--opening seed holes --while female laborers are employed in the supposedly lighter tasks of planting the seed or beating and leveling the soil surface after the seed is in the ground. The wage rates are similar to those for planting, again with dry and humid weather adjustments, although the rationale is somewhat different. During dry, sunny weather there exists greater risk of seed desication, so planting must proceed as quickly as possible and requires more labor in a shorter period of time. In wet, humid weather planting can proceed slowly, and a household can often complete the task with family labor alone by spreading it over a longer period of time. Thus, demand for hired labor declines.

In Huacuyo, minka labor is also employed for both weeding (khoraña) and hilling (aporque) tasks. Oddly enough, there exists no difference in wage payment between men and women when both are paid in produce, which usually amounts to 1/2 arroba (12.5 pounds) of dehydrated tubers (chuño, caya, etc.) or quinua, broadbeans, or wheat. Yet when these same tasks are paid in cash, male laborers receive 100 pesos (US$4.00) per day while female laborers receive a mere 30 pesos (US$1.20) per day.

In harvest tasks, minka wage payments depend on the crop and the abundance of the harvest itself. For potato harvesting, the wage during a good year may rise to 3 arrobas (75 pounds) per day, or it may drop to 2 arrobas for a poor harvest. Payment is almost always made in produce. Note that if this payment were calculated at its cash equivalent (given potato prices in the marketplace) it would be worth 170-210 pesos (US$6.80--8.40) per day, or twice the traditional wage rate. In potato harvesting, male and female workers are paid the same wage. Barley harvesting is usually paid in cash, with male laborers receiving 140 pesos (US$5.60) per day compared to 50 pesos (US$2.00) per day for women. In the harvesting of broadbeans, for one day of labor a minka worker is paid a single stack of harvested stalks, from which one arroba of dry beans may be obtained. Once again, as with all other wage payments in-kind, male and female laborers earn the same quantity.

CLIMATIC AND OTHER RISKS OF NATURE

The Bolivian highlands offer one of the world's most inhospitable natural settings for agricultural undertakings. The extremely high altitudes (over 10,000 feet above sea level) not only exagerates climatic extremes, but also retards and lengthens the growth cycle of food crops, thereby increasing their exposure to those extremes. The most serious climatic hazards are hail, frost, excessive rain, lightning, snow, drought, heavy winds, and intense solar radiation. These dangers are compounded by seasonal infestations of birds, rodents, ants, worms, and other pests. Based on information provided by farmers from the communities of Yuka, Huacuyo, Killay Belen, Chiarhumani, and Jaruma, we have constructed the following composite calendar of crop risks in the Bolivian highlands.

JANUARY: This is the month when most crops (planted in September and October) are in the flowering stage and therefore extremely vulnerable to the elements. The worst threats at this time come from hail, excessive rain, and sudden frosts. The evening of January 24th is considered the moment of maximum frost risk. If no frost occurs on that date there will be widespread rejoicing in rural communities.

FEBRUARY: The hail threat continues, and the danger of excessive rain increases. Farmers have a saying: En Enero es poco y Febrero es loco ("Little in January and crazy in February"). Heavy rain causes serious soil erosion in hillside plots, while in lowland plots the excess soil moisture causes tuber crops to rot. In February the allkatiti, a worm which attacks oca, and the gusano blanco, a white worm which attacks potatoes, make their first appearance. Crops of barley, oats, wheat, and quinua begin to attract predations by wild birds.

MARCH: What farmers fear most at this time are hail storms and frost. Most rural communities collect supplies of green fuelwood to have on hand for building smudgefires to ward off imminent hail storms. The object is to create the maximum amount of smoke possible, not flames. Farmers will run around their plot boundaries and shout at the approaching storm clouds: "Pass over, pass over!" Peas, broadbeans, and barley are the crops most seriously at risk to hail damage in March. The danger of frost remains high as well, because since the soil remains fairly humid this time of year, any frost occurence will cause potatoes to freeze underground. But on the other hand, drought can also be a problem. March is considered the month of kholly, when the first (of three) plowings of fallow land is completed in preparation for the following season's potato crop. Lack of rain will cause the soil to become too dry and too hard for plowing.

APRIL: During this month the risk of hail practically disappears. The possibility of frost increases, but it is not a serious danger to crops because they are almost fully matured. April does bring a resurgence of natural pests and blights. In drier plots, potatoes begin to be attacked by white worms, while in humid soils the crop is attacked by snails. These threats are sufficiently serious to justify early harvesting in many cases because within a single month they can destroy half the crop. In April, the grain crops of barley, oats, wheat, and quinua attract renewed predations of wild birds, and it sometimes becomes necessary to advance the harvest and stacking of these crops. During April, the second plowing of fallowed land is begun to prepare for future potato crops. If the weather is too dry, the soil becomes hard to plow. In drier areas like Jaruma, a plowing with oxen becomes necessary prior to potato harvesting to loosen the soil for digging.

MAY: This is the principal harvest month. The rainy season has passed, the weather becomes sunny with warm days and cool nights. May is one of the months of least climatic risk. The most serious problem at this time consists of predations by rats and mice on newly-harvested produce stored in makeshift silos. In communities like Yuka and Huacuyo, rats and mice cause serious damage to stocks of potatoes, peas, broadbeans, barley, and quinua.

JUNE: Because of the certainty of consecutive frosts (indeed, June 24 is celebrated as the coldest night of the year), June is the season for the preparation of freeze-dried, dehydrated tuber products such as chuño (from potatoes), caya (from oca), and others. These products are extended on the ground for several days of freezing and thawing before being stamped, peeled, and finally stored. Frosts, therefore, are a welcome event. However, the most feared climatic event at this time is snow. A snowfall during the night can destroy products being dehydrated, and will cause damage to stacks of grain crops by causing them to rot. A second climatic threat associated with June is that of strong winds, which sometimes become so powerful as to blow away stacks of grain and even thatched roofs.

JULY: Strong winds continue in July. This is the month for transporting and threshing grain, so as long as they are not excessive, the winds are welcomed to assist in winnowing the chaff after threshing. However, when the wind becomes too strong, both the transport and threshing of grain crops must be interrupted. Snow is also common in July, but at this time of year a snowfall is considered more of a blessing than a risk because it provides moisture for the soil which will facilitate land preparation tasks and possibly early plantings in August.

AUGUST: This is the last month of the windy season, and usually of snow as well. The production cycle is about to begin once more. What is welcomed most is rainfall to promote easy soil preparation and early planting. Conversely, the most serious climatic threat is bright sunshine and drought.

SEPTEMBER: This is the first month of the traditional planting season, and September plantings are considered "early". Most needed is rainfall and overcast days to enhance proper soil humidity for plowing, furrowing, and planting. The greatest climatic danger remains bright sunshine and drought. A serious secondary threat, for newly-planted crops, is the kellunchu and other soil pests that attack the tender sprouts of young plants.

OCTOBER: The planting season continues. October is the principal month of potato planting, particularly frost-resistent "late-planted" varieties, and for planting barley for green fodder. Drought continues to be the most serious problem, and even more so once the seed is in the ground. When the rains are long overdue, farmers begin to practice a variety of traditional rituals intended to attract rain for their plantings.

NOVEMBER: The planting season ends in November. Crops planted in this month are usually those which were planted late due to drought. Again, lack of rain is the primary problem farmers face at this time of year.

DECEMBER: By the end of the calendar year, crops are well advanced. December is a month for weedings and hillings. Inadequate rainfall continues to be the primary risk. Moisture is required to enhance normal plant growth in the pre-flowering stage, and to facilitate soil cultivation tasks. December marks the beginning of the dreaded hail season, which will last until April. Along with the hail, farmers also fear lightning, which they consider to be a supernatural punishment. Where a lightning bolt strikes the ground it will destroy--as if burnt by fire--an area some 15 meters in diameter, while its consequences for humans and livestock are usually fatal.

INDICATORS OF NATURE FOR PREDICTING WEATHER AND HARVEST OUTCOMES

Predicting weather conditions and their likely effect on harvests is practically an obsession with subsistence farmers of the Bolivian highlands. Will it be a wet year or dry? Will the rains come early or late? Will frost damage be moderate or disasterous? To answer these questions, rural households consult a wide range of natural indicators. These include insects, birds, animals, plants, constellations, and weather conditions observed on special saints' days or others indicated by tradition, experience, and the farmer's almanaque. The preoccupation with weather and harvest predictions begins as early as February, when the results of the previous crop season are not even known yet, and reaches its climax in August and September, before the traditional planting season begins. At these times, when one farmer encounters a neighbor, they almost invariably talk about the signs they have observed and how they should be interpreted. On weekly market days it is common for complete strangers, often from different geographical regions, to initiate conversation with each other about how they see the prospects for the forthcoming agricultural year. Some households hire readers of coca leaves to predict weather and harvest conditions; others pay special heed to their own dreams. All the available evidence and opinion regarding signs and natural indicators are regarded with great seriousness. The indicators themselves--say the farmers--always speak the truth; the error arises when humans fail to correctly interpret what the indicators are saying. This is one reason why old people are treated with such great respect in the rural community: they have had long experience reading signs and checking outcomes against predictions.

Farmers often liken agriculture to a juego de azar or game of chance. Using this analogy, the consultation of natural indicators can be compared to the gambler who is attempting to calculate his odds and establish a strategy for beating them. However, nothing is gambled until the bets have been placed. For a farmer, planting is the act of placing the bet; once the seed is in the ground, the bet can not be withdrawn. However, like many gamblers, most rural households prefer to hedge their bets by planting not just once but on three separate occasions. According to what their indicators convince them to do, they play their strategy--their "system"--by electing to advance or delay planting dates, by changing the location of the planting, and by increasing or reducing the area planted or the planting investment--i.e., by changing the size of the bet. Finally, by spreading out planting dates, the initial performance of early plantings provide further guidance on where, when, and how much to bet on the second and third plantings.

No one single indicator permits the farmer to determine his planting strategy. He consults as many as possible, seeks to determine a discernable pattern among them, balances their relative importance against his own and the experience of others, and finally arrives at a decision. Hence, the number of possible interpretations drawn from combinations of even a few indicators can be endless. Moreover, similar indicators are frequently interpreted differently from one community to another, and from one household to the next. Presented below are just a few of the most common types of indicators and some of their possible interpretations. To present an exhaustive description of natural indicators would require a book unto itself.

INSECTS

A rural household's planting decisions can begin as long as eight months before the seed goes in the ground. February is the month of kolly, when fallow land is given its first plowing in preparation for the following year's crop. How much fallow land is plowed, and where it is located, places a fundamental constraint on the many planning decisions to follow. For this reason farmers are alert to advance signals of how their crops will be faring a year from the time fallow plowings occur. One such signal is a fly called the chuñosillpi, which hatches in clouds during February. Sometimes the bug-hatch mainly occurs in low lying areas, other times on highland slopes. The location of the hatch is an indicator to farmers of where their future potato crop will fare best.

CONSTELLATIONS

The next group of indicators to be consulted are the constellations. The most important are the Uru Uru or Koto (morning stars), the Jawira or Milky Way, and the Cruz del Sur or Southern Cross. The last two should make their appearance in early May and depart in mid-July. The sighting of the Southern Cross or the Milky Way before May 3rd is considered an indicator that the harvest dates should be advanced. The months of May and June are ones of intense star gazing by farmers, because at this time of year a clear, star-filled night is almost a sure sign that a frost is imminent. Frosts are welcomed because the harvest is over and rural households need several consecutive nights of freezing temperatures to facilitate the making of chuño and other dehydrated products.

The Uru Uru leaves the sky in February (near Carnival) but if it returns by October 1st, this is regarded as a sign to repeat the planting of potatoes in the same plot for a second year, a practice known as kutirpu. The Koto appears larger in certain years than in others, a harbinger of harvest abundance. The normal planting season for the potato crop begins with October. This is a frantically busy time for farm households, for whom it is normal to start the day with the first crowing of the rooster around 3 A.M.

Hence, studying the morning stars becomes part of the daily planting ritual.

WEATHER CONDITIONS ON SPECIAL DAYS

Winds: An indicator of primary importance for farmers is St. Peter's Day, June 29th, which is also known by its more complete title San Pedro Laka Tutuka or St. Peter of the Winds. If the season of winds arrives before this date, the farmer will interpret this as a sign to advance his planting dates. Wind on the 29th indicates that the normal planting schedule is appropriate. And if the winds delay until July, this is a sign that plantings should be delayed. The wind itself, irregardless of the day of its appearance, is also subject to interpretation depnding on its direction. Wind blowing from the northwest is a harbinger of a rainy year or jallu mara. However, if the wind blows from the southwest, farmers interpret this to mean a year of severe hail and frost.

Rainfall: On certain days, rain is a cause for rejoicing; on others it is a prediction of heavy frosts to come. The earliest day in the year for predicting rainfall is February 8, Day of St. John the Divine. Rain on this date pressages a year of abundant rainfall. Similarly, rainfall on St. Andrew's Day, November 29, is considered not only an indicator of a good harvest (since planting has now been completed) but is actually considered a prerequisite for a successful crop year.

The most intensely observed days of the entire year come during the month of August, particularly the first three days. Beginning at midday of August 1st, if the sky remains clear and no rainfall occurs before midnight, this means that the first or early planting will prosper. A cloudy or rainy day at the outset of August means a poor crop is in the making. August 2nd and 3rd similarly refer to the second and third plantings. From one community to another there are variations on the trinity theme of August. For example, in Chiarhumani the first nine days of the month are divided into three 3-day phases known as Jacha (August 1-3), Taipi (August 4-6), and K'epa (August 7-9), each with a indicator significance of its own corresponding to the early, middle, and late plantings. Rainfall during these periods is considered bad, a sign of early frosts. Finally, rainfall on the last three days of the month is also considered bad news.

Fog: On most religious holidays, farmers wake early to study fog patterns and interpret their significance. But the most important day of the year for such observation is again August 1st. In the community of Huacuyo, for example, it is customary for a group of farmers to leave their homes on the evening of July 31st to climb to the summit of Mount Cerujani, which is the highest point in the district with the best possible view. Just after midnight the observation of fog patterns begins. Where the fog is first located, where it moves, and many other characteristics have a localized and special significance for the observers.

Frost: In general, the appearance of a frost in August is considered a indicator favoring early planting. But the most specific and possibly widespread frost observance ritual takes place on August 1st, known as the Dia de las Nieves or Day of the Snows. At nightfall of the previous day, the farm family takes three flat stones and places them in their outside patio or storage yard. Each stone has a ritual significance, representing the first, second, and third plantings respectively. At daybreak, the family assembles in the patio to uncover and inspect the bottom side of the stones for signs of frost or humidity of any kind. If any stone displays such moisture, this is an indication that the planting it represents will be successful. Any stone which appears completely dry represents the crop planting which is frought with the greatest danger, thereby calling for corrective or defensive measures to "dodge" the implied risks.

BIRDS AND ANIMALS

The cry of the Pucu Pucu, a wild bird, is a harbinger of abundant pasture if its cry is not heard in the fields until August 30th. If the bird's cry is heard earlier in the month, however, this indicates a year of scarce pasture lies ahead, a year when many lambs will starve to death.

September is considered the month of land preparation for planting. Roughly corresponding to this period is when the cry of the bitch fox in heat can be heard. This howling is listened to attentively by rural households because it is considered a major indicator of when and where to plant as well as a reliable predictor of crop success. If the cry of the fox is heard in August, or even as early as late July, this is a clear indicator of the need to advance harvest dates. In contrast, when the cry is not heard until late September and early October, the traditional wisdom suggests that a delay in planting is appropriate. Where the fox is heard is also important. If heard in lowland areas, that is an indicator that crops will grow more abundantly there in the coming year; a cry coming from highland areas indicates the expediency of giving greater emphasis to upland plantings. During September, shepherds keep a special lookout for fox dung. Whenever encountered, the excrement is subjected to careful inspection. Shepherds look for undigested chunks of potatoes, chuño, even corn; these are sure signs of an abundant harvest to come. But the most important and universal indicator is the tone of the fox howl. If it is low, hoarse, or choked, this is a sign that the animal is glutted with produce--strangling from its abundance--which indicates a bountiful crop year lies ahead. In contrast, if the howl is thin, high-pitched, and clear, this indicates a poor year is in the offing.

PLANTS

Perhaps the largest number of indicators will be found among plants, both wild and cultivated. Plants commonly consulted for weather and harvest predictions include such diverse species as cacti, nettles, water lilies, algae, pears, and potatoes. The cactus or phuscalli and the nettle or itapallo both flower in mid-September under normal circumstances; thus, when flowering occurs earlier or later, these are signals to advance or delay plantings. The water lily or lirio flowers in three stages during the months of May and June, a period of high frost risk. Farmers inspect each stage for frost damage and apply the results to predict the risks to each of their three plantings. Algae begins to appear in rivers and ponds in late June and mature by All Saints Day on November 1st. When the growth of algae is interrupted or destroyed by snowfall, this is regarded as a sure indicator that the following crop cycle runs a high risk of total destruction from frost. Pears are used as an indicator in highland communities such as Jaruma, which are located near access routes to the temperate valleys regions and conduct routine commercial contacts and barter with them. Pears are considered to be a fruit which "competes" with potatoes. In other words, when the pear harvest in the valleys is a great success, the potato harvest in the highlands will be a failure, and vice versa.

Potatoes are used as indicators in a variety of ways. First, many families take three seed potatoes of the same variety and plant them at seven day intervals during September in three separate containers inside the farmhouse. These indoor plants represent the early, middle, and late plantings respectively. As each plant sprouts it is observed for signs of strength or weakness, particularly differences in coloration that symbolize varying degrees of frost damage. A second use of potatoes is to inspect plots which were planted the previous season to potatoes and look for the sprouting of papas k'ifas or potatoes left behind ("abandoned") during harvest. Their sprouts are then inspected for indications of risk or good fortune that may lie ahead.

But the search for indicators and planting guidance continues into the planting season itself. Once the first planting is completed, it is customary for farmers to wait until the crop has sprouted and been carefully inspected before proceeding with the middle and late plantings. In this instance, the sprouting leaves are closely examined for coloration. If the underside of the leaf has a purple tint, this is an indicator that heavy frosts can be expected. If the leaf's underside displays only a pinkish tint, this is a sign of moderate frost in the future. The absence of either of these colorations is cause for great happiness, a sure sign that frost risks will be negligible during the current agricultural year.

STORAGE STRUCTURES

Harvested agricultural produce is stored in a variety of ways depending on the type of crop, its quantity, and whether it is being stored temporarily or permanently. All produce passes through a two-stage storage process. The first stage consists of provisional field storage, which begins almost immediately after harvest (usually April) and continues until the crop is ready to be graded or threshed (June-August). Once so processed, the crop enters into a final and better-protected stage of storage, usually in a permanent structure near the homestead or in a variety of places and containers within the farmhouse itself.

Essentially there are two storage models for agricultural products. The first applies to rootcrops, particularly potatoes, oca, papaliza, and izaño. The second applies to fodder and grain crops, including barley, oats, wheat, quinua, tarwi, broadbeans, peas, and corn.

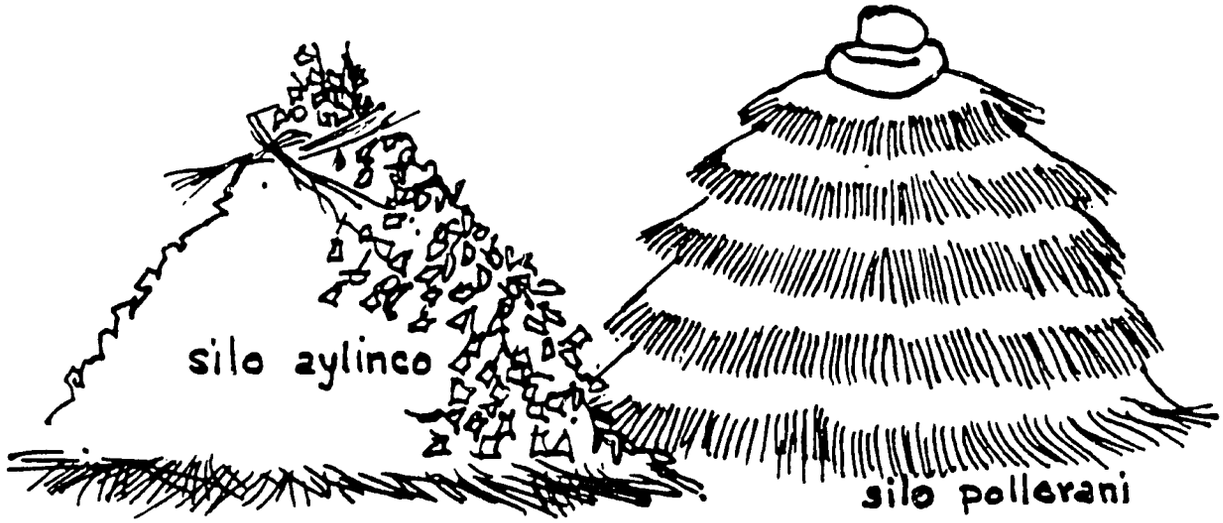
ROOTCROP STORAGE

Soon after harvesting, a rootcrop is stored in a temporary silo to protect it for a couple of months until it is ready for grading. The location of these silos will vary from one community to the next. Most farmers prefer to transport their produce back home and build their silos in the finawiri canchón or storage yard of the farmhouse (also known as the patio). However, there are instances such as in the community of Jaruma, where the temporary storage site is the field where the produce was harvested. All silos resemble each other in shape, but from one family to another there may be important differences regarding the number of silos constructed, their size, and the materials or technique used to build them. Usually it is customary to have separate silos for different kinds of root crops. Silo size will depend on the quantity harvested. Typically minor crops--such as oca and papaliza--tend to have smaller silos (reflecting reduced area under cultivation) than a major crop like potatoes. Moreover, at the discretion of the farm household, separate varieties of the same crop--for example, bitter, frost-resistant versus so-called "sweet" variety potatoes--can be placed in different silos to facilitate subsequent grading.

The construction of all silos begins the same way. A flat area is selected on the ground and cleared of rocks and debris. Next, a circular bed of straw about 12 cm thick and 1-2 meters in diameter is laid. Onto this bed the produce is spilled gently and carefully from cargo sacks to form a neat, conical pile. For minor crops, this pile may contain less than a single carga of 4-5

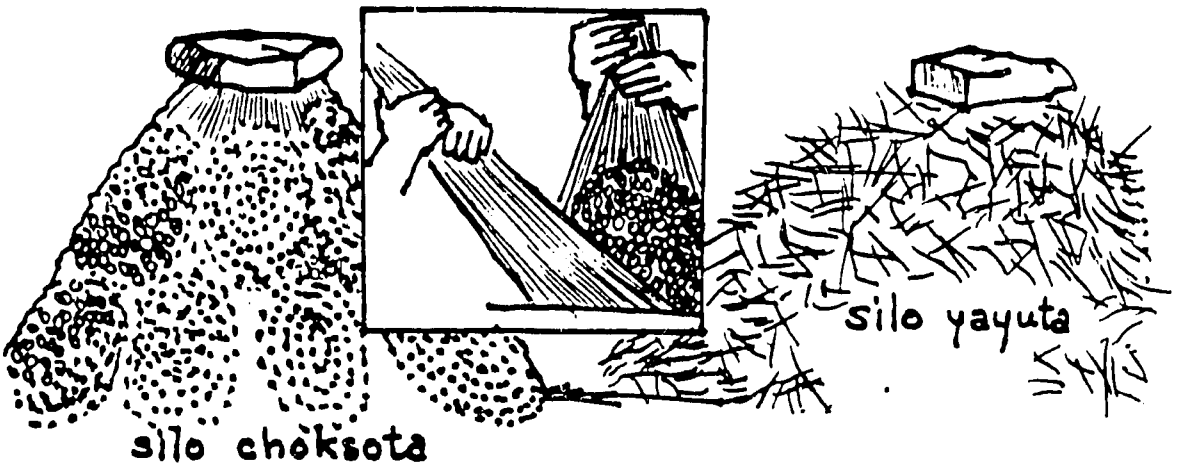
arrobas (100-125 lbs); for potatoes the pile may contain 5, 10, even 15 cargas. Once the pile is completed it must be covered with one or more layers of straw or other materials. It is precisely here that a number of differences in silo construction can be observed.

One model is to cover the produce pile with a layer of straw and then finish with an outer layer of potato stalks, known as aylinco. This type of silo has obvious advantages for farmers with scarce supplies of straw, because it is a general rule-of-thumb that a typical potato silo requires two cargas or about 200 lbs of straw if it is to adequately protect its contents from the elements, frost in particular. Among straw silos there appear to be at least three distinctive models. These are known as the pollerani, choksota, and yayuta.



The silo pollerani gets its name from the close resemblance it bears to the polleras or layered skirts used by indigenous women in Andean America. This silo is covered by 5-6 overlapping skirts of straw which have been knitted together semi-permanently. The structure is covered by two flat rocks at the apex to hold the last skirt in place and thereby keep the others from blowing away in the wind. The major advantage of the pollerani silo is that it allows the farmer to economize in his use of straw over time. By carefully removing the straw skirts when the silo is uncovered, they remain intact and can be used for covering another silo the following year. The disadvantage of the pollerani is that it can not endure really strong winds. It also does not provide quite as good protection from frost as other types of silo.

The silo choksota has a braided, tightly-knit appearance. It has an inner layer of straw followed by an outer layer composed of clumps of straw which have been tapped against the ground at an angle to create an oval-shaped

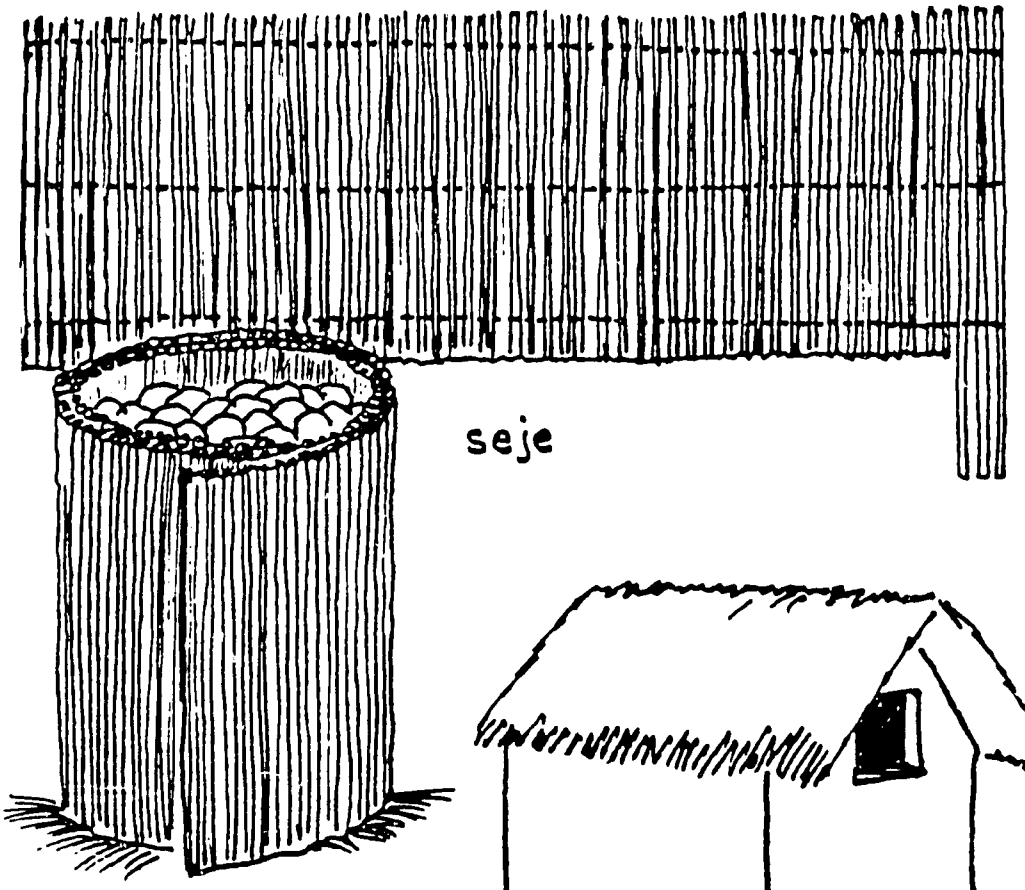


base. Each clump is inserted into the produce pile and anchored so that the oval base faces outward. This form of knitted construction is built to withstand high winds and severe frost. Its principal disadvantage is that the choksota is extremely laborious to build.

In contrast, the silo yayuta is the easiest and fastest model. After the produce is piled, the straw is sprinkled in an even and heavy layer over the entire surface. The yayuta is the most protective against frost of all three straw silos. However, it is vulnerable to heavy winds. Also, because of the lack of stacking, almost all the straw will be lost and can not be saved for another silo the following year.

The grading of rootcrops usually takes place in June, which conveniently is combined with the season for preparing dehydrated products from the smallest and poorest quality produce. Once graded--for example, potatoes for cooking, gifts, seed, dehydration, and sale or barter--each type will be placed in a separate location or in a different container for storage within the farmhouse or in a nearby structure. Often, storage arrangements are extremely casual: heaped in a corner, in a sack under the bed, lying along the wall behind a border of adobe bricks. The most important feature of such storage is simply to keep the produce in a dry, dark location. Where rodents are a problem, tin cans and ceramic vessels sealed with a board or adobe brick are easy ways to store produce.

Nonetheless, many households elect to store their potatoes and particularly dehydrated products in more elaborate structures. The most common of these is the storage bin. It is built of adobe bricks, sometimes with interior walls to separate different classes of produce, is lined with straw, and stands a meter or so in height. Next is the seje or storage basket. This consists of a woven straw mat--about 1.20 meter wide by 5 meters long--which is rolled into a cylinder several layers thick. The seje is usually made from wichu, a wild straw that is so resistant to moisture it will not rot even if submerged in water for several months. This mat can be used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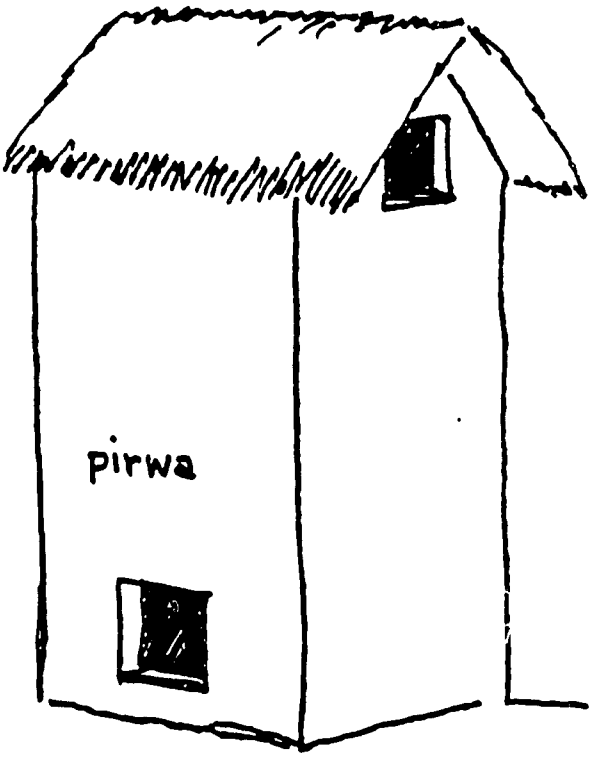
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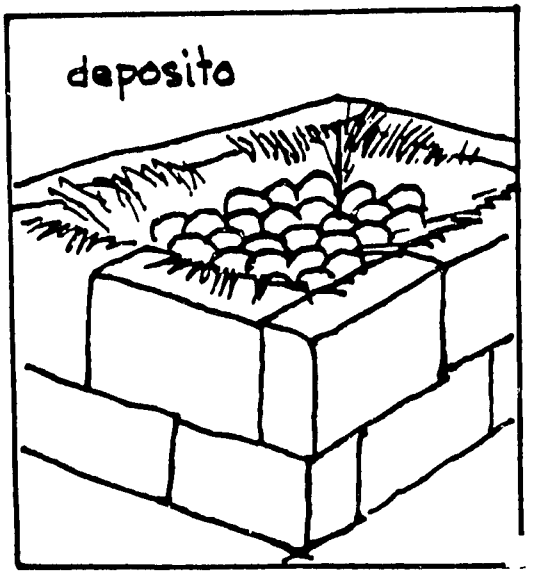
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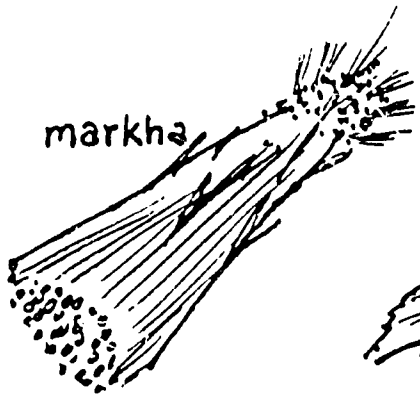
again and again, year after year, and be reshaped to different diameters to meet changing storage needs. Finally, for truly secure, long-term storage--particularly for large quantities of potatoes, chuño, grains--many rural households use the pirwa. This shelter resembles a small, narrow house with adobe walls and a thatched roof. It has one small window near the roof for loading produce, and a small door near the ground for unloading. In a pirwa, it is possible for grain and dehydrated products to last for 3-4 years provided the structure is kept completely dry.

STORAGE OF GRAIN AND FODDER CROPS

With the exception of barley for fodder, all grain crops pass through a two-stage storage process. In the first stage the crop is field dried for a month or two in stacks called calchas or in silos called arcos to prepare it for threshing. Fodder barley is also field dried, but it is usually left unstacked, lying in clumps and windrows for a couple of weeks and then stored directly in a fodder silo. In the second stage, following threshing, dried grain is stored much like rootcrops--in sacks, tins, ceramic jars, sejes, and pirwas.

Barley for fodder is harvested by sickle. It is left lying in the field in armful size clumps called chullas or markhas for a period of about two weeks. This drying serves to age the hay (green barley can be harmful to livestock) and also reduces its weight for transport to the homestead. Fodder barley is stored in a silo known as the pelón or cebar arco, of which there are two principal models, cylindrical and rectangular. In the round silo, barley stalks are all placed in the same direction with their cut bases facing out and their stem points inward. The silo is covered with a removable straw roof to facilitate access to the contents and to protect the fodder from the elements. The rectangular model is a less pretentious silo, with a single row the width of the stalks (which also lie in the same direction) and covered with a protective layer of straw.

Grain barley, oats, wheat, quinua, tarwi, and corn are also harvested by sickle, with the entire stalk left intact. Broadbeans and peas are also harvested with their stalks, but these are usually pulled from the ground by hand. In any event, all of the above crops are first piled into stacks known as calchas. The calcha is a simple structure consisting of several armloads of stalks standing upright . The first armload is placed as a vertical "post" around which the other armloads are stacked at a slant to form a roughly conical, twisted pile. In areas where strong winds are prevalent, it is advisable to secure the top of the calcha with a binding. This usually consists of an improvised "rope" made from several twisted stalks of the same crop being stacked. The purpose of the calcha is to allow the crop to dry (which facilitates its transport) and also to protect the grain from rain, snow, or hail until the arrival of the threshing season in July or August.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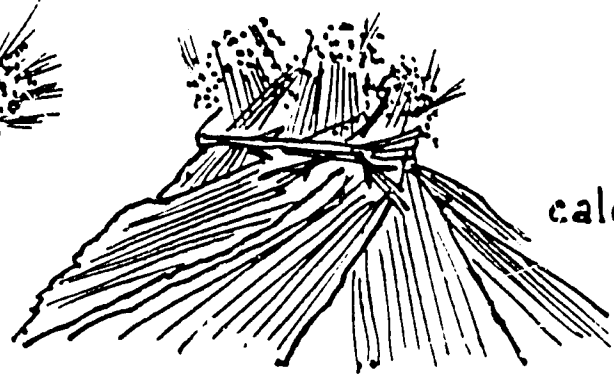
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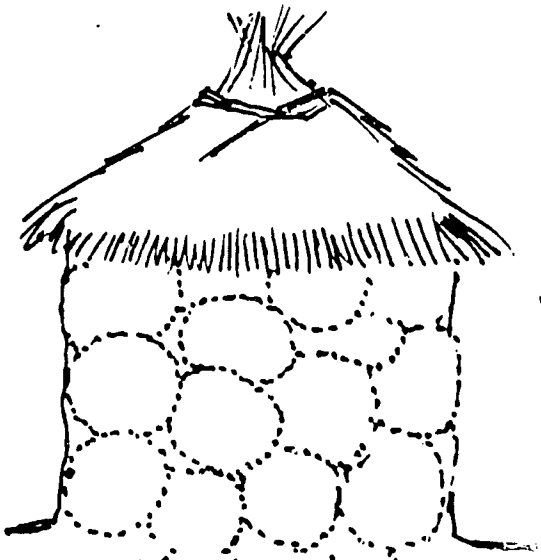
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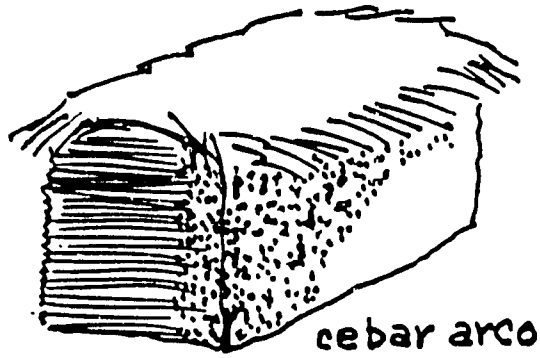
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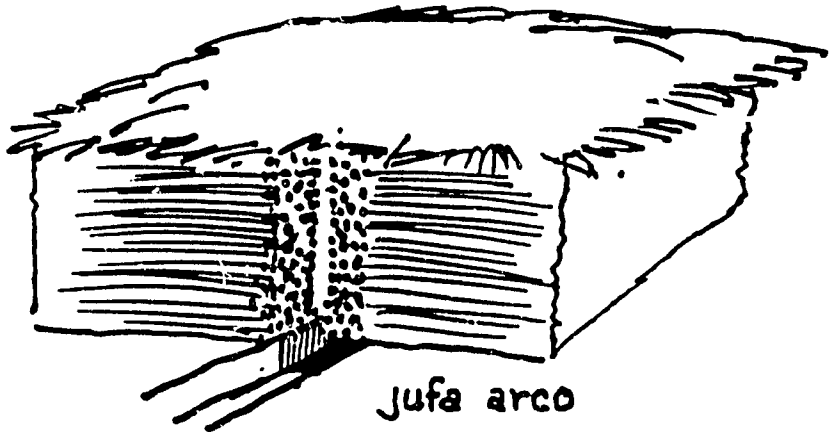

jufa arco

When grain crops are threshed at the farmstead, the crop is taken from its calchas and placed in an arco, like fodder barley described above, where the grainheads point in the same direction, the cut stalk bases in another. However, there are modifications made in the construction of the arco depending on the crop. In the case of barley, the arco is located so that the side with the grainheads faces eastward to catch the morning sun, which is particularly intense, and thereby promote more rapid drying. In the case of peas and broadbeans, the arco is not given a straw roof, because this would increase humidity within the silo and cause that portion of the grain located in the middle of the silo to rot. Perhaps the most elaborate silo for grain drying is the so called jufa arco or quinua storage structure. This silo is designed not in a single straight or curved row but rather with two rows which face each other--grainheads touching in the center, cut stalk ends facing outward. Furthermore, running through the middle of the silo along the ground is a narrow trough. Its primary purpose is to facilitate air circulation and thereby lower heat and moisture which might otherwise become excessive due to the silo's straw roof. The trough also facilitates the collection of grain which may fall during the drying process.

After drying in calchas or arcos, grain crops must be threshed. This task takes place during the windy season, usually in July or August. Large quantities of a grain crop--for example, 5-10 calchas or more--are threshed either by driving animals around and around a threshing floor, or by beating the grain with long, curved poles known as jauk'añas. When smaller amounts of grain are threshed, the dried stalks are placed on a leather hide and beaten with sticks, or struck against the ground, or the grain rubbed off manually, or by stamping with the feet. Subsequently, the grain is separated from the stalk residues, which are then stored as fodder. The grain is further cleaned by repeated tossing into the air on a windy day so that the chaff will be blown away.

Once winnowed in this fashion, the clean grain is then stored like most other produce. Large quantities--in excess of 2-4 arrobas--are stored in the pirwa, in sejes, or in bins. Smaller quantities are stored in ordinary ceramic pots (called wacullas) or in jute bags, woven sacks, five-liter tin cans, and other recepticles available to the farm household.

MARKETING AND BARTER PRACTICES

Just because rural households in the Bolivian highlands are described as "subsistence" producers, this should not be interpreted to mean that they lack a commercial or market orientation. Indeed, the exact opposite is true. Aymara families conduct highly complicated and continuous marketing activities, on a wholesale as well as retail basis, for cash but even more frequently as barter transactions.

The reason subsistence producers are regarded as having a low commercial orientation is because the total amount of produce they sell at harvest is only a tiny fraction of their farm production; similarly, produce marketed on any given day tends to be in very small quantities. For example, the Aymara household would define a "wholesale" transaction as any sale of farm produce in excess of one arroba or 25 pounds. In turn, "retail" transactions are measured by half- and quarter-pound units, by mere handfuls, hatfuls, and even canfuls. However, such sales continue week after week after week. When measured over the space of an entire year, these transactions eventually add up to a major portion of the family's harvest. One way the household manages to stretch its marketed commodities over so long a period of time is by converting most of its poorest quality fresh produce (particularly potatoes and oca) into dehydrated products such as chuño and caya, which can be safely stored for years if necessary. Chuño is the principal commodity of exchange used by Aymara households to barter for fruit, vegetables, bread, kerosine, salt, sugar, rice, noodles, dry fish, coca leaves, and other staples or supplies they can not produce for themselves.

Precisely because sales and barter transactions are conducted as a weekly activity, involving minute quantities of produce, most highland families to their business at a local or regional feria, a market day held once a week, usually within reasonable walking distance (several hours) from their homes. Such markets attract a wide variety of participants, are highly organized, and offer an amazing array of goods. What is not widely recognized, however, is that the majority of market transactions consist of barter arrangements, not cash sales. Moreover, since male household heads normally take responsibility for (infrequent) wholesale transactions, while small-scale trading is considered a female activity, the large majority of market participants are women.

In order to document these and related characteristics of rural marketing and barter arrangements in the Bolivian highlands, we present a description of market transactions by the residents of three communities: Yuka, Huacuyo, and Jaruma.

COMMUNITY OF YUKA

Residents of Yuka normally sell their agricultural produce in any of three locations: (1) at the sunday market in Escoma, (2) at the highway bridge 500 meters north of Escoma, also on sundays, and (3) within Yuka itself. Market transactions within the community are the least important; hence, they will be described first, and only briefly.

Community-Based Trading: These internal transactions occur in two instances. The first takes place at harvest time, when indigenous intermediaries arrive at the farmstead or the digging site itself (in the case of potatoes and oca) to barter for produce directly, before it has been graded. This is usually the only opportunity for outside merchants to obtain first quality produce, which local households prefer to reserve for their own consumption. The second type of community-based trading involves women from communities located on the Titicaca lakeshore, who periodically travel to Yuka to barter dry fish for agricultural products. The terms of trade are generally similar to those which exist in the Escoma market, except that whenever the transaction occurs at the homestead itself the outsider stands a better chance of receiving in trade a better quality of produce. However, when barter transactions occur at the Escoma market, or at the bridge outside of town, Yuka households generally use their lowest quality fresh produce or dehydrated products.

The Escoma Market: This weekly commercial event occurs in the town plaza. It attracts merchants from Peru, from nearby mining districts, and from the city of La Paz, not to mention thousands of buyers and hundreds of sellers from over a dozen indigenous communities in the region. After the border market at Puerto Acosta, Escoma's market is possibly the largest in the northern highlands.

There are at least twelve sections to the market distributed around all four sides of Escoma's central plaza. In each section, there is one or more rows of sellers or traders, each located in a designated space of about four square meters which remains the same from one week to the next and commands a rent of 5 pesos (US$0.20) per day or 60 pesos (US$2.40) per year. The location of the principal market participants is presented in Diagram 1 (below).

Beginning on the southern side of the plaza, facing the church, are three different types of sellers divided between two rows. On the left, in two separate rows, are the intermediaries who sell contraband goods from Peru, most likely purchased in Puerto Acosta. These include blankets, shoes, clothing, detergent, crackers and candy, canned goods, wines, and many other products. To the right of the church are two rows of merchants from the city of La Paz. The row nearest the church sell a large number of processed goods, the so-called "articles of prime necessity" such as salt, sugar, kerosine, bread, etc. The second row, nearest the plaza, consists of the

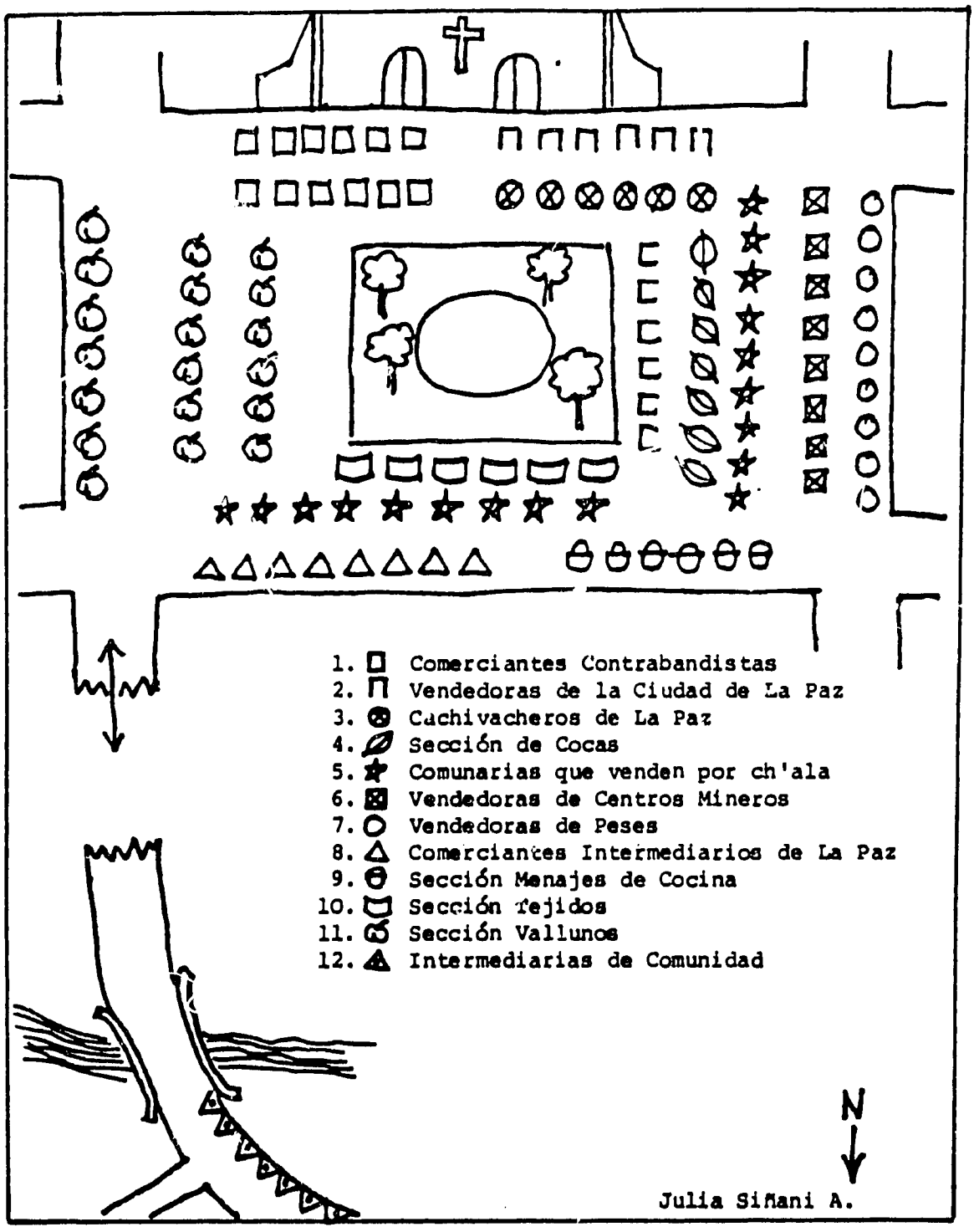


DIAGRAM 1: THE ESCOMA SUNDAY MARKET

so-called cachivacheros or sellers of bicycle parts and small miscellanea.

Turning to the western side of the plaza we encounter the most congested part of the Escoma market. Here are located six rows of vendors representing five different types of goods. The row nearest the park at the center of the plaza is comprised of more merchants from the city of La Paz. Parallel to these is a row of coqueras or sellers of coca leaves. Beyond them is located a row of women from neighboring indigenous communities who are selling or bartering agricultural commodities on a small-scale retail basis known as ch'ala raleo. Behind these farmer-retailers are located two rows of women from the nearby Matilde mine and sometimes from more distant mining centers in Oruro and Potosí; these traders specialize in barter transactions --exchanging kerosine, sugar, salt, bread, noodles, and other staples for agricultural produce, particularly chuño. Finally, sitting in a single row along the curb on the far side of the street are a group of women from communities located on the shore of Lake Titicaca, who barter dry fish for other products.

The third or northern side of the plaza at Escoma contains four market sections. Nearest the plaza is a row of textile sellers. In the middle of the street is another row of women retailers from neighboring indigenous communities, and it is precisely here that many households from Yuka trade their produce. Those retailers which come from villages more suited to herding livestock than growing crops settle at this location to barter animal products such as lard, llama grease, hides, organ meats, etc. in exchange for agricultural products. On the far side of the street are located two groups of sellers in a single line that runs the length of the block. The first consists of traders of kitchen pots and utensils (menajes). Beside them are the wholesale intermediaries from La Paz, known by the local indigenous name of katuquipas. Buying agricultural commodities in units of one or more arrobas, their market power is considerable because they deal in whole truckloads of produce and establish prices on a take-it-or-leave-it basis wherein there is little room for the seller to negotiate.

The eastern side of the plaza at Escoma is devoted exclusively to merchants and producer-retailers from temperate valley regions; hence, this part of the market is known as the Sección Valluno or Valleys Section. These traders bring fruit, vegetables, dry corn, and condiments to trade for highland products such as potatoes, oca, papas, chuño, and cayu.

Located 500 meters from the plaza, and just past the bridge on the northern outskirts of Escoma, are the indigenous retail intermediaries or revendedoras who generally buy or barter for agricultural produce in small quantities of one arroba or less which they later take to La Paz for resale. Most of these intermediaries are residents of local communities, and all of them are women. Yuka households prefer to trade their produce at the bridge because they say the prices at the bridge are the same as in the plaza, while additionally the bridge merchants give symbolic gifts or "extras" with each transaction like candy, oranges, bananas, sweet peppers, and coca. These revendedoras also buy eggs and cheese. Because they transact business outside of Escoma

these traders escape paying the market tax. They also have the first opportunity to intercept and trade for produce coming into the Escoma sunday market from the north carried by farmers traveling on foot.

In the Escoma market, barter remains the dominant form of transaction. The principal agricultural commodities used by Yuka residents as barter goods are potatoes, peas, oca, chuño, caya, grain (barley or oats), and prickly-pear. For the most part, only second- and third-class quality produce is utilized for barter. The most common unit of exchange is the double-handful known as a manojo, which is equivalent to about one-half pound. The principal exchange equivalents for barter transactions at the Escoma market as of June 1981 were the following:

Potatoes (small size only are used)

3 double-handfuls	=	6 peaches
4 double-handfuls	=	4 prickly-pears, or 2 tablespoons of lard
5 double-handfuls	=	4 oranges, or 3 limes, or 3 tangerines, or 5-6 karachi fish or 2 kingfish, or 1 can of rice, or 1.5 cans of sugar
6 double-handfuls	=	3 breadrolls, or 5 hot peppers
1 arroba (25 lbs)	=	2 blocks of salt

Chuño (dehydrated potatoes, second class, small)

2 double-handfuls	=	3 plantains, or 3 oranges, or 3 limes, or 3 tangerines, or 3 breadrolls, or 3 spoonfuls of oregano or cumin, or 5 garlic heads (medium), or 6 onions (medium), or 7 prickly-pears
3 double-handfuls	=	1 bottle of kerosine
4 double-handfulls	=	30 candies, or 1/2 lb. of sugar, rice, or noodles

Caya

5 double-handfuls	=	3 limes, or 4 hot peppers, or 1 small glass of cumin

Oca Dulce

5 double-handfuls	=	3 spoonfuls of cumin, or 4 spoonfuls of oregano, or 4 onions (medium)

Dry Peas
4 double-handfuls = 4 plantains, or 3 oranges, or 3 tangerines, or
6 karachi fish or
2 spoonfuls of lard, or
3 large bread loaves

Grain (Oats or Barley)
3 double-handfuls = 2 plantains, or 2 oranges, or 2 limes, or
2 tangerines, or 4 prickly-pears

Eggs
2 eggs = 3 breadrolls

Ceramic vessels are also obtained through barter, usually in exchange for chuño. The exchange value is determined by loading the vessel with chuño until its capacity is reached. The following exchange equivalents are considered to be the norm:

Chuño
2 double-handfuls = 1 ceramic plate
6 double-handfuls = 1 clay pot
10 double-handfuls = 1 clay cistern (medium)

COMMUNITY OF HUACUYO

The principal agricultural commodities sold by the residents of Huacuyo are potatoes, broadbeans, oca, tarwi, and straw. When sold for cash or when bartered, these products are normally traded at the sunday market in the town of Copacabana. Several times each year, barter exchanges take place with Peruvian producers at several market fairs organized at border locations. Once a year (in August), Peruvian merchants travel to Huacuyo to exchange llama meat for agricultural products.

The Copacabana Market: This feria opens at 5 O'clock every sunday morning in a marketyard located a half a block from the town plaza. Following a good harvest--after the rural household has estimated its requirements for consumption, seed, barter stocks, and storage risks--produce may be sold in one or more wholesale transactions. This activity is the responsibility of the male head of household because of the physical strength required to transport, load, and unload the heavy sacks. Small-scale retail sales of produce, known as ch'ala raleo, are conducted by weight, quality, double-handfuls, and single-handfuls, depending on the commodity.

POTATOES are sold wholesale by arrobas (25 lbs) and quintals (100 lbs). Retail sales are conducted by weight (one pound units) or by quality. As of June 1981 the following quality-based prices were prevalent:

1 large potato	=	1 peso (US$0.04)
1 medium potato	=	50 centavos (US$0.02)
3 potatoes the size of an egg	=	1 peso
4 potatoes the size of a lemon	=	1 peso
5 small potatoes	=	1 peso

Bitter varieties of potatoes are not sold as fresh produce but rather are used to make chuño, which is subsequently used for both family consumption and barter transactions (see below).

BROADBEANS or HABAS are sold in two qualities for two separate uses. First class broadbeans (called haba usmayo) are used for toasting. Toasted habas comprise one of the most popular snack foods in Andean regions, and Copacabana is known as a center for the supply of highest quality broadbeans. First class broadbeans are sold in wholesale transactions of one or more arrobas, which commanded 170 pesos (US$6.80) in June 1981. Second-quality broadbeans are sold green, then boiled for use in soups, stews, and meals in general. Their June 1981 price was 150 pesos (US$6.00).

OCA, a sweet tuber which resembles small turnips, are sold wholesale by the arroba while retail transactions are measured in double-handfuls. In June 1981 the respective market prices were 50 pesos (US$2.00) per arroba and 5 pesos (US$0.20) per manojo. Since ocas are used to make the dehydrated product known as caya, only minor quantities of fresh oca are sold outside the community of Huacuyo.

TARWI, a traditional grain crop, is only sold wholesale. It is in high demand by Peruvian buyers and was worth 160 pesos (US$6.40) per arroba in June 1981. STRAW is sold at the Copacabana market by armloads or brazadas which were valued at 70 pesos (US$2.80).

When produce is bartered at Copacabana, the exchange goods are usually habas, chuño, and caya. These are traded in very small quantities, and the most common unit of exchange is not even the double-handful but rather the single handful or puñado (fist). This amount is equivalent to approximately one-quarter pound with a 1981 cash value of 50 centavos or US$0.02. One handful of caya can be exchanged for a handful of ghispina, a flour made from quinua. One handful of habas can be exchanged for a single bread-roll.

Market Transactions with Peruvian Traders: There are three market days organized each year on the Peru-Bolivia border, and these are expressly for barter transactions. Two of the three trade fairs are held in the community of Yunguyo, on August 15th and October 10th. Between these dates is a middle fair on September 8th at Kesani, a border site known as "No Man's Land" by farmers from both sides. At these three market events the Peruvians principally trade textiles and ceramics for Bolivian agricultural produce.

Bartering for textiles follows a special convention fairly widely practiced in the Bolivian highlands. To exchange a textile for agricultural produce, the owner of the textile folds it lengthwise. The bottom and one side is then sewn up with temporary stitching to form a narrow sack. This sack is then folded in half, then folded once again in half to demarcate four equal quarters. Now, to determine the textile's exchange value, the owner of agricultural produce must fill the improvised sack three-quarters full.

When non-textile commodities are involved, the wholesale unit for a barter exchange may be the tupu, a woven wool sack which holds slightly more than four arrobas or 100 lbs. By folding or marking the tupu by quarters, it becomes possible to conclude transactions in units of one arroba or more. For transactions of less than an arroba, the manojo or double-handful is the standard unit of exchange. When ceramics are bartered, the volume equivalent of the vessel in agricultural produce becomes the exchange value. A few examples of barter transactions with textiles and ceramics are the following:

Chuño, Caya, Habas	
6 double-handfuls	= 1 pound of alpaca wool
3/4 of the content of folded textile "sack"	= 1 shawl, 1 blanket, or 1 poncho of variable dimensions
1 tupu of 2 arrobas	= 4 yards of homespun cloth
2 platefuls	= 1 ceramic glazed dish

Once each year on August 5-6, Peruvian merchants travel to the community of Huacuyo to barter llama meat for agricultural products. The llamas are brought in alive, usually 4-5 animals at a time. These are slaughtered in accordance with local demand and produce of acceptable quality to the Peruvians. The traditional barter equivalents are the following:

Potatoes, Oca, Papaliza	
1 tupo of 4 arrobas	= 1 leg of llama, or 1 shoulder and 1 head, or 1 llama hide, or all organ meats plus hooves

COMMUNITY OF JARUMA

Jaruma is the urbanized center of several surrounding communities (ex-haciendas) known as Ojtaya, Iquiaca, Cayaca, and Aroma. It has a central school serving all four communities. But Jaruma's primary economic importance is that it is a market center. It rests astride the road to Luribay, one of the principal access routes into the temperate valleys region from the southern highlands. It is also located only about 20 kilometers off the major paved highway linking La Paz with Oruro and Potosí. For most of the week, Jaruma has a deserted appearance; but beginning on Friday and continuing through Saturday, Jaruma becomes a bustling marketplace crowded with trucks, scores of stalls, hundreds of buyers and sellers. Participants come to Jaruma from the surrounding communities, from Luribay, La Paz, and from the distant mining centers of Oruro and Potosí.

Actually there are two markets. The Friday market is known as the Feria de Cambios or barter market, and on this day cash transactions are practically nil. The farmers of the region bring potatoes, chuño, and onions to trade with merchants from the mining centers, who bring bread, rice, sugar, noodles, and other staples--but their principal exchange commodity is bread. Known as maraquetas, the oval-shaped loaves are small, with a hard crust and a coarse yet pleasing interior, about the size of an avocado or mango; they are nicknamed pan de batalla or "battlefield bread". At the Friday market, the equivalencies generally observed for barter are the following:

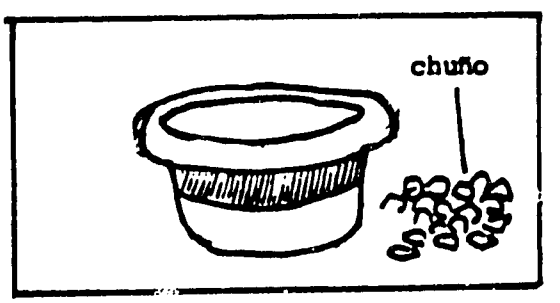
1 arroba (25 lbs) of potatoes	= 30 breadrolls or maraquetas
1 arroba of chuño	= 40 "
1/4 arroba of chuño	= 10 "
4 pounds of chuño	= 2 lbs. of rice
1 arroba of chuño	= 1/2 arroba of sugar
1 double-handful of chuño	= 1 breadroll
10 onions (medium)	= 1 plateful of sugar, rice, or noodles

These equivalencies vary according to quality and quantity of commodities exchanged. For example, when the potatoes are small, the number of breadrolls is slightly reduced. Or when a large supply of bread is offered, the equivalency may increase to 35 breadrolls per arroba, while the 1/4 arroba of chuño may command 12-13 breadrolls. Bread not traded at the Friday market is offered the following morning at reduced prices, for the merchants from the mining centers are usually leaving for their long trip home by noon on Saturday.

The Saturday market in Jaruma is organized and supervised by local residents elected to their posts. They collect market taxes (60 pesos per stall per year), supervise prices, inspect weights and scales, and generally enforce orderly movement of human and vehicle traffic. Among the market sections are the following: meat, vegetables, fruit, canned goods, wool, hides, hardware, cooking

utensils, medicinal products, school supplies, and vendors of coffee and cooked meals or snacks. At the Saturday market both cash and barter transactions occur, with the latter being the dominant mode of exchange. For barter transactions the dominant unit of exchange is not the double-handful but rather the "hatful" or sombrero. This refers to the little derby hat so popular with Indian women in the Andes. A single hatful can vary from about 2-3 pounds of produce, depending on the product weighed. The primary agricultural commodities used for barter are potatoes, chuño, and onions. By type of commodity bartered, some of the common equivalencies prevailing in June 1981 were the following:

Potatoes	
1 hatful	= 4 cups of sugar (2 lbs), or 3 cans of rice (3 lbs), or 4 cans of oats (2 lbs), or 4 cups of powdered milk (2 lbs), or 6 cans of noodles
2 hatfuls	= 2 hatfuls of grapes, or 8 peaches, or 4 pears, or 4 chirimoyas (medium), or 10 pesos of coca leaves (4 lbs)
Onions	
25 onions (medium)	= 20 pesos of coca
20 " "	= 2 cans of sugar (1/2 lb)
30 " "	= 2 cans of rice (1/2 lb)
50 " "	= 20 breadrolls
Chuño	
1 hatful	= 1 hatful of peaches, or 1.5 hatfuls of grapes, or 2 hatfuls of pears, or 8 chirimoyas (medium), or 20 pesos of coca



Hat Used to Measure Barter Transactions at the Jaruma Market

WEIGHTS AND MEASURES

UNITS OF WEIGHT AND VOLUME

Carga: a load carried by a pack animal. The term applies to a wide variety of loads including harvested crops, fodder, farm supplies such as manure and seed, and products being transported to market. Normally cargas are considered to be of 4 arrobas (100 lbs.) and 5 arrobas (125 lbs.).

Costal: a woven wool sack used to carry heavy loads, usually with a capacity of 5 arrobas.

Khumu: an indigenous term for 1 carga (Yuka).

Tupu: a mark woven into a costal to signify a particular volume or commodity weight for sale or exchange transactions. For example, in Jaruma the tupu is defined as the mark placed 60 cms high on a sack that has a width of 50 cm. This measure is used to exchange--in equal volumes--potatoes, chuño, or barley grain for salt. In Chairumani, a tupu is measured by a height of 5 cheas and a tajlli (see below) and a width of 2 cheas and a tajlli. It is considered a unit of exchange for potatoes, chuño, quinua, corn, oca, and papaliza with an approximate weight of 100 lbs. In Killay Belen the tupu is given by a dimension of 4 cheas by 3 cheas, again with a weight of 100 lbs.

Pesada: a measure equivalent to 6 arrobas and 6 lbs.(156 lbs. total), which is used exclusively to weigh agricultural products.

Cuartilla: a woven sack measuring 20 cms. high and 20 wide, considered to represent a weight of 12.5 lbs. or 1/2 arroba. The cuartilla is also known by its indigenous name, karwa kunka, and is used to weigh agricultural products.

Arroba: a unit of weight with an equivalent of 25 lbs. There exist measuring sacks with the dimensions 1 chea wide and 2 cheas and 1 tajlli high (20 by 48 cms) used to represent the arroba.

Canasta: a basket for harvesting potatoes, and which measures a quantity of produce equal to 1 arroba or 25 lbs.

Palta: a unit of weight equivalent to 1/2 arroba or 12.5 lbs which represents the load being transported and is carried on top of the carga.

Chipha: a load of onions, carried in a leather net, with contents equivalent to about 150 heads of onion or an approximate weight of 100 lbs.

Gangocho: a carga of onions, same as the chipha. While the approximate weight of 100 lbs remains unchanged, a gangocho may contain either 150 large heads or 500 small heads. A gangocho normally equals 2 rows of onions.

Ch'iro: a sack containing sufficient onion seedlings to result in the harvest of 25 gangochos.

Brazada: a unit of measurement in the harvest and sale of green barley. It is equivalent to 3 armlengths. This distance is measured on a rope and marked at both ends. Then, between two people the stack of barley is increased until its diameter, when tied by the rope, allows the two marks to come together. A brazada is approximately 2.70 mts. long.

Quintal: another term for the brazada. It is considered equivalent in weight to 4 arrobas or 100 lbs.

UNITS OF AREA AND DISTANCE

Chellke: a 1 meter distance measured by a single pace. It is used to measure parcels of land and task areas.

Reata: a rope with a length of 5 brazadas (6 in Killay Belen), equivalent to 12-13.5 meters. It is used to measure land and to secure cargo for transport.

Markha: a linear distance of 2 meters, equivalent to the circumference of an armload of barley. Any product picked up by armloads is measured by markhas.

Chulla: a term equivalent to markha, equivalent to 6 lbs.

Loka: same as brazada

Tajlli: a unit of measurement, equivalent to 8 cms or the width of four fingers.

Chea: a unit of length equal to 20 cms formed by the distance between the ends of the thumb and index finger of an outstretched hand.

Media-Hectaria: a unit equivalent to an area 50 paces by 20 paces, each pace a single meter or chellke. This gives an area of 1,000 square meters which in fact is only 1/10th of a hectare, not 1/2.

Cato: a unit of land measurement equivalent to 50 paces by 15 paces or 750 square meters,

Canchón: a walled-in area for growing onions. It has a length of 50 paces and a width of 180 furrows.

Loka: a unit of length equal to 2 meters, equivalent to a brazada.

Ekha: a unit of area 20 by 30 lokas (40 x 60 meters) equivalent to 2,400 meters, particularly used in measuring land parcels for purposes of determining land inheritance.

Vico: a unit of length equal to 15 cms, which is given by a straight line from the base of the thumb to the end of the index finger.

OTHER UNITS

Olla: a variable unit of exchange when pottery is traded for produce. Depending on conditions of supply and demand, the ceramic vessel will be loaded once or twice with the produce to be exchanged, and that quantity determines the vessel's exchange value.

Prenda Tejida: In Chairumani, it is customary for visiting sellers of woven goods to exchange their products for agricultural commodities. The woven article can be a sack, blanket, shawl, etc. It is folded into three equal parts. Then the first two thirds are temporarily held together and filled with a desired produce, the volume of which determines the exchange value of the textile. In the case of particularly valuable grains such as quinua, only one third of the textile is used to determine the exchanged quantity.

Tupu: a unit of distance equivalent to 5 kilometers. Not to be confused with the term of the same name for measuring weight.

CHAPTER III.

FARMING PRACTICES FOR SPECIFIC CROPS

Presented in this chapter are detailed descriptions of agricultural techniques for growing nine different crops: potatoes, barley, ocas, habas, peas, corn, quinua, papalisa, and onions. Since potatoes are the most important commercial and subsistence crop, it is described in far greater detail than the others. Each crop is introduced with a brief statistical summary of actual performance covering area planted, labor use, yields, and net income. These summaries are taken from information collected in the farm journals of actual households who participated in the Traditional Practices Project. Following the numerical introduction, each crop description then covers specific cultivation tasks in order of their occurence: land preparation, planting, weeding and hilling (if any), and harvesting.

POTATOES

A SUMMARY OF CROP PERFORMANCE (1978-1981)

For three consecutive crop cycles (1978-79, 1979-80, and 1980-81), records of potato production were kept by at least 31 farmers representing the five participating communities from the Altiplano region. A profile of their performance can be summarized as follows:

TOTAL AREA PLANTED: The total area planted to potatoes averaged 0.89 hectares (2.2 acres) per year per farmer, which represents the sum of many separate plots and varieties planted. The average amount of seed planted per year was 47 arrobas or 1,175 pounds. At the time of planting, each farmer utilized an average of 24 cargas or 2,400 pounds of animal manure, and a few farmers mixed with this manure small quantities of chemical fertilizer.

LABOR USE: The average household utilized 88 days of family labor and 17 days of hired labor to prepare the land, plant, cultivate, and harvest the crop. By crop stage, 21 days of family labor (24%) and almost no hired labor were required for land preparation tasks. Planting required an average of 18 days (20%) of family labor and 4 days of hired labor. Hilling and cultivation tasks required another 14 days (16%) of family labor and 3 days of hired labor. Finally, harvesting tasks, including the preparation of chuño (dehydrated product made from poor quality potatoes) required an average of 35 days (40%) of family labor and 7 days of hired labor. Regarding use of animal traction, the average family utilized 8.5 days of oxen for land preparation and 5 days for furrowing and burying the seed.

PRODUCTION: The average farmer harvested 267 arrobas or 6,675 pounds of potatoes, of which 10 percent were processed into chuño. This represents a return of almost sixfold for every arroba of seed planted, or 5.7 pounds per pound of seed.

INCOME: Production costs increased an average 157 percent over the three-year period, while gross income increased by 170 percent, suggesting that net income per crow grew faster than the inflation rate. In 1978-9, the average farmer earned 82 pesos or US$4.10 for every day of family labor. During 1979-80 he earned 96 pesos or US$3.84 for each family labor day. In 1980-81, the average net income per family labor day climbed to 196 pesos or US$7.84.

SOIL TILLAGING AND OTHER PREPARATIONS FOR PLANTING

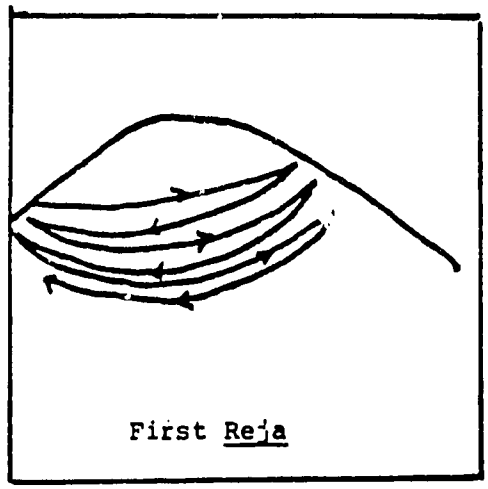
PLOWING

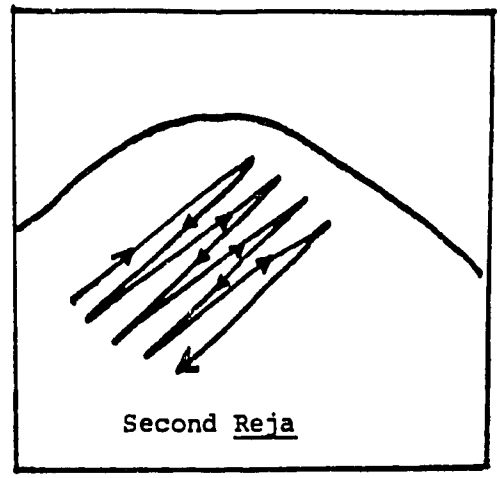
Following any period of fallow, potatoes are almost always the first crop to be planted in the new rotation cycle. Even though planting occurs in October and November, the first plowing of fallowed land is undertaken seven to eight months earlier, in February or March, to take advantage of the moisture provided by the rainy season.

The first plowing of land left in fallow is known as kolly. In Jaruma, March is known as the "Month of Kolly". The arrival of the plowing season is signaled by the first monday following Ash Wednesday or the beginning of Lent. However, starting dates will inevitably vary in accordance with the extent of soil moisture. Most farmers first test the soil of the land to be plowed by digging with a pick in several locations to determine if it is too wet or too dry. If plowed when it is too wet, the soil will produce large and hard clods. On the other hand, if the soil is too dry it will not turn over properly, which will result in the farmer having to repeat the task. Soil which is turned at the right time will facilitate easy subsequent tillages (barbechos),which are conducted in April, and will also make it easier to conduct the final plowing and furrowing at planting time.

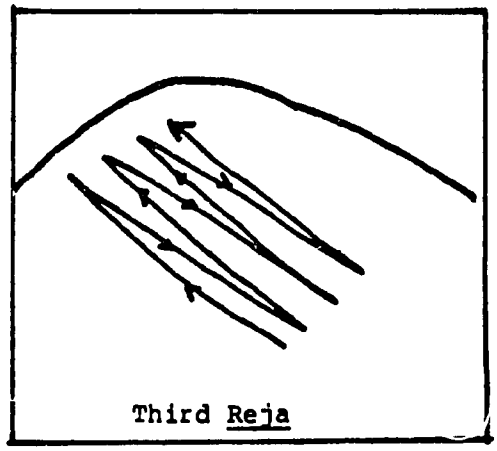
The direction of plowing established during kolly often determines the direction of subsequent plowings. And how the first plowing is conducted as a great deal to do with the slope of the land and the strength of the farmer's draft animals. The steeper the slope or the weaker the animals, the more gentle should be the ascent of the plowing angle, following the contour of the hillside. For the second plowing or reja, the farmer will plow at a steeper angle than the first. The third plowing will then be conducted almost perpendicular to the first. However, when the land is fairly flat, each plowing will be conducted at right angles to the previous plowing.

The direction taken by the furrow just prior to planting will ultimately be determined by the farmer's estimate of rainfall prospects. In the more humid areas, farmers tend to construct nearly vertical furrows, which are designed to facilitate runoff and keep potato plants from excess humidity and consequent rotting. In contrast, in arid regions of the Altiplano an exactly opposite furrowing strategy is observed. Where rainfall is scarce farmers become experts at constructing furrows that follow the contours of their fields. Such contour plowing allows them to detain the maximum amount of moisture made available by rainfall.





AN EXAMPLE OF HILLSIDE PLOWING ANGLES



Once the oxen begin to plow, they should be made to complete no more than ten round trips with the plow before resting. Each rest period should be about ten minutes. If the plowing lasts longer than half a day, the plowman must bring two brazadas (armloads) of hay for his oxen to eat at mid-day. The mid-day rest period will last 30 minutes to an hour. During this time the draft animals must be unyoked.

In general, the first reja or kolly should be completed by April 15th. The second and third rejas or barbechos should be completed by May 15. The soil will then be left undisturbed for about five months, until the final plowing and furrowing at planting time.

PREPARATION OF ANIMAL MANURE

In most highland communities, the primary source of fertilizer for crops is animal manure. And frequently the only crop which is fertilized is the potato. The task of collecting and preparing manure is normally the responsibility of women, while men are responsible for transporting it to the fields. Three different manure products are collected from the household's livestock pens. These are known as guano, k'aya, and jiri.

GUANO is the pure dung which accumulates on the surface of the livestock pens. It is removed at roughly two-month intervals and piled in one corner of the corral, where it is allowed to dry. Three or four months before the planting season, perhaps during July, the housewife begins to prepare the guano stocks. Using a pick-hoe to loosen the dung heap, she then uses a shovel to collect the chunks of dry guano and piles them into an aguayo (mantle used by women for carrying loads). The guano is carried to the patio of the farmhouse, where it is spread on the ground. There the woman beats the dung into a coarse powder using a khofaña (wooden mallet). Finally, the pulverized manure is loaded into cargo sacks for eventual transport to the planting sites.

K'AYA is the same guano but mixed with dirt and straw which has formed a stiff crust from the combined effects of moisture and the trampling of livestock. Once all guano has been removed, the housewife cuts out large blocks of k'aya measuring about 40 cms. long, 20 cms. wide, and 2-5 cms. thick. These she places on the roof of the animal shelter, which is where k'aya is stored during the dry season. These blocks are subsequently used as fuel for either of two purposes: (1) in the kitchen for cooking meals, and (2) as fuel in the calcination of limestone.

JIRI is the same as k'aya except very wet. It is in an advanced state of decay and has a greenish color. Jiri has an important agricultural use in the "greasing" of tuber seeds such as potatoes, papaliza, and oca. First, the jiri is loaded into a wooden trough or washtub filled with water. The manure is disintegrated and mixed by hand to form a thin "guano mud". Into this mixture are placed the seed to be planted. They are soaked and then carefully left to dry on the ground before being transported to the planting site. The use of jiri is especially common among households which have insufficient stocks of animal manure or chemical fertilizer.

SEED VARIETIES

In the Altiplano, farmers classify their potatoes into "sweet" and "bitter" varieties. The former are preferred for home consumption and commercial sale. However, they are more sensitive to cold and frost, which requires that they be planted early and in the relatively more protected sites--usually mountain hillsides rather than bottomlands. Sweet varieties are also more tolerant of sandy soils. In contrast, the bitter potato varieties are especially used for planting on plains or lowland areas because they are more frost resistent. These varieties are most acceptably consumed as chuño or tunta (dehydrated potato products), because if used as a cooking potato they truly do taste bitter.

A very small sample of Project participants--five households--were asked to name the potato seed varieties they use most commonly. This modest exercise resulted in a listing of 38 "sweet" varieties and nine "bitter" varieties, as follows. Those varieties mentioned by more than one household are marked with an asterisk (*):

SWEET		BITTER
1. Pala Negra	21. Papa Camote	1. Luki (*)
2. Pala Blanca	22. Zapallo	2. Moco Ttoro
3. Sani Imilla (*)	23. Cholo	3. Choquepito (*)
4. Imilla Negra (*)	24. Titiquilla	4. Torill
5. Imilla Compi	25. Foreja	5. Vajra
6. Vila Imilla	26. Camarizo	6. Laram Likre
7. Janko Imilla	27. Arekero	7. Jarraka
8. Chiar Imilla	28. Piña	8. Pala (*)
9. Pako	29. Sakampaya	9. K'aisala
10. Polo	30. Papa Holandesa	
11. Sandari	31. Ajawire (*)	
12. Kopollo	32. Chugo	
13. Sepa Blanca	33. Chiarachugo	
14. Sepa Negra (*)	34. Kaisille	
15. Avacho Rojo	35. K'ene (*)	
16. Avacho Negro	36. Isla	
17. Avacho P'ako	37. Koyo (*)	
18. Vaca Lajra	38. Mezcla	
19. Sota		
20. Papa Ursula		

There are advantages and disadvantages to using a large number of potato varieties. By planting many varieties, the farmer can always be assured of harvesting enough to guarantee subsistence--even if his crop suffers from hail and frost--because the more resistant varieties will survive and he will never experience a total loss. The disadvantages of keeping many seed varieties are that it requires considerably more family labor to select them, and more space (or appropriate containers) in which to store them inside the farmhouse.

PRE-PLANTING SEED SELECTION

Potato seed is selected on two occasions: the first time is a couple of months following their harvest; the second time is immediately prior to their planting, a task often conducted at the planting site itself. Seed selection is a task normally assigned to women, as is the task of planting. "A good potato seed", says Feliza Chipana of Chiarhumani, "is one which has large eyes. The size is not so important. Since the larger potatoes have greater acceptance in the marketplace, they are the ones that get sold. This leaves the smaller ones to be used as seed." Another impor-

tant aspect in selecting good potato seed has to do with the number of eyes, but it is precisely here that seed selection becomes so complicated because the number of eyes will vary from one variety to another. The seed selector must also study the size of the sprouts. Thick sprouts are considered a sign of good seed while slender sprouts indicate poor seed. As part of the potato selection process, all sprouts on acceptable seeds are rubbed off. Furthermore, many highland farmers do not cut their larger potato seeds in half because it has been their experience that cut seeds run a higher risk of rotting in the furrow and never sprouting.

In addition to eyes and sprouts, potato seed must be inspected for a number of other defects suggesting a health risk. These include (1) any potato showing signs of mange or scabs; (2) any potato which has been pinched or bruised--called silluta; (3) any potato which has been partially effected by frost--called chuñuta; (4) any potato showing signs of rot--called ñusata; (5) any potato that appears wormy--called lakota; and (6) any potato showing signs of spittle from snails.

PLANTING

FINAL LAND PREPARATION

Just before planting it is necessary to conduct a final plowing with the ox-drawn wooden plow , because in most instances the soil has not been worked for five or six months (since April or May). This final plowing should bury all grass and weeds that have grown up during the interim. It should leave the soil soft and workable. Where there exist significant amounts of clods, it is necessary for additional workers to follow behind the plow busting sods with their khofañas or wooden mallets, a task usually left to women and children.

Once the final plowing is completed, the manure hauling begins. For each 1,000 square meters of land (20 by 50 meters) about three cargas or 300 pounds of manure will be required. These loads are hauled on the backs of burros or workers from the farmhouse to the planting sites. The manure is left in small piles in different locations around the field to be planted. It is from these piles that the workers spreading manure will supply themselves during the planting process.

PLANTING DAY

The rural household will have many planting days for its potato crops. Some will occur at highland plots--using the "sweet" varieties--planted "early" between mid- and late October. Then will come the "middle" plantings through mid-November. Finally there are the "late" plantings, often devoted to bitter varieties, which continue until the end of November or, in extreme cases caused by inadequate rainfall, into early December. Farmers who have not completed their potato plantings by Saint Andrew's Day (November 29) will be deeply worried about their crop prospects.

On planting day the entire farm household rises early. Usually it is still dark. The female head of household begins her day in the kitchen, preparing the noon meal. She also calculates which variety and how much seed will be needed for the day's planting, separating that seed in sacks for transport. Meanwhile, the male head of household readies the planting tools. He makes sure that his plowshares (including replacement) are sharp, that the plow and yoke for each team of draft animals are complete with all their pieces and straps, and that he has enough sacks. He feeds his draft animals. He loads all planting equipment, sacks, two armfulls of hay, and the family's mid-day meal onto one or more burros. After completing its breakfast, the family departs for the planting site.

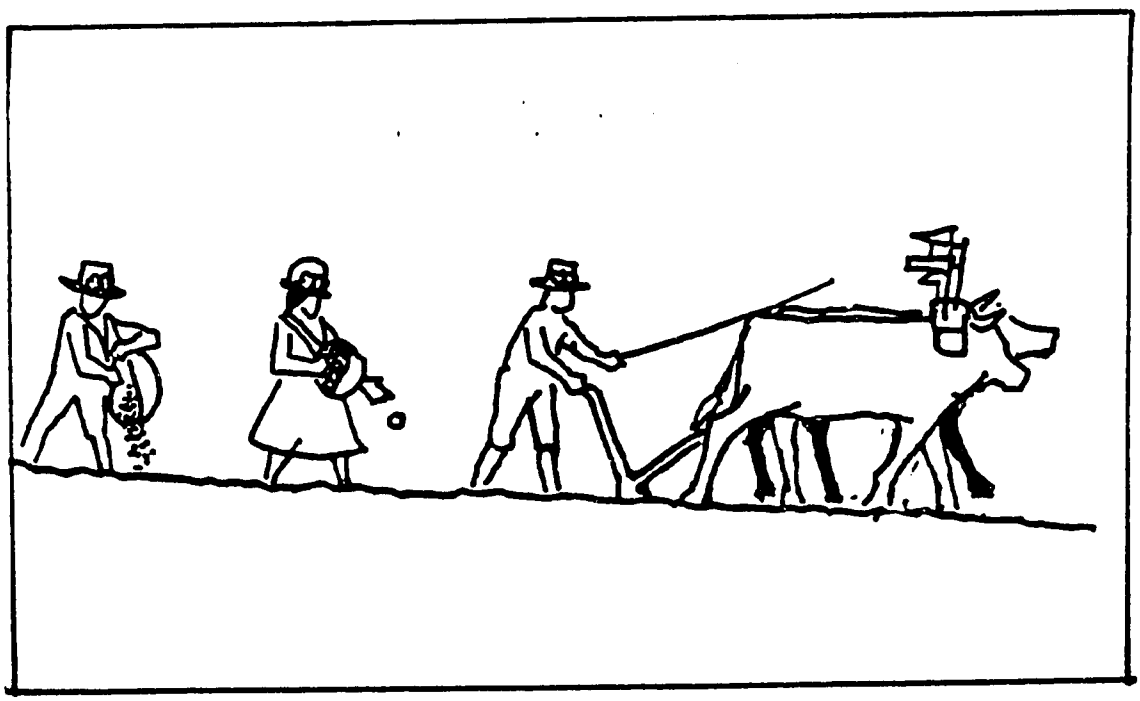
Once at the field, and before planting begins, most families conduct a ceremonial rite. With coca leaves, some wine or alcohol, and soft drinks they toast the Earth Mother or Pachamama requesting a bountiful harvest. It is customary to decorate the yoke of the plow team with brightly colored paper flags. Sometimes the members of the planting party decorate their hats with bright flowers. The flowers symbolize a challenge to the earth and the seed. During Carnival festivities four months in the future (February is a time of pre-harvest celebration), they will again wear flowers on their hats at least as large as those used for planting; and similarly, the earth is challenged to produce potatoes of at least the size of those planted.

The draft animals are yoked. The plowshare is bound to the plowshoe--at a deliberately measured height which will allow for the desired furrowing depth given soil conditions, plot slope, and animal strength. The plow is secured to the yoke. The planting process begins.

The plowman cuts each furrow about 25 cms. deep. Following just behind the plowman comes a female worker who is the planter. Withdrawing the seed with both hands from her shoulder bag, she first drops one seed with her right hand, takes a step, drops the next seed with her left, and so on down the furrow. The seeds fall from a waist-high elevation, landing in the furrow with a neat spacing of about 30 cms. The planter walks inside the furrow and steps on each seed to bury it.

Following the planter comes a worker spreading animal manure. The manure is carried in a homespun sack. It is allowed to fall into the furrow in an even stream. Sometimes there is a fourth or fifth person in the planting team. For example, some farmers apply a very thin stream of granulated chemical fertilizer to the furrow. This can be applied separately from the manure--before or after--or it can be mixed with the manure itself, but generally very small quantities are used--like one kilo every quarter-hectare. A fifth worker in the planting sequence may be required to extend the length of the furrow itself. In other words, at the edge of the field where the draft animals and plow must turn around there inevitably occur empty places where furrows must be extended with a pick-hoe.

Upon completing the furrow, the plowman waits briefly until the planter and manure spreader complete their task. Then the plow begins a return trip by cutting a new furrow adjacent to the first. The return-trip furrow is not planted. Its purpose is simply to fill with dirt the newly-planted and fertilized furrow. The planter and manure spreader simply follow the plow back without doing anything, or use this brief rest opportunity to replenish their supplies. In this fashion--one completed furrow or round trip of the plowteam at a time--the planting continues until its conclusion. Generally speaking, the normal distance between planted furrows is usually 50-60 cms.



Potato Planting with the Ox-drawn Plow

PLANTING WITH THE FOOT PLOW

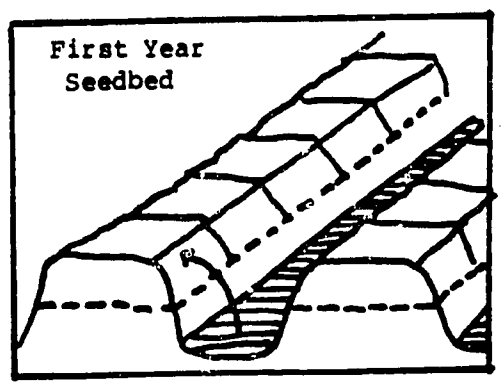
The foregoing description applies to potatoes planted with the wooden plow or arado de palo which is drawn by a team of oxen or yunta. This system is most prevalent on fields located on flat to moderately sloping hillsides. In the relatively arid communities of the southern Altiplano--as represented by Chiarhumani and Jaruma--land preparation, planting, and cultivating with yuntas is the only system used; in fact, ox-drawn plows are frequently used to assist in harvesting potatoes as well. However, on steep slopes such as those which prevail in Huacuyo and Killay Belen, most potato planting is done without draft animals. Another variant is for farmers in these communities to use the footplow for turning poroma (fallowed) lands and planting them during the first year of the cultivation sequence; but once the soil has been softened by cultivation, it becomes known as kallpa land and is subsequently worked--if not too steep--by using animal traction.

LAND PREPARATION

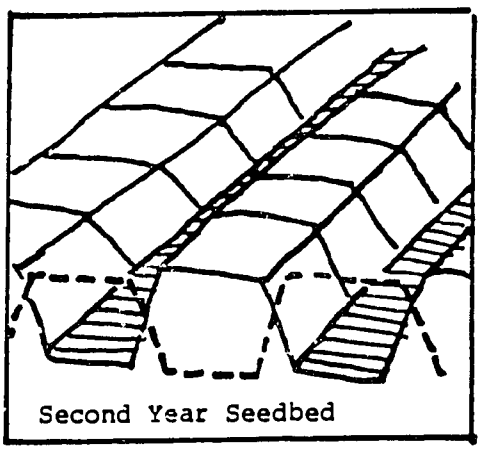
When draft animals are not used, the major implement for preparing the land and planting potatoes is the footplow or huiso (see FARMING TOOLS, Chapter II). Land preparation generally occurs in February or March with the turning of poroma soils that have rested for 6-8 years or more. This extremely arduous, labor-intensive task is conducted by a four-member team of laborers known as the uma. It consists of two plowmen or kolleri, each using a huiso; a woman who turns over the sod with her hands, known as finch'ere; and a fourth person--known as the chapalliri--who assists with the sod turning by using a digging hoe or chontilla.

The cut sods measure 90-100 cms. long and 30-40 cms. in width and height. Because of the region's greater humidity and more abundant rainfall, the furrows are constructed vertically to facilitate water runoff. In this case the area from which the cut sod is removed becomes a ditch, while the area occupied by the cut sod becomes an elevated seedbed, as illustrated below:

In the illustration of the first-year seedbed, the dotted line represents the original soil surface. Soil above the dotted line consists of the sods cut from the ditch to the right. They have been turned over intact. If the soil is good, this same seedbed may be used two years in a row for the planting of consecutive crops.



When the land is poor, the original seedbed will be destroyed after one year and a new seedbed created. This is done by first placing the sod back into the ditch from where it was first removed. Then, the base of the original seedbed will be dug up and its sods piled on top of the sods which were restored to their initial location. This creates a new set of elevated seedbeds and a new set of ditches. In the illustration of the second-year seedbed, the dotted line represents the trench and seedbed profile of the previous year.


Second Year Seedbed

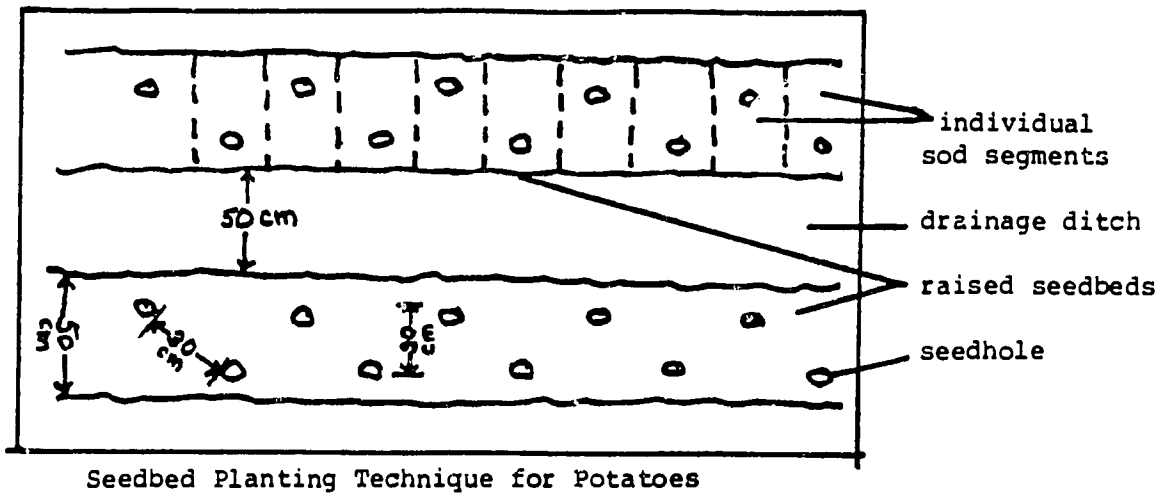
An agronomist would recommend that furrows should follow the contour of a slope so as to avoid unnecessary soil erosion. They would be right in the case of loose, sandy soil or very deep soils. But in communities such as Huacuyo and Killay Belen, the soil consists of a thin layer of highly compacted topsoil which is only 40-50 cms. deep, and often much less. Upon building the seedbeds, virtually all the good soil is removed from the vertical drainage ditches; there remains little soil to erode because what remains is nearly pure bedrock. This--combined with minimum tillage (the sods are left intact) and soil compacting practices (the sods are beaten with wooden mallets)--results in negligible soil erosion.

PLANTING

Planting begins near October 15th and continues until late November. To prepare for this planting, the farmer first burns any grass that has grown up since the soil was turned. The soil surface is compacted once again using khofañas (mallets). Manure is transported to the planting site. Once planting begins, the highland plots are planted first, then the middle zones, and finally the lowland plots.

Planting is conducted by four people. The plowman opens the seedhole with his huiso. The planter, a woman, drops in one seed for each hole. A third member of the planting party drops a handful of manure into the hole. The fourth participant covers up the hole (after the blade of the footplow has been removed) and beats the soil surface firm with the khofaña. This compacting not only minimizes soil loss from erosion but also protects the seed from intense heat of the sun and also discourages harmful insects and rodents from eating the seed.

The seedholes are made in a zig-zag pattern, with one hole per sod. The lateral distance between any two consecutive seedholes (from adjacent sods) is only about 30 cms. However, each seedbed will have two rows, each separated by a distance of only 20 cms. as illustrated in the following diagram.



Seedbed Planting Technique for Potatoes
Using the Footplow or Huiso

WEEDING, HILLING, AND FUMIGATING TASKS

There are two principal cultivation tasks required by potatoes. The first of these is weeding or khoraña; the second is hilling, known as aporque or kawaña. Depending on the needs of the crop, and the cash resources of the household, farmers will sometimes fumigate their potato crop with spray or powdered insecticide.

KHORANA

Normally, weedings begin in the month of December, or about two months after planting. The task is usually initiated following a rain, when the soil is humid and easier to work. Weeding is most frequently conducted with the digging hoe or chontilla and consists in loosening the roots of weeds and grasses so they can be removed by hand. Men, women, and children participate in this task. In the case of potatoes planted with the footplow, each worker weeds one seedbed (or two rows of plants) at a time. The work progresses from the top of the slope downward. In one day a single laborer should be able to weed about 425-450 square meters (4,575--4,844 square feet) of soil. When the crop has been planted by ox-drawn plow in single furrows, each worker weeds a wider area covering two rows at a time. In a day he or she can complete about 25 rows of 15 meters length apiece. Weeding potatoes by hand is usually a requirement in the more humid regions of the Altiplano, where weed growth is a more serious problem. In the arid southern highland districts no weeding of potatoes is required. Instead, a single hilling task is conducted with the ox-drawn plow, which also serves to destroy any grass or weeds that have grown up since planting.

KAWAÑA

The task of hilling potatoes is usually conducted during the month of January on a day following a rain. Kawaña is completed in either of two ways: by hand or with the ox-drawn plow. Hand hilling itself proceeds in two stages. First, the worker loosens the soil on the bottom and sides of the ditches between seedbeds, or the soil between rows. The second stage involves the heaping of this loose dirt around the base of the potato stalk. The worker does this by gently lifting the lower leaves of the plant and scooping the soil against the stalk. This creates a layer of protective soil to cover the future potatoes, which grow near the ground level. The tools required for hand hilling are several. When the soil is hard, the huiso or footplow may be needed to widen the ditches to obtain loose soil. Sometimes the picota or hand pick is needed to loosen the dirt or remove rocks encountered in the ditches. The chontilla, however, is most commonly used to scoop the soil against the base of the plants. Kawaña is conducted with the worker backing down the slope. However, hilling takes twice as long as weeding because it occurs in two stages. Thus, a single worker would only be able to hill about 15 rows of about 15 meters length apiece during a full day's work.

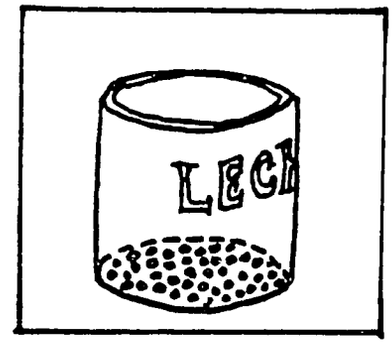
In arid zones such as Jaruma and Chiarkumani, hilling is conducted with the ox-drawn plow. The task is begun when the potato plants have attained a height of 15-20 centimeters. The work requires a yunta and two laborers: a plowman and someone to follow behind (usually a woman or child) to uncover potato plants which have been accidentally buried with too much dirt. The task must be conducted the day following a rain, when the soil is easy to work. The plow must be guided directly down the middle of the space between rows. In this way an equal amount of dirt is piled both to the right and the left of the plowblade, supplying soil to two rows of plants simultaneously. To assist this pushing of soil in two directions, it is customary for the farmer to attach a clump of brush to the middle of the plowshare. This brush is held in place by rawhide. With a yunta the hilling task proceeds at a slow, careful pace. It is important to keep the plowshare from cutting too deeply (which pushes too much dirt against the plants and also tires the draft animals), or also from cutting too superficially. But at a normal pace it is possible to complete the hilling of one hectare of crop area in a single day.

FUMIGATIONS

Potatoes are attacked by a variety of diseases and pests, all of which have local names in Spanish or Aymara which vary considerably from one community to another. To combat these problems farmers apply curative doses of liquid insecticide (in spray form) or preventive applications of powdered insecticide just before flowering. The most common liquid insecticide is FOLIDOL. It is mixed with water in a proportion of about one capfull to every three liters of water. The solution is applied with hand-pumped, back-pack sprayers

one plant at a time and one row at a time. The sprayers as well as the insecticide can be purchased at local weekly markets or in the city of La Paz. However, use of insecticide appears to be still quite limited in the Altiplano. According to farm records kept by participants in the Traditional Practices Project, only about one farmer in ten listed purchases of insecticide or use of family or hired laborers for fumigating tasks.

The second kind of insecticide used is powdered ALDRIN. To apply it, the farmer constructs a home-made applicator. It consists of a tin can (usually a powdered milk product for infants) in which dozens of holes have been perforated in its bottom using a hammer and a 1.5 inch nail. The can is filled half way to the brim with powdered ALDRIN. Plants are dusted one at a time and one row at a time. Generally, this task is conducted only by adult workers because of the potential danger to children from accidental poisoning.



Home-Made Applicator for Powdered Insecticide

HARVEST TASKS

DIGGING

In most highland communities the potato harvest advances by stages. The first plots to be harvested are those containing the "sweet" varieties, because these are most susceptible to frost and also those most intensively attacked by worms if left too long in the ground. For these same reasons, the sweet varieties are the first to be planted and therefore mature before the bitter varieties. In turn, the first plantings usually occur in the plots located at the highest elevations, then come the middle-level plantings, and finally the lowland plantings. Thus the harvesting sequence follows a similar pattern. If the potato harvest begins in mid-April, it is likely to continue through the month of May and into the early days of June.

Just about everyone in the community participates in the potato harvest--men, women, and children. This is the task for which practically all households encounter their most serious labor constraint and are required to use hired laborers.

The harvest day begins with a ritual offering to the Earth Mother. A mesa or package of special ingredients--including khoa, incense, coca leaves, candies, and tobacco--is burned by the female head of household in the center of the field to be harvested. The participants in the harvest party kneel and pray, asking permission of the Earth to harvest her products and imploring her to be bountiful. The burnt offering and prayer is accompanied by a ritual toast with an alcoholic beverage in which all participants drink, remembering to always spill the first drops on the ground in honor of Pachamama.

Each harvester is expected to provide his own digging tools--chontillas or lijwanas--and basket or mantle for collecting and hauling short distances the produce he harvests. The digging task itself proceeds by rows. Depending on the size of the field, each harvester will be assigned the digging of one or more rows. If production is good, one row at a time will be assigned; but if production is bad the harvesting may progress two rows at a time by each worker. If the field is quite large, rows may be too long for workers to complete in a single day. In this case, one-half or one-third of a row will be designated for a day's work. Such a section of a larger task area is called a cucha.

The digging itself requires that the potato plant be uprooted. In order to keep plant stalks and leaves--known as aylinco--from interfering in the digging and search for potatoes, it is customary to harvest the plant stems first. These are cut off just above the ground with a sickle. The stems are collected for subsequent use as livestock fodder or as a protective cover for temporary potato storage piles. The earth around the plant is scooped in chunks, turned over, and gently knocked into smaller fragments to expose the hidden tubers. For each plant the surrounding earth may be turned over at least 2-3 times to ensure few potatoes will be overlooked. The worker explores and sifts the soil with both hands. Potatoes encountered will be tossed to the side, or under the legs, or over the shoulder toward a cleared area known as a khaya or kañi. There will be a small khaya every 3-4 meters along the row as harvesting progresses. Each of these collection points will contain a basket-load or perhaps an arroba (25 pounds) of produce. It is common to see young children following behind adult harvesters. The job of the children is to collect and neatly pile the dug potatoes on their khayas.

At mid-day the owner of the field being harvested is expected to offer all members of the digging party a fine meal. He is also expected to provide alcoholic beverage and coca leaves. These items are considered part of the wage payment for hired laborers. It is expected that hired laborers will receive the remainder of their payment in produce, not cash. The customary payment is two arrobas (50 pounds) of potatoes. This convention will be increased for a good harvest and decreased for a bad harvest. Of course, some families will try to pay less than the norm--arguing that production is poor--but it will become difficult for them to obtain workers if other

households in the community are willing to pay more. For the most part it appears that hired laborers in Altiplano communities are themselves local residents rather than outsiders. Those who work the most as hired laborers are usually the residents with the smallest land holdings; they are considered the community's "poor".

In one day an adult man or woman can dig up prom 2-3 cargas (200-375 pounds) of potatoes. The variation depends both on the abundance of the harvest and on the size of the carga itself. Some communities have cargas of 4 arrobas (100 pounds) while others have 5 arrobas (125 pounds). When the potatoes are fairly large, a single plant may contain five potatoes or 1-2 handfuls.

In the more arid (southern) districts of the Altiplano, farmers frequently use their yuntas to loosen the soil so as to facilitate the digging task. In such cases the entire field is furrowed between rows on a single day--even if only a fraction of the crop can be harvested on the day the field is plowed. In contrast, in the more humid northern districts of the highlands, it is considered inadvisable to loosen hilled potatoes with the ox-drawn plow. There exists a belief that once potatoes have been smelled by draft animals they will become diminished in quantity and size. For this reason the yunta is used only when the harvest is completely bad, and when there is practically nothing worth digging up.

As a final note, it should be mentioned that two and even three diggings of potatoes in the same field may occur. The first digging, of course, is the principal harvest. The second digging may be conducted by family labor that is not needed more urgently elsewhere. In any event, the last digging is conducted not by people but by pigs. These animals are specialists in rooting out overlooked tubers; and their forraging efforts are usually quite successful.

POST-HARVEST STORAGE AND SELECTION

At the end of each harvesting day, the potatoes are gathered from their khayas or assembly points and emptied onto one or more large piles at the edge of the field. There they are loaded into cargo sacks, the sacks are sewn shut, and the harvest is transported on the backs of burros to the farmhouse. In the patio or storage yard of the farmhouse the potatoes are once again emptied from their sacks and piled into large stacks known as phinas. The phina is constructed on top of a bed of straw and may consist of ten or more cargas of produce. This cone-shaped pile is then covered with a protective layer of straw or potato stalks. In such a silo--one for each variety planted--the potatoes will be perfectly protected for a month or two until they are selected (graded) during the month of June. (see STORAGE STRUCTURES, Chapter II).

In the community of Jaruma, potato phinas are constructed at the harvest site, not the farmhouse. This custom exists because potato theft is unknown in that community. Indeed, so trusting are Jaruma's farmers that they even leave their plows and hand tools lying out in the field overnight.

But regardless of their location, potato phinas are usually uncovered during the month of June. Their contents are transferred to a comfortable and clean location beside the farmhouse and a new pile formed. Around this pile will sit several women. They roll the potatoes out of the pile into their laps and then begin grading them by size and quality into smaller piles to their left and right. The sweet variety potatoes or khaty ch'okes are generally divided into at least three classes: the largest for sale, the medium for family consumption or seed, and the smallest for making chuño or for animal consumption.Bitter variety potatoes are generally used only for chuño.

To demonstrate the seed selection process, let us take the example of Mariano Velasquez Choque of the community of Huacuyo. On July 4, 1979, Mariano, his wife Josefa, and six relatives attempted to complete the selection and grading of ten phinas. Each phina consisted of about 25 arrobas for a total of 250 arrobas or 6,250 pounds of potatoes to be selected. During the course of the day, this produce was entirely graded into seven categories, as follows:

First: These were the largest potatoes. They were destined for market sale, particularly during the month of November when potato prices reach their yearly peak. Normally, some portion of the largest potatoes will also be used for home consumption on special occasions--for example, a family celebration--or for making gifts. The ability to serve large potatoes to relatives and friends is considered a source of prestige within the community. Of this first quality produce, the Velasquez household obtained 60 arrobas (25 percent of the total harvest).

Second: The next largest potatoes are known as monda. They are reserved both for sale and for special family consumption. This grade yielded another 50 arrobas (20 percent of the total harvest).

Third: This group consisted of medium size potatoes to be used for ordinary home consumption. Of these, 40 arrobas (16 percent of the total) were obtained.

Fourth: The next category, selected with very special care, consisted of the seed potatoes. They were of medium-size, completely healthy, round in shape, and with large eyes. The Velasquez household set aside 25 arrobas of seed (10 percent of the harvest) and stored them in a special bin lined with straw.

Fifth: This group consisted of potatoes selected for "first class chuño" and were taken to the dehydration yard. Of this category, 40 arrobas (16 percent) were obtained. Mariano explained that, as a general rule, for every

eight cargas of potatoes one obtains about one carga of dried chuño.

Sixth: The next category consisted of the smallest sized potatoes, and were designated for dehydration as "second class chuño". Some 30 arrobas (12 percent) were selected for this purpose.

Seventh: The last group of potatoes were designated as throw-aways to be fed to pigs. The produce from this category were potatoes that were rotten, diseased, wormy, very small, or had been sliced or otherwise damaged during harvest. Of this lowest quality, the Velasquez household obtained five arrobas (two percent).

All sale and consumption grade potatoes, as well as seed, were stored in bins inside the farmhouse. Potatoes designated for chuño were taken to the dehydration yard and spread on the ground to await several consecutive days of freezing evenings. The animal potatoes were piled in a phina near the pigpen and covered with straw.

MAKING DEHYDRATED CHUÑO AND TUNTA

Late June and early July is the coldest time of the year in the Altiplano, a period of freezing temperatures and virtually daily frosts at night followed by days of intense sunshine. This is the season when rural households prepare their freeze-dried products from tuber crops such as potatoes and oca. The two principal dehydrated products made from potatoes are chuño and tunta.

Both initiate their processing in the same fashion. The potatoes are graded and spread out on a bed of straw in the dehydration yard. They are left to alternately freeze and thaw for about a week until they acquire a wrinkled. greyish appearance. At this point they are gathered into small piles. Care must be taken to select potatoes of approximately equal size for any given pile. The members of the household remove their sandals and step carefully about on top of the piles, squeezing out the water left in the potatoes. They are left to freeze again and once more are squeezed dry using the barefoot technique. A third day of freezing and squeezing occurs. In the process of repeated squeezing with the feet, the potato skins begin to come off by rubbing against each other. When finally ready, the chuño is collected and the remaining skins removed by hand. The dehydrated produce is then tossed in the air--using a blanket--to remove straw, bits of skin, and other impurities. Finally, the chuño is stored inside the farmhouse in sejes or cylindrical straw baskets. Under perfectly dry conditions it can last for as long as five years. The straw upon which the chuño was processed is subsequently served to cattle as fodder. The skins are used to feed sheep and pigs.

Tunta is a more processed product. Basically, it is chuño which has been left soaking in cold water for about one month. The chuño to make tunta is collected into a straw basket or loosely-woven sack. This container is taken to a nearby river or lake. A bed of straw is prepared inside the water. The sack or basket is placed on top and then covered with more straw. After about 30 days, the container is removed, drained, and finally its contents are allowed to dry in the sun. The final product is of a very light grey color. It is consumed by the farm household on special occasions and sometimes sold or used as a barter good.

SPECIAL CUSTOMS RELATED TO POTATO CULTIVATION

PHASES OF THE MOON AND FORBIDDEN WORK DAYS

Most highland farmers practice the custom of an obligatory rest day on kantati sonak'e or the day of the first quarter moon. On this day all agricultural activities must be suspended--such as planting, hilling, harvesting, and especially land preparation for potato crops. Lands plowed on these forbidden days will become sterile, and they will be unable to recover their fertility for at least three years. Potatoes planted or hilled at this time will produce large plants with shiny leaves, good roots, but no fruit.

A second dangerous day is that of jairi or the third quarter (waning) moon, which is a particularly inappropriate day for planting potatoes. It is not that potatoes planted on jairi will fail to produce well; indeed, the plant will grow normally and produce a normal harvest. The problem, however, is that the potatoes harvested will be t'ojo or blind, in other words without eyes. If one uses such potatoes as seed for the following year, he runs a serious risk of entirely losing his seed or his harvest.

During the new moon and the full moon, farming activities can proceed without interruption.

Although there are many farmers who are illiterate, they still follow the Farmer's Almanac with great care; they have it read to them by children or relatives who have had some schooling. It is very important for them to know in advance the dates of different moon phases so they can plan their agricultural activities accordingly. Also important is to know the Almanac's weather predictions, and also to know the four temporas or fasting periods of the year.

Besides the phases of the moon, there exists another source of forbidden work days, namely: days on which special Catholic masses are given honoring the renovation of community leadership positions. For example, in Huacuyo there still exist traditional community authorities known as mandones or jilacatas. Such leaders do not have fixed dates for departing or assuming their posts. Sometimes they do so before planting, sometimes after planting, and still other times during the potato hilling period. It is customary for each authority to turn over his responsibilities to the person elected to replace him by ordering a holy mass said for his successor in the Cathedral at Copacabana. The mass for each authority is said separately, and each authority must wait his turn. On the day following a renewal mass, Huacuyo residents suspend all agricultural activity. It is believed that anyone who violates this custom will be punished by Pachamama with a disasterous harvest.

PLANTS AND ANIMALS INDICATING CROP PROSPECTS

Before initiating potato planting, farmers in Jaruma and Chiarhumani carefully observe the flower of the sankayo, a cactus plant. If this flower has been damaged by frost, it is appropriate to postpone planting dates by a week or two. On the other hand, if the flower is healthy, it is advisable to advance planting dates. From one zone to another the sankayo flower will indicate the best planting dates for each zone. For example, flowers of this plant found in highland planting sites will usually display different signs then those found at intermediate and lowland planting sites. According to 62-year-old Manuel Apaza of Chiarhumani, the sankayo flower is an indicator of absolute confidence.

Another natural indicator is the ukoruro or watercress plant, which grows in small streams and springs. Observed at planting time, if the ukoruro shows frost damage this means that the future potato crop will also be damaged by frost. But if the ukoruro is healthy and well-matured, this indicates there will be a bountiful potato harvest.

The leke-leke is a wild bird that is also observed carefully by farmers as an indicator of good or bad prospects for the potato crop. If the bird's feathers display a shiny green color, this means the year will be good. A bad year and a disasterous harvest is predicted when the leke-leke's feathers display a brownish color.

Manuel Apaza says: "We have great faith in what Nature tells us. These indicators are not the result of man's science, nor are they the invention of people with long experience. Rather, they are the voice of Nature herself announcing how we should plant our crops."

In Killay Belen, the family of Pedro Illa, age 65, practices a custom of using selected potato seeds as "guides" for other seeds. One takes the seed potatoes and selects three of the very best that can be found. Tiny holes are punched in these seeds with a needle. Into each hole a coca leaf is inserted by its stem. These decorated potatoes are called anaquiris. Their role is to set an example of growth for the other seeds to imitate. After the anaquiris have been properly annointed and toasted with libations of wine, they are taken out to a furrow and planted.

On October 29, 1979, Andres coaquira of Huacuyo discovered a medium-sized toad in the field which he and his family were planting. This discovery was a source of great delight because the toad--depending on its size--is considered an excellent indicator of the future size of the potatoes to be harvested. If a large or medium-sized toad is found during the first planting, this is immediately cause for a toast (with wine) to the Pachamama because a bountiful harvest is assured. However, if additional toads are encountered during the middle or late plantings, they will not be celebrated. Only the first toad indicates success.

Sometimes instead of toads, small yellow frogs are found in the seedbeds. This is considered an indicator of a bad harvest caused by frost or a hailstorm. When these animals are discovered the entire planting party experiences a deep disappointment. The planting must continue until its conclusion, but everybody is sad because they know that what has been planted is in great danger of destruction. After encountering this kind of negative indicator, it is customary for farmers to expand plantings occuring at other locations at later dates.

BARLEY

A SUMMARY OF CROP PERFORMANCE (1978-1981)

After potatoes, the most important crop to the subsistence of rural households is barley. For some families the total area planted to barley each year will exceed that of all other crops combined. Barley is required to support cattle (especially draft animals) during the lean pasture months from June through December. It is predominantly destined for livestock consumption as hay and green silage. However, barley grain is threshed and is used as an important compliment to the diet of the rural household as well as its animals. During three consecutive years (1978-79, 1979-80, and 1980-81), records of barley production were kept by at least 31 farmers. A profile of their performance follows:

AREA PLANTED: The total area planted to barley for grain or cebada en grano averaged 5,489 square meters, equivalent to 0.5 hectare or 1.24 acres. In addition, at least one-third of all farmers kept records of another kind of barley for silage or cebada en berza. Area planted to silage barley averaged another 4,730 square meters or just under a half-hectare. For grain barley the average amount of seed planted was 10.7 arrobas (268 pounds); for silage barley it was 5.7 arrobas (143 pounds). No manure or chemical fertilizer of any kind were used, nor any insecticide.

LABOR USE: Barley is generally planted as the second or third crop in a 3-4 year rotation. Because potatoes and possibly another crop preceeded it, barley is planted on well-cultivated soil. In only one community out of five (Yuka) were primary tillaging tasks used. Most farmers simply furrowed and planted. The average household invested ten days of family labor, five days of yunta, and no hired labor to plant their barley. In four of the five communities (all except Killay Belen), no labor investment was made in any task during the period between planting and harvest. The average family spent 15 days of its labor harvesting barley, of which five days were devoted to threshing the grain.

PRODUCTION AND INCOME: The average production per family was 91 arrobas (2,275 pounds) of hay and 17 arrobas (425 pounds) of threshed grain. By weight, this represents about ten arrobas of harvest for every arroba of seed. In terms of net income, the three-year period saw diminishing profitability for barley growers. In 1978-9, the average grower received net income of US$3.15 per day of family labor. This income declined to US$2.48 per day in 1979-80, and to US$2.08 per day in 1980-81.

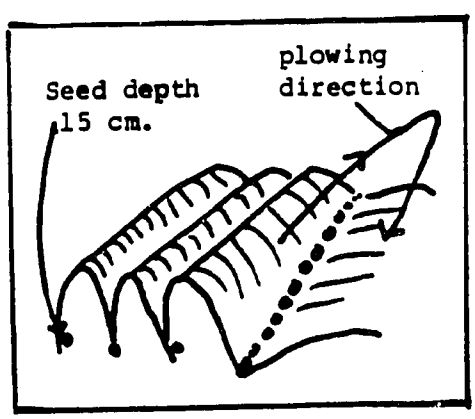
BARLEY PLANTING

SOIL PREPARATION

Barley is planted on three different kinds of land. The best barley yields are obtained from soils containing fertilizer residues. For this reason the crop does best when planted in kallpas or plots which during the previous year were used for growing potatoes (one of the few crops on which farmers apply fertilizer). The next kind of land used for barley is the kare or plot where barley was grown the previous year. Normally, after a second year of barley cultivation the plot is returned to fallow. In some cases barley will be planted on poroma or lands which are being cultivated for the first time following the fallow period, but this happens as the result of a disaster befalling the potato crop. In other words, poroma lands are always reserved for potato cultivation, and for this reason an intensive investment in land preparation and fertilization is made. But if this crop should be prematurely destroyed between, say, October and November, it is too late to replant with potatoes but not with barley. Rather than leave the field uncultivated (thereby wasting the investment), farmers will plant a barley crop. Barley for grain must be planted by October, but barley for silage can be planted as late as December.

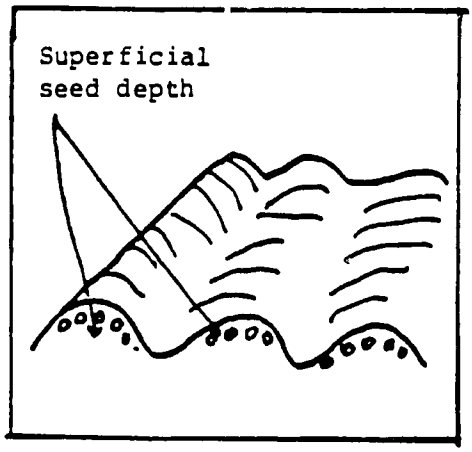
FURROWING AND SEEDING METHODS

There are two basic methods for planting barley, both of them being conducted with the ox-drawn plow. Use of footplows in barley cultivation is considered unnecessary because the plot has been cultivated for one or more years and is easy enough to be worked by yunta. The first method is known as surk'a and is appropriate for conditions of scarce rainfall or for the earliest plantings in September and October. The second method is called lomo surk'a and is employed during periods of abundant rainfall and excessive soil moisture.



SURK'A PLANTING

SURK'A: With this method the farmer uses his yunta and plow to construct normal furrows cut to a depth of about 15 cm, and with a distance between furrows of 15-20 cm. Following behind the plow is the planter. He carries a woven seedbag from which handfulls of seed are taken. The seed is sowed to the furrow in a continuous stream. On its return trip, the yunta opens a parallel furrow, the dirt from which closes the already seeded furrow.



LOMO SURK'A PLANTING

LOMO SURK'A: With this method the seed is not planted in furrows. Instead, before furrowing commences, the seed is sown by broadcast upon the untillaged soil surface. Then a furrowing is conducted to bury the seed. Thus a single laborer can conduct the entire planting--first sowing and then plowing. The principal advantage of lomo surk'a planting is that it allows the seed to remain near the top of the furrows or on the ridges between furrows. This high-lying seed is thereby protected from excessive soil moisture. In fact, the method is employed during periods of unusually heavy rainfall. Even if the furrows fill with water, most of the seed will not be washed away.

In barley planting, the orientation of furrows is also important. For example, if the previous crop's furrows were constructed from east to west, the furrows of the subsequent barley crop should run at a perpendicular angle, or north to south.

In the communities of Yuka, Huacuyo, and Killay Belen, barley is planted with three workers: the plowman with his yunta, the seeder, and a khoferi or sod buster. Once the seed has been buried, the job of the khoferi is to level any remaining furrow ridges and to compact the soil surface. This is done by beating the soil surface with a khofaña or wooden mallet. The task serves to help maintain soil humidity, to protect the seed from birds and rodents, and--by breaking up dirt clods--serves to facilitate the reaping of stalks at harvest. Sometimes barley is planted in widely-spaced rows where the distance between furrows--perhaps because of association with another crop--exceeds 50 cm. In such instances the yunta does not do the burying of the seed. Instead, the khoferi does this by raking the dirt ridges back into the seeded furrows.

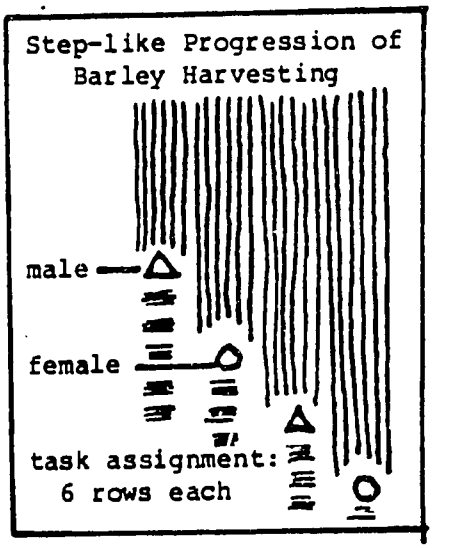
HARVEST TASKS

Barley is a crop which is about one-fourth as labor-intensive as potatoes. One reason is that barley generally does not require extensive land preparation. Another is that it requires few, if any, cultivation tasks between planting and harvest. Nonetheless, harvesting barley is conducted by hand --with sickles--and is fairly laborious. Barley for sileage must be cut, field-dried, transported, and stacked in silos. These tasks are usually conducted during the month of May. Grain barley is cut in June, stacked in the field for at least a month, and transported and threshed by hand in August.

REAPING

The reaping of barley is conducted with each worker harvesting a strip which is about 5-6 rows wide (equal to a width of about 1.5 meters). Harvesting is frequently considered a competitive activity, especially between men and women. Workers begin their task assignments or strips on a staggered basis so that one harvester does not interfere with the work of another. Therefore, the person considered the "best" harvester takes the first strip--to set the pace--while his companions attempt to catch up and pass the leader. Barley is reaped with hand sickles. The harvester grabs and cuts 4-5 stems at a time, then again and again until his hand is full. This handful of stems is called a markha or a chulla and weighs about five pounds. Each handful is placed behind the worker in a neat row known as a gavilla, in which all markhas lie so that their cut ends face in one direction. Each worker has their own gavilla. The work proceeds from one field boundary to the opposite boundary, irregardless of whether rows run length-wise or width-wise. In the case of very long rows (and harvesting strips) that can not be reaped in a single day, it is customary to designate a stopping point to form a cucha or fraction of a harvest assignment.

Handful by handful the barley stems are cut and left in their gavillas. In the case of barley for silage, the stems are left on the ground to dry from 1-2 weeks. They are then collected into horizontal transport loads known as cargas or brazadas (see WEIGHTS AND MEASURES, Chapter II) and hauled to the farmhouse for subsequent storage in silo. In the case of barley for dry grain, the stems are only left in their gavilla for a few hours. At the end of the harvesting day they are gathered into vertical haystacks known as calchas. The purpose of the calcha is to protect the grain from frost and hail until it is dry enough to be threshed. Calchas will be left in the field for as long as two or three months.



Whether early (for silage barley) or late (for grain barley), the crop is transported eventually to the farmhouse on burros. Silage barley is stored in a round silo with a thatched roof known as the pelón de cebada. Grain barley which is awaiting threshing is stored in a neat, rectangular pile known as the cebar arco (see STORAGE OF GRAIN AND FODDER CROPS, Chapter II).

THRESHING

The threshing of barley is normally conducted during the months of July or August, because this period is both dry and windy. The task is conducted at an era or threshing floor located in close proximity to the farmhouse. Barley can be threshed in three different ways. The first consists of beating the stems with threshing poles called jauk'añas. This beating proceeds in two stages, the first to separate the grain heads from the stems, and the second to separate the husks and hairs from the grain. A second method of threshing, usually employed only when minor quantities of grain are involved, is to grab the stems one handful or markha at a time and beat them against a large, flat rock. A third threshing method is to drive burros or cattle around and around the threshing floor.

Once the grain has been threshed, it is necessary to wait for a windy afternoon for the winnowing of the chaff. Using a ceramic dish or a light, wooden trough (batea), the grain is tossed gently into the air by hand. The grain falls back to the vessel but the chaff is carried away. For large amounts of grain, the winnowing can be accomplished by tossing the grain in the air with a shovel. The clean grain is stored inside the farmhouse or in a dry storage silo made of adobe, known as a pirwa or troje, located close by. The barley straw is placed in a straw-roofed, cylindrical pile destined for consumption by livestock, and also for a variety of roofing, storage, and other construction needs of the household.

Threshing Barley with Jauk'añas

OCA
(OXALIS TUBEROSUM)

Following potatoes and barley, oca is one of the most common crops grown in the Altiplano, particularly in the more humid districts. Most households will grow several small plots of oca (ranging from about 500-1,200 square meters) in a variety of high- and low-level locations. Oca often follows potatoes as the second crop of a 4-5 year crop rotation cycle. Ocas are tubers that resemble stubby carrots or turnips. They grow well at altitudes exceeding 3,000 meters (9,842 feet) above sea level. The advantage of ocas is that they are quite sweet tasting and therefore offer a pleasant variation from potatoes in the starchy rural diet.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of oca cultivation, we present the case of Lorenzo Patzi of Yuka. All data are based on farm records he kept himself.

AREA PLANTED AND SEED: Lorenzo Patzi planted oca in a crop lot denominated Juchujri with a total area of 1,200 square meters. He utilized 12 arrobas (300 pounds) of seed. In this planting he utilized six cargas (750 pounds) of animal manure combined with six kilos of chemical fertilizer.

LABOR AND ANIMAL USE: On this crop Lorenzo utilized only family labor, investing 13 jornales (person-days). Of these, three were for land preparation combined with one day of yunta. Three more workers and a yunta were required for planting. Cultivating tasks (weeding and hilling) required an additional 3 jornales. Harvesting required four workers and one burro for transporting the produce back to the farmhouse.

PRODUCTION AND INCOME: Lorenzo harvested a total of 36 arrobas (900 pounds) of oca. This represents a return of three arrobas for each arroba planted. Excluding family labor, the total production costs for this crop--covering yuntas, burro, seed, manure, and chemical fertilizer--totaled 1,064 pesos or US$24.16. The value of harvested production was 1,440 pesos or US$32.73. Net income per jornal of family labor provided by Lorenzo's household was therefore $0.66 per day or about one-quarter of the daily wage earned by hired laborers.

SEED VARIETIES

Like potatoes, ocas come in "sweet" and "bitter" varieties. They also come in a variety of colors. For example, in Chiarhumani the most common varieties are known by the names koillo apilla (yellow-red), kellasunti (yellow), and lluchu (pink), of which there are sour and sweet types for each color. In Huacuyo, farmers use six varieties, each with a particular use. Khene is a pink oca which is very sweet and eaten in boiled form for most ordinary dishes. Jumentha apilla, which is yellow and thick, is used in baked dishes, particularly good with pork. Ch'isme, a light pink oca, is used exclusively for making caya, a dehydrated product similar to chuño. Jango ch'isme, which is completely white, is also a good oca for dehydration. Ch'ear ch'isme, which is completely black, is only used for making caya. Sabacero, a thin and yellow oca, is a bitter variety that must be sweetened in the sun before it can be boiled and eaten.

PLANTING

Because the oca crop follows potatoes, it is not usually necessary to conduct land preparation tasks prior to planting. If any tillaging work is needed, this is usually limited to a single plowing or reja combined with beating and leveling the soil with wooden mallets. For most plots, however, the first soil tillage occurs at planting and consists of normal furrowing with the ox-drawn plow. In some highland plots it is customary to use the footplow--opening seedholes combined with minimum tillage methods.

Oca is one of the first crops to be planted each year. Oca plantings begin as early as mid-August and continue up to mid-October, which is when potato planting begins. Like potatoes, high-zone plots of oca are planted first, then the intermediate ones, and ending with the low-zone plots. However, unlike potatoes, it makes no difference where sweet or bitter varieties of oca are planted. They give the same results in high locations as well as low ones.

For planting oca, two or three workers are required depending on whether or not manure or fertilizer is applied. In the case of oca planted with yunta, one worker guides the oxen and plow, cutting furrows to a depth of about 15 cms, with a distance of about 40 cm from one furrow to the next. Behind the plowman comes the planter, who almost always is a woman. She carries a seed bag hanging from her shoulders, from which seeds are removed with both hands and planted one per step taken. The normal spacing between seeds in the furrow is 30 cms. If manure or fertilizer is to be applied, this third worker follows the planter. Usually the yunta buries the seeded furrow by cutting a parallel furrow at about 20 cm distance on the return trip. In this way there is no need for a khoferi to fill in the furrows.

When oca is planted with the footplow there will usually be three members in the planting party: the plowman, the planter, and the khoferi. If fertilizer is used, this will require still a fourth worker. Ocas are planted exactly like potatoes. The plowman opens up a seedhole with the footplow, a single seed is dropped in the hole, then a handful of manure (if any), and finally the seedbed is beaten firm by the khoferi after the plowblade has been removed.

In Chiarhumani it is customary to fertilize oca. However, in this community farmers prefer to use only the manure from cattle or burros, because sheep manure or chemical fertilizer is considered too strong and is likely to burn the oca seeds. (Under conditions of inadequate moisture which prevents the fertilizer from dissolving, such burning is indeed likely). In place of cattle or burro manure, some Chiarhumani residents prefer to use ashes. Like manure, ashes are spread along the furrow in a continuous stream by a worker following behind the planter.

CULTIVATION TASKS

Oca requires two cultivation tasks: khoraña or weeding and khawaña or hilling. Khoraña is conducted during the month of December. Weeds and grasses are loosened at their roots using the chontilla or digging-hoe and pulled out of the ground by hand. At the same time the soil about the oca plants is gently worked. Because weeding is considered a light task, this work is most frequently assigned to old people and children.

In contrast, khawaña is a much harder task. The work consists of digging and deepening the canals between the rows of oca and mounding the soil around the base of the plants (in the case of oca planted with the footplow). However, when oca has been planted by yunta it is also hilled by yunta. The procedure is conducted exactly as with potatoes. The main purpose of hilling oca--like potatoes--is to prevent the tubers from being exposed at the soil surface. The date at which hilling occurs can be quite variable. This is because hilling requires a previous rainfall to soften the soil and make it workable. If adequate rain comes early, hilling may be completed in December along with weeding; otherwise the task is generally scheduled for completion in January.

When oca is in full growth it is an extremely healthy crop and there do not exist diseases or insect pests which can seriously damage it. For this reason oca is never fumigated. Aside from hail and frost, the most serious danger to oca plots is caused by the wild fox, which destroys the plants while digging in search of the tubers.

HARVEST TASKS

Oca is harvested in April or May. Once oca tubers are fully matured it is dangerous to leave them in the ground because they can be easily destroyed by worms. The crop is also quite sensitive to frost. A premature helada can turn oca into caya inside the ground.

There are two harvesting methods for oca, each one adapted to different soil conditions. Where the soil surface has baked rather hard, it is necessary to loosen the roots of the oca plants using the traditional handtools of the lijhuana or the chontilla. When soil moisture is more abundant, most of the plants can be pulled from the ground by their stalks. In this case, harvesting proceeds in two stages. First, laborers go down the rows pulling out the oca plants by hand. Behind them follow other laborers who collect the ocas from the stalks that have been left exposed on top of the furrows. The oca tubers are gathered in baskets or assembled in khayas (small clearings within the rows). At day's end they are gathered into a single pile, loaded into cargo sacks, and transported by burro to the farmhouse. Production yields can vary enormously from one year to the next, but the normal expectation is to harvest six or seven times what one plants as seed.

The oca crop is stored in temporary above-ground silos or phinas located near the farmhouse. They remain there until June or July, at which time they are selected and graded. Much like potatoes, ocas are graded into at least three categories. The first group consists of the largest tubers, which are reserved for family consumption or market sale. The second group consists of medium-sized ocas. These are reserved for seed or for making caya, a freeze-dried product like chuño. The third group, consisting of the smallest and damaged ocas, are reserved for second quality caya or fed to livestock.

On the day ocas are to be selected, it is a custom that the persons who participate in this task should not look at a chicken egg, nor look at any kind of fruit. It is believed that the sight of these objects will cause ocas to rot.

Following grading, selected ocas are generally stored in outside locations, either above- or below-ground. The above-ground silo is covered with straw like the ordinary phina. In the other , a hole is dug and lined with straw. It is filled with oca, then covered with more straw, and closed with dirt. Buried ocas are consumed only after December, while ocas stored above ground are usually eaten before then, or sold.

HABAS
(BROADBEANS)

Habas or broadbeans is one of the most important of the Altiplano crops, especially in the more humid districts. In communities such as Yuka, Huacuyo, and Killay Belen, the average household will grow anywhere from one-tenth to one-half hectare of this crop. Habas are important not only for their critical (protein) contribution to the rural diet, but also as a leguminous crop which assists in the restoration of soil fertility. Broadbeans are frequently planted mid-way through a crop rotation, following oca in most instances, and in this way help to lengthen the rotation cycle by at least a year.

A SUMMARY OF CROP PERFORMANCE (1981-82)

Toasted habas are one of the most popular traditional snack foods in the Andes, and Huacuyo (outside Copacabana) is one of the principal suppliers of first-class broadbeans for commercial sale. We therefore take as an example of haba production the performance of Andrés Coaquira of Huacuyo. The following profile is based on information collected by Andrés in his farm records during the 1981-82 agricultural year.

AREA PLANTED AND SEED USE: Andrés Coaquira planted a 1,200 square meter crop of habas in a plot known as Corsillo Chalca on September 1, 1981. He used a total of two arrobas (50 pounds) of seed. The planting was accompanied by four cargas (100 pounds) of animal manure.

LABOR AND ANIMAL USE: The crop required an investment of 25 jornales of labor, of which 12 jornales were hired workers. The haba crop was planted with the footplow, with a labor outlay of three days of family labor and two of hired labor. On October 20 and 21st, Andrés conducted the hilling of this crop with a labor expenditure of three family workers and four hired workers. The haba plants were pulled from the ground and stacked to dry on March 31, 1982, a task requiring 3 days of family labor and 2 days of hired labor. The harvest was threshed on June 2nd and required four days of family labor and two days of hired labor. Threshing was continued on July 2nd and required another three days of family labor and two days of hired labor.

PRODUCTION AND INCOME: The Corsillo Chalca plot yielded 29 stacks or calchas of barley. The two threshings yielded 14 and 10 arrobas of dry beans, or 600 pounds in total. Excluding family labor, total production costs for this crop were 1,580 pesos or US$35.90. At a value of 200 pesos per arroba of dry

habas, the value of the harvest totaled 4,800 pesos of US$109.09. This yielded a net income of 248 pesos or US$5.64 per day of family labor utilized to grow the crop, which is about 2.5 times the daily wage rate for hired labor.

PLANTING AND SEED VARIETIES

There are three kinds of habas: the first quality or usnayo, the medium-sized, and the small habas or ochocolo. The second and third types are usually preferred because they are more resistant to both frost and intense sunlight. Habas require fairly protected locations and are best grown in a temporate climate. They prefer sandy, alkaline soils.

Habas are planted between July and September. Usually the July planters have access to irrigation water while the late planters must await rainfall. In Huacuyo, the higher plots are planted first and the lowland plots last. Habas do not require a special land preparation because they are always planted in fields that have previously been cultivated for two or more years. The crop can be planted either with the ox-drawn plow or the footplow.

When habas are planted with yunta, normally only two laborers are needed: the plowman and the planter. The plow cuts furrows of about 10 cms in depth and a distance between furrows of 30-35 cms. The seed is planted with a spacing of 10-20 cms between seeds, depending on whether the farmer seeks a thin or a dense planting. The seeded furrow is filled with dirt as the yunta cuts a parallel furrow on its return trip. Generally, no fertilizer or manure is applied to the haba crop.

When habas are planted with the footplow, three laborers are needed: the plowman, the planter, and a khoferi to compact the soil surface. When fertilizer is applied at planting time, which is rare, a fourth worker must be added. Using the footplow method, haba seeds are planted at a depth of 15-20 cms and at a distance of about 30 cms from one seedhole to the next. Vertical rows are planted when a wet year is anticipated, and horizontal rows when a dry year is predicted.

Under normal circumstances, habas require about 30 days to sprout in humid soil. However, it is possible to speed up the process by soaking haba seed in water for about 12 hours prior to planting it. This procedure will shorten sprouting time to around 21 days.

CULTIVATION TASKS

Habas are usually grown under rainfed conditions. However, in fairly arid districts such as Jaruma and Chiarhumani, many families grow at least one haba plot--called a cato and about 750 square meters in area--which is located near the farmhouse and is irrigated. Under these circumstances, one of the principal tasks during the cultivation period will be irrigations. The first of these should take place when the haba plants are about 10 cm high. It would be counterproductive to irrigate sooner than this because the combination of the water with intense sunshine causes the soil to form a stiff crust and thereby obstructs the sprouting of the crop. The second irrigation should be conducted any time between two and four weeks after the first, depending on when the farmer is scheduled to receive his mita or irrigation turn. Subsequent irrigations should be repeated at this standard interval until the arrival of the rainy season (December or January), after which irrigation is no longer required.

Aside from irrigation, there are at least one and possibly two additional cultivation tasks: weeding and, more important, hilling. Habas should be weeded when they are about 20 cm tall and are beginning to flower. The task consists of loosening the roots of all weeds and grasses so they can be removed by hand. It is conducted with the lijwana or chontilla, usually by older workers and children. The weeds and grasses removed during the weeding process are washed with water and then fed as fodder to livestock.

The hilling of habas is generally conducted during the month of January, but some farmers (like Andres Coaquira) conduct the task much earlier--in October or November--so that it becomes a joint hilling and weeding activity. The same tools are used as in weeding. The work consists in pilling up dirt about the base of the haba plant to prevent the stalk from falling from the weight of the fruit.

HARVEST TASKS

The harvest period for habas generally extends from late March through late April. When soil conditions permit, haba plants are pulled from the ground by hand. The harvester removes the plant, shakes the dirt from the roots, and lays it in a neat windrow or gavilla. However, when the soil is hard and dry it is customary to harvest haba plants with the hoz or hand sickle. If the habas are to be consumed or sold green, the pods must be removed from the stalks at harvest time. Otherwise--and this is the usual procedure--the stalks are gathered into stacks or calchas. There the crop will be left to dry for at least a month. Each calcha consists of 3-4 armloads of stalks.

One armload is stood upright and the others are leaned against it and "locked" into place at the top.

The stacks of dry haba stalks are brought in from the field during the month of June, or in some instances--like Killay Belen--they are left to dry until August. By this time the stalks are very dark brown or almost black. Once transported to the farmhouse, the stalks are neatly stacked in a rectangular pile or arco. This pile is without a roof, because this would result in a warm and dry shelter which would attract rats. Here the beans continue to dry until threshed.

Threshing of habas usually occurs during the months of June and July. There are three threshing methods depending on the quantity harvested. When a small quantity is involved, habas are threshed with the fingers. The pods are removed from the stalks, pinched open--a procedure called k'iche--and the beans removed. Such a method is appropriate when the household expects to harvest about 3-4 arrobas (75-100 pounds) of beans.

For moderate quantities, habas are threshed with the feet. A cowhide is extended on the ground. The haba stalks are piled on top and the beans separated by stamping. Sometimes to avoid unnecessary injury to the feet, the thresher will place a second hide on top of the haba pile before the stamping begins.

Large quantities of habas are threshed with curved poles or jauk'añas. No attempt is made to remove the pods from the stalks. After the clubbing is complete, the beans are separated to one side for winnowing, the stalks to another side, and the crushed pods in a third pile. The stalks are carefully stored and destined for consumption by draft animals. The pods or jipis are reserved for sheep and pigs.

Once the beans have been winnowed in a strong wind and the chaff or other remaining impurities removed, the habas are stored inside the farmhouse in woven wool sacks or cylindrical straw baskets known as sejes. It is not customary to select the beans into grades for consumption, seed, and market sale; rather, all produce is stored together and removed as the need arises. Dried habas will remain edible as long as two and three years if kept perfectly dry. Nonetheless, after one year they lose their natural color and turn dark brown.

ARVEJAS (PEAS)

All families in Yuka grow one or two plots of peas every year, but it is clearly considered a secondary crop. They grow it to vary their diet and--in its toasted form--to send it to sons who are doing their military service. Peas are also the basis of a traditional meal prepared for All Soul's Day (November 1st), a time for honoring the dead.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of pea cultivation, we present the case of Tomás Yanarico Surco, a resident of Yuka. All figures are based on farm records kept by Tomás during the 1981-2 agricultural year.

AREA PLANTED AND SEED USE: Tomás Yanarico planted an 882 square meter plot known as Jacha Jawira Pata. He employed one arroba of seed. This planting received no manure or fertilizer application. No insecticides were used.

LABOR AND ANIMAL USE: Tomás conducted one-half day of land preparation (a single reja with ox-drawn plow) on October 1, 1981. Only family labor was required. The same day he furrowed and planted the field, occupying another one-half day of his own labor and the yunta. No further task was conducted at this site until harvest. The crop was harvested on March 25, 1982 and required two jornales of family labor to cut and stack the stalks in calchas. After three months of field drying, Tomás Yanarico's household threshed the pea crop on June 26, 1982, requiring two more days. Total labor use: six days.

PRODUCTION AND INCOME: Tomás obtained ten arrobas (250 pounds) of threshed, dried peas from this crop. He also obtained ten amarros or stacks of plant stalks for animal fodder. At 120 and 80 pesos respectively for these main and sub-products, the total value of the harvest was 2,000 pesos or US$45. Excluding family labor costs, the total production expenses for this crop (covering yunta and seed) were 160 pesos. This left a net income of 306 pesos or US$6.97 for each day of family labor invested in the crop, which amounts to three times the early 1982 daily wage rate for hired labor (100 pesos per day).

LAND PREPARATION AND PLANTING

Peas do not require special land preparation because they are planted in kallpas or previously cultivated land where the soil is already easy to work. At most, a single reja or tillaging just before planting may be necessary. In the traditional crop rotation, peas (like habas) are used as a soil fertility enhancer and usually follow a crop of barley.

In Yuka there are only two varieties of peas: jango (white) and luky (bitter). The first of these is larger and easier to cook, so it is used in soups and boiled dishes. The luky variety produces smaller grains which are suitable for making a toasted snackfood similar to popcorn. Most families grow one plot apiece with each of these varieties precisely because of their different uses.

Peas are planted like most other crops. The furrows are plowed with the yunta. Behind the yunta comes the planter, dropping the seeds in the furrow with a spacing of about 5-10 cm. On its return trip, the yunta plows a parallel furrow which covers the seeded furrow. Each furrow is seeded, and the distance between furrows is about 40 cm. In Yuka it is sometimes observed that the planter will walk in front of the yunta instead of behind it. With this method she plants the previously cut furrow just seconds before it is covered over with dirt from the new furrow. By walking in front of the yunta the planter assists in guiding the animals. This becomes necessary when the draft team is inexperienced. Such a situation occurs frequently in Yuka, because in that community it is common to use a cow on the left side of the draft team. Moreover, to economize on pasture requirements, some families sell their ox or bull at the end of the planting season and buy a new draft animal the following year , just before planting.

No manure is applied to peas. If their are many clods in the soil following planting, it is advisable to bust them and smooth over the soil surface. Peas are normally planted in the last half of September. The plants sprout after about 30 days. If any weeding is to be conducted it must be completed soon after sprouting. But afterwards there are no more tasks to be done until harvest. Indeed, nobody should even enter the plot because they are likely to damage the pea vines and tendrils--called surtijillas--which may cause the plants to collapse and rot.

HARVESTING TASKS

Peas are usually harvested in the first half of April. Even if there are still parts of the crop which are flowering, it is important to complete the harvest during April because peas are very susceptible to frost. The

harvesting is conducted by either of two procedures. When the soil is soft and moist, the pea stalks can be pulled from the ground. Otherwise, the stalks are cut with the hand sickle. Irregardless of the methods by which they are removed, peas are placed in windrows and eventually collected into calchas, where they will be left to dry for at least a month. When their harvested production is rather small, some families immediately transport the cut stalks directly to the farmhouse. With larger quantities, however, this is not advisable because field drying reduces considerably the weight of the crop and thereby facilitates transport.

The threshing season occurs in June and July. Peas are usually the first crop to be threshed--before habas, barley, wheat, or quinua. The pea stalks are piled on the threshing floor or era. They can be threshed in a variety of ways--like habas--depending on the quantity involved. The stalks and crushed pods are saved as a fodder for livestock. Once separated, the dry peas are winnowed in a strong wind to separate the chaff.

Once completely clean, dried peas are stored in an adobe bin inside the farmhouse or in a troje (storage structure) adjacent to the farmhouse. Dry peas can last for several years if stored under perfectly dry conditions, but farmers in Yuka ordinarily grow only enough to meet their family or sale needs for a single year. Of the total harvest of dry grain, it is necessary to reserve about two arrobas (50 pounds) for seed, which is enough to plant two plots the following year. Peas are grown predominantly for home consumption, but now and then one can see women from Yuka selling peas at the sunday market in Escoma. But such sales are very small--in quantities measured by handfuls--and never so much as an arroba.

The worst threats faced by the pea crop are those of frost and hail, sometimes drought and excess moisture (flooding). Rodents are not considered a serious problem. Once dried, peas are so hard that not even rats can damage them while in domestic storage.

MAIZE

Corn is not grown on the Altiplano. The altitude is too high, the weather too severe. However, Killay Belen is a remarkable exception to this generalization. Located on the shore of Lake Titicaca, the community is protected on three sides by steep mountain slopes. Even the opening toward the lakeshore is fairly narrow, thereby protecting the community from strong winds and cold blowing across the lake. As a result, Kilay Belen enjoys a micro-climate that is similar to the temporate valleys region. The hothouse effect of its topography is so effective that frost is not a serious threat to the community's crops. In fact, in order to make dehydrated chuño and other freeze-dried products, households in Killay Belen must carry their produce up to the highest zones in the community in order to obtain the benefit of consecutive frosts.

Thus, corn has become one of the most important crops grown in this remarkable village. All residents have two or more plots which they cultivate in bottomland locations close to their homes. The crop is planted with both the foot-plow and the yunta. It is weeded, hilled, field-dried in calchas, and husked by hand. Production is almost entirely destined for household consumption.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of corn growing in Killay Belen, we present below a summary of the production of Pedro Illa Choquehuanca. All of the following data are taken from farm records kept by Pedro for the 1981-2 agricultural year.

AREA PLANTED AND SEED USE: On September 4, 1981, Pedro Illa initiated the planting of a corn crop in a lot known as Sihuanca Huyo. The plot had an area of 1,500 square meters. Pedro used two arrobas of seed. Combined with this planting were 15 cargas (1,500 pounds) of animal manure.

LABOR AND ANIMAL USE: The planting of this field lasted two days. It required two days of yunta, four days of family labor, and one hired laborer. The crop was weeded once 15 days after planting, a task requiring three days of family labor and four days of hired labor. On September 30 and again on October 4, the crop was hilled by hand, requiring an investment of ten days of family labor and six of hired labor. No further tasks were conducted with this crop until harvest. The corn stalks were cut and stacked in calchas June 14-15, 1982, utilizing four family laborers and four hired ones. On July 3 the ears where picked and husked with an investment of 15 jornales, of which four were family and 11 were hired. In total, the corn crop at sihuanca Huyo required 56 days of labor, of which 25 were contributed by the Illa household.

PRODUCTION AND INCOME: Pedro Illa's corn crop resulted in 40 calchas which, once picked and husked (but not shelled), yielded 130 arrobas or 3,250 pounds of corn. This production was valued at 100 pesos per arroba, resulting in a gross income of 13,000 pesos or US$295.45. Excluding family labor, production costs for this crop totaled 3,900 pesos or US$88.64. Thus, the net income per day of family labor utilized was 364 or US$8.27. This represents 3.6 times the prevailing daily wage rate for hired laborers in early 1982.

LAND PREPARATION AND PLANTING

Even though the land designated for corn may have been cultivated one or more years in previous crops, it is still necessary to conduct at least two tillages or rejas. The plowing direction of the second should be perpendicular to the first. If the crop is to be planted by footplow, after the yunta has completed the second tillage it is necessary to beat the soil surface flat, leveling all the furrow ridges. But even when the crop is planted with the ox-drawn plow, after the furrows are seeded they too will be beaten flat and compacted.

In the first case, planting by footplow requires three or four laborers. The plowman opens the seedholes with his huiso at intervals of about 10 cm. He is followed by a woman, who deposits three grains of seed in each hole. A third worker throws a handful of manure into the seedhole, after which the footplow is withdrawn. A fourth worker follows along behind beating the soil firm over each seedhole. Thus the field looks as smooth after it has been planted as it did before.

Some families also plant corn using the ox-drawn plow, and sometimes the footplow as well. In this case a furrow is cut at a depth of about 15 cm. Into this furrow the corn seed is planted with a spacing of about 10 cm between seeds. The seeded furrow is buried on the round trip by the ox-drawn plow as it cuts a new furrow. In those turn-around areas for the oxen, where the furrow is not cut to the field boundary, it will be extended by planting with the footplow. The use of fertilizer on corn crops in Killay Belen is not a certainty. First-priority claim on available manure supplies is required by the potato crop. If a household has enough animals, and therefore enough manure for its corn crop as well, so much the better.

Seed for planting corn is often prepared at the planting site. It is not uncommon to see women shelling seed directly from the cobs just before the planting begins. In Killay Belen there are four varieties of corn that are planted. These are jancho (white), kulli (purple), pocu (grey), and k'ellu (yellow). The first two varieties are boiled and consumed in soups and stews. The third variety is for toasting. The last is made into pasankalla, a snack food like popcorn which is consumed during long trips away from the community.

CULTIVATING TASKS

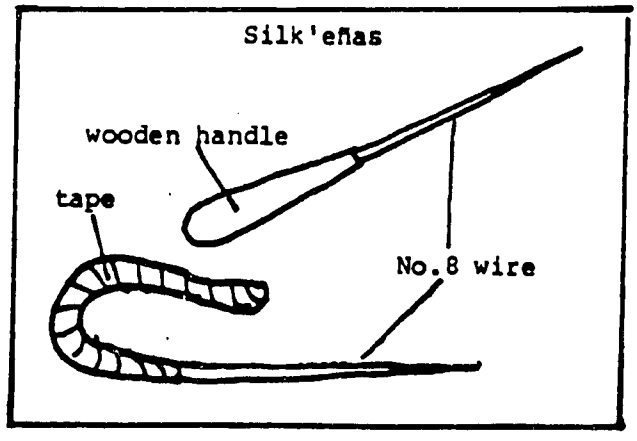
Corn growers in Killay Belen conduct two cultivation tasks: weeding and hilling. Like other crops requiring these tasks, they are undertaken with the traditional handtools of the chontilla and the lijuana. Normally, weeding does not occur until December, about three months after planting. Weeds and grasses are loosened at their roots, pulled out by hand, and--if large enough--are subsequently washed and served to animals as fodder. Men, women, and children participate in weeding tasks.

Hilling is usually conducted after a day of rain in January or, if the rainy season is delayed, in February. The task involves a general loosening of the soil in the areas between rows and heaping this soil against the base of the corn stalks. This mounding of the earth helps to keep the plants from falling over when they become top heavy with corn ears and/or when their roots are loosened by excessive rainfall or strong winds.

HARVESTING TASKS

The harvesting of the corn crop usually begins in May. The plant stalks are cut with a sickle, then stacked in calchas for drying of the ears. There are two methods of stacking corn in Killay Belen. The first is the common calcha or upright stack, which is used when the stalks are fairly long. The second method is to construct a horizontal pile--known as a carma--which is used when the stalks are short.

After drying for two or three months, the ears of corn are removed from the stalks by hand and then husked. This task is known as tonko silk'eña. The husks are separated from the ears with an instrument called the silk'eña. This is a sharp-pointed tool used to poke through and behind the husk to tear it away from the ear. In Killay Belen there are many different models of sich'iñas, most about 20 cm long and designed to fit comfortably in the palm of the hand. Some have wooden handles and others are wrapped in tape. The blade is usually made from thick wire.



Once the ears have been removed, the stalk and corn husk residues are known as challa. This material is highly prized as a livestock fodder. Often challa is saved until potato planting season, when it is fed to draft animals who do the heavy plowing, or to burros who carry difficult loads of manure.

After husking, corn ears are spread out to dry in the patio of the farmhouse for about five days of intense sun. The ears are then selected into two groups. The larger ears are reserved for seed and, if sufficient production exists, for family consumption. The smaller ears--which are also usually damaged in some way by rot or insects--will be separated for grinding into cornmeal, or for feeding to chickens..

Corn in Killay Belen is not shelled from the cobs until it is ready for its consumption or planting use. When corn is to be boiled for a meal, the ears will be shelled at the time the food is prepared. It is also common for the entire ear to be boiled with its grains attached, then sliced into chunks but still eaten directly off the cob. On those rare occasions when a family will sell some of its corn, the corn is sold by the ear; usually no more than half a dozen ears at a time will be sold.

Corn ears are stored inside the farmhouse in cylindrical baskets called sejes, the larger ears in one container and the smaller ones in another. Provided these baskets are kept in a perfectly dry location, the corn inside them will last for at least three or four years.

QUINUA
(CHENOPODIUM QUINOA)

Quinua is an ancient grain plant that was domesticated in the Andean highlands many centuries ago. It has considerable nutritive value, and until it was displaced by rice in recent decades it was widely consumed in Peru and Bolivia. Today quinua is a minor crop for subsistence households in the Altiplano, but nonetheless most families have at least one plot--and in rare instances grow as much as one-half hectare--because quinua has so many uses. Ground into flour, quinua is used to thicken soups and spicy sauses. In its boiled form, it can be eaten like rice. A sweet cookie known as q'ispiña is made from powdered quinua. Occassionally, quinua is used to make chicha, a fermented grain beverage. The husk of the quinua seed--called jipi--is burnt and its ashes used to make llujtha, an alkaloid substance which enhances the narcotic effect of chewing coca leaves. Finally, quinua stalks make an excellent fodder for livestock.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of quinua production, we present a summary of the crop grown by Felix Aruquipa of the Community of Jaruma. All of the following information is taken from farm records kept by Felix during the 1981-2 agricultural year.

AREA PLANTED AND SEED USE: Felix planted an exceptionally large field of quinua--one-half hectare--in a plot known as Jacha K'ollo Pampa. He planted the variety quinua real and utilized one-half an arroba (12.5 pounds) of seed. No manure or chemical fertilizer was applied at planting, nor was any insecticide or other agricultural chemical used during the crop cycle.

LABOR AND ANIMAL USE: No special land preparation for this crop was required. Felix planted it on September 4, 1981 and employed one day of family labor and a yunta. No cultivation task occurred between planting and harvesting. The harvest began July 16, 1982 and lasted for two days to complete the reaping. Four days of family labor were invested in this task. The crop was then immediately threshed and winnowed in the field, which involved another two days of family labor. In total, the quinua crop planted at Jacha K'ollo Pampa required 7 days of family labor and one day of yunta.

PRODUCTION AND INCOME: Felix's quinua crop yielded eight arrobas of threshed grain, which represents a return of 16 times the amount of seed planted. The value of harvested production as estimated by Felix--including the grain and the straw byproduct--was valued at 1,280 pesos or US$29.09. Excluding the

value of family labor, the total production costs of this quinua crop were 420 pesos or US$9.54. This left a net income of 123 pesos or US$2.80 for each day of family labor invested in the crop, which is only slightly more than the daily wage rate for hired laborers (100 pesos) which prevailed in early 1982.

LAND PREPARATION AND PLANTING

Quinua is almost always planted in a khananu or plot which was used for potato cultivation the previous year. This is a very old custom, both in lowland and hillside plots. By using a khananu, the soil will already be soft and workable. It will also have sufficient nutrients remaining from the manure applications of the previous year, so no new fertilization is necessary.

Normally, quinua is planted between mid-August and mid-September. In Jaruma it is almost certain that snow will fall in August. Thus, farmers wait for several days of snowfall, which will leave the soil moist enough to plant. The planting is done by the broadcast method. First, the entire surface of the field is sown. Next, a superficial plowing is conducted with the yunta in order to bury the seed at a depth of about 5-10 cm. For this reason, quinua can be planted by a single worker: he first broadcasts the seed and then does the plowing. It is quite important to bury the seed only superficially, because otherwise it will not sprout. The post-seeding furrowing should be conducted following the contour of the slope if quinua is planted on a hillside. Once planting is completed, no further tasks are required until harvest. The crop receives no irrigations, weedings, or hillings.

HARVESTING TASKS

The harvest season for quinua comes in June and July. Men, women, and children participate in the task, of which there are two methods. When the soil is soft, the quinua plants are pulled out of the ground, the dirt shaken from their roots, and the stalks piled in windrows. However, when the soil is too dry the stalks are cut with sickles, or sometimes just the grain heads--or llogo--are collected and placed in a large groundcloth. Quinua harvesting is normally conducted in the early morning because the existence of mist or fog prevents the grain heads from falling to the ground. Immediately after the reaping, the crop is transported to the farmhouse for storage. Quinua should not be left in the field to dry because it will be eaten by birds. Back at the farmhouse the crop is stacked to dry in a temporary silo known as the jufa arco, which consists of two rectangular piles constructed parallel to each other with all grainheads touching each other in the center. A trough cut below the silo serves to catch any grain that falls.

Quinua is threshed soon after it is harvested, usually in July. When there exists a large amount of crop, it is necessary to use threshing poles. In this case the task is conducted much like the threshing of barley or habas or peas. When only a small amount will be threshed, one lays a cloth on the ground, piles the quinua stalks on top, and either stamps the grain heads with the feet or rubs them together with the hands. Once the grain has been separated, the husks are stored to be burnt so their ashes can be used to make llujtha, or reserved for feeding to pigs or other livestock. Llujtha is prepared by mixing the quinua ashes with water in which potatoes have been boiled. Sugar is added according to one's taste. The substance becomes a dough which eventually hardens into the alkaloid so indispensable to coca chewers.

Once the quinua grain has been separated from the stalks and husks, it is winnowed by tossing in the wind. To conduct this task, known as venteo, it is necessary to wait for the right wind: not too strong, not too light, but moderate. The grain is lifted above the head in a clay bowl or other convenient vessel and allowed to spill gradually to the ground. The chaff and impurities are blown away by the action of the wind. Finally, the clean grain is screened through a sieve and then stored inside the farmhouse.

PAPALISA
(ULLUCUS TUBEROSUS)

Following potatoes, papalisa (also known as ullucu) is one of the most important tuber crops grown in the Aliplano, possibly more widely planted than oca, because it is one of the most common substitutes for potatoes in varying the highland diet. Papalisa is predominantly destined for family consumption. If it is sold at weekly markets, only very minimum quantities (handfuls) are made available and often only through barter arrangements. This tuber is used in soups, in spicy stews, and in a wide variety of boiled dishes. Papalisa can also be freeze-dried to make a dehydrated product like chuño.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of the production of papalisa, we present a summary of the crop grown by Francisco Quispe Ramos of the community of Chiarhumani. All the following information is taken from farm records kept by Francisco during the 1981-2 agricultural year.

AREA PLANTED AND SEED USE: Francisco planted a 3,200 square meter plot of papalisa in a site known as Titi Vichuka. He required two arrobas of seed for this crop. No manure or insecticide was used.

LABOR AND ANIMAL USE: Francisco first conducted a barbecho or land preparation on May 21, 1981 using two jornales of family labor and one day of yunta. He planted the field on September 28, again using two days of family labor combined with a day of yunta. On January 20, 1982 the papalisa crop was hilled, a task requiring two days of family labor and two days of hired labor. Two separate harvests of the crop occurred: the first on April 10, with two days of family labor, and the second on May 26, again with two family workers. Total labor use for the papalisa crop planted at Titi Vichuka was 12 days, of which ten were provided by the Quispe household. Total animal use amounted to two days of yunta and four burros to bring the harvest home.
PRODUCTION AND INCOME:
PRODUCTION AND INCOME: Francisco obtained a production of 20 arrobas of papalisa, which amounts to a return of ten arrobas for every arroba of seed planted. At 100 pesos per arroba, the harvest was valued at 2,000 pesos (US$44.44). Excluding family labor, the production costs of this crop totaled 983 pesos (US$22.34). The net return per day of family labor was therefore 102 pesos or US$2.32. This amounts to about 1.5 times the value of a single day of hired labor (70 pesos in early 1982).

LAND PREPARATION AND PLANTING

The planting season for papalisa is considered to be the last half of September and sometimes early October. Like potatoes, there are early, middle, and late plantings. The precise planting date depends on moisture availability as well as natural indicators consulted by the farmer, particularly the flower of the sankayo or cactus. This plant flowers in early September. If rain, snow, or frost damages the flowering in its early stage, this tells the farmer to delay his first planting or to expand his second and third plantings. Similarly, damage to the sankayo flowering in middle or late stages will tell farmers to advance their plantings.

Usually it is unnecessary to conduct a special land preparation for papalisa. The crop is planted with the ox-drawn plow. The task will require either two or three workers depending on whether fertilizer is used. The plowman guides his yunta and cuts furrows which are about 30-35 cm deep and about 40 cm between furrows. Behind him comes the planter, spacing her seeds at intervals of approximately 30 cm. Unlike potatoes, sheep dung is not applied to papalisa; instead, only the manure of cattle and burros is used. Sheep dung is considered too strong and likely to burn the seeds. In some instances farmers apply ashes to the furrows as well. When each furrow has been seeded, fertilized, and ashed, the plow makes its return trip cutting a new furrow and at the same time filling in the seeded furrow.

CULTIVATION TASKS

Between planting and harvesting, the principal task conducted with papalisa is the hilling of the plants. This is done once or sometimes twice--the first hilling scheduled for early December and the second for early January. At the time the plants are hilled, workers also remove all existing weeds. The task is conducted by hand with the chontilla or the lijuana. Because it is not considered a heavy type of work, hilling (and weeding) is usually performed by women, children, and old people.

HARVESTING TASKS

Papalisa requires about nine months to fully mature in the Altiplano. It is almost always harvested in April because the crop is considered extremely sensitive to frost which, by May, becomes a serious threat. If caught by a premature frost, papalisa tubers are completly ruined; they can not even be eaten by livestock.

The crop is harvested like potatoes. Each worker is assigned one or two rows. The plants are dug up one by one, the soil about them turned over several times to assure few tubers are overlooked. The papalisas are gathered in cleared areas or khayas within the rows. At day's end tne contents of the khayas are collected in baskets and assembled in a single pile, where the papalisas are loaded into cargo sacks for transport to the farmhouse on burros. Like potatoes, hired laborers participating in the harvest of papalisa are normally paid in produce rather than cash. The payment per worker is normally two canastas (about two arrobas or 50 pounds).

Once transported to the farmhouse, papalisas are selected into three groups. The largest are set aside for family consumption and possible sale. The medium-sized papalisas--and of these only the very healthiest--are set aside for seed. The third group consists of the smallest tubers as well as all that show signs of damage or rot. These are destined for feeding to livestock or for dehydration as chuño.

Papalisa is never stored inside the farmhouse but rather outside in the patio, like oca. A hole is dug in the ground and lined with straw. The hole is then filled with produce, covered with more straw, and buried under a layer of dirt. To an outsider visiting the farmhouse, it would be impossible to tell that produce is stored beneath his feet. Papalisa is used almost exclusively for family consumption. It is sometimes reserved for consumption on very special occassions by those families producing only minimum quantities of the crop.

ONIONS

Onions have become one of the principal commercial crops of southern Altiplano communities like Chiarhumani and Jaruma, which have at least minimal access to irrigation water. Most growers plant between 1,000 and 2,500 square meters of this crop within protected, walled-in fields known as canchones which are fertilized every year and never allowed to rest. Several farmers grow as much as one-half a hectare. Area planted is limited not only by water availability but also by the labor supply, because onions are an extremely labor-intensive crop. Ten years ago nobody in this region grew onions. Five years ago some families had begun onion production but only during the rainy season. Today many families grow at least two and sometimes three crops per year. With the possible exception of livestock, onions have become the principle source of cash income for farm households in Chiarhumani and Jaruma.

A SUMMARY OF CROP PERFORMANCE (1981-2)

As an example of onion production, we present the case of Eusebio Nina Cuba of the community of Jaruma. All the following information is taken from farm records kept by Eusebio during the 1981-2 agricultural year.

AREA PLANTED AND SEED USE: Eusebio planted two onion crops, one in September for an area of 1,650 square meters, and a second in November for 850 square meters. The total area planted was therefore 2,500 square meters or one-quarter hectare. The planting site is known as Canchón de Casa A. The onion seedlings had been grown by Eusebio in his own nursery. He planted 34 cabezas of seedlings during the September planting along with 30 cargas (3,000 pounds) of manure. The second planting required 13 cabezas of seedlings and five cargas (500 pounds) of manure. The "cabeza" is a unit of measurement specially applied to onion seedlings. To obtain a cabeza one takes a string and measures the circumference of one's head. A clump of onion seedlings equivalent to this circumference is therefore a cabeza.

LABOR AND ANIMAL USE: Eusebio plowed the land of his canchón on September 20, 1982. He used one day of yunta and two days of family labor. He conducted a second plowing five days later using one day of yunta and one of family labor. Three more days of family labor were spent breaking up sods and preparing a finely pulverized seedbed. Transplanting of seedlings began September 3, 1982 and was conducted on six different days through the 23rd of that month. The second transplanting took place November 2-3. Total labor use for transplanting (all supplied by the Nina household) was 11 jornales.

The crop was irrigated on four separate occasions: October 24 and 31, November 6, and December 7. Each irrigation or riego required a day of family labor. The crop was also weeded on three occasions during October to December, requiring nine days of family labor in total. The harvesting of Eusebio's onions began January 4, 1982 and continued for seven days over a period of six weeks. In harvesting the Nina household spent 14 days of family labor.

PRODUCTION AND INCOME: Eusebio Nina's onion crop produced a total of 8,900 heads of onion. These were sold in loads of 100 heads each at 50 pesos apiece for a total of 4,450 pesos or US$178.00. Excluding family labor, the production costs for the crop (seedling nursery, animals, manure, and seed) amounted to 1,625 pesos or US$65.00. This resulted in a net income per day of family labor of 201 pesos or US$8.04, which amounts to slightly more than twice the daily wage paid to hired laborers in early 1982 in the Jaruma region (100 pesos per day).

NURSERY

Jaruma residents buy their onion seed from the Peruvians, who sell them a variety known as Arequipeña at a cost of about US$15-20 per pound. The bed of the nursery is quite small, often about four square meters in area, but size will vary in accordance with the planned plantings. The seedbed should be finely pulverized to a depth of at least 30 cms. Animal manure is worked into this soil. Then it is leveled, irrigated, and the onion seed scattered evenly across the surface. The seed is then covered with a thin layer of soil, followed by a thick layer of straw. The straw is required to keep the dirt from washing away when the seedbed is watered. Every two days the nursery will be watered until the plants sprout, then at progressively less frequent intervals. As the seedlings grow, the straw is gradually removed and the nursery weeded as often as necessary until the seedlings are ready for transplanting.

Onion seedlings are called kocha. The nurseries or almácigos are started in the month of April, because they will require five or six months until ready for transplanting. The irrigations of the nursery will be conducted by hand. If located close to a holding pond, the nursery can be watered by gravity flow using a plastic hose; otherwise, the water must be carried to the nursery in buckets.

SOIL PREPARATION AND PLANTING

The field or canchón reserved for onion cultivation is first given an irrigation to make the soil easier to plow. The plot is left to dry for about four days before it is plowed. This is done by a single plowman with his team of oxen. The plowshare should penetrate the soil to a depth of at least 30 cm. Because the irrigation water causes weeds and grass to grow rapidly, it is necessary to conduct a second plowing immediately before transplanting of the seedlings. This second plowing should leave the soil very soft and workable. If there are still dirt clods and sods, these must be pulverized. A final task prior to transplanting is to transport the manure to the planting site. This is usually done on the backs of burros, although some farmers--who are located near a road--transport their manure supplies by truck.

Onions Being Transplanted

For transplanting onions a great deal of labor is required. If hired laborers can not be obtained, the planting task will have to be stretched over a longer period of time in accordance with family labor availability. First, the seedlings are removed from their nursery with a pick-hoe. The seedlings are laid in rows so that only the best plants--all of a same size--will be selected.

Next, the furrows are constructed, again using a pick-hoe. The width of the furrows is variable from one farmer to another. But the furrow depth is usually 20 cm, while the distance between furrows is about 30 cm. Once each furrow has been constructed, a layer of animal manure is spread throughout its entire length. The seedlings are then placed on both sides of the V-shaped furrow with a spacing of 15-20 cm. The furrows are then filled by hand and gently packed around the seedlings to a depth of 10 cm. Finally, the field is given an irrigation to complete the planting task.

CULTIVATION TASKS

The primary cultivation tasks required by onions are irrigations and weedings. Because of the critical water requirements of this crop, it can not be grown except by those farmers who have access to reliable community irrigation facilities or who have their own well and a small holding pond. The first irrigation must be conducted the day of planting. The second should come about a week later. The third and fourth irrigations will depend on water availability. For example, if there is sufficient rainfall there may be no need to irrigate, or perhaps the family must await its mita or water turn. Often families will grow more than one plot within a single walled-in canchón because the household does not have adequate water to irrigate the entire canchón in a single riego. If it receives a water turn, say, every four days, it will irrigate the first onion plot with one turn, the second plot with the next turn, and back again to the first plot on the third turn, etc.

Once planted, the onion crop requires at least three weedings and sometimes four. This is the hardest part about growing onions. The task is almost a continuous one for family labor. A plot of one-quarter hectare can take a worker almost two weeks to complete when weed growth is heavy, and by the time he finishes it is time to weed again. Men, women, and children participate in the weeding, using the traditional handtools.

HARVESTING AND MARKETING

Onions are harvested by hand. The plants can be pulled from the ground with a brief tug on their stalks when the soil is moist, but if it is dry the soil should first be loosened with the chontilla. The harvest proceeds row by row, taking special care to harvest onions of a uniform size. If plantings were stretched out over a month, say, it may be necessary to stretch out harvesting tasks in a similar fashion. As the harvesting continues, the onions are gathered into individual transport loads. A carga or transport load of onions consists of two rawhide nets or chipas, each filled with 100 heads of onions. A chipa is carried on each side of the burro. When the harvest takes place in lowland locations and produce must be transported uphill the 100 head-per-chipa norm is respected, but in highland plots where the transport is downhill the chipa volume can be expanded to 150 heads of onion.

Most of the onion production from the Jaruma region is sold to intermediaries at the weekly (Saturday) market in Jaruma proper, or at the (Wednesday) market in neighboring Lahuachaca. Onions are normally sold in quantities of 100 heads. Prices can vary enormously from one month to the next. In 1981 the price ranged from a low of 80 to a high of 180 pesos (US$3.20--6.00).

In order for the grower to command the best prices, he must take a number of post-harvest precautions. First, he should not allow the produce to get rained on, which causes onions to rot. Second, onion loads should not be exposed to the sun for long periods of time because this causes the produce to turn yellow, causing rejection by merchants. Third, the grower must be careful that his burros do not bang their loads together (against each other or against buildings), because this causes bruising and subsequent classification as lower quality produce. And finally, when a grower transports his onions to market on several burros at a time, it is necessary to muzzle each animal with a ñuko or loose net bag which is tied about the animal's nose and mouth. This prevents pack animals from knawing on each other's cargo.

CHAPTER IV.
LIVESTOCK PRACTICES

The first third of this chapter is devoted to general aspects of raising livestock in the Altiplano. We first describe the rural household's livestock inventory as a whole--the types of animals raised, their value, changes in animal stocks over time, and differences in livestock ownership pattern. Next, we present a "calendar of livestock activities and risks", which allows the reader to gain an appreciation of the changing livestock cycle and its relationships to both weather and agricultural production. Finally, we present a description of livestock marketing practices, with specific reference to an actual market.

The remainder of the chapter is then devoted to detailed descriptions of livestock practices for six separate kinds of animals. These include cattle, sheep, llamas, burros, pigs, and cobayos or guinea pigs.

LIVESTOCK HOLDINGS IN FIVE HIGHLAND COMMUNITIES

Raising livestock is of vital importance to the subsistence of rural households in the Bolivian highlands. These families are herders as much as they are agriculturalists. The interdependency of these activities is extremely high, so much so that if animals were removed from the subsistence strategy this would virtually destroy the rural household's ability to survive independently.

Precisely because of these linkages, it is appropriate to gain a general understanding of the highland family's livestock inventory as a whole before describing the production practices for specific kinds of animals. What types of animals, and how many of each, are raised by the typical farm household? What are their principal uses or contributions to subsistence? What is the cash value of the average livestock inventory, in total and by individual components? How does this inventory change over time? And what are some of the differences in livestock ownership patterns from one household or community to another?

LIVESTOCK INVENTORIES

The above questions can be addressed with quantitative data provided by two livestock surveys conducted by the Traditional Practices Project among 39 highland families. An initial inventory of animal holdings was completed for 32 households as of December 30, 1980. This was followed six months later by a second inventory--dated June 30, 1981--which included 35 families. All told, 29 households were interviewed on both occasions while ten households only participated in the first inventory or the second. By community, the distribution of participating families was 11 from Yuka, 6 from Killay Belen, 5 from Huacuyo, 6 from Chiarhumani, and 11 from Jaruma.

TYPES AND USES OF LIVESTOCK HOLDINGS

The average or "typical" highland farm household manages a livestock holding which consists of two cattle (most likely one cow and a bull), a flock of about two dozen sheep, at least one burro or other pack animal, 2-3 swine, 3-4 chickens, and perhaps 6-8 cobayos or guinea pigs. Both in terms of quantity and value this inventory changes continually during the course of the year; however, the distribution of livestock types remains fairly constant--obeying rather fixed subsistence requirements and resource constraints.

Although cattle are valued for their milk, meat, hides, and manure (particularly as a cooking fuel), their primary economic purpose--cows included--is to provide animal traction for plowing, furrowing, and threshing tasks. The vital importance of cattle to farming operations is demonstrated by two facts: first, the average rural household's investment in cattle amounts to two-thirds of the value of its total livestock inventory; and second, roughly half of the total land cultivated by the farm family each year is normally devoted to grain crops that are intended to feed its cattle. Thus the death of a cow or bull, or the destruction of a barley crop, is one of the most serious disasters that can befall the subsistence household.

Sheep provide wool for the weaving of blankets, ponchos, shawls, cargo sacks, rope, and homespun fabric for general clothing. Their hides serve as rugs and matresses. The dung of these animals is considered the highest quality manure available for crop production, and frequently it is the primary if not exclusive source of fertilizer for the all-important potato crop. During the abundant pasture season, ewes are milked to make cheese for home consumption and market sale. Mutton or lamb is the primary source of meat for the farm family, yet it is consumed infrequently: usually only when an animal dies from disease, malnutrition, or accident, or on very special occasions such as a birthday or religious festival. Finally, the sale of sheep and their byproducts tends to be the principal source of cash income needed by the rural household to purchase basic necessities, finance productive investments, and meet other contingencies requiring monetary expenditures. In a very real sense, sheep serve as the family's savings account.

Burros are valued for their almost daily transport services. They haul manure, seed, fodder, tools, and other supplies to field work sites; they transport harvested crops from the fields to the farmhouse; they carry loads to and from weekly markets. Another beast of burden--the traditional llama--continues to be raised by about a quarter of the families surveyed. But since this animal carries less than half the weight tolerated by burros, the llama is valued primarily as a source of wool and meat.

Taken together, cattle, sheep, and pack animals constitute at least 90 percent of the total value of a rural family's livestock inventory. The balance of holdings consists of relatively short-term, inexpensively maintained, easy-to-liquidate animals such as swine, chickens, and guinea pigs. Swine are raised almost exclusively for market sale since most highlanders have serious reservations about pork. Poultry and eggs are primarily sold rather than consumed by the farm household, thereby generating resources for minor cash purchases. Guinea pigs are a special occasion food item for rural families and are seldom sold.

VALUE OF LIVESTOCK HOLDINGS

The livestock holdings of the typical highland farm can be roughly estimated at a value of between US$1,000 and US$1,500. Using the average of farmer-declared values for animals of different age but of the same type, a list of prices can be established as of mid-1981. At that time, a household owning 2 cattle, 20 sheep, 1 burro, 2 llamas, 2 swine, 3 chickens, and 6 guinea pigs would have total livestock assets with an approximate value of US$1,119, as follows:

Animals	Quantity	Price (US$)	Total (US$)	Value %
Cattle	2	309	618	55
Sheep	20	15	300	27
Burro	1	41	41	04
Llamas	2	38	72	06
Swine	2	35	70	06
Chickens	3	4	12	01
Guinea Pigs	6	1	6	00
			1,119	99

CHANGES IN INVENTORY VALUE AND SIZE

Considering only the 29 households that were inventoried twice during the six month period ending in June 1981, the average value of a single family's holdings grew from 22,702 pesos or US$908 to 31,321 pesos or US$1,253, an advance of 38 percent. Of these 29 households, there were only five which experienced a net decline in livestock inventory value (decapitalization averaged US$304 per family), while 24 households experienced a net gain over the period (average of US$480).

This seemingly remarkable growth of almost 40 percent in the value of livestock inventories over a mere six-month period can be explained by a combination of factors. To begin with, the mid-1981 or second inventory was taken soon after the harvest period (April-May). This is the most likely time for farm households to invest harvest earnings to increase their livestock holdings. In the case of the twice-surveyed households, there occured a net increase of seven bulls and five cows; this represents a 19 percent expansion of original holdings. Additionally, five new burros were purchased (a 16 percent increase) while llama holdings grew suddenly from eight to 33 animals.

A second factor in livestock capitalization involves pasture abundance. The second inventory was taken at the end of the period when natural pastures are most plentiful (January-May). Thus, livestock which are dependent on such pastures--sheep in particular--are likely to reach their numerical peak and optimum health near mid-year. Inventory data for the 29 households

show that sheep flocks collectively experienced a net expansion of 189 animals (or 30 percent growth) between December 1980 and June 1981. In other words, a June inventory would document livestock holdings at their yearly peak.

On the other hand, December constitutes the lowest point in the annual livestock cycle. By year's end grazing livestock have already suffered six months of relatively scarce pasture, with consequent animal losses from starvation. August to December is also a period when health risks to animals are at their highest, and when livestock deaths--particularly among newborns--are most common. Finally, the last three months of the calendar year witness the gradual intensification of livestock sales. Rural households increasingly sell off animals at this time because (1) they need to finance agricultural activities (October is the heaviest planting month); (2) available supplies of pasture and fodder may be inadequate to maintain existing herds; and (3) they seek to take advantage of holiday season demand for meat and the high market prices which prevail in December.

A final factor explaining the large increase in the value of livestock holdings between December and January involves normal price inflation. Inventory values are based on farmer-declared price estimates for the animals they own. In turn, these prices must be averaged among animals of different ages and value to establish a single price for each kind of livestock. On this basis, during the first six months of 1981 the average price per head of cattle increased by 12 percent; sheep by 13 percent; swine by 31 percent; and llamas by 78 percent (which resulted in a 15 percent decline in the price of burros).

DIFFERENCES IN LIVESTOCK OWNERSHIP PATTERNS

Cattle: In the northern Altiplano communities of Yuka, Huacuyo, and Killay Belen--where soils are fairly humid and easy to plow--land tillaging tasks are conducted by cows as well as bulls. Normally, each cow is teamed with a bull. This results in a cattle population almost equally divided between animals of both sexes. Among 18 households surveyed in these three communities, their mid-1981 cattle holdings totaled 23 bulls and 27 cows. However, in the southern highland communities of Chiarhumani and Jaruma--where soils become very hard and must be plowed by animals of considerable strength--there exists a strong preference for bulls and oxen. Cows are seldom used in the plow team. Among 15 households surveyed in these two communities, bulls and oxen outnumbered cows by 38 animals to 13, nearly a three to one ratio.

Because of the need for stronger draft animals, Jaruma residents maintain the largest average number of cattle (3.4) among the five communities surveyed. It is the only community where all households studied have at least two bulls, a complete plow team. Because oxen and bulls are considerably

more expensive than cows, the average investment of Jaruma residents in their cattle enterprise alone reaches US$1,040, by far the highest of any community studied. But Jaruma's rural households raise large flocks of sheep as well as considerable numbers of burros and llamas. So when all livestock holdings are considered, the average value reaches US$1,857 per family.

Sheep: However, the community with the highest average value of livestock holdings is not Jaruma, but rather Huacuyo. Here the average size for a flock of sheep is 53 animals. In terms of value, the investment in sheep by the average Huacuyo household is almost exactly equal to that of cattle. Because of this dual cattle-sheep specialization, the average value of the family livestock holdings reaches US$1,990 per household, which is the highest of all communities surveyed. Such large livestock investments are explained by historic as well as ecologic factors. Huacuyo is an ex-hacienda which formerly supported almost 4,000 sheep and almost 250 dairy cattle at the time of its expropriation in 1952. Furthermore, Huacuyo currently enjoys the enviable advantage of some 2,670 hectares of natural pasture, which is enough to provide each resident family with roughly ten hectares of grazing land.

In terms of the magnitude of their respective livestock investments, the average family in Huacuyo and Jaruma are in a category by themselves. Both have larger-than-normal holdings of cattle as well as sheep. As a result, the livestock inventories in Huacuyo and Jaruma are some 60-80 percent more valuable than those of Yuka (US$1,156), Killay Belen ($1,152), and Chiarhumani (US$1,103).

Swine: Some 27 of the 39 highland households surveyed listed pigs in their respective livestock inventories, so their production is quite generalized in the highland region. However, the community of Yuka is specialized above all others in raising pigs. In the December 1980 inventory, no less than 70 of the 103 pigs listed from the five communities were to be found in Yuka, or 68 percent of the total. Six months later, after Yuka producers had sold off over one-third of their swine herd, still one out of every two pigs listed in the June 1981 inventory were located in Yuka.

Llamas: Although once the highlander's traditional beast of burden, llamas are now raised only by scattered households. But a resurgence in the popularity of these animals appears to be occuring. At the time of the December 1980 inventory, only three families of the 39 surveyed--in Killay Belen, Huacuyo, and Chiarhumani respectively--were raising a total of 10 llamas. Six months later there was still one solitary family of llama producers in each of these communities, although the Chiarhumani herder had increased his holdings from 7 to 17 animals. But now the community of Jaruma had entered the picture. Six of its residents suddenly listed 29 llamas in their final June 1981 inventories.Such data clearly suggest that a commercial opportunity for raising llamas has developed in the southern Altiplano, and Jaruma may be the first community to specialize in their production.

A CALENDAR OF LIVESTOCK ACTIVITIES AND RISKS

The available data from the livestock inventories of December 1980 and June 1981 suggest a dynamic pattern of change in the size, value, and composition of animal holdings managed by highland families. In general, there appears to be an annual livestock cycle characterized by an initial six months of expanding livestock holdings (the result of both animal purchases and the vegetative growth of flocks), which is then followed by an equal period of livestock decapitalization (the result of animal deaths, consumption, and sales). Both periods are strongly conditioned by pasture availability. They are also highly effected by the success (and income) from agricultural activities as well as market forces. In synthesis, the pattern would appear to be marked by alternating seasons of abundance and scarcity. If gains in the flush season are greater than losses in the lean season, the rural household wins another battle in its struggle for subsistence.

The above description, however, amounts to an over-simplification which is suspiciously symetrical and therefore merits--indeed requires--further elaboration. The following section is therefore devoted to a month-by-month account of monthly livestock activities, and of the many contingencies which make herding animals such a risky and complicated undertaking for the subsistence farm household.

JANUARY: The calendar year generally begins with abundant--often excessive --rainfall. The rains are frequently accompanied by severe hail storms. Newborn animals can perish from exposure to dampness. Flooded pastures complicate grazing and forraging by livestock. Animals drinking in swollen streams can be washed away and drowned. Constant exposure to wetness and mud causes animals' hooves to crack and blister. Cattle and sheep suffer more frequent accidents (especially fractured limbs) during periods of heavy rainfall.

Nonetheless, January is the beginning of the flush season for livestock--a period of pasture abundance. January is a good month for animals to give birth to their young. This is also an appropriate time for rural households to purchase cattle (even if other animals must be sold to finance such investments) and to begin the amance or training of plow teams for the primary tillage or kolly (first plowing) of fallow land destined for potato planting in October. Kolly is normally conducted in February, once soils have been softened by the rains.

FEBRUARY: The rainy season continues and there is pasture abundance everywhere. Lambs and calves born at this time have an optimum chance for survival because lactating cows and ewes are well nourished and produce excess supplies of milk. In February it is customary for highland households to milk ewes as well as cows in order to make cheese for family consumption and market sale. On the monday or tuesday before Carnival (near mid-month) many highland families conduct the marking of their sheep by cutting notches in the ears of younger animals or attaching colored yarn decorations to the backs of already-marked animals. This is also a time for the selection of sheep for breeding, which sometimes culminates in the quaint ritual of "marrying" selected rams and ewes. However, February is not without its special livestock risks. A common problem is bloat or timpanismo in cattle and sheep caused by overeating green forrage which has been heated by the sun. Another ailment is diarrhea in newborns as they begin to learn to eat pasture.

MARCH: Pasture abundance continues and grazing herds grow fat. Many households initiate breeding of cattle at this time. One of the principal problems at this stage in the calendar year is the infestation of livestock by a host of external parasites such as ticks, lice, and mites. These are combatted by a wide variety of home remedies or by bathing animals in a comunal livestock dip, if one exists. March is the principal month for shearing sheep and llamas. This is often conducted as a prelude to bathing these animals in a livestock dip.

APRIL: The rains have passed and pastures begin to dry out. The harvest season begins. Early frost can seriously scorch remaining pasture supplies, causing premature pasture shortages later in the year. April marks the beginning of the risk period for the strange disease known as muyu muyu which is especially prevalent among young lambs. It causes the animal's brains to turn watery and is usually fatal.

MAY: The harvest season continues. This is the month when green barley for silage is reaped and stored to feed cattle during the lean pasture months. May is a likely time for farm households to purchase pigs and other secondary livestock as a means of investing harvest income. At this point in the year, livestock inventories--swollen by newborns and purchased animals --often reach their peak. Some households consider May as the best month for castrating sheep and pigs. Now that the potato crop has been harvested, swine are sent to the empty crop lots to root out tubers.

JUNE: Natural pasture is now growing scarce. Cattle and to a lesser extent sheep require supplementary feedings of barley silage. The winter season begins. Days are characterized by intense sun and clear skies, followed by freezing nights. Frosts occur frequently. Newborn animals must be carefully protected both from excess exposure to sunlight following nursing periods, which is a sure way to curdle the milk in their stomachs and cause fatal

colics. At night newborns often freeze to death unless suitably sheltered. The principal fiesta day for cattle is June 24th or Día de San Juan, which is also actively celebrated in Bolivia by the lighting of bonfires to greet the coldest night of the year. On this day cattle are decorated with adornments of brightly colored yarn on their horns and ears. This is a desireable time to breed cows so that their calves will be born during a period of abundant pasture.

JULY: This is a month of continued climatic extremes, and newborns must be protected from both intense sunlight as well as freezing temperatures at night. There also exists a danger of snowfall, which sometimes reaches a depth of some 50 cms, covering grazing land. Water from melting snow is considered very harmful to livestock that drink it. Cattle are now almost completely dependent on silage.

AUGUST/SEPTEMBER: These months find the rural household threshing and winnowing its grain crops because it is the season of winds. Simultaneously with the winds, the arrival of a wide variety of livestock diseases and external parasites is observed. Among the most dreaded killers are hoof-and-mouth disease in cattle, trichinosis in pigs, and muyu muyu in sheep. Hoards of ticks, and acute infections of mange, aggressively attack most grazing livestock at this time of year. The fox becomes a deadly predator of young animals and a scourge of sheep. Meanwhile, newborns have only tenuous chances of survival during this period because their mothers are undernourished and unable to create an adequate milk supply. Finally--in these dry and windy days--rural households begin to remove manure from animal corrals, pulverizing and bagging it in anticipation of the planting season that lies ahead.

OCTOBER: By this time of year both pasture and silage supplies are nearly exhausted. Animals begin to lose weight. Newborns are starving. Predatory animals become more audacious. Losses in livestock become more frequent.

NOVEMBER: This is a critical month for many reasons. It is perhaps the hungriest time of the year, not only for livestock but for people as well. Food crops are still being planted. But the earliest plantings have now sprouted. Shepherds must exercise extremely close supervision of grazing animals to keep them from straying into crop lots to consume the plants. Some households must now begin to sell off their livestock herds because they can no longer feed them enough to prevent their starvation.

DECEMBER: By year's end rainfall is beginning to restore natural pasture. Meanwhile, food crops continue to remain extremely vulnerable to predations of grazing herds searching for something to eat. December is a month of intense holiday demand for meat, particularly lamb and mutton. Market sales of livestock are brisk. This month marks the lowest point to be reached all year in the size of livestock inventories. It signals the end of the lean season and the start of a time of abundance.

LIVESTOCK MARKETING

Throughout the Altiplano there are weekly markets or ferias. These are organized in such a way that rural households as well as market intermediaries are able to make contact with each other--at different locations--on just about any day of the week. Many of these markets are actually two markets in one location, the first being a produce market, the second for the buying and selling of live animals, especially cattle. In the following narrative we will present as an example the Sunday Livestock Market in the town of Escoma.

MARKET LAYOUT

The Sunday market at Escoma actually consists of two separate markets: one for agricultural produce and other commodities located in the town's central plaza; and the other for livestock which is located on the outskirts of Escoma almost a half kilometer from the plaza. The livestock market itself straddles the road to La Paz and is divided into three sections. On the (northwest) side of the road are two sections devoted to cattle and burros. On the other (southeast) side of the road is a section for swine. On a typical market day, some 2,000 people will show up at this market, and offered for sale will be some 250 head of cattle, about 125 burros, and perhaps 450 swine. However, these numbers only represent normal volume of livestock. If a major holiday is approaching, the number of pigs will vastly increase. Just before planting season there will be a relative abundance of bulls or oxen for sale. Around harvest time there will be more plentiful offerings of burros.

MARKET PARTICIPANTS

Other than the broad division of the livestock market into specialized sectors, there are no fixed locations for individual sellers of animals. Each seller must find room for his or her livestock. Their only obligation is to pay a market tax or cisa for the right to sell their animals. In February 1981, this tax amounted to 5 pesos or US$0.20 per head of livestock. In the case of bulls and cows, men do the selling and the buying. Women are entrusted with the sale and purchase of pigs and burros.

There are usually two kinds of buyers: merchants or intermediaries and rural households seeking to buy animals for fattening and breeding. The merchants are generally of two types, large and small. The largest are the so-called

mañazos, which literally means "deceitful" or "tricky" persons. Most are outsiders (from Peru, La Paz, Oruro, etc.) who operate with trucks, a lot of capital, and purchase animals for slaughter and sale in the city. They normally buy no less than 5-10 animals in a single day. The other merchants are campesino residents of local communities who operate on a small scale --purchasing animals for the purpose of fattening, breeding, and resale. On a single market day they may buy 1-3 head of livestock. Occasionally these smaller buyers operate as agents for the mañazos as well. Most merchants, whether large or small, are specialized in one type of livestock only, or in only one livestock use. For example, farmer-merchants from the nearby communities of Cachachique and Keropi specialize in buying and slaughtering swine. Residents of the community of Yuka buy and fatten pigs for resale. Farmers from Ticowaya purchase cattle for fattening and resale, while those from Chaguaya purchase cattle for slaughter. Residents of Ancoraines and Chinaya are known as breeders and fatteners of cattle.

MARKETING PRACTICES

Prices are established by word of mouth, bargaining, and listening to sales and purchase offers. The mañazos tend to establish broad floor and ceiling prices on any given day. Smaller buyers and sellers (or their family members) follow the mañazos here and there listening to what they are offering and then adjust their purchase or sales expectations accordingly. In turn, the mañazos are collusive among themselves in an attempt to lower prices. They also support networks of farmer-agents who they retain to bargain and buy for them.

Of course, prices must obey certain relationships with respect to the age and quality of the animal. In the case of cattle and burros, age is determined by the animal's teeth. There exists a five-stage nomenclature of age determination and price, as follows:

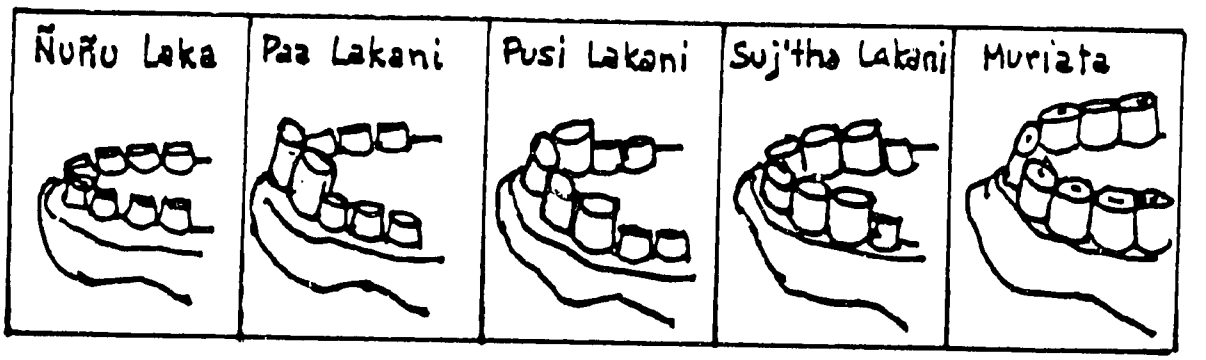
1. Ñuñu Laka (milk teeth) describes an animal with eight small milk teeth, all of an even size, indicating an age of 1.5 to two years. In early 1981 a young cow or steer of this category sold for 4,000 to 5,000 pesos (US$160-200).

2. Paa Lakani (two teeth) describes an animal with two permanent teeth, indicating three years of age. In early 1981 the price for such an animal was 5,000 to 6,000 pesos (US$200-240).

3. Pusi Lakani (four teeth) describes an animal with four permanent teeth, indicating an age of four years and a 1981 price of 6-8,000 pesos (US$240-320).

4. Suj'tha Lakani (six teeth) describes an animal with six permanent teeth, indicating an age of five years and a 1981 price of 10,000 to 12,000 pesos (US$400-480).

5. Muriata (middle age) describes an animal with all its permanent teeth, but they are still somewhat pointed and their edges are sharp. Such an animal was priced in the range of 10-15,000 pesos (US$400-600) in 1981. Hereafter, teeth begin to be worn down with a consequent decline in price.



This system of determining age and price is also used with burros, although the changes in price from one age to another are not as large. In pricing swine, however, teeth have little to do with the determination. Instead, what counts is each pig's health and weight. Here the buyer must make sure the animal does not have triquina (trichinosis). To check for this malady it is necessary to turn the pig on its back, force open the mouth, extract the tongue, and examine its underside for blisters. A pig with blisters on its tongue simply has no market. It can not even be given away. The animal's owner faces several options. She can submit the animal to veterinary attention. She can force the diseased pig to eat quicklime, which causes the blisters to disappear. Or finally, the animal can be butchered and sold as fresh meat. Perhaps it is because households so frequently resort to the last alternative (disguising diseased meat) that pork is seldom consumed by highland families. In general, they raise pigs for sale to city people.

CONCLUDING THE SALE

In all purchases of cattle, and occasionally of burros, immediately after the money has been counted it is customary for the buyer to purchase 1-4 bottles of beer as gifts to the seller. The number of bottles is determined by the sex of the animal. For example, a bull qualifies for twice as many bottles as a cow. In Escoma, these gift drinks or t'inkhas range from 1-2 bottles; in the Patacamaya market (near Jaruma and Chiarhumani) they range from 2-4 bottles. If the seller is a non-drinker of alcoholic beverages, he/she can request the equivalent in cash or in soft drinks. The seller is expected to drink his gift with any relative present, and if there are none he must drink with the buyer. Of course, some buyers offer t'inkha before the sale transaction is complete--to soften up the seller for accepting a lower price offer.

SPECIALIZATION BY SEX IN LIVESTOCK MARKETING

Whether a man or a woman sells or buys livestock in the Altiplano is determined by the type of animal involved, and the quantity. The purchase or sale of cattle represents the most valuable single livestock transaction made by the rural household. Only the male household head can sell or buy cattle, but he must consult his wife in discussing the price. Llamas are also commonly bought or sold by the male household head after consultations with his wife. Burros are usually bought or sold by the female household head when single animal transactions are involved, and after consulting the price with her husband. When two or more burros are transacted, it is the husband who buys or sells.

In the case of sheep, single animals are normally sold by the female household head, either live or butchered, and she does not need to obtain her husband's approval. Likewise, women are in charge of selling sheep by-products--like hides, wool, and cheese. The only time a man participates in the sale is when a large transaction occurs involving at least ten animals.

As long as a pig is sold live, the transaction is always the woman's responsibility. She is also entrusted with purchasing piglets for fattening or sows for breeding. However, after a pig has been slaughtered, the sale of the meat is normally the responsibility of the man, after consulting with his wife.

Poultry and egg sales are the exclusive responsibility of women. Guinea pigs are also bought and sold by women only. With such animals there is no need to consult one's spouse regarding price.

CATTLE

Cattle constitute the single most important livestock enterprise in the animal inventory of the highland farm household. As of mid-1981, 33 out of 35 families interviewed raised cattle--oxen, bulls, or cows. The declared value of these cattle holdings amounted to two-thirds of the average value of the family's total livestock inventory. Two patterns of cattle ownership are noticeable. In the northern Altiplano, where soils are more humid and easier to plow, cows are used (each teamed with an ox or bull) for land tillage tasks. Thus, in the communities of Yuka, Huacuyo, and Chiarhumani the number of cows (27) exceeded the number of bulls or oxen (23), with the typical holding consisting of one animal of each kind. In contrast, in the southern Altiplano communities of Chiarhumani and Jaruma, where soils are much harder to plow and require animals of considerable strength, a preference exists for bulls and oxen over cows. In these communities the bulls or oxen outnumbered cows by a margin of three to one, or 38 versus 13, as of mid-1981. In all communities the cattle are predominantly criollo or local mixed breeds.

USES

The primary use of cattle in the Altiplano is to provide a source of animal traction for land tillaging tasks. On the typical plowteam--at least in the northern highlands--the cow is positioned on the left side, the bull or ox on the right. Bulls are preferred to oxen because there exists a more ready market for their meat. For this reason few households castrate their bulls.

After animal traction services, cattle are valued for their meat and milk- and hides. Beef is rarely eaten by the farm household unless an animal dies from accident or disease. The milk is used to prepare derivative products such as cheese, butter, and requezón or curd. Hides are used for making shoes, sandals, belts, buttons, and straps, while cattle horns are used to make pututos or musical instruments used in traditional dances. Dried cattle manure is valued as a secondary quality manure--used in the planting of oca and papaliza--because it is less powerful than sheep dung. Cattle manure is also useful as a cooking fuel.

LODGING

In the Altiplano, subsistence farmers generally confine their cattle to corrals built of stones and located in close proximity to the farmhouse. It is not customary to construct a shelter with a roof. When pastured, cattle are usually staked at a fixed location and allowed to graze with sheep or other livestock.

ACQUISITION

The cattle herd is initiated by selling other animals in order to purchase a heifer or cow, and then breeding it with a neighbor's bull. Heifers are usually purchased when they have two permanent teeth, indicating an age of about three years. Some households prefer to buy a cow of about four years of age, which has had one or more crías or offspring. The cost of a three-year-old cow was about 4-5,000 pesos (US$160-200) in 1981. Steers are purchased usually at the age of three years, when they are old enough to plow. For households with limited pasture resources, steers are frequently purchased on a seasonal basis. In other words, they are acquired for the plowing season only and then sold. Cows and steers are purchased at the local (weekly) market, or from a neighbor who wishes to sell such animals.

BREEDING

Cows can be bred from the third year onward. One can tell when the cow is ready for breeding because it begins to moo morning and afternoon, becomes skittish, runs about, and may even try to horn its owners. Under these circumstances it becomes necessary to rent the services of a breed bull--either a neighbor's from within the community or that of a stud service elsewhere. In mid-1981 the normal stud fee was about 1,000 pesos (US$40). The best breeding season is March. This is because the period of gestation in cattle lasts 9-10 months, so that when the young is born there will be abundant pasture and an ample supply of milk. In the Altiplano it is customary to breed a cow on the day of a full moon. If the cow resists being mounted, it is necessary to secure her by the horns inside a stall or in one corner of the corral. Three mountings are considered expedient to assure fecundation.

The number of offspring a cow can have in a lifetime depends on how long the calves are allowed to nurse. If the calves are weaned at six months, a single cow can be bred 5-6 times in her life. If calves are weaned at one year or more, only three to four breedings are appropriate.

GESTATION AND POST-NATAL CARE

During the gestation period the cow receives no special attention until the final month of her pregnancy. At that time the animal is no longer taken long distances to graze but kept close to the farmhouse. About three hours before giving birth, the cow will become nervous, show signs of fatigue, repeatedly lie down and stand up again, and her udder will fill with milk. Her owner must then tie the animal to a stake by the horns. At this time all dry forrage is denied the animal because it is believed this will cause her to retain the placenta. Before the birth begins a bottle of water is spilled over the animal, a symbolic rite which expresses the prayer that the cow will likewise spill her young easily.

When the young is born its placenta is removed and fed to the dog, because cows have been known to choke to death by eating the afterbirth. Care must also be taken to make sure the mother, in licking her young clean, does not bite the calf, which can result in its bleeding to death. The calf is not allowed to nurse on its mother's first milk or colostrum, which is known as poke. This is milked for human consumption, and it is often presented as a gift to the neighbor who provided a stud bull for the breeding service. A very special dish is prepared, made of curdled colostrum mixed with potatoes. It is believed that if a calf is allowed to drink poke, it will cause the animal to become bad natured and too lazy to work. So the calf is removed from the mother and kept inside the farmhouse for a period of one week. It will be taken outside only twice daily--once in the morning and once in the afternoon--to suckle its mother. This custom is also intended to keep the calf out of direct sunlight. If the animal gets over-heated in the sun, the milk in its stomach will coagulate; this can result in colic and even death. For three weeks after giving birth, the cow is kept in the patio of the farmhouse, where it is given a special diet of barley straw and pasture grasses.

MILKING

The first day the poke is milked. It is immediately cooked for the mid-day meal, with the owner of the breed bull being the invited guest. Thereafter, whenever the cow is to be milked, it is customary to allow her calf to begin suckling first; because otherwise the cow is unlikely to allow herself to be milked. In the first weeks about four liters of milk per day will be obtained, then about 2.5 or 3 liters per day. This milk is used to make cheese. The calf will continue to nurse for about six months, and in some cases will not be weaned until it is a year old.

PASTURE AND FEEDING

The calf begins to lick the soil after about a month, then begins to eat small amounts of pasture and fodder. Once weaned, the animal begins to eat much more. Cattle are sustained by a combination of enclosed feeding and pasture grazing. Generally each animal requires a feeding of barley silage with some salt--once in the morning and once in the afternoon. During the day cattle are staked and allowed to graze on natural pasture. For each adult cow, bull, or ox, it is roughly estimated that a one-half hectare of barley must be grown for its consumption during the entire year. Cattle should be watered three times a day. For corral watering, simple troughs hewn from logs or stone are utilized. For the mid-day watering, cattle and other grazing livestock--if pastured far from the farmhouse--must be taken to a standing pond, spring, or stream. Mature cattle will drink between ten and 20 liters of water per day.

JOINT SEASONAL GRAZING

Cattle are generally grazed on fallow land or otherwise uncultivated land which is exploited by community residents on an individual basis when cropped but on a communal basis when used as pasture. Where precisely each herd is grazed each day is normally a decision made by the individual household or herder. However, there are exceptions. For example, in the community of Cayaca (Jaruma) there exist three pasture zones for collective use which are rigorously controlled by the Secretary General of the Agrarian Syndicate. These zones are former ahijaderos or pasture annexes of the original hacienda. They consist of prime grazing land which needs to be rationed equitably among all residents. During the months of May and June, when second plowings (barbechos) are being actively conducted to prepare for the forthcoming planting season, all 27 local resident households take their cattle for evening grazing in one of these rich pasture zones. Each zone is grazed intensively for one week; then all cattle are transferred to the next zone, and so on. The grazing schedule begins at five in the afternoon, after all draft animals have completed tillaging activities for the day, and continues until nine O'clock the next morning, when plowing tasks are resumed. The grazing of cattle in these special zones continues until the barbecho season is concluded. Male heads of household (the plowmen) are usually in charge of taking their draft animals to and from the pasture zones--spending the night in makeshift tents or in simple, semi-permanent huts built by herders to obtain a measure of extra protection from the intense cold which prevails this time of year. At the end of barbecho season, the cattle are removed from the special grazing zones and sheep herds are introduced. These animals are permitted to graze until September, by which time the pasture is totally exhausted. Men are entrusted with the grazing of cattle, while women and children oversee the grazing of sheep.

CASTRATION, MARKING, AND REMOVAL OF HORNS

It is not customary to castrate cattle in many communities of the Altiplano because farmers believe this practice decreases the strength of steers for land tillaging purposes, and limits as well the market for steers to be slaughtered for beef. Generally cattle are not branded or marked because they are so few in number that each household is able to identify by color and other characteristics the 2-3 animals that it owns. Dehorning is not practiced either, because even cows are used for animal traction in most communities; and the yoke for pulling the plow is attached directly to the horns.

DISEASES AND AILMENTS IN CATTLE

Diarrhea: This ailment is caused by eating green or sun-heated pasture. While each family has its preferred remedy, the most common cures include maiing the animal drink (1) a tea prepared with vinegar and lemon juice, (2) a tea made from kantuta leaves mixed with pito de cañagua, or (3) a tea made from puraya

Ch'iti Uso or Bloat: This ailment consists of excessive swelling of the stomach with gas that cannot easily escape. It is caused by the eating of green silage or hay or dew-covered pasture (which is one reason why herders prefer to graze their animals only after mid-morning). There exist a large variety of common remedies: (1) by making the animal drink two cups of human urine with salt; (2) by making the animal run about briskly, then bathing it in cold water, and finally forcing it to the ground and making it swallow five small glasses of pure alcohol; (3) by massaging the stomach of the animal with kerosine; (4) by making the animal drink kerosine; (5) by forcing the animal to inhale hot mist prepared from a concoction of fig leaves and yellow chili peppers (causing violent sneezing); and (6) by punching a hole in the animal's stomach (left side) to release the accumulated gases.

Ch'upu Uso or Pastela : This ailment consists of a swelling below the jaw which eventually becomes too painful for the animal to permit it to graze. The malady is believed to be caused by the animal's having eaten pasture which has been soiled by the excrement of pigs. Ch'upu Uso is cured by preparing a concoction made of sulpher and ralt; and getting the animal to lick it.

Mulla Falla is an ailment caused when the animal has been scared by a dog. The animal does not eat well and begins to lose weight. One cure is to make the animal drink animal bile obtained from a slaughterhouse. Afterwards the animal must be bathed.

Jamaq'o is an external parasite (louse) which can spread all over the hide of cattle. Most herders admit they do not understand how this plague gets started, but there exist a variety of home remedies to cure it. One is to boil tarwi (a bitter cereal grain) in water--five pounds of tarwi with two liters of water--then sprinkle the concoction over the hide of the animal. Tarwi water is extremely bitter and repells a wide variety of external parasites. Another remedy is to mix--in ten liters of water--four pounds of ollín, two handfuls of salt, and a half-pound of lard. This is sufficient to bath an entire animal. The latter remedy is preferred by families who believe the tarwi water cure is too strong and leaves the animal emaciated.

Chojri Uso: When cattle fight among themselves, this can result in bruises and other minor (but internal) wounds. The pain can be alleviated and the wound itself cured by making the animal eat kolle (budleya diffusa).

Umallak'e: During the rainy season, when cattle stand in mud and water for long periods of time, their hooves crack and blister, causing them to limp. This condition is cured by bathing the effected areas with 1-2 cups of human urine mixed with salt.

El Calvario: This is an ailment (symptoms not specified) which farmers claim afflicts cattle which have grazed on a spot which was struck by lightning. Lightning itself is considered a punishment by God, particularly when the bolt damages crops. The ailment can be cured only by a traditional healer, who must rub the effected animal with a bath of milla and incense, followed by the making of a burnt offering.

Fractures: Cattle sometimes suffer accidents (particularly during the rainy season) which result in leg fractures. This can be treated by preparing a parche or compress containing sankayo (cactus), wild cañagua, chuku-chuku, and solda que solda. This poultice is applied to the leg at the site of the fracture. It is often mixed with snake meat or grease. The poultice is then surrounded by small sticks as braces, bound with a cloth, and tied in place with string or yarn.

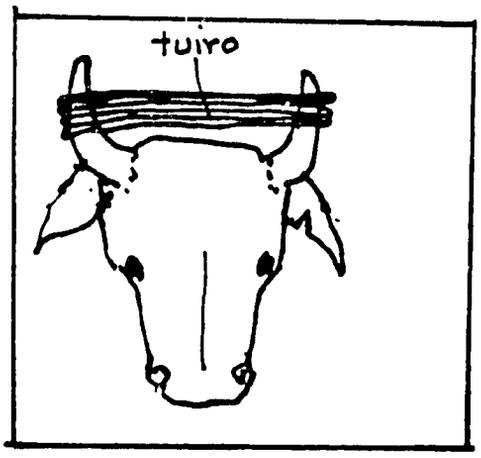
SALES

Both cows and steers are sold at the local livestock market. A cow is considered "old" and will be sold when she is about six years old. Beyond this age, cows are considered too weak to safely endure breeding and pregnancy. Steers are frequently sold in June, following the end of the flush pasture season as well as the land preparation season (kolly and barbecho tillages). At this point such animals should be near peak weight and can command better prices as a result.

SPECIAL RITES INVOLVING CATTLE

Cattle have been assigned a special festival day, that of San Isidro (May 15) which is also Ascention Day. On this day one finds large cattle markets in many locations in the Andean region.

In general, cattle are neither branded or otherwise marked by Altiplano households unless there exists a fairly large herd of, say, ten animals or more. If so, they will be marked on the same day as when sheep flocks are marked: in February, on the Tuesday of Carnaval Week or Jach'a Anata. The marking ceremony is explained in greater detail in the section devoted to sheep-raising. At this point it is sufficient to mention that a hole or one or more small pieces are cut in each animal's ear. These pieces of ear are called qui'llpas. After the cutting, bulls are adorned with brightly colored yarn stretched between the horns. Another yarn is fastened to the neck of the animal. Cows are decorated by puncturing an ear hole, from which is hung a ring made of colored yarn known as sarcilla. The colored yarn pieces are known as tuiro. They remain in place until they fall off. The rite is accompanied by the firing of black powder rockets. After the cutting and decorating is complete, a dish containing alcohol and sugar is placed on the ground, and family members--imitating their animals--kneel down and lick the plate saying: "I am the bull, I am the cow, I am the llama, etc."



Bull With Decoration

Cow With Decoration

SHEEP

Sheep raising is practically universal among highland farm families. In terms of value, sheep flocks constitute the second most important livestock enterprise following cattle. Of the 39 rural households for whom animal inventories were taken, all raised sheep. Overall, the flock size per family averaged 32 sheep. Highland sheep are mostly criollo or local mixed breed animals, highly adapted to the inhospitable Altiplano climate. These animals are hardy but of low productivity. Highland farmers are fully aware of the benefits of purebred sheep--most can identify breeds such as Merino, Corredale, and Lincoln--but they consider these animals too delicate for highland conditions and requiring too much special attention. Moreover, purebred sheep have a reputation for being difficult to keep with the flock; they keep wandering off looking for better pasture.

USES

A sheep flock represents an excellent investment for subsistence households. Sheep provide the primary, if not exclusive, source of fertilizer for the vital potato crop as well as other commercial crops such as onions. An ewe can supply about one kilo of wool a year, and when slaughtered yields about 10-12 kilos of fresh meat. In the period of abundant pasture (January to May), rural families milk ewes milk to make cheese for both family consumption and market sale. Sheep can be readily sold when cash is needed to finance basic necessities, a celebration, an emergency, or a farm investment. A single animal may produce as much as 40 pounds of manure per year. In exchange for these uses and benefits, sheep demand only minor cash expenditures. They feed predominantly on natural pasture. They reproduce at least once--and sometimes twice--per year. They can be supervised by herders who are children. Sheep are the only major livestock enterprise controlled entirely by women.

ACQUISITION AND BREEDING

One usually starts a flock of sheep as part of one's inheritance, or as a wedding gift from parents. To start a flock requires one ram and perhaps 5-10 ewes. If animals must be purchased, it is best to buy rams as yearlings and ewes at six months. When both are at least a year old they can be bred. Left to themselves, sheep will breed once and sometimes twice in the same year provided there is abundant pasture. The best breeding season is September or October so that young will be born in January or February during the time of abundant pasture. However, sheep can and do breed at just about any time of year. Spontaneous breeding is perhaps most common in January.

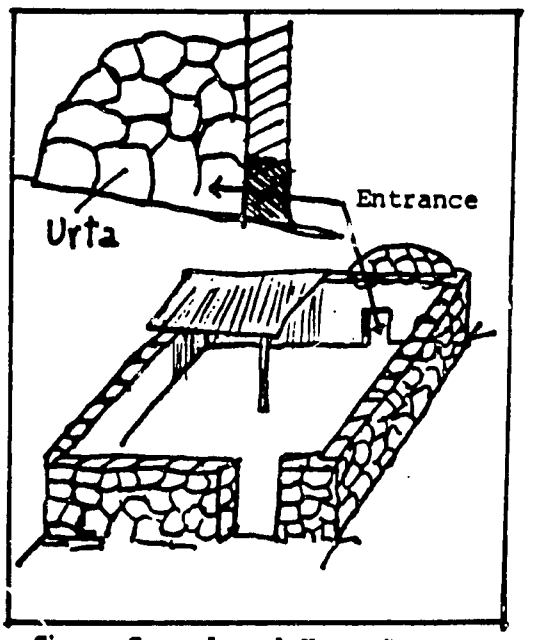
GESTATION AND POST-NATAL CARE

The gestation period for sheep is five to six month, with rams delaying longer than ewes. There is no special attention provided the mother until following the birth of her young. The most important post-natal care is to keep the newborn out of direct sun for 3-4 days. Often the lamb is kept inside the farmhouse and allowed to nurse a couple of times each day. For the first week after giving birth, the mother ewe is kept near the farmhouse and served a special diet consisting of agua de chuño (water in which chuño has been boiled), barley grain, and silage. Sometimes the animal is served as fodder the stalks of potatoes or aylinco.

When released to pasture with its mother, it is important for the shepherd to construct a small tent where lambs can rest without exposing themselves to intense sunlight. This is done by stretching a mantle or aguayo secured by a pair of sticks to form a lean-to. For protection of lambs in the evening (particularly from the predation of foxes), it is necessary to build a small shelter at the back of the sheep corral known as an urta. This structure is built of rock--both walls and roof--and is enclosed on all sides except its opening into the corral. Each evening the mother is locked inside the urta with her young.

FEEDING AND PASTURE

Sheep are herbivores. They graze on a wide number of natural grasses with names such as chemba, chellwa, chojlla, and paja brava. About two or three weeks after birth a lamb learns how to eat this pasture. Sheep require 2-3 liters of water a day. They should be watered in the morning, at mid-day, and in the evening. They also require salt, particularly in the season of pasture abundance. Some families supplement natural pasture grazing with feedings of barley silage--especially for pregnant or lactating ewes, and mostly in the lean pasture season--but only if silage supplies are sufficient to meet the requirements of cattle and burros. However, sheep remain essentially dependent on natural pastures; and when these grow scarce, flocks become scrawny and many newborns die of hunger.



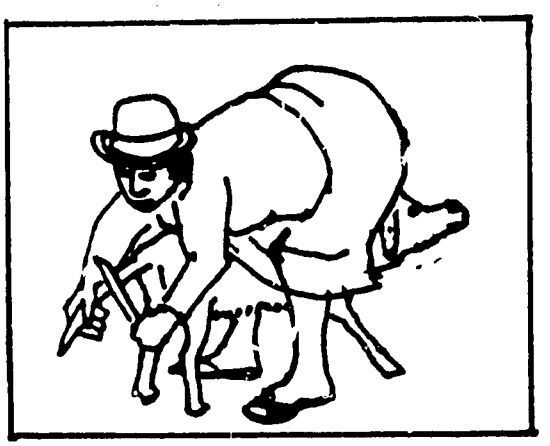
Sheep Corral and Urta for Protection of Newborns

JOINT PASTURE ARRANGEMENTS

Sheep flocks are generally herded by female members of the rural household --both women and children. It is common in some communities for several families to make arrangements to merge their flocks together under the watch of a single shepherdess. She provides a service much like that of a baby-sitter or nanny, except that the responsibility tends to be a continuing one and is contracted on a monthly basis. For example, a typical payment (in 1981) for a month of sheep herding might be some 300 pesos (US$12) in cash and another 300 pesos worth of payment-in-kind, like one arroba (25 pounds) of chuño and another arroba of potatoes. This payment might be split among two or more families. Some shepherdesses work for payment in textiles or manure. In Yuka, the community has an apacheta or pasture annex for grazing livestock which contains some 314 hectares of area and is located nine kilometers from Yuka proper. Each year resident households organize themselves (along kinship lines) to jointly pasture their flocks in the apacheta. For example, 3-4 families will combine their flocks. One family will provide a shepherdess for one week, another family for the next week, and so on. Herding duties are thus equitably distributed. Apacheta grazing usually lasts for six months, from September to February. This keeps the community's sheep population far removed from the crop production areas.

TAIL CUTTING

Sheep usually have their tails cut at the age of 3-6 months. This is a task normally performed by women. The cutting is done for a variety of reasons. First, a cut tail helps to fatten the animal, because nourishment which formerly would be adsorbed by the tail is redistributed to the rest of the body. Second, in ewes the cut tail facilitates their milking. And third, a cut tail also facilitates the breeding of ewes as well. The tails of rams or bucks are not always cut, however, because the presence of the tail makes the animal look larger and this can possibly result in a higher price when sold. Now and then sheep will be born without tails. These are called k'ewili.



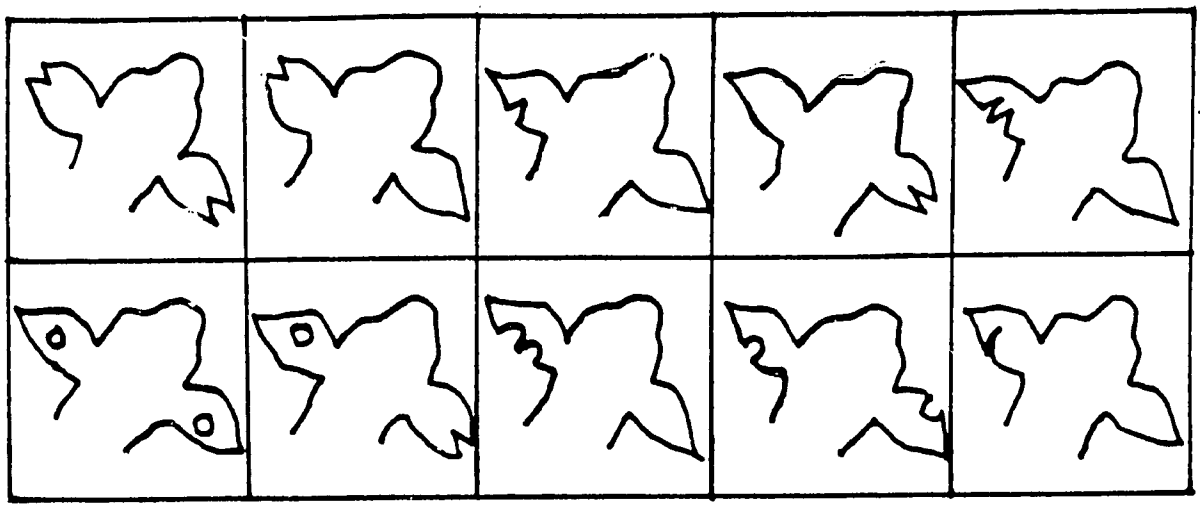
Tail cutting is normally conducted on the day of a full moon. There are two methods of cutting. The first is to hold the animal between the legs so that it will not bolt when the cut is made. The second method is to cut the tails of lambs while they are nursing. The tail is cut with an ordinary kitchen knife, at a distance of about three finger widths from the base. No disinfectant is used. After cutting, the tail ends are fed to the family dog.

CASTRATION OF BUCKS

Bucks are castrated at age 6-8 months, a task conducted to facilitate their fattening and to keep unselected animals from breeding. Castration is usually performed by men, with some assistance by women to help steady the animal. Like tail-cutting, rural households prefer to castrate their sheep on a day of the full moon. The operation requires a very sharp knife. The scrotum is cut in two places, then squeezed with both hands to pop out the testicles, which are then cut off (or sometimes chewed off with the teeth). No disinfectant of any kind is used. After cutting, the only precaution taken is to allow the animal one day's rest in the corral. If a non-family member does the castrating, his or her payment are the testicles themselves or, if they are unwanted, a payment of about 25 pesos (US$1) per animal castrated at 1981 prices. The testicles are cooked (boiled) for human consumption and are considered a delicacy. While cooking, it is important not to let the pot overflow, because it is believed that this will cause gangrene in the castrated animals. Precautions must also be taken to see that blood resulting from the castration does not fall on the ground. If this happens, the blood must immediately be covered with dirt before it has been seen by the sun; if not, it is believed castration wounds will become infected. A final precaution is that the castrated animal should not be given any water for a full day. This presumably allows the wound to heal more quickly.

MARKING

Sheep are marked, a task known as qui'chi, by having small pieces cut out of their ears. This activity is an annual ceremony conducted with newborn animals and it takes place on Jiska Anata or Jach'a Anata, that is, on the Monday or Tuesday of Carnival Week during the month of February. The cutting is done with a pair of scissors or with a very sharp knife. The person doing the cutting is called lari, while the ear cuttings are called qui'llpas. Not all families perform the marking task, but the majority do (1) to distinguish animals belonging to different members of the same family, and (2) to avoid confusion between flocks when these are jointly herded. In many households there are sheep which are identified as the property of the wife, others as the property of the husband, and still others as the property of each child. This gives rise to fairly elaborate coding systems for identifying sheep both within and between families. Cuttings may be made on both ears of the animal or one ear only. The location of the cut on the ear, as well as its shape, is almost infinitely variable. Common marks include triangles, single cuts, holes in the center of the ear, and combinations of the above. The following are only a few of many possible examples.



Common Sheep Markings in the Altiplano

The qui'llpas are collected in a clay dish or tari. When the marking activity has been completed, the qui'llpas are placed on a mantel on the ground and counted by pairs. If there is an odd number of cuttings (one qui'llpa left over), this means there will be earnings or net increase in the flock during the coming year. The cuttings are then ritually toasted with coca, wine, alcohol, and candies. The cuttings are saved until Anat Domingo or the Sunday of Temptation (a week after Carnival). They are then burried in the sheep corral at a depth of one meter so the family dog will not dig up the pieces.

Of course, once an animal has been identified by an ear cut there is no need to repeat the activity. But during carnival week it is customary to do some ritual act to all members of the flock. For already-marked animals, a rite known as the "sheep marriage" is conducted on the same day as ear cutting. A one-year-old buck is paired with a ewe of similar age. On the right foreleg of each animal a ring is placed made of black wool. The couple is then intertwined with paper streamers. On the back of the ewe is placed a mantel used by women; on the back of the buck a folded poncho used by men. Around the neck of the buck is hung a chuspa or woven wool purse filled with coca leaves. The animals so joined in "matrimony" are kept joined together for five minutes and then released. At this moment candies and fruit are tossed at the animals. The ceremony ends with an annointment of the entire flock with a mixture of alcohol and wine (or sugar).

SHEARING

The shearing season for sheep is in March or April. Usually only ewes of 1-3 years of age are sheared, and not the bucks because their wool makes them look larger when marketed. For those communities with a sheep dip or baño antisarnico, the shearing is done as a prelude to bathing the animals. The wool is removed with a sharp knife, scissors, or the lid of a tin can

which has been sharpened to a fine edge. The amount of wool that can be sheared from a single animal varies from one to three pounds depending on the size of the sheep and whether it is sheared yearly or every two years. Best quality wool is saved for family use, with the remainder sold by the pound. Sometimes all the wool of a single animal is sold as a unit--known as jawi--and had a market value in 1981 of 30-50 pesos (US$1.20-2.00).

DISEASES AND AILMENTS

The principal cause of death among sheep is lack of adequate pasture, which which causes ewes to produce inadequate milk to nourish their young and also weakens mature animals as well, thereby making them more vulnerable to disease and parasites. A second cause of death is the freezing to death of lambs during the winter months (June to September). Wild foxes prey on sheep herds both while they are being pastured and also while they are corraled at night. However, in addition to the above problems there exist a number of ailments and diseases in sheep which, if neglected, can become fatal. A few of these health problems are described below.

External Parasites: There exist many different external parasites which afflict sheep in the highlands, especially ticks and lice. These are identified by farmers with such names as laram lapa (lice), sarna (mange), colilla, etzetilla, jamakus, and garrapata (tics). These parasites are controlled by bathing sheep in chemical dips once or twice yearly. If no bath exists, the animals should be first sheared and then washed down with kerosine or warm salt water. Sometimes infected animals are treated by traditional healers, who take them to the edge of the community and exhort the parasites to abandon their hosts.

Muyu-Muyu: Also known as "Crazy Sickness", this disease is especially prevalent among lambs. An animal afflicted with muyu-muyu begins to run around in circles, walks dizzily, and is constantly falling down as if entirely disoriented. When slaughtered, it will be found that the animal's brains have become watery. The ailment is believed to be spread by sheep who eat pasture that has been contaminated by human excrement. Another cause appears to be the eating of a plant called garbanzo, which also causes the animal's meat to become very bitter and yellow in color. There is no sure cure for muyu-muyu, but one cure and several preventive measures include: (1) getting the animal to expulse the ailment through violent coughing or sneezing, perhaps by steaming its nostrils with a boiling concoction made from chili peppers; (2) bringing the flock back to its corral earlier in the day; (3) bringing it back later in the day; (4) hanging a fox pelt or bladder in one corner of the corral, because its odor will repell the disease. Muyu-muyu is usually fatal. The animal is slaughtered, its head thrown away or buried, and if the meat is spoiled the entire carcass must be disposed of as well.

Ch'iti Uso or Bloat: This ailment consists of a swelling of the animal's stomach with gas, and if unchecked can eventually cause death. It is caused by animals eating green silage or dew covered pasture. To cure bloat, the

animal is forced to drink human urine, or kerosine, or milk mixed with kerosine, and then is doused with a bucket of cold water.

Juiqo Uso or Blindness: The cause of blindness in lambs is unknown. In older animals it is believed to be caused when they eat a plant known as kela kela. Another explanation is that it is caused by the saliva of toads. Some families believe that blindness comes from grazing sheep in the vecinity of the tombs of their ancestors. There exist a number of traditional remedies: (1) application of human milk to the effected animal's eyes and eyelids, or milk mixed with the flour of a cereal grain to form an ointment; (2) application of grease mixed with salt; (3) making a small cut on the underside of the eyelids, resulting in bleeding which will "wash" the eye and cure its blindness; (4) application of a powder made from dry mushrooms called phoq phoq which grow among natural pasture during the rainy season; (5) washing of the eyes with lemon water; and (6) soaking the animal's head in cold water every morning until the ailment disappears.

Wichu Uso or Diarrhea: This ailment is common among lambs. It is caused by eating green or dew-wet pasture. It must be treated promptly because within 2-3 days the animal can die from dehydration. One remedy is to force the animal to drink a tea made from phasa cruda, toasted onions, coffee grounds, or ground avocado seed. Sometimes diarrhea is treated by picking the animal up by its hind legs and shaking it vigorously. The meat of sheep which have died from diarrhea can not be eaten. It is called khachi, and it is so tough that not even dogs will eat it.

T'uqa Uso or Malnutrition is caused by lack of pasture. It can be alleviated by cutting the tails of lambs. The blood that is shed from this wound is called tiji vila or skinny blood (sangre de flacura). Once such blood has been shed it is believed the animal will gain weight more readily.

Laka Ch'ulla: This is a problem of oversized teeth. It is prevalent among young lambs when they are about 30 days old and begin to eat pasture. Some teeth grow longer than others, with the result that the animal is unable to chew properly. To cure this problem it is necessary for the herder to rub the oversized teeth with a piece of salt block once a day. Gradually with this treatment the teeth will even out.

Tawra K'ararti describes an ailment where sheep begin to lose wool. The problem is usually blamed on the owners of the animals, who have not conducted shearings on a timely basis. The problem is remedied by rubbing the body of the animal with pork lard.

SALES

Sheep are usually sold live--mainly 1.5 to 3-year-old bucks--at the nearest livestock market. The mid-1981 price ranged from 250-300 pesos (US$10-12) per animal. A butchered sheep is normally sold only in La Paz or another major city, with the dressed carcass yielding about 11 kilos of meat. Whether sold live or butchered, the selling of sheep is the function of the female head of household. She is also responsible for selling wool and sheep hides and cheese made from sheep's milk.

LLAMAS

Of all the principal types of livestock raised by highland families, the llama is the only one indigenous to the Andean region. From ancient times this animal has figured predominantly in the economy and culture of the Altiplano. However, in recent decades the raising of llamas has declined. Of the 39 highland families for whom livestock inventories were taken, only ten raised llamas. Their combined holdings amounted to 50 animals, with the largest llama herd consisting of 17 animals, the smallest two. Llamas display considerable diversity of natural wool colors, which is why their wool is not dyed for weaving purposes. These colors include jango (white), khella (red), millu (yellow), wila chumpi (light tan), thore chumpi (dark tan), cheara (black), and others.

USES

The reasons why llama raising is no longer widespread involves their uses relative to other animals. As a source of meat, llamas are inferior to cattle because their meat must be processed into charqui (sun-dried); and if used for cargo transport, the quality of llama meat declines further. As cargo animals, llamas are quite inferior to burros, which can carry loads up to four times heavier. Compared with sheep, llamas have a longer gestation period, take longer to fatten for market sale, in many cases can only be sheared once before reaching ideal market age, and provide manure that is considered less potent than sheep dung. In those uses where llamas enjoy superiority, their market is quite limited. Fine quality llama wool is only used in the weaving of undyed textiles. One llama neckhide would supply enough leather parts for a dozen plowsets. Llama leg bones are used to make wichuñas or weaving picks for handlooms.

ACQUISITION AND BREEDING

To begin a llama herd it is customary to buy a male and a female at the same time, when both are about two years old. Llamas are usually purchased in the months of April and May, and the purchase of these animals is considered the responsibility of the male head of household. Otherwise, the herd is often begun when an adult pair of llamas is given as a wedding gift.

Llamas must be corraled separately from sheep. They breed privately, without external assistence or supervision. Breeding age is reached between two and three years of age. The only precaution the herder must take is to make sure the males, if more than one, do not fight over the female llamas.

GESTATION AND POST-NATAL ATTENTION

The gestation period of the female llama is approximately eight months. Once pregnant, the female should be separated from the rest of the herd. If this is not done, the males may kick the female and cause the fetus to abort. Care should also be taken by shepherds to avoid using their slings when moving pregnant llamas to and from pasture, or crowding them too quickly in or out of their corral.

At birth it is customary to wrap the belly and hind quarters of the baby llama with cloth. This protects the newborn from cold, possible infection of the umbilical cord, and keeps the animal's hairless stomach out of direct exposure to the sun. During their lactation period, llamas should be grazed separately from the rest of the herd--preferably in sheltered pasture areas to minimize the exposure of newborns to cold and wind.

GRAZING NEEDS

Like sheep, llamas graze on natural pasture--particularly paja brava and chellwa--together with a thorny bush known as choquecailla. Some farmers insist that llamas should never be fed barley or other cultivated forrage because this will result in the transmission of diseases. For the same reason it is considered desireable for llamas to drink at watering troughs or ponds with quiet water rather than running streams. Water resulting from the melting of snow is considered especially dangerous. During gestation and lactation, female llamas should be watered frequently, at least twice a day.

CASTRATION AND MARKING

Male llamas are castrated when they are about two years old, or just before they reach breeding age. As with other animals, castration is conducted at the time of a full moon. It is customary to keep the newly-castrated male from drinking water for at least a day--a practice which is believed to lower the risk of infection. The castration is conducted in exactly the same fashion as sheep, except that because of the llama's greater size it is necessary to have at least one and preferably two assistants to hold the animal still while the castrator completes his work.

MARKING

The marking of llamas is generally not practiced because herd size tends to be small enough for each animal to be identified by special characteristics, such as its coloring. However, when the herd exceeds half a dozen animals, marking becomes a worthwhile task. Llamas are marked exactly like sheep, with the cutting of qui'llpas or pieces of ear in an assortment of patterns. The marking ceremony occurs jointly with sheep during Carnival Week in February.

SHEARING

The shearing season for llamas is March or April, near Easter. The first shearing is conducted when the animal is two years old. The task requires the participation of three people--two women and a man. The llama is kept in a standing position. The man holds its head by both ears, while one woman on each side of the animal does the shearing. Llama wool is very fine and quite light. In a single shearing only about 1.5 pounds of wool will be obtained. Shearing takes place at an interval of two years. Since most llamas are sold at an age of four years, it is quite possible that only one shearing will occur during the animal's lifetime.

There are two kinds of wool obtained from llamas, each with its own special uses. The longer, first-quality wool is spun into fine yarn in its natural colors to be woven into sweaters, blankets, cargo sacks, hats, scarves, and gloves. The shorter, second-quality wool is rougher. It is woven into ropes and slings. Some families use llama wool to weave Mucus, a loose mesh designed to fit over the snout of cargo animals to prevent them from nibbling on each other's loads, or to keep newborns from suckling their mothers at night.

DISEASES AND AILMENTS

The principal problem facing llamas, as with other animals, is the lack of sufficient natural pasture. This is a most serious problem during the months of October and November. At this time of year llamas lose weight, grow weak, and sometimes collapse and die in the field. In such cases, their owners slaughter the animal for family consumption, drying the meat into charqui. Another serious threat--particularly for newborn animals--is posed by predatory species such as foxes and condors. The fox kills its prey by leaping on the animal's neck and ripping out its throat. The victim of the condor is usually a newborn which strays too far from its mother and falls asleep in the field. However, beyond these problems, llamas also suffer from a number of ailments or diseases such as the following.

External Parasites: Like sheep, llamas are plagued with a variety of ticks, lice, and other external parasites. These can be controlled by bathing the animal in a chemical dip. A related ailment, mange, is cured the same way.

Kasarje: This describes the cracking of the hooves and toes of the animal caused by continuous exposure to conditions of dampness, mud, and extreme cold. It is treated by applications of lard or automobile grease to the effected areas.

Trichinosis: This disease commonly effects older llamas which have been allowed to reach six or seven years of age. It has no cure, and the animal must be destroyed.

SALE

Llamas are sold when they are four or five years old, the female after completing her second cycle of procreation. The animals are usually sold live to the buyer. The sale is conducted by the male household head, but with the consent of his wife. In contrast, sales of llama wool or hides are exclusively a woman's responsibility. In 1981, a mature llama sold for 1,500 pesos (US$60) in the Jaruma market.

BURROS

In December 1980, 20 of the 32 highland households inventoried raised at least one burro. At that time their combined holdings totaled 35 burros. In June 1980, 30 out of 35 households inventoried raised burros, with a total population of 55 of these animals. The largest holding of burros for any one family was five, the smallest was one. It is noteworthy that seven households raised burros and llamas. On the average, burros represented just over 7 percent of the total value of family livestock holdings.

USES

The burro is the primary transport animal of the rural household. It is preferred to the llama as a beast of burden because it is less delicate, can carry four times more cargo, and lives many more years. In fact, some families have burros that are about 25 years old. The burro is used for a large number of transport duties. These include carrying seed and manure to planting sites, hauling fodder for draft animals, carrying the plowset and other tools, transporting harvested produce from the fields to the farmhouse, and--on at least a weekly basis--carrying products to and from the market. The manure of burros, like that of cattle, is less potent than sheep dung and therefore used in the planting of relatively more delicate tuber crops such as oca and papaliza.

ACQUISITION AND BREEDING

Because of its fairly specialized use as a beast of burden, most rural families do not seek to raise a herd of burros, rather only one or two. Often, not even one burro is maintained as a permanent fixture in the family's livestock inventory; instead, a burro is purchased for the harvest season and then sold. Other families maintain no burro at all but rather rent one or more burros from neighbors or relatives when heavy transport needs arise. In any event, burros are easily purchased at the nearest livestock market.

In breeding burros, the female must be at least two years old. The gestation period is approximately twelve months. During the last six months the animal should not be used for transport, because this can cause her to abort the fetus.

POST-NATAL CARE

The newborn burro requires close attention for about a month. Its stomach is wrapped in cloth to protect the umbilical wound from infection and to keep the stomach out of direct sunlight. The young burro learns how to eat pasture after three months, but until then it is allowed to suckle with the frequency its mother will tolerate. The milk of the female burro is considered an excellent remedy for controlling certain diseases in human infants, like measles.

GRAZING

Burros are allowed to graze with other livestock when not required for transport services. They eat just about all kinds of natural pasture, green weeds and grasses, and barley silage. Like cattle, their grazing consumption should be supplemented by morning and evening rations of silage with some salt. They also need at least two waterings per day.

CASTRATION AND MARKING

Neither of these practices is conducted with burros.

DISEASES AND AILMENTS

Diarrhea: This ailment is especially prevalent in newborns. It is curred by making the animal drink a tea concocted of phasa, salt, and human urine.

Mata is the name for a lesion or swelling resulting from excess cargo and negligence of the owner. For example, when a burro brings a load to its intended destination, the animal arrives sweating profusely. The cargo saddle and karoma or cargo blanket is removed from the animal, but if a cold wind catches the burro still soaked with sweat, this can cause painfull swell ng. There are several cures: (1) preparation of a polstice using the meat of a dog, or a large toad; (2) preparation of a warm rub made from the grease of a cow or snake; or (3) mixing into the above grease the ground meat of a snake. These polstices are covered with a cloth and left until the swelling or wound heals.

Moquillo is the name given to a recent epidemic among burros in the community of Jaruma, something never before experienced by its residents. The ailment is characterized by a dripping of green mucus from the nostrils of the animal, fever, continuous shaking of the head, and loss of appetite. The attempted cures have centered on the concotion of pungent vapors (saumerios)--such as boiling hot peppers, or human excrement and urine--intended to produce a violent sneeze that will clear the animal's nostril congestion. The results of such experiments have been mixed. Some burros have been cured, others have died. The dead burros have been dragged to a location distant from the farmhouse and left for the dogs to eat.

THE CARGO SADDLE

Burros can generally carry two cargas (200-250 pounds) at a time, but for this they need to have their backs well protected. This is done by use of a cloth cargo saddle known as the karoma. The karoma itself is constructed out of old clothese stuffed between sheepskins to make a cushion or mattress. Each karoma is custom-made by the household to fit the exact specifications of their burro. Attached to the back of the karoma is a wool rope which fits beneat the burro's tail and is intended to prevent cargo from slipping toward the animal's neck. On top of the karoma is placed a chusi or ordinary blanket (woven of sheep or llama wool) which is folded in quarters to give the animal even more protective bulk between the load and its back. In turn, the chusi is covered with a sheepskin--called lip'ichi--to protect the blanket from being soiled or damaged by the cargo. The use of the lip' ichi is especially appropriate in the transport of barley. Finally, to hold the karoma in place a sincha or cinch is used. At one end it has a metal ring and at the other end a leather belt. The middle of the cinch is made of sheepskin.

SPECIAL RITES INVOLVING BURROS

Most domesticated livestock have their special fiesta days and patron saints. For example, Saint Lazarus (April 1st) is the protector of dogs, Saint Isidro (May 15) is the protector of cattle, Saint John (June 24) is the protector of sheep, and Palm Sunday is the day for burros because this animal carried Jesus Christ through the streets of Jerusalem. Among the exceptions, llamas do not have a special day because they are indigenous, while pigs are likewise deprived because they are considered an animal denied by God.

Beginning at nine O'clock in the morning on Palm Sunday, women members of the rural household begin to fashion adornments for their burros made of brightly colored wool. For male animals not previously adorned in any previous year, a barquilla or woven collar is placed around their necks, while females are adorned with wool earrings or sarcillas. The ritual of making these adornments is known as t'ikacha. If any animal has already been adorned in an earlier year, then the only decoration made is to tie some colored wool to the burro's back or its mane. The same adornment--known as tuiro --is placed on males as well as females. The most common colors of wool used in decorating animals are blue and pink. The ritual itself is conducted entirely by women.

PIGS

Of the 35 rural families for whom livestock inventories were taken in 1981, 23 or two thirds of them raised pigs. The average herd size per family (including animals of all ages) was four pigs, with the largest holding consisting of nine animals and the smallest only one. The large majority of pigs raised in the Altiplano are local mixed breed or criollo varieties. In a few instances farmers have purchased Durocs or other purebreds, but these are not raised in abundance because they are considered too delicate for the climatic extremes of the Altiplano and require too much special care. Pigs are predominantly sold live to be sent to urban slaughter houses. Rural consumption of pork is quite limited. If a pig is slaughtered on-farm, the family is likely to process and consume the skin, some organ meats such as the heart, and perhaps wash and throw the intestines to the dogs; but the pork is taken and sold in the city.

LODGING

Pigs need protection both from intense cold as well as solar radiation. The pig pen should be located near the farmhouse to facilitate the feeding of the animals and to provide protection from theft or predatory animals such as the wild fox. Like the corrals of other livestock, pig pens should be constructed wherever possible on a well-drained slope. Continuous dampness is dangerous for pigs, resulting in rheumatism and pneumonia. There should be a roof over at least part of the pen, and the roof and walls should be so constructed as to permit the entry of early morning and late afternoon sunshine. The floor of the pen can be of packed earth, which is considered preferable to concrete because the latter gets too cold (causing sickness) or too rough (causing damage to hooves and teats). It is always advisable to lay down a bed of straw in the roofed section of the pen, with frequent changes of this covering as it gets damp or dirty. Most pig pens are built with adobe or rock walls. Roofs are constructed of straw or sheets of fin.

ACQUISITION AND BREEDING

One can raise pigs by purchasing and fattening weanlings, or by breeding and fattening one's own piglets and hogs. In the first instance, it is customary to purchase young pigs when they are at least eight weeks old. To start a breeding herd, one must purchase a sow and then rent the services of a breed boar. As with cattle, it is customary for the owner of one or more sows to pay for stud service. If a criollo boar is used, the breeding fee will be about US$1 per animal, while the service of a purebred will cost about four times more. Breeding services are often paid not in cash but with a piglet from the future litter. Breeding can take place any time of year.

GESTATION AND POST-NATAL CARE

The gestation period for pigs is about 5-6 months. The litter size will vary from four to eight piglets. A sow can provide two litters per year. Just before giving birth, it is necessary to keep the sow in the pen and under close watch, with a special diet of potato peelings, cooked in chuño water, and barley grain or feed concentrate. At birth it is customary to remove the piglets from their mother for three days, keeping them inside the farmhouse for warmth and as protection from being accidently smothered by the sow. They are allowed to suckle three times a day but under close supervision. During the eight-week lactation period, a piglet will consume some 40 liters of milk. Starting in their second or third week, piglets should be served a pre-initiation mix of feed concentrate.

PASTURE AND FEEDING

Pigs can be raised in confinement, by pasturing, or by a combination of both. Confinement is more conducive to rapid weight gain, but it has the disadvantages of requiring greater investment in feed concentrates and running higher risks of infectious disease within the herd. Pastured pigs grow more slowly but are less disease prone and are less expensive to maintain.

In confinement, pigs can be fed with bran, potato skins, kitchen garbage, rotted or inferior quality farm produce, barley, and alfalfa. They should be fed three times a day, and provided with abundant water. When pregnant or lactating, sows require no less than 15 liters of water a day. A confined herd of pigs can be mostly sustained with kitchen scraps provided the herd does not exceed five or six animals.

Pastured pigs can consume green or dry fodder, weeds and grasses, and forgotten tuber crops. After the harvest of potatoes, ocas, or papaliza, it is customary for farmers to stake their pigs in the plots where these crops were harvested to root for produce which may have been overlooked by the harvesters. From December through April, pastured pigs can survive and grow on pasture alone. From May to August their diet must be complimented with grain, kitchen scraps, and other convenient prepared food. From September through December--the truly "hungry season" for pastured animals--pigs can be maintained by mixes of bran (afrecho) and water in which potatoes or other tubers have been boiled.

CASTRATION

Barrows should be castrated at age 5-7 weeks, although some families postpone this task until the animals are four months old. The operation is done on the day of a full moon. The procedure is practically identical to that with sheep. Once completed, the barrow should not be given food for a period of 24 hours. Normally, no disinfectant is used. Once the testicles are pop-

ped outside the scrotum, their ducts should be scraped in two rather than cleanly cut; this minimizes the possibility of hemorrhage.

DISEASES AND AILMENTS

Fever is an ailment which occurs among pigs most commonly during the cold winter months of June, July, and August. Its symptoms are little blisters that break out all over the animal's body. The disease is believed to be transmitted by dogs, which frequently eat the meat of dead animals left far from the farmhouse, then return to bite and infect healthy pigs. One cure is to make the sick pig drink a broth made of tiny fish known as ipis; however, the remedy is not consistently effective.

Trichinosis is an ailment identified by the outbreak of blisters under the animal's tongue. The diseased pig begins to cough continually and fattens from edema. Altiplano pig raisers appear to have little appreciation of the origin of this malady as being due to muscular parasites. Some say the problem is caused by cold, the result of poor shelter. Pig raisers are likewise in doubt as to what constitutes a cure for this disease, or whether a cure even exists. Some farmers treat the symptoms by attempting to make the blisters disappear by serving the sick animal quicklime in its food. However, it appears that the majority of farmers believe that triquina can not be cured. They destroy the animal, burying its carcass, or sometimes boil it first to render its lard.

Sarna Uso or Mange appears in pigs as well as sheep and cattle. In extreme cases it can cause the pig's tail to fall off. The origins of the disease are not known. The disease is cured by bathing the infected animal with fermented human urine.

Lap'a Uso describes an infection of lice which covers the skin of the pig. It is caused by direct transmission from other animals. If left untreated, lap'a uso will weaken the pig until it dies. The parasites can be cured by bathing the animal in kerosine. Another treatment is to spray or dust the animal with DDT or Lexone.

A few highland pig raisers have learned to conduct comprehensive animal higiene programs in conjunction with their pig enterprises. Their activities include periodic disinfection of the pig pen, vaccinations, and consultations with veterinaries as required.

SALES

Pigs are normally sold live at local livestock markets. Prices in 1981 for adult hogs ranged from 1,000 to 1,500 pesos (US$40-60) and 500-800 pesos (US$20-32) for barrows.

COBAYOS
(GUINEA PIGS)

Most highland families raise at least a half dozen cobayos, also known as cuyes. These are cute, furry animals which grow to a weight of about a pound when mature. Cobayos are a special occasion food item for rural households and are primarily raised for home consumption. If marketed, these animals are usually bartered in exchange for bread, sugar, or other necessities.

To raise cobayos, one must first create a place for them to nest. A common location is the kitchen of the farmhouse, usually beneath the adobe oven, if any. Another preferred location for these animals is in a bedroom. The cobayo shelter is typically constructed of adobe bricks, leaving one or more openings--at ground level--for the animals to enter and exist. The roof of the shelter may be the stove or oven itself, providing a convenient heat source to the nest. When cobayos are sheltered in a bedroom, the roof of the structure usually serves as the bed for some member of the family. It is lined with straw, or covered with straw, sacks, or a mattress as well as blankets. Once again, the cobayos are assured of a convenient heat source.

The cobayo flock can be begun with the purchase or acquisition of an adult male and female about two months old. Cobayos begin to breed between two and three months of age. Multiplication of the animals is extremely rapid. Within days of giving birth (while still nursing her young), the female can become pregnant again without ill effect on the pups. Her first litter will usually consist of two pups, the next three or four, and eventually litters may reach five or six pups, themselves able to reproduce within two months.

Cobayos eat a variety of pasture grasses, oats, barley, and kitchen scraps. The food is left in front of the shelter; the animals will take it inside. October and November tend to be the worst months for cobayos, as with other grazing animals, because natural pasture becomes scarce. If the females continue to procreate at this time it is probable that they or their litters may die. For this reason cobayo-raisers prefer to kill off the adult males to prevent them from breeding during the lean season.

There are several other dangers to be concerned with while raising cobayos. Many families have a cat, which is the rural household's major strategy of rat control. However, cats confuse cobayos for common rodents and will therefore attack and kill them if given the opportunity. Periodically, some cobayos fall sick, showing symptoms such as trembling and loss of appetite. These must be separated from the rest of the flock so that the ailment will not be spread to the healthy animals. Finally, when collecting green barley stems, a weed known as janu k'ara--which is poisonous to cobayos--sometimes

gets mixed with their fodder, resulting in a number of deaths within the flock.

In general, dead cobayos not dispatched by the owners are thrown away instead of being eaten. If the animal has been sick or was poisoned, its meat will be bitter. This is a sign--according to local custom--that the meat is sajra, that is to say, it has the devil inside.

In early 1981, large cobayos were valued at a price of 15 pesos each (US$0.60), medium-sized ones at 10 pesos apiece (US$0.40), and small ones at 7-8 pesos each (US$0.28--0.32.

CHAPTER V.

FOOD PREPARATION PRACTICES

This chapter begins with a description of techniques for turning fresh produce into dehydrated products that will last several years in dry storage. Next, the every-day kitchen equipment used by the Altiplano household is covered. We then present an overview of the average farm family diet and the as many as five separate meals it eats in the course of a single day. This is followed by a selection of recipies--taken directly from descriptions by female participants in the Traditional Practices Project--which cover a representative variety of dishes prepared for the different meals consumed by the farm household at different times of the day, and in some cases different seasons.

The final sections of this chapter are devoted to special food preparation activities. These include "emergency foods", wild plants which guarantee the rural family a minimum food supply when most of its cultivated crops are destroyed. The chapter concludes with descriptions of cheese-making, bread-making, and the elaboration of grain beer or chicha for special occasions.

FOOD PRESERVATION TECHNIQUES

In the Altiplano, food preservation activities are of critical importance to the subsistence of the rural household. The principal techniques involve the dehydration of fresh produce by submersion in cold water, squeezing with feet or fingers, freeze-drying, sun-drying, and combinations of the above. A considerable amount of post-harvest family labor must be devoted to these tasks, and perhaps a quarter of all fresh produce harvested is processed for long-term storage.

The advantages of food preservation for the rural household are several, and not all of them are obvious. Since dehydrated products last up to five years or more in dry storage, this guarantees the family a minimum food supply in the event of an agricultural disaster. Food preservation allows the household to vary its diet over a longer period of time. Sun-drying and freeze-drying actually alters product flavor by enhancing sweetness or eliminating bitterness. Most of the produce subjected to dehydration consists of potatoes and ocas of the lowest quality (small in size, wormy, or damaged in harvest) which otherwise would have no market acceptance. Finally, dehydrated products constitute one of the principal barter goods of the rural household. Traded in minor quantities (by handfuls and hatfuls) week after week throughout the year, chuño and other dehydrated commodities allow farmers to dispose of a large share of their marketable surplus spread over a long period of time--at the equivalent of fixed prices--thereby maintaining family purchasing power for basic necessities such as salt, sugar, bread, noodles, kerosine, and other products that the household can not produce for itself.

The principal commodities subjected to dehydration processing are potatoes and ocas. Those products made from potatoes are known as chuño, moraya, tunta, and moskho. Dehydrated oca products include huma caya, juifi caya, and oca seca.

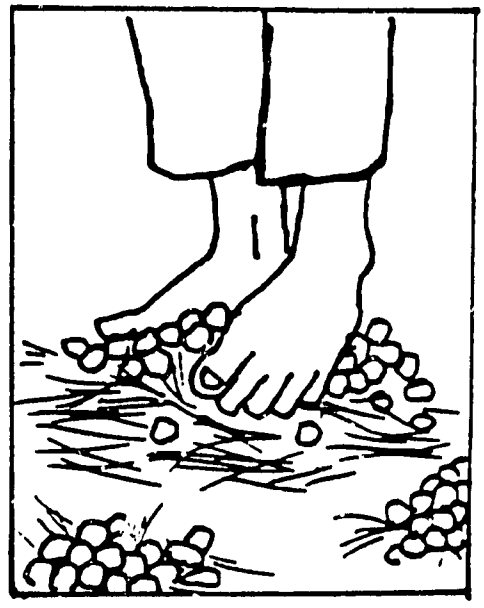
CHUÑO

The best known dehydrated product is chuño. It is made from the smallest size of sweet variety potatoes and of bitter variety potatoes of any size. The selection of potatoes for chuño occurs during the month of June, when temporary storage silos of fresh produce are uncovered and graded. To begin, one needs to prepare a dehydration site or chuñuña ch'ije (place of low-cropped pasture). It is usually located on a pampa or flat bottomland field where frosts are more intense. The place must be leveled, then covered with a thin layer of straw. The potatoes destined for chuño are then emptied onto this

surface and spread out evenly, making sure none are lying on top of others. The preparation of the potatoes is conducted in the late afternoon of a completely cloudless day, which indicates the approach of a clear, star-bright evening and freezing temperatures. Depending on the intensity of the frosts, the potatoes should be left to freeze 3-5 evenings. The produce will indicate it has been thoroughly frozen when it acquires a greyish, wrinkled appearance. In protected communities such as Killay Belen, where the climate is fairly mild, farmers must carry their potatoes to highland areas in order to encounter freezing temperatures. Sometimes they also facilitate the freezing process by soaking the potatoes with water every day at sunset.

Once frozen for several consecutive evenings, the produce is gathered into a number of individual piles--of about 15 pounds of potatoes apiece--which are placed at different locations about the chuñuña ch'ije. Just before sunset, members of the farm household remove their sandles and begin to stand and move about on top of these small piles. The object of this barefooted squeezing is twofold: first, to remove as much liquid from the potatoes as possible, and second, to remove the potato skins by the action of their rubbing against each other. This task is always conducted in the late afternoon, because after being squeezed the potatoes are moist--inside and out--and this will facilitate their being frozen again that same evening. If the potatoes had been squeezed in the morning, the effect of the sun all day long would cause their juices to ferment, resulting in a bitter-tasting product. Once trampled, the chuño is removed from its piles and once again extended over the straw of the dehydration site to be frozen for the final time.

The chuño will now be left to sun-dry for about three or four days. During this period the family must remain vigilant for rapid changes in the weather, because chuño which has been rained or snowed upon will loose its texture and become mushy when cooked. After adequately sun-dried, one must await a windy afternoon in order to winnow the chuño. The produce is placed in a blanket and tossed repeatedly in the air while the wind carries off the straw, pieces of skin, and other impurities still stuck to the chuño. This completes the processing of this dehydrated product. Chuño is stored in sacks or in cylindrical straw baskets known as sejes inside the farmhouse, or in external storage structures known as pirwas. The dry chuño skins are saved and fed to pigs. The straw floor of the dehydration site--now impregnated with potato juices --is fed to livestock.



Making Chuño

On the average, the rural household will process about 10 percent of its total potato production into chuño. The conversion of potatoes into chuño results in a weight and volume loss of roughly three to one. In other words, for every three arrobas of potatoes, the family will obtain one of chuño.

MORAYA

Wormy and partly rotted potatoes, as well as slit or damaged ones, are known as ch'enkhata. These are selected out at harvest time and destined for processing into moraya, another dehydrated product. The ch'enkhata are loaded into a sack and taken to a quiet arm of a river or a pond where the water is not flowing. The produce is emptied from the sack directly into the water where they will remain for thirty days. Size is unimportant. Both large and small potatoes enter this process. The produce sinks to the bottom and becomes mixed with mud. During this month of soaking in frigid water, the potatoes will experience a brief period of fermentation.

After 30 days the potatoes are collected, washed carefully, and taken to the chuñuña ch'ije or dehydration site. There they must be left to freeze for at least two evenings. Once frozen, however, the produce does not have to be squeezed by barefoot trampling. The moraya is skinned and left to dry for three or more days in the sun. It is then collected into a sack and stored for family consumption. Moraya which during the process has crumbled into pieces, as well as the skins, are saved and fed to pigs.

TUNTA

Tunta is another dehydrated product which is made from larger, even first-quality potatoes. Its processing begins in the fashion of chuño and ends up like moraya. The final product is a white, sweet-tasting, luxury food which is reserved exclusively for family consumption on very special occasions.

First, the potatoes selected for tunta are taken to the chuña ch'ije, where they are left to freeze for at least four evenings. Then, at sunset of the following day, they are squeezed dry by farefoot stamping and immediately taken to a river or pond to be soaked underwater for about 30 days.

A special bed must be prepared in the water. It will consist of a shallow hole or well, lined with rocks, and with a floor of straw. The produce is placed in this hole, covered with more straw, and more rocks placed on top to keep the straw in place. The quality of the water is very important in the making of tunta. The best tunta is made in streams inside constantly running water. Tunta made in running water is sweeter and whiter than tunta made in still ponds or wells.

After a month, the tunta is removed from the water and extended once more on the floor of the dehydration site. This operation should take place just before sunset, because the dampness of the tunta will result in its thorough freezing that same evening. Like moraya, there is no need to squeeze tunta by foot stamping after it has been in the water. Once finally frozen, the tunta is skinned and left to sun-dry for about a week. During this period it is important to make sure that no rain or snow falls on the produce, which will damage its texture such that when subsequently cooked it will turn mushy. Finally, the tunta is winnowed to separate out impurities and stored inside the farmhouse.

Because it is a softer product than chuño, tunta will only last about two or at most three years in dry storage; after that it is easily damaged by moths. Tunta is seldom sold. It is reserved for family consumption on festival days or for meals given for very important friends. The luxury nature of the product is better understood when one considers the enormous weight loss (along with volume) which occurs when potatoes are processed into tunta. From one carga (100 pounds) of potatoes, one obtains a half-carga of tunta in volume but which has a weight of less than an arroba (25 pounds), that is, a conversion of four to one.

MOSKHO

A final dehydrated product made from potatoes is moskho. It can be seen as a low-quality tunta. Essentially it is processed the same way as tunta but it is made from low quality produce--namely, the ch'enkhata potatoes selected just after harvest and also used in making moraya. Moskho is also different from tunta in that it is not white but rather brownish in color. It is used exclusively for family consumption and never sold. In fact, relatively few families prepare this product because it is easier and more economical (less labor and less weight loss) to make moraya.

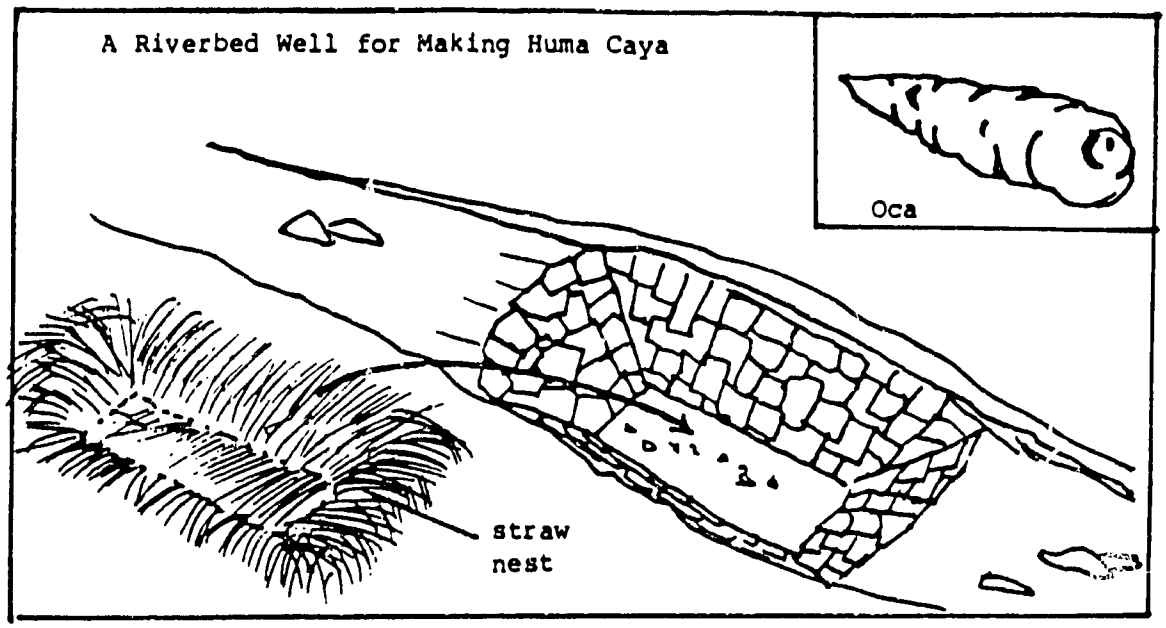
PRODUCTS MADE FROM OCA

Oca is very important in the Altiplano diet because it provides some variety from potatoes. Fresh oca is placed in underground storage in the patio of the farmhouse. There it will last only about eight months (until November) before it becomes inedible. In order to extend oca consumption for the entire year, this tuber is processed into several products, both freeze-dried and sun-dried. Ocas that are soaked for a month in water are known as huma caya, while ocas that have been frozen and foot-squeezed above ground are known as juifi caya. The third process consists of ocas which are cut in half and dried in the sun but kept from freezing. These have no special name; they are simply called oca seca or dry oca.

HUMA CAYA

The first product to be processed from fresh oca is huma caya. This product is made with ocas which are wormy or which have been cut or damaged in the harvest. These poor-quality ocas are selected out at the harvest site, because to store them in silos along with healthy produce would result in possible damage to the latter. Furthermore, since oca is harvested in April, it is still too early to begin freeze-drying of products because the season of continuous frosts does not arrive until June. Thus, to "rescue" their low-quality ocas for human consumption, rural households soak it in cold water for about a month.

The oca destined for huma caya is placed in a hole constructed in a streambed. This hole or well usually measures about 80 cm deep, with an area of about two square meters--say, one meter wide by two meters long. The well is built by damming and diverting the water so that it bypasses the location of the well. The well is given slanting walls, then lined with stones. Into this structure is placed a bed of straw to make a nest. This nest is then filled with oca, covered with straw, and stones placed on top to keep the straw in place. Finally, the stream is diverted back to its normal channel so that it will run over the top of the well containing the oca.



The time the oca must remain in the water depends on water and temperature conditions. Each community appears to have its own preferred recipe for huma caya preparation, which can vary from three to six weeks. As is also the case with tunta made from potatoes, the quality of the water is quite important. Running water is much preferred to pond or lake water. For example, the residents of Killay Belen--even though their homes are located only a few hundred meters from the shoreline of Lake Titicaca--never soak their huma caya in the lake. They say the water is too cold to produce good huma caya, and also the action of the waves is too strong and might possibly destroy a well for oca built near the shore (not to mention the problems of building the well in the first place).

After about a month, the ocas must be removed from the water in the late afternoon, avoiding contact with direct sunlight. The wet huma caya is then allowed to freeze for two or three consecutive evenings. Once frozen, this produce should not be squeezed by stamping with the feet because it is too delicate. Instead, the ocas should be squeezed gently with the fingers. Their liquids fall onto the straw at the dehydration site and are adsorbed by this straw, which makes it such a nourishing fodder for livestock. The now frozen and squeezed huma caya is left to sun-dry for about a week, then collected and winnowed on a windy afternoon to remove straw and other impurities. The huma caya is finally stored inside the farmhouse in straw baskets or sacks. From four arrobas of caya, one obtains about one arroba of dry huma caya. This product can last in storage from one to four years. Some farmers assert that by changing the produce from one seje to another each year, and sun-drying the sejes at the same time, huma caya can

be stored for as long as ten years. However, few households attempt to store huma caya more than a year because they insist that long-term storage causes the product to loose its taste, to become insipid.

JUIFI CAYA

Rural households only begin to make juifi caya during the middle of the frost season, in June or July. The healthy ocas are removed from their silos and selected--one group for fresh consumption (to be divided between family use and market sale), one group for seed, and a third group for dehydration as juifi caya. These lowest-quality ocas are taken to the chuñuña ch'ije and spread out evenly making sure all are touching the bed of straw. This is done at sunset. The produce is left to freeze, thaw, and refreeze for a week. The oca exudes its liquids during the day and this facilitates its freezing at night. It is important to let this process continue for six or seven days before squeezing begins. Ocas which are squeezed before this time will eventually result in a product that weighs less than one which was squeezed at the proper time.

For squeezing, ocas are collected into small piles and squeezed with the feet, exactly like chuño. The squeezing task must be done at sunset. Then the produce is frozen another night, which gives juifi caya its special taste. Finally the caya is allowed to sun-dry for about two weeks before it is winnowed and stored. Juifi caya is stored the same way as huma caya and lasts the same amount of time in storage. The major difference between the two products is with regard to taste and also their preparation for cooking. Huma caya is sweeter while juifi caya is slightly bitter tasting. Huma caya is also much easier to cook; it only needs to be boiled for a few minutes before eating. In contrast, juifi caya is quite hard and should be soaked a couple of days in water before it is cooked.

DRY CAYA

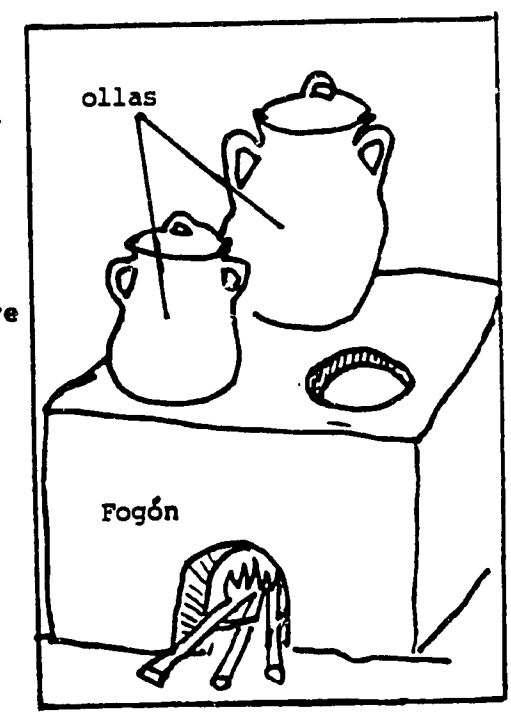
In the community of Jaruma it is customary to process dry caya <u>without</u> freezing the oca, and there exist two methods of doing it. The first is to take fresh ocas and cut them down the middle with a knife. These are left to sun-dry on a bed of straw for eight days. At night they must be covered with straw to protect them from freezing temperatures. The second method consists in drying uncut ocas. These are sun-dried in the same way but require four times as long--at least a month. Again, it is necessary to cover the produce with straw every time there exists a threat of frost.

KITCHEN EQUIPMENT

One of the reasons female household heads spend so much time cooking is because their implements are so simple, and food preparation conditions so rudimentary. Because the use of gas is still quite rare, wood-burning earthen stoves remain the primary cooking medium; and the continuous search for fuel to burn in such stoves is one of the primary tasks of rural women. Since there is no convenient source of refrigeration, perishables must be hung from the roof to air dry (meat, fruit) or quickly consumed and continuously replaced (eggs, milk, etc.) Non-perishables tend to be inconveniently scattered about the farmhouse--both inside and out--in sacks, tins, bins, baskets, and storerooms or trojes. Nor is there a convenient supply of water for preparing meals or washing dishes. Water supplies must be stored in ceramic cisterns, buckets, or cans and replenished almost daily, itself a difficult task. Without running water, and without wash basins, the cleaning of cooking utensils and dishes is extremely cumbersome. Such cleaning normally begins as the first step in preparing a meal, not the last.

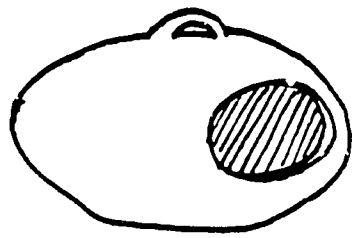
The average rural family's stock of kitchen utensils is quite rudimentary yet adequate to meet the fairly narrow range of ordinary foods consumed by the household. The following implements are used for food preparation almost on a daily basis. Implements for making cheese, bread, toasted grains, and certain foods prepared in the field are described in other sections.

FOGON OR KITCHEN STOVE: The fogón of many Altiplano families is constructed of packed earth. It is a home-made structure containing two or three hornillas or burners and an opening below for entry of air and to stoke the stove with fuel. Most stoves are about 50 cm from the ground. However, some families have built two-story stoves such that the fire burns on a floor located above ground level; this leaves a space below for housing cobayos or guinea pigs



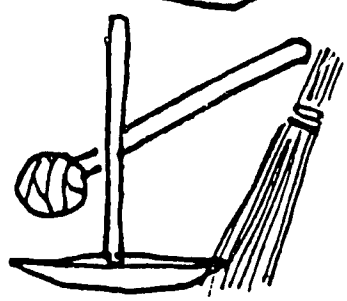
OLLAS OR COOKING POTS. Each household has at least three ceramic cooking pots of somewhat different capacity--12 liters, 8 liters, etc. These pots have handles, and lids that fit snugly.

JIK'Y OR TOASTER OVEN: The jik'y is a ceramic oven which is used for toasting grain. It has an opening on one side for stirring the contents while they are cooking. This implement is used both inside the kitchen and on outdoor fireplaces where more air movement is required to produce a more intense heat.

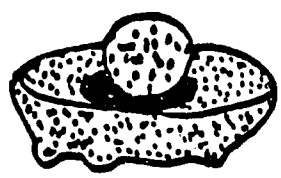


PEROL OR FRYING DISH: The peról is a (copper) frying dish. The depth of the pan allows for deep frying. The slanting walls provide for gradually intensified heat the lower one moves in the pan.

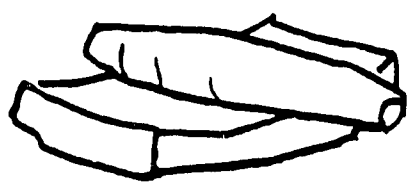
JIRUÑAS OR STIRRING IMPLEMENTS: Jiruñas are home-made implements for stirring toasted grain or frying foods. They are made of stiff straw, bound tightly to form a kind of broom. Toasted grain is also stirred with a stick covered at one end with a ball of rags, known as the alliña



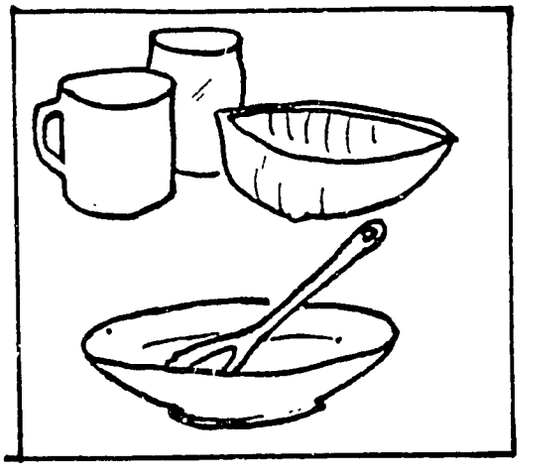
BATAN OR STONE HAND MILL: The batán is the first of two stone hand mills which are commonly found in Altiplano kitchens. The batán is most commonly used to prepare ground chili peppers for hot sauce, or for grinding fairly minute quantities of spices and condiments in general.



KHONA OR LARGE STONE HAND MILL: The khona is larger than the batán. Instead of a round grinding stone it employs a long, cylindrical one. The khona is mainly used to grind grain into flower.



LAMANA OR MIXING PAN: The lamana is a shallow mixing pan, made of ceramic or tin. It is used for preparing the doughs of different cereal grains, and as a recepticle for general use in the kitchen.



EATING UTENSILS: Most Altiplano households use metal cups for drinking hot beverages such as teas and coffee. Cold beverages like beer and soft drinks are drunk from ordinary glasses. Chicha or grain beer is most commonly drunk from a gourd. Knives, forks, and spoons are metalic, usually an aluminum alloy. Of the three, the primary eating utensil is the large soup spoon, even for dry meals. Soup bowls are almost always made of clay. Ceramic plates are more common than metalic.

Sets of matched dinnerware represent a luxury for rural families. Indeed, many do not have enough dishes for all household members to eat at the same time. Thus, dishes must be washed before the meal is served, and sometimes during the meal itself.

DIET OF THE TYPICAL ALTIPLANO HOUSEHOLD

During the Traditional Practices Project, women participants or their literate scribes kept daily records for periods up to 12 months describing their principal subsistence activities: care of livestock, gathering fuel and water, artesan crafts, marketing, care of infants, washing clothes, and--most important of all--cooking meals. Food preparation is the best detailed of all these female activities because it is repeated so frequently, as often as five times a day. The women's diaries provide a detailed account of what rural families eat in the Altiplano. Summarized below are some of the principal characteristics of their diet.

SCHEDULE AND FREQUENCY OF MEALS

The average highland farm family eats four and sometimes five times per day. The day begins about six O'clock in the morning with breakfast or desayuno. A second meal, called almuerzo but not necessarily equivalent to the mid-day meal, is a hot meal that can be eaten as early as eight or nine O'clock in the morning, before family laborers leave for their work in the field; or it can be eaten between ten O'clock and noon, thereby replacing the following meal known as merienda. The merienda is eaten in the field from noon onward. It usually consists of dry food, and sometimes is prepared hours before and kept warm at the work site wrapped in a special cloth. Following the conclusion of the day's labors, family workers return to the farmhouse to take a hot beverage at te, a late-afternoon snack. The last meal of the day is cena or supper, which is normally eaten between eight and nine O'clock in the evening.

The above schedule and frequency of meals is by no means fixed. At planting and harvest times--the busiest periods of the year for the rural family--the workday can begin earlier and end later, with breakfast merging with almuerzo, almuerzo with merienda, te with cena, and at highly variable hours. On market days, when female household heads do their shopping, the normal meal pattern may be totally altered and food preparation activities highly improvised.

DESAYUNO

Almost without exception, breakfast will consist of at least a hot beverage and some bread. The beverage may be coffee, tea, cocoa, or a wide variety of mates or herb teas. When coffee is scarce it may be extended or replaced by addition of toasted grain coffee, or tea may be replaced by concoctions made of burnt sugar. But whatever the beverage, it is usually served very sweet with large amounts of sugar. In addition to the bread and beverage, many fami-

lies serve a kind of porridge made with toasted grain flour (known as pito) or cornmeal, served with water or milk. About one breakfast in three will include milk, often in powdered form from a donated source (like CARITAS). Fresh milk from cows and sheep is in relative abundance only during the first months of the calendar year; even then it is mostly reserved for the making of cheese.

ALMUERZO

With the possible exception of market days, or those spent traveling, it is almost certain that the Altiplano family will eat potatoes at least twice and usually three times each day: always for almuerzo and usually for merienda and cena as well. The average adult will easily eat 3-5 pounds of potatoes daily, either fresh or in dehydrated form such as chuño or tunta. During almuerzo, potatoes are generally served cut up as part of a soup. Indeed, almuerzo is considered the "wet" meal. In most instances, the soup will contain at least two carbohydrates--potatoes and chuño or rice or noodles. It will most likely contain onions, hot peppers, and perhaps carrots. Barley or quinua grain will often be substituted instead of rice. One out of every two or three of these soups will contain a piece of meat. If the soup is to serve four people, the meat would probably not exceed a quarter pound. When meat is not available, it will be substituted with lard, perhaps fish, or even quinua leaves.

MERIENDA

During the planting and harvest season, the merienda becomes the meal of the day. When hired laborers are involved, the merienda is considered part of their wage compensation; hence, it should be something special. It will either be prepared at the farmhouse and taken to the work site, or it may be prepared at the work site itself.The merienda is considered a "dry" meal. It usually consists of boiled potatoes, ocas, habas, or papalisas as well as dehydrated products such as chuño, tunta, moraya, or moshko. These are served accompanied by a hot sauce, or sometimes a spicy cheese sauce or creamed corn, in which the tubers can be dipped. A general favorite are baked potatoes or papas watia, cooked under the ground and dipped in a paste made of a calcium-like mineral deposit known as phasa. The merienda may be accompanied by a piece of dried meat (charqui), or cheese, or boiled eggs, or possibly a home-made baked or steamed patry made of flour or cornmeal.

Of course, under normal circumstances the merienda is not a luxury meal at all. For shepherds it could mean a few boiled potatoes and a pocketful of popcorn. For a family fallen on hard times, the merienda can consist of nothing more than inferior-quality moskho, eaten without sauce and not even salt.

TE

Normally, te will consist of a hot beverage and a piece of bread eaten upon one's return from the field. When laborers return to their homes late, the tea snack may be skipped entirely; they may eat supper directly and retire to bed. Or the reverse can occur. Delayed by her field tasks, the female household head may not have time to prepare supper, so supper is replaced by a simple tea snack, perhaps strengthened by some boiled potatoes or soup left over from almuerzo and reheated.

CENA

This is the final meal of the day. When there is time to prepare it, cena is generally seen as a dry meal. At least two-thirds of all cenas will again include potatoes or dehydrated products. This will likely be combined with a plate of rice, perhaps a fried egg or a small piece of meat or some cheese. Often some kind of simple fried pastry may be prepared, or possibly a tortilla made with egg. However, the most likely situation is that the cena will include leftovers from one or more previous meals, particularly the breakfast and almuerzo. Therefore, some kind of soup is not uncommon for this meal.

In summary, the normal diet of the Altiplano household is relatively simple, with a monotonous dependence on boiled potatoes and other tubers, whether fresh or dehydrated. If the family has the advantage of fairly diversified plantings, it may create limited diversity in its diet by complimenting potatoes with habas, peas, ocas, and papalisas, and it may substitute wheat, oats, and quinua for its routine dependence on barley grain. Of the four basic food groups--fruit or vegetables, grain, meat, and milk--it is clear that meat and milk are consumed in deficient amounts.

BREAKFAST AND SNACK FOODS

Breakfast is almost always eaten with bread, a hot beverage such as tea or coffee, and often with a dish of toasted cereal grain known as pito. Most Altiplano families buy bread already made, or barter for it in exchange for chuño or other products. The description on bread-making will be left to a separate section. When bread is not available, it is sometimes replaced with a variety of substitutes including q'ispiña or quinua dough crackers, k'aswira de quinua or fried quinua cakes, or humintas de choclo or corn cakes. Because of similarities in their preparation, we will also include a description of three common snack foods: tostado de grano or toasted grain, pasankalla or popcorn, and toasted habas.

SUBSTITUTES FOR TEA AND COFFEE

MATES OR HERB TEAS

Mates can be made from an unlimited number of arromatic herbs and leaves which grow in the Altiplano. Some of the most common are known as sultana, toronjíl, cedrón, perejíl, chijchipa, jankoñoque, and others. These are prepared like any tea--by steeping in boiling hot water for several minutes, then sugared to taste.

BURNT SUGAR TEA

To make this tea, one takes a spoonful of sugar and burns it in the flame of the kitchen stove. When the sugar has acquired a dark brown color it is added to boiling hot water. The burnt sugar turns the water to the color of tea. It is then sweetened to taste and served.

GRAIN COFFEE

Café de grano is made from toasted grain, usually barley. The grain is first toasted in a ceramic oven, stirring constantly to keep the grain from burning. The grain is removed after it acquires a dark brown color. Next, this toasted grain is ground into a fine powder using the stone hand mill or batán. Finally, boiling water is poured through a filter containing the powder. The resulting liquid has a dark color similar to coffee. Sometimes barley powder is added to coffee to extend the supply of the latter.

PITO DE GRANO

Pito de grano is a coarse flour of toasted grain. It can be mixed with hot beverages, it can be served as a porridge with milk, and it can be eaten dry. It is a very common food in the Altiplano breakfast. The following recipe is based on a description provided by Petrona Marca de Condori of the community of Jaruma. It will serve seven people.

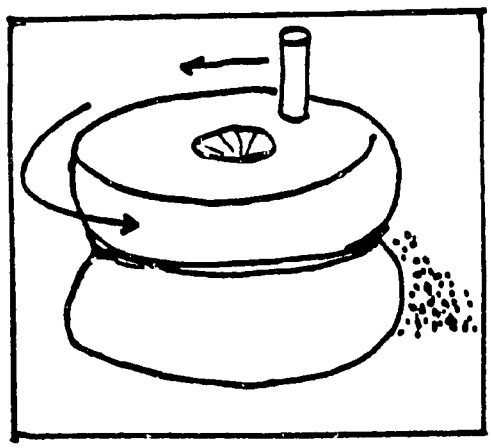
INGREDIENTS

Barley grain two kilos

First, one starts the fire in the stove and places the toasting oven to heat. When the oven is hot, the grain is thrown in one handful at a time and toasted until a dark brown. It must be stirred constantly so it will not burn. When all the grain has been toasted, it is next milled on the kona. The kona is a carved stone with a rectangular base about 70 cm long and 30 cm wide. A long, slender rolling stone is used to grind. This stone is used with both hands, and for this reason it is longer than the width of the grinding platform itself. This kona should be placed on top of one or two sacks. This helps to steady it. It is good to place a cloth on top of the sacks in order to catch any flour that falls from the stone. Also, the stone should be inclined slightly so that the flour will fall easily from it. The ground flour is known as pito.

When the pito has been milled, it should be sprinkled with a little water to keep it humid. Then it should be winnowed in the wind to separate any husks that remain on the grain. Once cleaned, the pito is ready for eating. To make a batch of pito will take about four hours.

Some families grind their pito with a pair of milling stones. The grain is poured into a hole in the top of the upper stone. This stone is then turned rapidly around and around by means of a handle attached to this stone. The ground pito comes out of the middle space between the two milling stones. The flour is collected with a cloth placed beside the mill.



QUINUA DOUGH CRACKERS
(Q'ISPIÑA)

Q'ispiña is an occasional food prepared by highland families, sometimes to replace bread. Most frequently it is served for breakfast or is prepared for long overland trips, when it is eaten with crackers. Q'ispiña is almost always prepared to celebrate All Soul's Day or Todos Los Santos on November 1-2. At this time the crackers are made in the shape of animals--particularly llamas and sheep--and are eaten during the ceremonies conducted by rural families honoring their dead. The following recipe for q'ispiña was provided by Sabina Nina de Quispe of Huacuyo.

INGREDIENTS

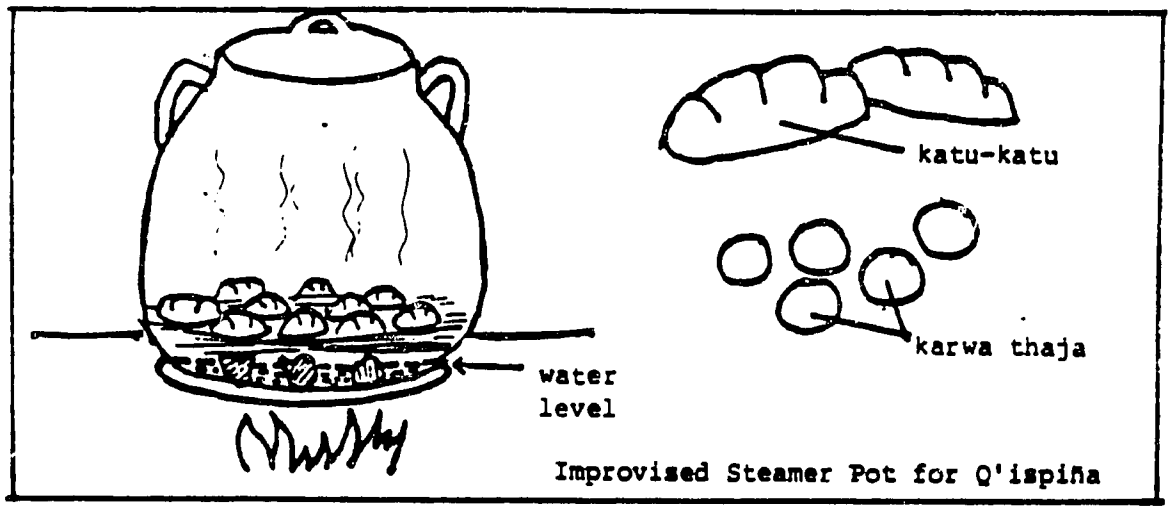
Quinua	5 pounds
Lard	1 large spoonful
Salt	According to one's preference
Soda (cal)	1 spoonful

The quinua grain must first be washed in water. This is done by rubbing the grain between both hands several times, and changing the water itself, until the grain loses its bitterness. The washed grain is then sun-dried for one or more days, depending on the weather.

Once dry, the grain is then toasted over slow heat in a ceramic oven or jik'y, stirring constantly with a thin broom-like implement or jiruña. The toasted grain is then ground on a stone hand mill or khona until it becomes flour, which will take about two hours.

Next, one prepares the quinua dough. This is done in a ceramic mixing bowl or lamana. The quinua flower is mixed with a little water, salt, and the spoonful of soda. Finally, the lard is worked into the dough and squeezed vigorously with both hands until the dough is compact but not sticky. The dough can be moulded into cylindrical strips, sliced, and rolled around in a dish with a little flour in it until the pieces are round. These little balls are called karwa thaja or llama droppings because of their resemblance to that animal's manure. Another popular shape is that of the half-moon or the oval onto which is left the imprint of the fingers.

The dough balls or ovals are cooked in the following fashion. A clay pot (with a lid) is placed on the kitchen stove about 5 cm above the fire. Three sticks are placed in the bottom of the pot. Across these is constructed a floor made from strands of straw. The bottom of the pot is then filled with water, but to a level below the straw floor, thereby creating a steamer. The q'ispiña doughs are layed on the straw and left to cook for about an hour, with strong heat. When cooked, the quinua crackers will acquire a yellow color, at which time they must be immediately removed from the pot and left to cool on a tari (cloth). Q'ispiña must never be eaten warm, because this will result in a stomach ache.



Improvised Steamer Pot for Q'ispiña

FRIED QUINUA CAKES
(K'ASWIRA DE QUINUA)

In the community of Yuka, when a family puts a new roof on its house, it is customary for their relatives to come and assist them on a collective basis. Some of the participants arrive with a gift of cash--20, 40, 50 pesos or more. Those who are not in a position to offer money often colaborate with a gift of k'aswiras, which is received by the female head of household. At about three O'clock in the afternoon of the roofing day, all participants are served a very special meal prepared by the female household head. It is at this time that everyone eats the k'aswiras. The following recipe was provided by Manuela Patzi de Yanarico and Angélica Laime de Patzi, both of Yuka.

INGREDIENTS

Quinua	6 pounds
Lard	1 pound, or
Cooking oil	1/2 liter
Salt	2 spoonfuls
Soda (cal)	1 spoonful

The quinua grain contains an oil which is extremely bitter. This must be washed off first by rubbing the grain between the palms of both hands and occasionally changing the water. This washing results in a soapy mixture in the water, and when the suds no longer appear this is a sign that the grain is adequately cleaned. Once clean, the grain must be sun-dried and then milled into flower using the stone handmill or khona.

The quinua flower is worked into a dough in a mixing bowl to which has been added three jars of water, the salt, and the soda. The resulting dough should be heavy and compact, not sticky. The dough is broken into pieces and rolled into balls the size of an egg. Next, each is flattened with the palm of the hand until it acquires a thickness of about 1 cm.

K'aswiras are fried in a copper frying dish or peról. The perol is filled with the cooking oil or lard and heated until smoking on a hot flame. The k'aswiras are then deep-dried in this oil until thoroughly browned and crisp.

CORN CAKES
(HUMINTAS DE CHOCLO)

Because of its unique climatic conditions relative to the rest of the Altiplano, Killay Belen is a community which grows considerable amounts of corn. And one of the most popular foods made with this corn are small maize cakes known as humintas. The following description was provided by Micaela Mamani de Aruquipa.

First, the ears of corn are shelled by hand. Then the kernals must be ground in a batán--sprinkling occasionally with water--until one has about four pounds of corn meal. To this meal is added a handful of salt. Enough water is then mixed with the meal to make a dough, which should be neither too dry or too runny. The condiments for this dough are ground separately. These include anise seeds, sugar, cinnamon, hot peppers (to give a yellow coloring), and sometimes crumbled cheese; these ingredients are all mixed together in a ceramic dish. They are then combined, along with some lard, with the corn meal dough.

While one person is preparing the fireplace, the other places the huminta dough--one spoonful at a time--on dried corn husks and wraps them up. Meanwhile, the fireplace is constructed outdoors. It consists of flat stones piled to form an empty dome about 50 cm high, with an opening facing the wind to facilitate the burning of the fire. This fireplace is stoked with animal manure and allowed to burn intensely. Gradually the stones will become extremely hot. When the fuel has been consumed, the top of this oven is removed using metal tongs; then the interior is swept clean of ashes using a broom made of breen grasses and plants. The floor of the oven is lined with hot stones. Over this floor a layer of hinójos or green herbs is placed, and on top of them a layer of humintas wrapped in corn husks. Then a second layer of stones is layed on top, followed by more herbs and more humintas. This must be done very rapidly to prevent too much heat and steam from escaping. The roof of the oven is finally covered with herbs, then a sack or cloth, and finally a layer of dirt. The humintas should be left to cook for an hour.

Residents of Killay Belen make humintas on a fairly small scale, mostly for home consumption. Sometimes they make humintas to barter for fruit from other zones. Humintas are mostly eaten either for breakfast or for late afternoon tea.

TOASTED GRAIN
(TOSTADO DE GRANO MOTETE)

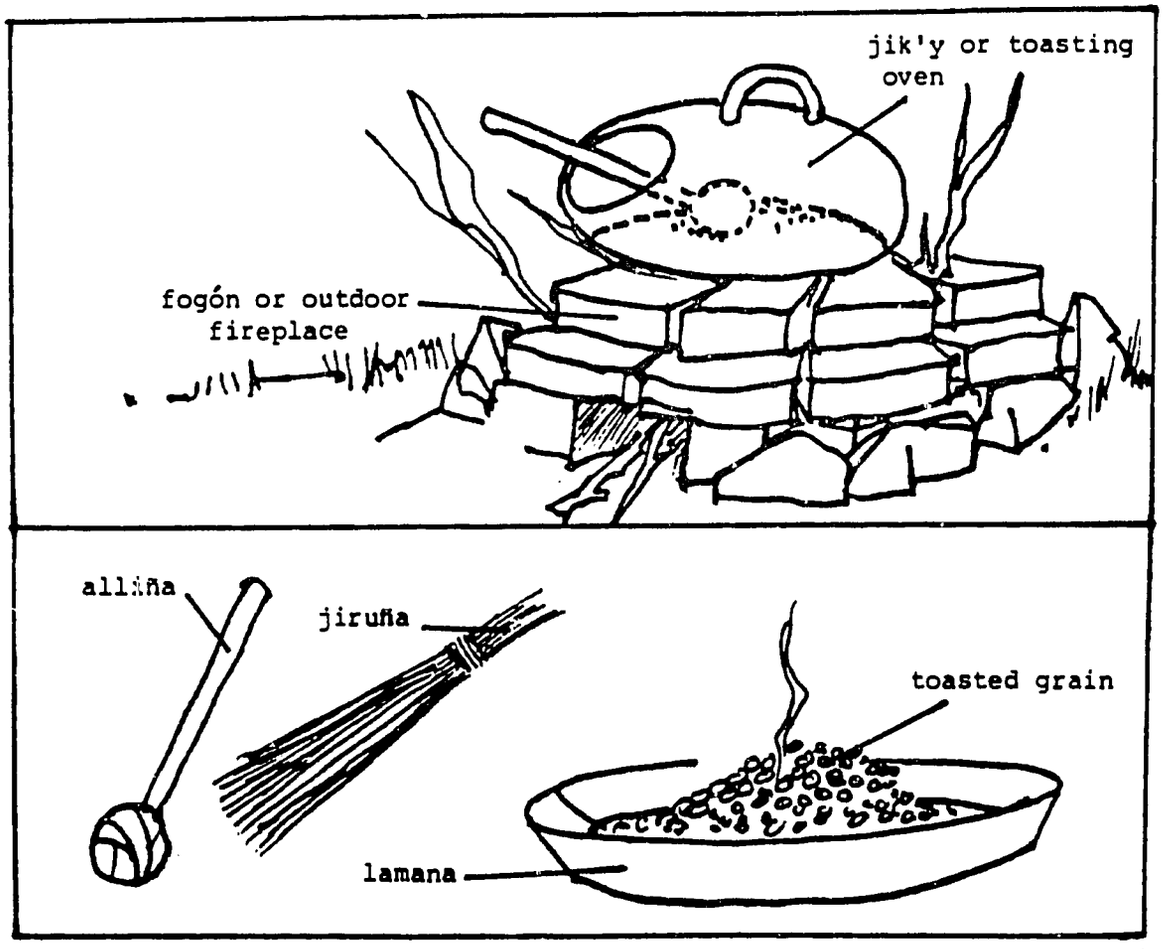
Toasted grain is generally a snack food used to satisfy hunger when one is away from home or when the preparation of a cooked meal is not possible. Tostado is eaten for breakfast. Students take it to school to eat during their recreation periods. Shepherds eat it while watching their animals. When members of the highland family take a long trip, they often carry this product in their pockets. Tostado is often prepared as well to send to sons who are doing military service. The following recipe was provided by Lucia Quispe de Apaza from Chiarhumani.

First, the cereal grain--usually barley or wheat--must be washed to remove dirt and rat droppings. This is done by soaking the grain in a vessel filled water, changing the water several times. Then, the grain is placed on top of a sack or cloth outside in the patio to dry in the sun. If there is abundant sunshine, the grain will dry in a single day, but if the weather is cloudy or damp it may take the grain several days to dry.

Before toasting begins it is necessary to construct a special outdoor fireplace or fogón. This should be located near the farmhouse, preferably on top of a small hill exposed to the wind. With the chontilla (digging-hoe) one constructs a shallow pit about 10 cm deep, and about 30-40 cm in width and length. The pit is then lined on three sides with flat stones, placed upright, but leaving an opening facing the wind. Next, the pit is piled with blocks of dry manure or jira to a height of 25 cm above ground level, but leaving the center of the pile empty with an opening also facing the wind. Into this opening is placed straw and kindling wood, and the fire begun.

The ceramic vessel used for toasting grain is known as jik'y. It has an oval shape, completely enclosed except for an opening to the side. This oven-like container is used to toast any kind of grain including wheat, barley, corn, peas, quinua, and broadbeans. The jik'y is placed on top of the pile of burning jira and allowed to heat. When the jik'y is sufficiently hot, one throws inside two handfuls of grain. The grain is moved around and around with an implement called the allifia. This consists of a stick about 30 cm long with a ball of rags wrapped around the stirring end. A second implement that can be used for stirring the grain is the jiruña, which is a bound clump of straws that resembles a narrow broom. The stirring must be continuous to keep the grain from burning. When one batch of grain is completely toasted the jik'y is emptied and new grain thrown inside.

Doña Lucia explains that tostado is best prepared between five and eight O'clock in the morning, or between five and seven O'clock in the afternoon, because at these times there exists sufficient wind. Toasting should not be attempted inside the kitchen because there is not enough air movement there. The outdoor fireplace and pile of jiras described previously would be adequate to toast about 15 pounds of grain, after which the jiras will have been consumed by fire. If more grain is to be toasted, it is necessary to remove the ashes and construct a new pile of manure blocks.



Utensils Used for Toasting Grain

POPCORN
(PASANKALLA DE MAIZ AMARILLO)

Pasankalla is a popcorn made from yellow maize. Few highland households make it because they do not grow their own corn. But the protected location of Killay Belen allows the production of this crop. Accordingly, local residents prepare pasankalla. This product is cooked almost exclusively for family consumption because the grain is of inadequate quality--small grains, little sugar--to produce a commercially viable snackfood. Pasankalla is served at mid-day meals, is taken to school by students to eat at recess, and is eaten when family members take a long trip. The following instruction for pasankalla was provided by Ricarda Illa de Rojas of Killay Belen.

First, an outdoor fireplace is constructed on the patio of the farmhouse using several adobe bricks. Surrounding this fireplace must be placed bags or ground cloths to catch the popcorn which flies out of the toasting oven.

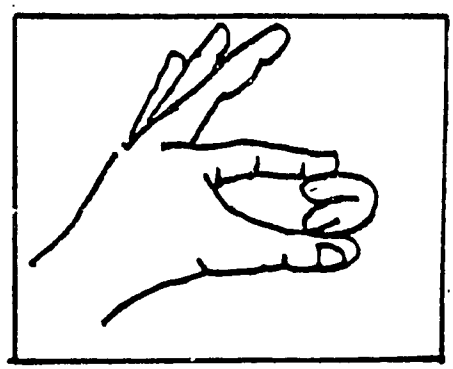
Like tostado, pasankalla is cooked in a jik'y or ceramic vessel made especially for toasting grains. Into the bottom of the jik'y is placed a layer of screened sand, which earlier had been taken from the shoreline of Lake Titicaca. The jik'y is placed on the fire and the sand is allowed to heat for five minutes. Next, one handful of kernals at a time, the corn is thrown inside the jik'y. It is stirred constantly with the broom-like jiruña. Once all kernals have exploded, they are emptied into a sajaña or sieve, and all sand mixed with the pasankalla is screened out and returned to the jik'y. The clean popcorn is then loaded into mixing bowls or other recepticles for storage.

TOASTED HABAS

Huacuyo is a community that grows large quantities of broadbeans or habas. These can be boiled or toasted. The neighboring pilgrimage sanctuary of Copacabana is well-known as a market for toasted habas, and a number of Huacuyo families toast habas on a commercial basis for sale in Copacabana. Such families therefore toast habas in large quantities, using large toasting tins. But when small quantities of habas are toasted--for family consumption--the ceramic oven is used for toasting. The following description of habas prepared for commercial sale is based on information provided by Petrona Coaquira of Huacuyo.

To toast habas it is first necessary to select the beans so that they are all the same size. If this is not done, the smaller habas will begin to burn while the larger habas are still not toasted.

Next, it is necessary to soften the haba for toasting. This is done by either of two ways. The slow way is to leave the habas to soak in a container of cold water for approximately eight hours, or until it is possible to take single habas between the fingertips and fold it in half without its breaking. But on the other hand, if the haba is too flexible, it will break apart too much during toasting and will fill with sand.



The second or fast way is to place the dry habas in a pot with plenty of water and boil them using a strong flame for about 30 minutes. Near the end of this period one must begin to test individual habas to see how well they bend. Once they do bend (springy but not easily) it is time to take the beans from the stove. As with the above method of haba preparation, over-cooking will cause habas to break up and fill with sand when they are toasted.

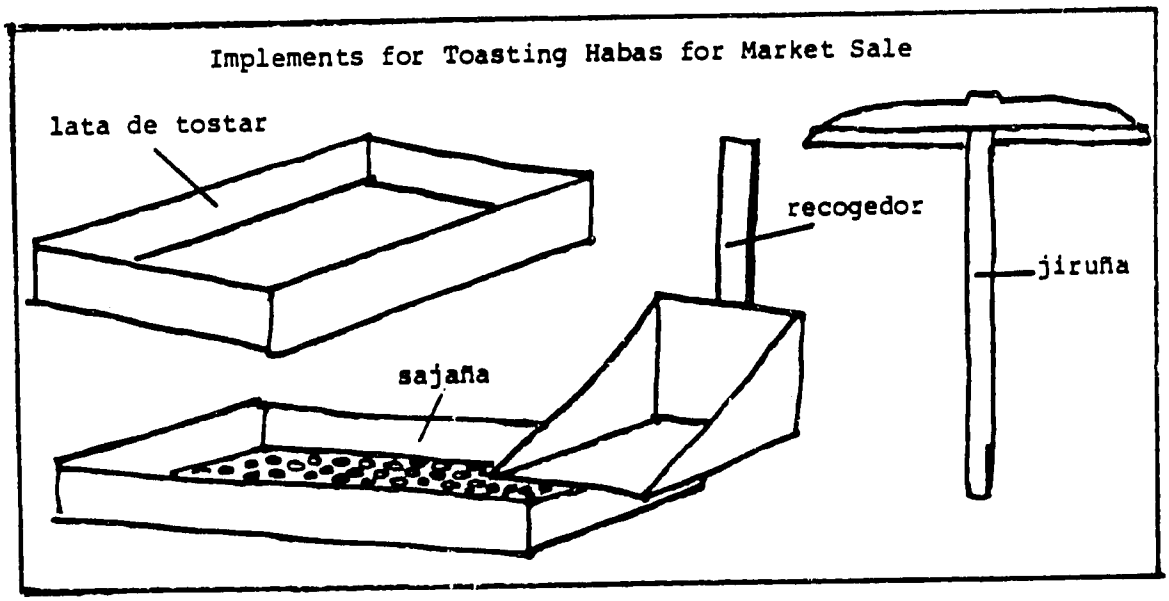
Once the habas are prepared for toasting, it is necessary to build an outdoor fireplace. This is usually done using adobe bricks. If no bricks are available, one can use stones. There are two kinds of stones--what Huacuyo residents call machos (males) and hembras (females). Macho stones are coarse and rough while hembra stones are smooth. For preparing the fireplace or fogón it is advisable to use female rocks only, because male rocks have a tendency to break when they are heated. If no female rocks are available, the males can be used; but first it is advisable to soak them in salty water, which makes them less likely to split. The fogón itself should be rectangular in shape--about 50 cm long by 40 cm wide by 30 cm high, and open at one end. Habas are usually toasted during the post-harvest months of July and August. At this time of year there exists an ample supply of cattle manure for fuel, also plenty of dry branches and leaves of the eucayliptus tree.

On top of this fireplace is placed a rectangular toasting tin, which is slightly larger than the fogón dimensions mentioned above, but is 5 cm high. The fire is started and the tin heated for two minutes. Then the tin is filled with a layer of white sand--brought from Lake Titicaca--and the sand allowed to heat for five additional minutes. When the sand is sufficiently hot, the prepared (soaked or boiled) habas are spread across the top. They are stirred slowly, pushed back and forth, using a jiruña which is shaped in the form of a "T". As soon as the habas acquire a yellow color, this indicates they have been adequately toasted. At this point they are skimmed off the surface of the sand with a recogedor or utensil that resembles a dustpan. The habas are then emptied onto a sieve or sajaña to screen out any remaining sand. This

seive is nothing more than a toasting tin in which hundreds of holes have been punched with hammer and nail. The hot habas are doused with warm water and--steaming--they are placed in sacks. This steam allows this product to remain tender.

In Huacuyo, toasted habas for commercial sale are prepared in lots of about five arrobas (125 pounds) at a time. In early 1981 an arroba of toasted habas sold in Copacabana for 170 pesos (US$6.80). An arroba of dry, raw habas could be purchased for 120 pesos (US$4.80). A single commercial lot of toasted habas requires three workers to prepare. Assuming family labor is used, and not including the costs of implements or obtaining the sand, a household would stand to make a net profit of 250 pesos or 83 pesos (US$3.28) for each day of family labor utilized, as follows:

Sales of toasted habas: 5 arrobas x 170 each	= 850
Cost of product: 5 arrobas x 120 each	= 600
Net income	= 250
Net income per day of family labor (3)	= 83



SOUPS

In Altiplano households the second meal of the day or almuerzo is usually a hot soup--the day's "liquid meal"--and is generally served before family members leave for their field tasks or at mid-day. The soup almost always contains potatoes, cut in halves or quarters. Frequently it also contains chuño, onions, condiments, and--about one-third of the time--a piece of meat. The above ingredients can be considered constants. However, certain variety is achieved by adding special ingredients from time to time--like rice, quinua, barley, squash, carrots, oca, corn, or even sheep's milk. It is this special additional ingredient that often gives the soup a special name which suggests a different meal entirely. In reality, however, most soups are simply variations on a theme of potato broth. The following recipes are provided to give an idea of the limited range of soup-making options. The principal differences are found not in the soup itself but in the preparation of special ingredients to be added to it.

RICE SOUP
(SOPA DE ARROZ)

This recipe is provided by Victoria Deheza de Torrez, of the community of Jaruma.

INGREDIENTS

Rice	one-half pound
Luki potatoes	two pounds
Onion	one medium-sized head
Salt	according to taste
Lard	one spoonful
Chuño	two pounds
Water	two liters

The water is placed in the cooking pot along with salt, diced onions, and the lard, which is used in place of meat. While the water is heating one peels the potatoes and cuts them in six pieces apiece, then washes them once and places them aside in a bowl. The rice is placed in another bowl, filled with water, and should soak for ten minutes. The chuño should have been soaking in water since early in the morning; at this time it should be washed twice (two changes of water) and placed in another cooking pot containing two cups of water. The bowl of rice should now be drained and added to the first cooking pot. When the water begins to boil it is time to add

the potatoes. These should be cooked until both are done. The soup is served in bowls. The cooked chuño is drained and served in a single dish from which each participant in the meal serves himself. The above recipe should be sufficient to feed two adults and two children.

NOODLE SOUP WITH MILK

This recipe is provided by Petrona Coaquira de Coaquira, of the community of Huacuyo.

INGREDIENTS

Noodles	one pound
Milk	two small pitcherfuls
Water	three small pitcherfuls
Onion	one head
Salt	one spoonful
Potatoes	five
Chili peppers (aji)	ground, according to taste

Into a clay cooking pot is placed three pitcherfuls of water, the salt, and an onion. As the water heats, one peels the potatoes and cuts them into small chunks or slices. When the water begins to boil it is necessary to add the noodles. When these are cooked it is time to add the two pitcherfuls of milk. The ground peppers are added last to enhance taste and color. This meal can be served with chuño photi (boiled chuño) or boiled caya (dehydrated oca). The above recipe will serve five persons.

CHUÑO SOUP
(CHAIRO DE CHUÑO)

This recipe was presented by Rosa de Apaza at the First Regional Conference of Women of the Traditional Technology Project, held at Pillapi on November 13-14, 1981.

INGREDIENTS

Potatoes	three pounds
Chuño	two pounds
Habas and peas	according to one's possibilities
Carrots	two
Onions	two
Meat	one-half kilo
Chili peppers (aji)	two, ground
Salt	five spoonfuls
Cumin, oregano, parsley	as one prefers

One must first prepare the chuño. This is done by beating the chuño with the grinding stone to soften it up a little bit. The chuño is then soaked in water until it becomes swollen, then squeezed three times and set aside. Next, the potatoes must be peeled and cut into chunks. A cooking pot containing seven liters of water and five spoonfuls of salt is placed on the stove and brought to a boil. Meanwhile, one fries the onions, carrots, habas, and peas. When the water is boiling the potatoes are put into the pot. Once the potatoes are cooked the fried vegetables and the chuño are added, along with the condiments. At the moment the soup is served, one adds parsley to enhance the taste and the appearance.

WHEAT SOUP
(SOPA DE TRIGO)

This recipe is provided by Lucia Quispe de Apaza of the community of Chiarhumani.

INGREDIENTS

Meat	one-fourth kilo
Carrots	two
Onion	one head
Potatoes	one pound
Wheat grain	two pounds
Habas	a few
Peas	a few
Salt	according to taste
Water	three liters
Condiments	according to taste

First, the cooking pot is filled with three liters of water, salted according to one's taste. While it is coming to a boil one must wash the piece of meat. The carrots, onions, habas, peas, and potatoes are peeled, diced, and added when the water comes to a boil along with condiments. The wheat grains are toasted in a ceramic oven, then ground coarsely. This is then sifted, the coarse pieces destined for the soup, the finely ground grain for other uses. The coarse grain must first be washed several times, then added to the soup for thickening. The above recipe will serve four persons.

FISH SOUP
(WALLAQ'E DE CARACHI)

Residents of Yuka frequently consume fish instead of meat because of their proximity to Lake Titicaca. The fish is acquired through barter in exchange for dehydrated oca or huma caya; and for these transactions the women fish merchants sometimes come to the community twice a week. Described below is a recipe for fish soup, provided by Modesta Yanarico de Maquera of Yuka.

For this soup one needs a kilo of fresh carachi--small, scaly fishes which are caught in Lake Titicaca. They must be very fresh, caught the same day. One places in the cooking pot the desired quantity of water, perhaps three liters, with a couple spoonfuls of salt and k'oa or incense. While the water is being heated to a boil, one must clean the fish--removing their scales and washing them with two changes of water. When the water is boiling one throws in peeled potatoes, cut in half, ground chili peppers, cumin, garlic, and the prepared fish. This soup should cook for about an hour over low heat. It can be served for breakfast, lunch, or supper. However, this soup is not recommended for children under eight years of age because they can choke on the fish bones. Instead, they can be served the broth and the potatoes.

SQUASH SOUP
(SOPA DE ZAPALLO)

This recipe is provided by Albina Chipana de Apaza of Chiarhumani.

The cooking pot is filled half full with water and placed on the stove to heat. Meanwhile, one must peel carrots and onions. When the water boils one throws in a piece of meat and some salt and the cut vegetables. Next, one removes the skin of the squash, cuts this vegetable into small squares, and places them in the soup. Finally, the potatoes are peeled and cut in half, then added to the pot. The soup should cook on low heat for about an hour and a half. Before serving it is good to add a pinch of oregano. This kind of soup is usually prepared by Albina during the fiesta of Holy Week and Easter.

MERIENDA FOOD

The merienda is usually the third meal of the day, eaten in the field sometime after mid-day. For reasons of convenience, the merienda generally consists of "dry food" or comida seca. If prepared in the farmhouse, it is taken to the field wrapped tightly in a textile woven of llama wool known as a tari, which can keep the food warm for hours. Otherwise the meal is prepared at the field work site on an improvised fireplace.

The most common merienda foods consist of boiled products, both fresh and dehydrated. These almost always include potatoes and chuño, and may occasionally be complimented with boiled ocas, papalisas, or habas and perhaps tunta, huma caya, or caya seca. When hired laborers are involved, the merienda tends to be more elegant because the meal is considered part of the wage payment. In this case the merienda will usually include meat--mutton or dry charqui for example --and cheese. These foods are generally served from a single large pan from which all participants serve themselves. Food is eaten with the fingers, with products dipped into a hot sauce or cheese sauce accompanying the meal. Normal meriendas with family laborers usually include water as the beverage, but when hired laborers participate such beverages as chicha, beer, and soft drinks may be served.

The following narratives describe examples of typical merienda fare.

MERIENDA WITH HABAS AND CHUÑO

INGREDIENTS

Dry habas	five pounds
Chuño	four pounds
Ají	four
Cheese	one medium
Onion	one head
Salt	according to taste

The habas and chuño are placed to soak for a day in a five liter can filled with water. The day the meal is prepared, one first separates the habas and places them in a cooking pot. The pot is filled with water until the habas are covered and placed on the stove to heat. Next, the chuño is washed and squeezed in three separate washings, then placed in a second pot which is filled with water until the chuño is covered, and finally placed on the stove to cook. While both pots are cooking, one grinds up the chili peppers, mixing them with chopped onion to create the hot sauce. This meal, together with the cheese,

is wrapped in a tari for transport to the field. It will be served at the work site between twelve and one O'clock in the afternoon. The meal described above will serve five workers.

BAKED POTATOES
(WATIA DE PAPAS)

Watia de papas is a merienda food prepared at the work site. It is most commonly served during planting and harvesting tasks. The following description was provided by Ricarda Illa de Ramos of the community of Killay Belen.

INGREDIENTS

Potatoes	one-half arroba (12.5 pounds)
Phasa (a mineral)	one handful
Charqui of llama	one kilo
Cheese	one medium

The watia can be prepared from potatoes (but not the bitter varieties), ocas, and papaliza. These products are baked underground in an improvised oven, so the first step is to prepare this oven. In the parcela or crop lot where the work occurs one selects a flat place and digs a shallow hole about 10 cm deep and about 40 cm long by 40 cm wide. Next, one gathers an assortment of khulas or sods of earth of different sizes. With these one builds an oven, rounded on the outside, empty on the inside. The larger sods are used at the base, and progressively smaller sods as the oven roof is constructed. An opening must be left at the bottom of this oven for filling the oven with fuel. This opening must face the wind. When completed, the oven will stand about 50 cm high. The fire is kindled with straw and dry cattle manure. The fire should be started about three hours before the merienda is served.

When the oven has heated for two hours, the potatoes (or other tubers) are placed inside on the ashes. Then the oven itself is broken down so that the dirt buries the potatoes inside. There the potatoes should be allowed to cook for 60 minutes. They will announce when they are ready by giving off a special cooked odor. The cooking time will depend on the quantity of potatoes. For every six pounds of potatoes one can calculate about half an hour. The potatoes are removed from the oven using a digging hoe. They are tossed onto an aquayo and must be eaten immediately while still hot.

It is customary to serve with watia de papas a sauce for dipping made out of phasa. This is a mineral found in the ground, very similar to limestone. It is taken from mines located in the communities of Patacamarja and Achocalla and can be bought at the weekly market. Phasa comes in the colors of white and grey, the latter reputed to be a better-tasting material. The mineral is extremely popular with rural people, and it is often served in place of meat,

cheese, or eggs for merienda meals.

There is a special belief involving the preparation of watia in the community of Killay Belen. The woman who is preparing the meal must be especially vigilant at the time she places the potatoes inside the oven, making sure there is no man in sight who is urinating at that precise moment. If this happens, the potatoes will later emerge from the oven half-cooked, as if they had been soaked with water. To defend the meal from this risk, many women elect to punch holes in the potatoes with a needle, or with the spines of cactus, before placing them in the oven.

The above merienda recipe will serve six workers.

MOSKHO

Moskho is made from damaged potatoes, which are soaked in water for a month and then left outside to freeze (then sun-dry) to complete the dehydration process. Moskho is a principal--sometimes exclusive--merienda food for families who have suffered a bad agricultural year. The preparation of moskho for the merienda is quite simple. The tubers are soaked in warm water for three hours, with several changes of the water itself. Once soaked, the skins are peeled. These potatoes must then be boiled for half an hour. When cooked, moskho can be served with charqui of llama or cheese. Some families eat only moskho for their meriendas.

LAGUA DE MAIZ

Another merienda meal is lagua de maiz or creamed corn, which is generally served with boiled potatoes. This dish is particularly popular in the community of Killay Belen, which grows its own corn. The ears of corn are shelled by hand, then the grains are ground into a fine corn meal using a hand milling stone or batán. To this meal water is added to form a smooth dough. Next, a combination of water and milk, salted to taste, is placed on the stove to boil. Upon boiling, the corn meal is added to the liquid. It must be stirred constantly with a wooden spoon so that the bottom of the pot will not burn. After cooking for half an hour the lagua is ready. It is placed in a tari to preserve its heat and taken to the field work site. The lagua is served as a sauce in which boiled potatoes may be dipped.

CENA OR SUPPER FOOD

Under normal circumstances, the cena or evening meal is served between seven and nine O'clock at night. The contents of this meal tend to be somewhat more variable than those eaten earlier in the day. For example, when there is no time to prepare a separate meal in the evening, the cena will often consist of warmed-up leftovers from the almuerzo or merienda. Other times the cena may resemble tea or breakfast, because it may be nothing more than a cup of coffee and some bread. However, when there is time to cook a separate meal in the evening, the cena is usually a "dry" dish. The most common ingredient will always be potatoes, and these will be served most of the time with a dehydrated product like chuño or caya. Perhaps as frequently as one-third of the time the evening meal will include rice or its primary substitute quinua. If the household has chickens and sometimes consumes rather than sells their eggs, the most likely way they will be served is fried (with rice) and almost always for the evening meal. Very occasionally the family may also have a cena of sopaipillas, easy-to-prepare fritters made from wheat or cornmeal. In general, the final meal of the day for most Altiplano households is characterized by convenience of preparation.

PESCKE DE QUINUA REAL

Pescke or boiled quinua is one of the most traditional dishes prepared in the Altiplano. It is cooked with greatest frequency during the rainy season, first because at this time of year other products are growing scarce, but also because housewives have less field tasks to complete and therefore have more time for pescke, which requires close supervision in its preparation. The following recipe comes from Felipa Chipana de Morante of the community of Chiarhumani.

INGREDIENTS

Quinua	one kilo, washed
Cheese	one medium
Milk	one liter
Salt	one spoonful

The most essential ingredient of this recipe is to obtain white quinua grain, which results in a white pescke, and not the brown quinua, which is mostly used for toasting. This quinua should be washed by rubbing the grains vigorously between both hands inside a vessel of water. The water will have to be changed three or four times. When the water remains clear after washing the grain, this means that the grain is clean and has lost its bitter taste. Meanwhile, one should be heating water to a boil in a ceramic cooking pot.

This should be done using a fogón (wood or manure fueled fireplace) instead of a gas stove, because the latter does not provide a flame that is hot enough to cook quinua properly. Furthermore, ceramic cooking pots are also better than aluminum in preventing the quinua from sticking to the bottom of the pot and burning.

The clean quinua grain should be placed in the pot and boiled for 15 minutes. Next the pot should be drained of its liquid, then replaced with four cups of water and boiled until the water disappears, then two cups of water added and boiled until it disappears. When the quinua grains begin to break in half, they are cooked. At this moment the pot should be removed from the stove and placed on the floor of the kitchen. Here the contents should be beaten vigorously with a wooden spoon. Salt is added. The quinua is beaten until it is smooth and creamy.

There are three ways to serve pescke of quinua. One way is to crumble up a cheese and sprinkle it on top of each bowl of pescke which is served. The second way is to place milk in the bowl. The third way is called pescke humachi, which consists of making a soup out of the quinua. This usually happens when there exists leftover pescke from the day before. The soup is made by simply adding water to the pescke, along with any other ingredients one normally uses for soups.

AJI DE PAPALISAS

This recipe is provided by Pacesa Quispe de Huallpa of Jaruma

INGREDIENTS

Papalisas	four pounds
Potatoes	three pounds
Ají (hot peppers)	two or three, according to taste
Habas	according to one's possibilities
Onions	four heads
Meat	one-half pound
Salt	according to taste

The papalisas and meat must be washed several times, then placed in a clay cooking pot to boil. In a second pot one places to cook the potatoes, peeled and quartered. The hot peppers are ground up in the batán or handmill. These ajís should be yellow in color. The onions and habas are fried in oil, and then mixed with the ground pepper. These are now added to the cooking pot containing the papalisas. The potatoes, when cooked, are drained and also added to the single pot. The combined ingredients are boiled together for fifteen minutes and then served, as a thick stew, with rice.

PHUTI

Phuti refers to steam-cooked dehydrated products, such as chuño, tunta, and moraya. The food is prepared in a steamer-pot in precisely the same fashion as quinua dough crackers. In other words, three sticks are placed in the bottom of the cooking pot, followed by a floor of straw, and a cup of water in the bottom to provide the steam. The tubers are placed on top of the straw. The lid of the pot is closed tightly. The phuti is then left to cook for about half an hour. This food is served for meriendas and cenas.

PREPARING GUINEA PIG

Cobayos or guinea pigs are consumed by the household only on very special occasions, usually on a holiday like Christmas or Easter. The following description was provided by Petrona Coaquira de Coaquira, of the community of Huacuyo.

First, one puts water on the stove to boil. Next,the throat of each animal to be eaten is cut and the carcass left alone for the blood to drain. When the water is boiling, each cobayo is dipped into the pot for a few seconds, then its hide scraped rapidly to remove the hair. The dipping and scraping may occur several times until the body is completely free of hair. Next, each animal is gutted. The intestines and other internal organs are served to the dog. The carcasses are then cleaned very carefully with one or more changes of water. They are then placed in a pot of boiling salt water and cooked for half an hour. While the cobayos are cooking, the housewife prepares the other ingredients of the meal--perhaps rice, potatoes, phuti, and hot sauce made from peppers and onions.

When the cobayos are cooked, their broth is served to the dog. The meat of each cobayo is cut into six pieces. These are now fried in oil, with the pieces sprinkled with flour and salt. The meal would be served with boiled potatoes on one side of the plate, phuti of tunta or humacaya on the other side, rice in the middle, and the cobayo meat on top. Over this would be spread the hot sauce.

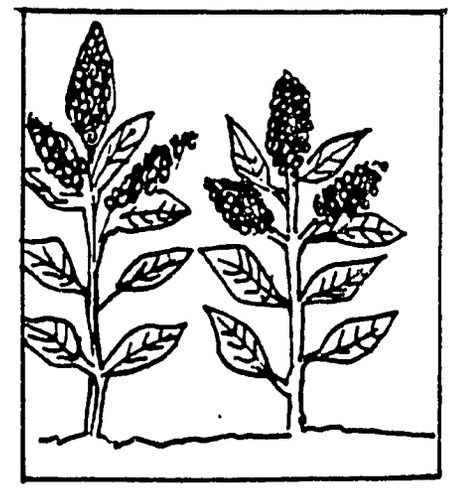
EMERGENCY FOODS

Subsistence households must take many precautions to guarantee their survival in the inhospitable climate of the Altiplano. They scatter their plots, they plant at different altitudes and at different dates. They use many different varieties of seed. And a significant portion of their harvests is processed into dehydrated products that can remain edible in dry storage for several years. However, after a disaster has occurred there are still additional measures that can be taken to safeguard family food supplies. One of these is to collect wild plants. Not only are these plants edible, but there exist traditional recipes based on them.

As an example of emergency foods, we present the case of Chiarhumani. In this community there are three plants which are eaten in times of food scarcity. These are ajara (also known as chullpa jufa),a plant similar to quinua; illama (also known as chullpa cañagua), which is also a wild grain; and achacana, a cactus. These plants grow as weeds and grasses both within and outside of crop lots. If by the time potatoes must be hilled there has not yet occurred any damage to the crop--from rain, frost, hail, etc.--farmers will remove these plants and destroy them or serve them to livestock as fodder. In contrast, if the potato crop has been seriously damaged, the emergency food plants will be left to grow in the furrows to be subsequently harvested when they reach maturity.

The following recipes are provided by Vicenta Mamani de Quispe.

AJARA OR CHULLPA JUFA



Ajara or Wild Quinua

This plant grows particularly well in soils where ashes have been spilled. Basically, ajara is a wild quinua. It sometimes grows larger than domesticated quinua and can actually produce larger yields. But unlike quinua, its grain comes in only one color --black. Ajara is used for a variety of dishes. These include pito, allpi, q'ispiña, and phiri

Pito or toasted grain flower is commonly eaten for breakfast or as a snack food on long trips. Pito made from ajara is virtually the same as that made from other cereal grains. The ajara must be first washed. This is done by placing the grain in water and rub-

bing it vigorously between the palms of the hand. The water must be changed several times. Slowly the ajara will change its color from black to white, losing its bitter taste. Next the grain must be sun-dried in the patio of the farmhouse for about two hours, then taken--while still humid--and toasted in a ceramic toasting oven (see TOASTED GRAIN). The toasted ajara is then ground into a coarse flour using a hand milling stone or khona. Once ground it is ready to be eaten. Pito of ajara can remain edible for up to three months.

Allpi is a thick, hot beverage most commonly prepared from purple maize. It is usually drunk at breakfast. Because of its consistency--almost like a thin porridge--it is famous for burning the mouth if swallowed too quickly. Allpi made from ajara (instead of corn) begins with the boiling of water with a little salt. To this is added pito de ajara, which is left to thicken the liquid for five minutes. It can then be served with or without sugar, depending on one's taste or economic possibilities.

Q'ispiña of ajara is prepared very much like q'ispiña made from normal quinua grain (see QUINUA DOUGH CRACKERS). The principal difference is that after toasting the grain, it is first necessary to mix this grain with ashes taken from the stove and rubbed between the palms of the hand to make a fine powder. After being mixed with this ash, the ajara grain is sifted and then ground in a hand mill. The resulting flour is mixed with water, salt, and baking soda to make a dough. The q'ispiña crackers are then shaped in balls or half-moons and placed in a steamer pot to cook. The pot itself is a normal ceramic cooking pot into which have been placed three sticks which support a straw floor. A small quantity of water is placed in the bottom, the q'ispiñas on top of the straw platform to steam cook for an hour and a half.

Phiri is also made from pito or toasted ajara grain. The flour is placed in a cooking pot, water is slowly added, and the mixture constantly stirred until it becomes a porridge. Salt is added according to taste. Before serving, the phiri should be removed from the heat and allowed to thicken and cool for two minutes. The dish is served most often at breakfast.

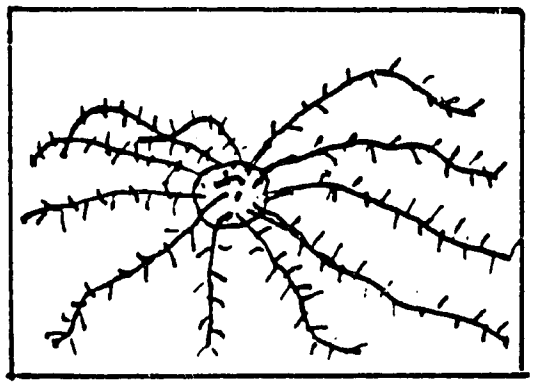
Illama or Wild Canagua

ILLAMA OR CHULLPA CAÑAGUA

This wild plant resembles another domesticated cereal grain--cañagua (Chenopodium pallidicaule)--and also produces black-colored grain. It grows by extending itself along the ground, with several stems growing as a clump from a single base. It is used to make pito and phiri. Although made from illama, these dishes are prepared exactly the same as when ajara is used.

ACHACANA

The achacana is a species of cactus. The base of the plant produces a round body about the size of a medium potato. From this spiny body extend about a dozen string-like branches. The achacana becomes edible during the months of December and January, which coincides with the "hungry season" for farm households when food stocks are becoming exhausted. For a meal serving five people, it would be necessary to collect about 15-20 achacanas. Their skins must be peeled because they contain so many spines. They must then be cut into chunks or crushed before being placed into a pot of boiling water containing salt, diced onions, and condiments. Once cooked for half an hour, the achacanas become very much like chuño, and the meal itself resembles chairo de chuño or chuño soup.



Achacana

QUINUA LEAVES
(CH'IWA)

When there exists a scarcity of food, the residents of Jaruma utilize the leaves of the quinua plant or ch'iwa for human consumption. Ch'iwa is boiled as part of a soup, often combined with potatoes or chuño. It is used to replace rice or noodles. The potatoes and chuño are cooked in one pot, the ch'iwa boiled in another. For a normal meal--for five persons--approximately two handfuls of ch'iwa would be used. Quinua leaves are also boiled as a replacement for meat.

MAKING CHEESE

Most highland families make cheese, primarily for market sale but sometimes for home consumption. Cheese is made from cow's milk, sheep's milk, or a combination of both. The early months of the calendar year are the most likely time for making cheese. This is because the rainy season has brought an abundance of natural pasture, livestock are well-nourished, and lactating animals have excess supplies of milk. The following description of cheese-making is provided by Sabina Nina de Quispe of the community of Huacuyo.

PREPARING THE COAGULANT (CUAJO NATURAL)

Cheese is made with a cuajo or rennin--an enzyme that coagulates milk which is found in the stomach of calves. This coagulant can be home-made, known as cuajo natural; or it can be store-bought and is known as cuajo Americano, sold in the form of small tablets. The home-made cuajo is preferred because it will last over a year. Store-bought cuajo only lasts about a month.

To make natural cuajo, one takes a newborn lamb which has been orphaned or rejected by its parent and therefore doomed to die. This animal is kept inside the farmhouse for several days and made to suckle cow's milk from a baby bottle. Then, on a day of intense sunshine, the newborn is forced to sleep outside in the patio. The milk inside its stomach heats up and coagulates, causing the lamb to die. The animal is butchered and its stomach (still full of coagulated milk) removed to dry for about a week. Sometimes a lamb will die by accident, with its stomach empty. In this case the animal is butchered, its stomach removed, and the stomach filled with sheep's milk. After drying the contents of the stomach become cuajo. Under conditions of dry storage it will last for many months, so small quantities can be removed as needed whenever cheese-making occurs.

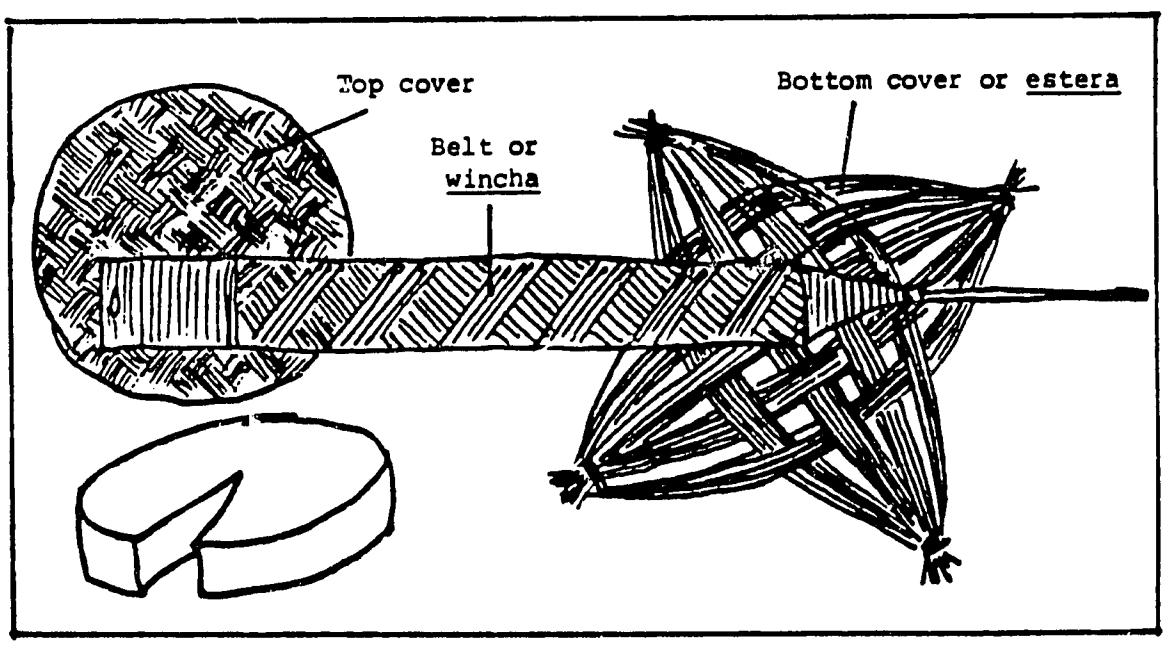
MAKING THE CHEESE

This recipe calls for three liters of cow's milk, one-half liter of sheep's milk, two large tablespoons of salt, and cuajo natural as needed, perhaps a couple of teaspoons. The implements for cheese-making include a cheesecloth for filtering the milk, a ceramic pot for cooking it, a molding set for shaping the cheese, and a shallow dish. The molding set contains two lids made of woven straw, and a belt (also of woven straw) for wrapping around the cheese to give it a round shape.

The milk is poured into a ceramic pot, carefully filtering it through the cheesecloth. This milk is placed on the stove to cook at low heat. Meanwhile, the ration of cuajo is dissolved in a little warm water. When the milk is warm (but it must not be allowed to boil) it should be removed from the stove. The dissolved cuajo is added to the milk. The milk is then returned to the stove and allowed to boil for three minutes, Once more it is removed, covered tightly, and left to cool and coagulate.

Next, the cheese mold is prepared. One takes a shallow dish or lamana and places it on a table. The lower lid or straw mat, called an estera, is placed inside this dish. The cheese-molding belt is fastened in the desired circumference and placed on top of the estera.

After carefully washing the hands, one squeezes the now-coagulated milk one handful at a time to remove as much of the liquid as possible. This material is then placed inside the prepared mold. A few pinches of salt is sprinkled on top. Then a second layer is added and sprinkled with salt, then a third and if necessary a fourth layer until the coagulated material protrudes a few centimeters above the top of the belt. If the cheese is being prepared for family consumption, even more salt will be added. This is so the cheese will "work harder" (para que obre más) during the merienda. The second straw lid is now placed on top. Using the palm of the hand, one must push down hard on this lid, which will cause more liquid or suero to be removed from the cheese. The belt is then removed, also the straw lids, and the cheese is left to be cooled. If no more cheeses are to be made, the molding set is washed.



Implements for Making Cheese

The liquid which was removed by squeezing the cheese is saved and returned to the cooking pot, where it is cooked for a period of four hours. When this material has cooled, it is squeezed and shaped with the hands (but not using any mold) to form a mound resembling a round loaf of bread. This cheese product is known as requezón and is similar to cottage cheese. It is generally reserved for family consumption, not market sale.

Cheese destined for the market was priced in early 1981 at about 25 pesos or US$1.00 apiece. From three liters of milk, one can make two cheeses.

HUMACHA CHEESE
(QUESO HUMACHA)

This recipe describes a dish which combines cheese with potatos. Queso humacha is usually a merienda dish, eaten in the field with all laborers dipping their boiled potatoes into a single plate of cheese sause. The recipe comes from Victoria Deheza de Torrez, of the community of Jaruma. It will serve ten adults.

INGREDIENTS

Cheese	1 whole cheese, crumbled
Onions	5 heads, chopped
Chili peppers (aji)	according to taste
Wacataya	several leaves, chopped
Potatoes	4 pounds
Salt	according to taste

One must first peel the potatoes and put them on the stove to boil. While they are cooking, the onions are cut up--into strips or chunks--as one desires. These are fried with a little oil and mixed with the ground chili peppers. Once the onions are well-fried, the cheese is crumbled and added to the pan. Also added at this time is the chopped wacataya, which is an arromatic plant used specially to prepare this dish. The humacha should end up as a sauce, not too dry but not too runny either. It is served in a single dish. Participants use their hands, dipping the boiled potatoes into the sause.

BREAD MAKING

Bread making is a very time consuming task. Gathering sufficient fuel for heating the oven can be a serious problem. And to make the investment in labor and fuel worthwhile, bread must be baked in large quantities, that is to say, on a commercial basis. For these reasons only a very few highland families--usually no more than one or two per rural village--are bakers of bread at least once a week.

Even so, bread remains one of the most important items in the Altiplano diet. Practically no breakfast is considered complete without it, and it is also consumed for tea and supper as well. Thus, a family that does not bake its own bread must inevitably buy or barter for bread almost continuously. Because of the importance of this commodity, we include a description of how bread is made. The following description was provided by Felipa Chipana of the community of Chiarhumani. In this case, "bread" refers to small breadrolls, not loaves, and hundreds of them are baked at a time.

INGREDIENTS

Flour	one quintal (100 pounds)
Water	three (10-liter) lard cans
Lard	two pounds
Yeast	one package
Salt	a few tablespoons, to taste

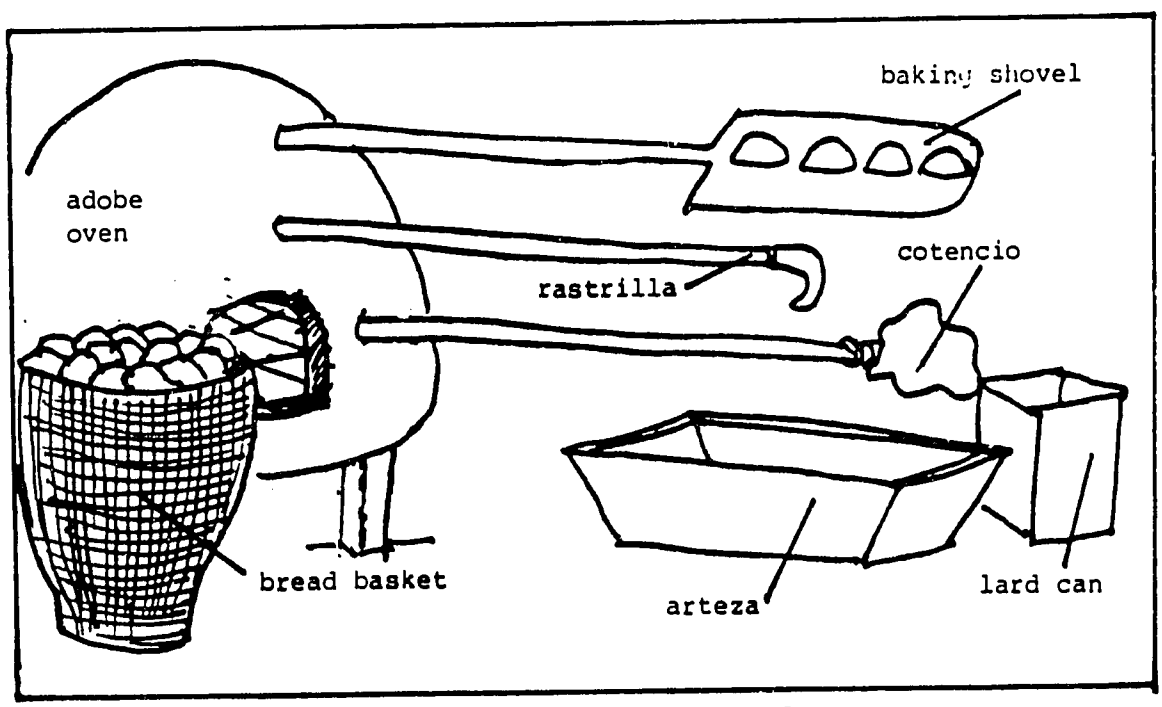
First, the flour, yeast, salt, and water are mixed together in a wooden trough or arteza, kneading with both hands to make a dough. The lard is then melted, poured over the dough, and mixed in with the hands. The finished dough must be neither too runny nor too dry, but in between. The task of preparing the dough begins at two O'clock in the morning. The dough is then left to mature (rise) for about four hours.

At six O'clock in the morning the oven is fired. The fire will be maintained for at least three hours, then allowed to burn to ash. While the oven is heating, the dough is rolled into little balls, one piece at a time. These dough balls are placed to further mature on wooden planks. They are covered with sacks or cloths.

Around eleven O'clock the door of the oven is opened and the ashes removed with a shovel. Next, the floor of the oven is cleaned several times by means of an implement known as the cotencio, which consists of a long pole with damp rags attached to one end. The dough balls are now placed on a wide but

very thin wooden baking shovel. Each dough ball is flattened with the palm of the hand into an oblong shape. These are then placed--one shovelful at a time--in neat rows on top of the hot oven floor. As rolls become fully baked, they are removed by means of a curve-tipped rake or rastrilla. When sufficient space becomes available on the oven floor, one or more new shovelfuls of raw rolls are placed inside to bake. The finished rolls are colected in a basket. While they are still warm they are cleaned with a rag to remove any ash that may have stuck to the bread.

From one quintal of flour, it is possible to bake 650 breadrolls. Of these, about 50 would be saved for family consumption and the remainder sold. In mid-1981 the price for breadrolls was 1.5 pesos (US$0.06) apiece, or an income of 900 pesos (US$36). The total cost of the bread-making ingredients (also estimated at mid-1981 prices) would be 660 pesos (US$26.40), of which 600 pesos represents the cost of the flour alone. This leaves a net cash income of 240 pesos or US$9.60 plus 50 breadrolls for home consumption with a value of 75 pesos (US$3). From the above net income it is still necessary to calculate the cost of fuel. Doña Felipa did not specify how much this fuel would cost. However, she did say that the baking of 650 breadrolls would require ten fardos (bundles) of firewood, the value for which could be estimated at about 150 pesos. This would leave a cash return to family labor--for one day's work--of 90 pesos (US$3.60) or almost twice the daily wage rate for hired labor which prevailed at that time.



Implements for Making Bread

MAKING CHICHA FROM QUINUA
(K'USA DE JUIRA)

Chicha is a home-made alcoholic beverage made from grain. Until only a few years ago it was the traditional beverage prepared by highland communities to celebrate their local celebrations, and for serving at work days during planting and harvesting season in which hired or exchange laborers were participating. However, making chicha is a very time-consuming process. Depending on the quantity to be prepared, making chicha can require the combined stoves of several households, many days of labor, and two or more weeks for fermentation. For these reasons the preparation of chicha is beginning to disappear in many highland communities, and chicha is being substituted with beer, alcoholic beverages, and soft drinks.

The usual ingredient for making chicha throughout most of Bolivia is corn. Nevertheless, chicha can also be made from quinua, peanuts, and other grains. The recipe described below is for chicha made from quinua. It is based on explanations provided by Máxima Cachicatari de Hoyo and Valentina Mamani de Ramos, both of the community of Killay Belén. The recipe is intended to produce 640 liters of chicha, which is enough to get 80 people completely drunk during a community fiesta lasting three days.

INGREDIENTS

Ground quinua	four arrobas (100 pounds)
Mojch'y	four pounds

OTHER MATERIALS AND IMPLEMENTS

Cisterns (wacullas)	minimum four, of 320 liters capacity apiece
Cooking pots (ollas)	minimum eight, of 16 liters capacity apiece
Stoves (fogónes)	four
Firewood	three cargas or loads, sufficient to keep four stoves burning for one day
Stone grinding mill	one or more
Ceramic bowls	two
Toasting ovens	eight, or two per stove

GRINDING THE QUINUA

First, the quinua grain must be washed. Then it must be dried in the sun for about six hours. Once dry, the grain must be ground into flour. This is done using khonas or grinding mills. Of the four arrobas of ground quinua, the first four pounds are separated for the preparation of mojch'y or the catalyst for fermentation.

PREPARATION OF MOJCH'Y

For the quantity of chicha to be prepared with 100 pounds of quinua, it is necessary to make four pounds of mojch'y, which in turn requires the participation of some 14-15 people. They will be divided into two groups, each group placed in a tight circle around a ceramic bowl. Each participant will be given about one quarter of a pound of quinua flour. Their task is to put one spoonful of the flour at a time into the mouth, moisten it with saliva until it becomes a paste, and then spit this paste into the ceramic bowl. This continues until the four pounds of quinua flour have been converted into paste. The preparation of mijch'y is conducted the day before the chicha is to be cooked. Meanwhile, the rest of the grain is being ground into flour in order to prepare a dough used in chicha-making called feri.

PREPARATION OF FERI

On the following day, beginning very early in the morning, the firewood is assembled and fires started in four stoves. These stoves will be kept burning all day long, and at least one person tending each stove will be needed. Next, the quinua flour is mixed with water--in two separate basins--and kneaded into a dough, called feri. While this feri is being prepared, the eight toaster ovens or jik'ys are placed, two at a time, on their respective stoves and heated. The feri is then toasted briefly in these ovens, perhaps two handfuls at a time, which serves to enhance both the taste and coloring of the chicha. When all the dough has been toasted, it is collected again in basins and taken to be emptied on top of a tablecloth extended on the ground, where it should dry in the sun for about three hours. The heat of the sun will cause the dough to begin to ferment.

COOKING THE CHICHA

While the feri is drying and fermenting, the clay cooking pots are filled with water and brought to a boil on the stoves. To each pot is then added about two handfuls of the dough. This dough is mixed thoroughly with the hot water--creating a kind of quinua broth--and boiled for a while. The solution is then emptied into one of the large cisterns or wacullas. When one cistern has been filled (about 20 cooking pots in volume), the next cistern is filled. The boiling of water and mixing of feri continues until all the dough has been used.

Next, to each cistern exactly one-half (or two pounds) of the mojch'y is added. This must be stirred vigorously so that the mojch'y mixes completely with the boiled quinua broth. Once this has been done, the cisterns must now be slowly emptied again--one cooking pot at a time--to be boiled a second time on the stove. The newly-boiled chicha is then emptied into a third and fourth cistern.

FERMENTING THE CHICHA

After the third and fourth cisterns have been filled, the first two are washed very carefully, removing all residues and impurities. Then, a cloth is placed over the mouth of each cleaned cistern and the chicha poured back again--one pot at a time--filtering the liquid through the cloth. Through this process the undissolved lumps of cooked quinua dough--known as jamch'y--are separated out. In this way each waculla is filled with chicha. These cisterns are then covered with sheep skins (the wool side, if any, facing out) and bound tightly with leather rope to make the vessels airtight.

The wacullas should be located in a warm room, preferably the kitchen of a farmhouse. This warmth promotes a more rapid process of fermentation of the chicha. The beverage can be consumed anytime after a period of two weeks. If left longer the chicha becomes even stronger. A well-fermented chicha can make one drunk after drinking only two gourds or cupfuls.

CONSUMPTION OF JAMCH'Y

The undissolved quinua dough screened out of the chicha remains as a very thick soup. More affluent families consume the finer parts of this material and leave the coarser jamch'y to be fed to pigs. Poor families will consume every bit of it. Jamch'y can last for four or five days without spoiling. It is eaten like a porridge. From one day to the next it is only necessary to reheat it.

MAKING NON-ALCOHOLIC CHICHA

Many households in the Altiplano have been converted to a religion which prohibits the consumption of alcoholic beverages. Among such families it is therefore customary to prepare chicha as a refresco, that is, as a refreshment or non-alcoholic drink. The following recipe for such a chicha is provided by Reymunda Mamani de Rojas of the community of Chiarhumani.

INGREDIENTS

Corn	six pounds
Cinnamon	one-quarter ounce
Clove	a few, according to taste
Sugar	four and one-half pounds

This chicha is made with corn, which must be purchased. This grain must first be toasted before it is ground. The corn is cooked in the jik'y until it turns a dark brown, but it must be stirred constantly to keep it from burning. After toasting the corn must be ground, but to a coarse rather

than a fine meal.

Once ground, the cornmeal is divided into three equal parts (of two pounds each), which correspond to three five-liter cans. The water for the chicha must be well-boiled. It should be boiled together with the clove and cinnamon for several hours. This boiling water is then added to the three cans already containing the cornmeal. This mixture should be allowed to set for half a day. After that time the liquid will acquire a yellow color, and if this color does not appear when expected, the chicha should be allowed to rest even longer. Once the yellow appears, the liquid of the three cans should be drained off into three new cans. This should be done gently so as not to disturb the residue at the bottom.

To each of the cans containing the drained chicha, one must add a pound and a half of sugar. If one prefers a sweeter chicha, more sugar can be added. But the chicha still lacks adequate color. To darken the beverage one can burn several tablespoons of sugar in the flame of the oven. When this burnt sugar is added, it turns the chicha into a cinnamon-colored beverage.

CHAPTER VI.

HYGIENE AND HEALTH

Because of the central importance of water supplies to family hygiene and health, this chapter begins with a detailed description of rural wells in the Altiplano--how they are constructed, maintained, and used. This is followed by descriptions of how farm households wash dishes and cooking utensils, their clothing, and how they bathe.

Next, the chapter deals with the subjects of menstrual hygiene, childbirth, and breast feeding practices. This is followed by a section on major childhood diseases, where we present the personal testimonials of several rural mothers describing their attempts to protect their children from scarlet fever and mumps.

The day-to-day home remedies of rural households are based on a huge number of medicinal plants. In a non-specialized study such as this one, we can only hint at the breadth of rural knowledge on this subject. We do so by briefly describing a single Altiplano woman's herbarium of over three dozen plants. With this background, the chapter concludes with 14 narratives by highland women describing home remedies (or the practices of traditional healers) for curing a variety of common ailments and symptoms. What is perhaps most enlightening about these narratives is the fact that many rural households are already making use of injectable antibiotics or other modern medicines.

WELLS

One of the routine, daily tasks of the rural household is obtaining water for domestic use--for watering livestock, drinking, cooking, and washing. Such water can be obtained from a variety of sources. During the rainy season, those families living in houses with adobe tile or metal roofs can collect rain water from the gutters. Some households collect their water from rivers or streams, at least part of the year. However, the primary source of water for domestic use are wells.

It is extremely difficult to generalize about rural wells because they represent such diversity in their construction, use, maintenence, capacity, and so on. Most wells are used collectively by several families, sometimes as many as eight or ten; yet many households have constructed small wells for their individual use. Some wells are several meters deep, others less than a meter. Some are fed by a spring, others replenished by groundwater seepage. Some dry up for several months a year, others provide water year round. Some wells are covered with a roof, enclosed in a hut, or protected by a lid; others are totally exposed. Many wells are lined with rock or concrete while others are simply unimproved holes or ponds dug in the ground. Well maintenence is highly variable as well. Some families clean their wells at least every two months, others never bother. When cleaned, some users throw quicklime in the water as a purifier, others simply dig out sediment, skim the surface, or screen out tadpoles and scum. Some groups of well users are highly cooperative, distribute well maintenence tasks equitably, and are careful to keep livestock from dirtying their water supply; other groups may fight continuously over these aspects.

In the following pages we will describe a variety of wells and water supply practices in the five communities of Yuka, Huacuyo, Killay Belen, Chiarhumani, and Jaruma.

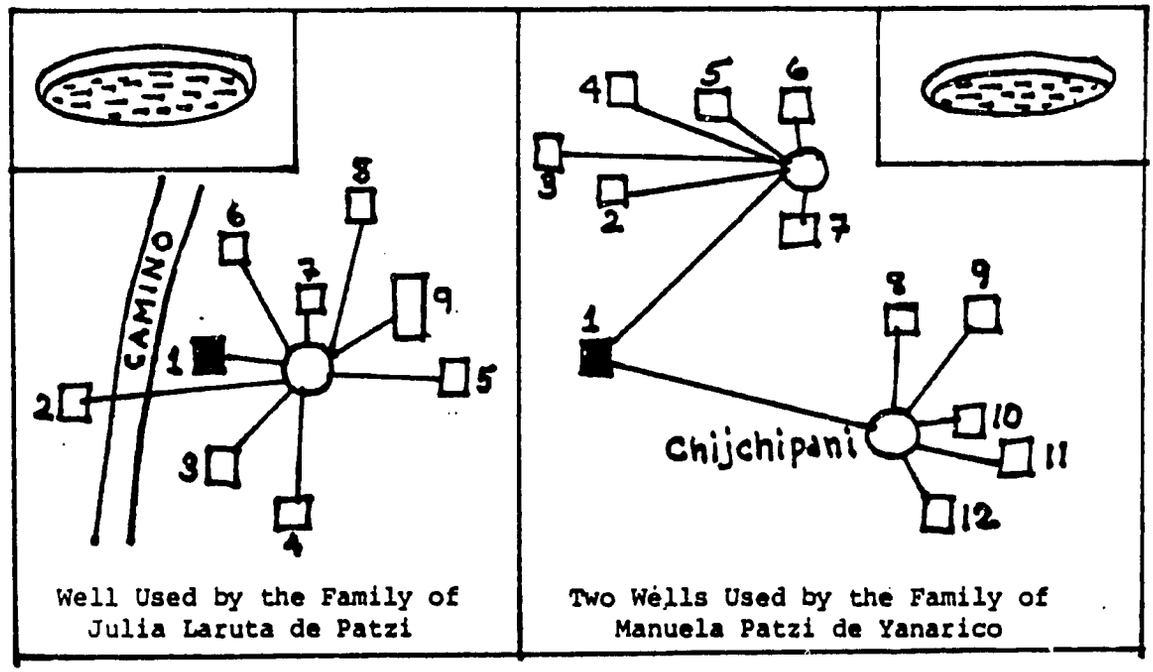
YUKA

The family of Julia Laruta de Patzi shares a well with seven other households plus the teachers of Yuka's elementary school. It is one of the oldest wells in the community; none of its users know when it was constructed. The well has a depth of three meters and is two meters in diameter. It consists of a simple hole. It has no wall, it is uncovered, it is not lined. During some years the well dries up during the month of November, in which case its users must draw their water from a second well located about 700 meters away. The primary well is cleaned three times each year--in January, June, and November. The well is cleaned in the following fashion. First, all its water

is removed. Next, a ladder is placed inside the empty well and a worker descends with a shovel. He cleans out all the sediment encountered at the floor of the well, then sprinkles the well bottom with five kilos of quicklime. The well cleaning task requires half a day of labor.

The family of Manuela Patzi de Yanarico draws its water from two wells. The first of these, located closest to their home, only has water from January to June. It is shared with seven other families, but its dimensions are not specified. The second well is known as Chijchipani and is used from July to December. It is two meters deep, 2.5 meters in diameter, and is fed by a spring. It is shared with five other families. This well is unlined and has no cover. It must be cleaned three times a year, but this task has not been equally divided among all users; those most interested in hygiene usually do the cleaning. No quicklime is used, however, because not all users have been willing to contribute money for its purchase.

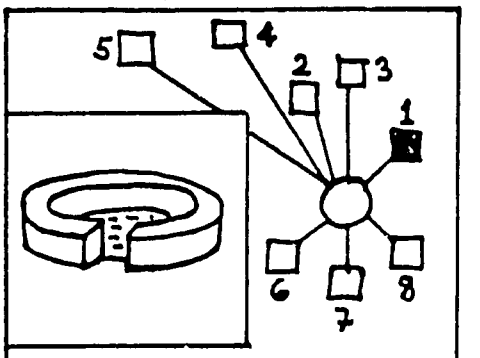
The Chijchipani well is one of the oldest in the community and is considered to be sacred. In those years when rainfall is scarce or overdue, community leaders go to the well at sunset. There a burnt offering is made. A small bottle of well water is taken from Chijchipani (all participants must avert their eyes so as not to witness this ritual "theft") and taken back to the center of the community, where at midnight a second burnt offering is made and the sacred water sprinkled on the ground. This ritual is intended to "call the rain" to the community.



Well Used by the Family of Julia Laruta de Patzi

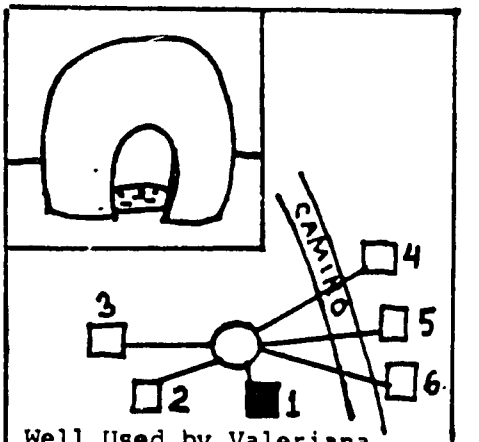
Two Wells Used by the Family of Manuela Patzi de Yanarico

The well where Dominga Laime de Maquera draws her daily water is shared with seven other families. It was built by its users in 1976 and measures 60 cm deep by 40 cm in diameter. Because it is surrounded by a low adobe wall, the well water remains quite clear and hence the structure has never been cleaned. Nor has the water ever dried up. Because the well is located near the path taken by local residents going to weekly market in Escoma, many passer-bys also consume water from this well--dipping in with their hats or plastic bottles.



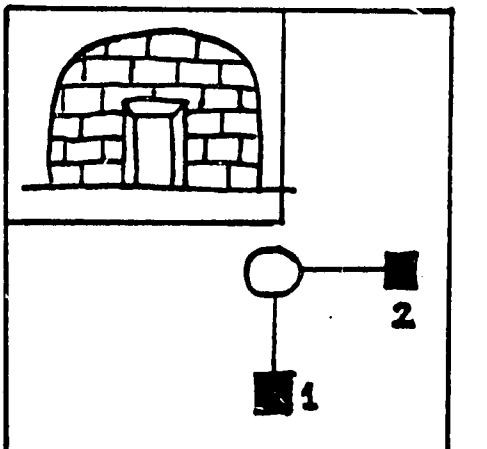
Well Used by Dominga Laime de Maquera

Valeriana Laruta de Yanarico and her family draws their water from an oven-shaped covered well. The well is 2.5 meters deep and 50 cm wide, with walls of stamped earth. The Yanarico household plans to someday line the walls with cement, but no agreement with the six other families which use the well has yet been reached. The well water never dries out. The structure is cleaned once a year, in August, at which time a kilo of quicklime is used. The water is only used for drinking and cooking. For the watering of animals and washing of clothes, Yuka residents must go to the Cala Cala River, which empties into Lake Titicaca.



Well Used by Valeriana Laruta de Yanarico

Lorenzo Patzi and Raul Quenallata built a well for their respective families in 1980. It took them three days, digging with crow bars and removing the dirt in buckets. When they reached a depth of five meters they encountered water. It then took them a fourth day to line the well with stone, leaving a diameter of one meter. The well also is covered with a little house made of adobe bricks and complete with a door and wooden frame. The well has not yet had to be cleaned. It was built because the former well used by both families was located quite distant and on a slope; and during the rainy season, family memebrs often slipped and spilled their loads while fetching water.



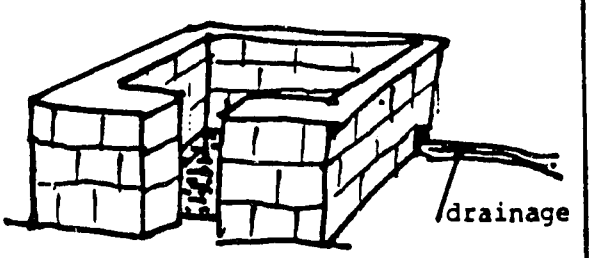
Well Built By Lorenzo Patzi and Raul Quenallata

HUACUYO

The Coaquira household does not have a well. It draws its water from the Sopocachi River. Water for drinking and cooking is fetched at six O'clock in the morning and five O'clock in the afternoon. During the day livestock are taken to the river three times. Washing of clothes is also done at the river. The cleanliness of the river is supervised by its users. They take turns every week or so to walk to Huma Jalsu, the site where the stream is born, to check for any dead animals--perhaps a dog or a burro--contaminating the water. Every time following a rain, the river water becomes quite muddy; it then becomes necessary to wait at least six hours before drawing water for domestic use, or until the water has become clear again. Water is hauled by plastic bucket, then stored in a tacho or large plastic cylinder with a lid. Every time the tacho is nearly empty, the sediment and water at the very bottom are thrown out, because it is in these dregs that the family has found little white worms.

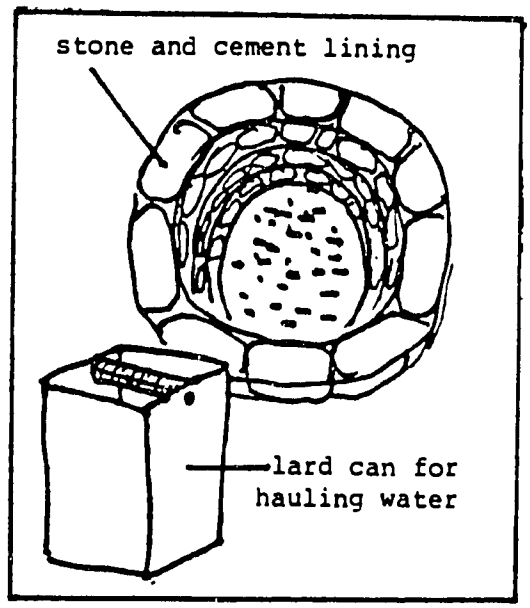
The well where Antonia Ramos de Mamani draws water is very old. It is located on a steep slope in a place called Jalsu Phujo and was built by their ancestors. It is a round pit, 40 cm deep by 50 cm in diameter. Antonia says her husban Ramón measured the well's capacity at 200 liters per hour. They clean their well three times a year--in February, March, and October--but they do not use quicklime. The family has a second well nearby which it uses for watering its livestock, washing clothes, and soaking potatoes to make tunta. These wells can be used all year; they never dry up. Neither of these wells has been improved with a rock lining, a protective wall, or a lid or roof.

One of the best-constructed wells in the community belongs to the family of Juana Choque de Tito. It is rectangular in shape--about 70 cm by 60 cm by 40 cm deep--and is surrounded by a wall of adobes on four sides, leaving a narrow entrance. The well is not covered. Juana says they must clean it every two weeks. The well never dries up. Indeed, it overflows into a drainage ditch, and this is used for watering the family's livestock.



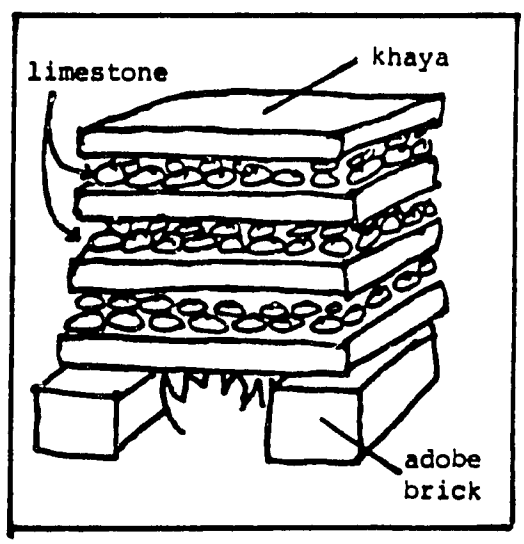
Well Used by the Family of Juana Choque de Tito

Josefa Mamani de Velasquez draws water for her family from a well they constructed in 1973. It is 1.5 meters in depth, one meter in diameter, and is completely lined with rocks and cement. The construction of this well required 3.5 bags of sand, one bag of cement, and 100 cut stones. The family cleans the well twice a year, in February and November. Every two months they purify the water with two kilos of quicklime. The well never dries up, and in the months of February and March it overflows. The normal capacity for the well is eight cans of water. In this case, the "can" is a 10 liter lard can into which a wooden handle has been nailed to facilitate hauling. This is the most common conveyance for hauling water in the Altiplano. During the rainy season the Velasquez household collects rainwater from its roof gutters, which is far easier than making trips to the well twice a day.



Well Used by Josefa Mamani de Velasquez and Family

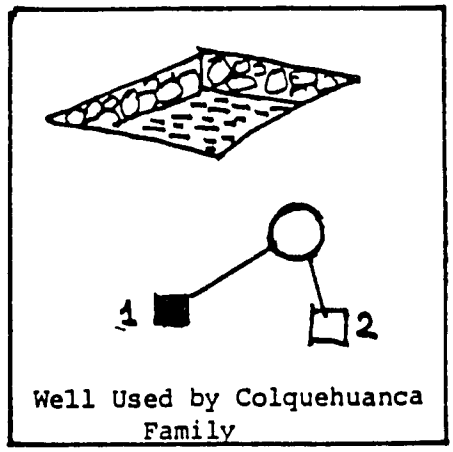
Quicklime or cal is used by many families to purify their wells, but the product is not always bought. Valentín Quispe Tito makes his own. First, he brings limestone from a vein in a nearby mountain. Next, he gathers blocks of dry animal manure known as khaya. Then a fireplace is constructed in a windy location. The base is made of three adobe bricks, leaving an opening for stoking the fire. On top of the adobes is placed a block of khaya, then a layer of limestone, then another block of khaya, another layer of limestone, and finally a top layer of khaya. The fire is then lit. It is left to burn all evening. The next day Valentín gathers the baked ash or quicklime. It is enough to last the family a year or more for its purifying of water and other uses.



Procedure for Making Quicklime from Limestone

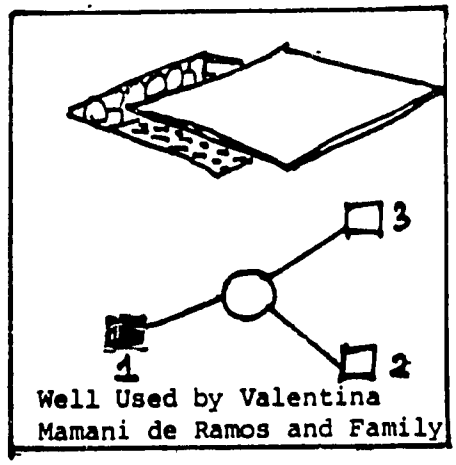
KILLAY BELEN

The family of Tomás Colquehuanca shares a well with one other family. The well is square--with sides measuring 40 cm--and has a depth of one meter. It has a floor of gravel and sand, and is lined with stone. This well is cleaned once a year, on the fiesta day of Exaltación or September 14th. Once cleaned , the well is purified with a tin can (condensed milk type) filled with quicklime. This material is also added to well water during the rainy season to kill toads and tadpoles. The well is spring-fed, but nonetheless it dries up during the month of November.



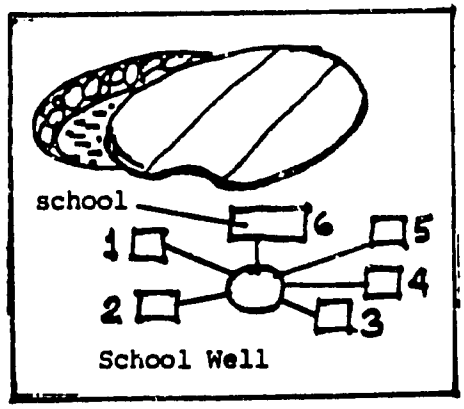
Well Used by Colquehuanca Family

The well used by Valentina Mamani de Ramos and her family is shared with two other families. All three households are located almost exactly 15 meters from the well, but the well itself stands on the property of the Ramos household. This well was built in 1970 by the three families which share its use. It is square, each side measuring 80 cm, with a depth of 80 cm as well. The well has a tin cover which is intended to keep out the kairas or frogs. Each user family cleans the well once a year--in January, May, and September. It is spring-fed but sometimes dries up during November. When this happens, its users draw their water from the well of the schoolhouse.

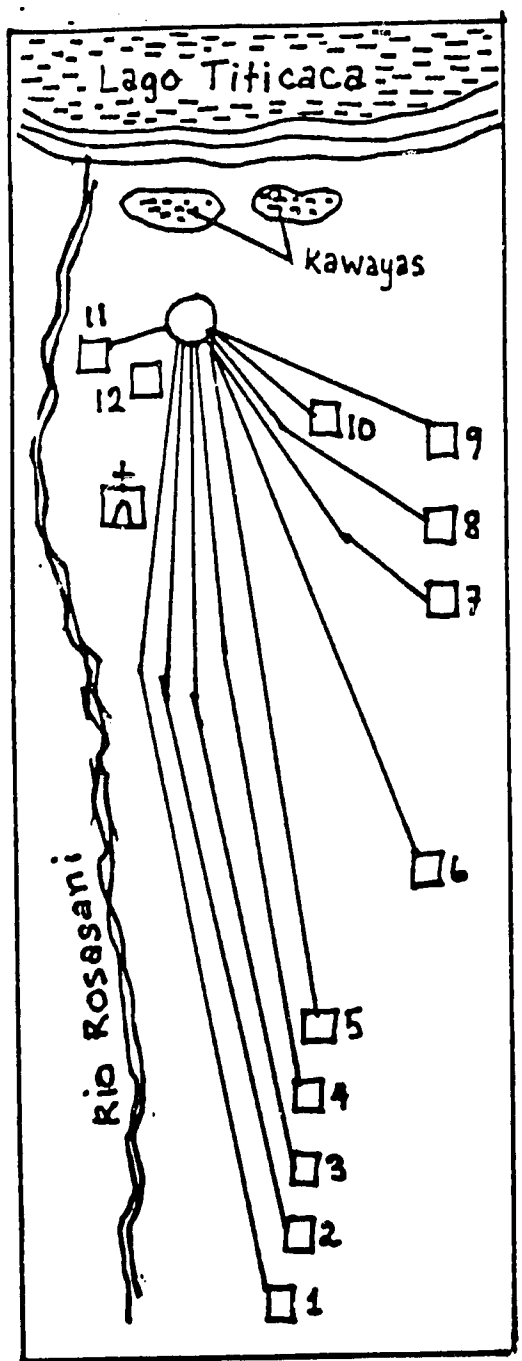


Well Used by Valentina Mamani de Ramos and Family

The well of the schoolhouse is one of the oldest in the community. It is spring-fed and never dries out. In addition to the school teachers and students, the well is used by five families. The structure is one meter deep and has a diameter of 50 cm. It was reconstructed in September 1980--completely lined with rocks--and given a new cover of molded tin.



School Well



Well.Used by Pedro Illa Family and 12 Other Households

Pedro Illa's family draws its water from the largest well in Killay Belén. This well is shared by 12 separate households that are scattered throughout the community. The well itself is located in the bottomlands of the ex-hacienda, to the right of the Rosasani River that tumbles down the steep hillsides to divide the community in half. The well is lined with rocks with a depth of 1.70 meters and a diameter of 60 cm.

The well is cleaned once a month, a task requiring 2-3 persons for an entire day. The water is emptied, the dregs removed, and quicklime added to kill the frogs. Since the well is located in a property which is rented for the pasturing of sheep by community residents during May and June, it is necessary to keep the animals carefully supervised so that they do not dirty the well. Residents are charged a daily fee to pasture their sheep (5 pesos or US$0.20 in 1980), and the payments are used to support the community school.

The well is mainly used during the months of June through November; at other times its users supply most of their domestic water needs by collecting rainfall from the roof gutters of their homes and storing it in large cisterns. Sometimes the well dries up. In this case its users collect their water from kawayas or small ponds located near the shoreline of Lake Titicaca. This water is somewhat salty. Water for drinking and cooking is never drawn from the Rosasani River because it is considered too dirty. The water of this river is only used for washing clothes and for watering livestock.

CHIARHUMANI

In Chiarhumani wells are called phuchus. About one-third of the residents have individual wells, while the balance share wells among three or more families. Because of the greater aridity of this zone, wells must be dug much deeper. In turn, this complicates both their construction as well as their cleaning.

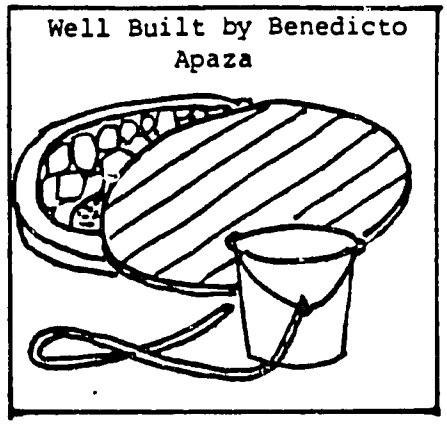
Lidia Ramos de Mamani draws water for her family from a well shared with six other families. It is fed by a spring. The well is 80 cm. deep and 60 cm. in diameter; it has no protective wall and no roof. It must therefor be cleaned every two or three months. To clean the well, Lidia uses a pair of empty sardine cans--the first to remove the water, the second to remove sediment, tadpoles, frogs, and other sources of contamination. She then rinses the well and allows it to fill. The other users of the well have never conducted a cleaning, says Lidia; to the contrary, they complain that she ties up the well's use with her cleaning. A second problem involves well access. The well is located in a field often used for planting crops, particularly onions. This situation obliges well users to make a time-consuming detour. Lidia would love to have a well near her own house, but the family only owns property a long distance away from their residence. Clothes washing is done at the well site, with dirty water being thrown into an arroyo nearby. As for watering her livestock, Lidia carries water from the well to her home, where she serves her animals in a trough located in the patio of the farmhouse.

Felipa Chipana de Morante draws water from the well of her father, who has a house located in Chiarhumani's town square. The well is located in the patio of the house. It is ten meters deep and one meter in diameter; it has never dried up. The Morante household procures its water in the following way. Felipa or her husband fetches a load of water first thing in the morning. Then, every time Felipa pays a visit to her parents, she takes her bucket to bring a load of water; and every time her mother or father come to visit her, they bring a load of water with them. These arrangements are necessary because the Morante family lives on the edge of town, a long distance from the plaza.

The well is cleaned twice a year, in April and November. The task requires four adult workers, so Felipa and her husband assist her parents. It takes almost a day just to remove all the water from the well. This water is collected in a pit behind the house and used for mixing clay for the making of adobe bricks. Once the well is emptied, Felipa's husband or father enters the well, cleans out all the sediment, and scatters a kilo of quicklime.

One of the family's greatest aspirations is to have a conveniently located well of their own. Lidia's husband, Paulino, has tried several times to dig a well next to the farmhouse on their own property, but each effort has encountered solid rock or janka after a depth of two meters. Paulino believes they will have to dig 10-15 meters to encounter water. To penetrate the rock with greater facility, Paulino plans to use dynamite.

The well used by Benedicto Apaza is one meter in diameter and seven meters deep. Benedicto built this well himself in 1945. It is completely lined with rock and cement, and covered with a wooden lid to discourage contamination by frogs and other causes. Benedicto has his well cleaned only once every two years. This is because it takes two days just to remove all the water. For well cleaning he hires two minka laborers. He pays them with a special meal of roast lamb prepared by his wife, Doña Lucia.

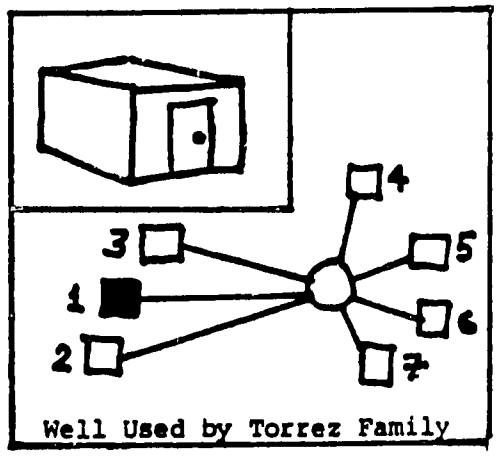


Well Built by Benedicto Apaza

JARUMA

In Jaruma, well contamination is a serious problem. In September 1980, the family of Felix Aruquipa Sullcani and four neighboring households were forced to abandon their well; this is because the well was plagued with frogs and tadpoles. Even if they cleaned it every two weeks, the contamination would resume and the water would become muddy and smelly. As a last resort, the well users contracted with the yatiri (traditional authority) to implore the spirits to banish the plague from their well, but to no avail. In the end, the effected households had to construct a new well in another location.

The well used by the family of Santiago Torrez is one of the best protected to be found anywhere. The structure was built by seven families in 1974, and they continue to be its only users. The well is rectangular--about 1.25 meters long by 75 cm wide--and has a depth of one-half meter. It is completely enclosed by a wellhouse, and boasts a wooden door and lock. This well provides its users with water for drinking and cooking only.



Well Used by Torrez Family

The family of Venancia Trujillo de Nina uses three wells. The first is a spring, completely uncovered. Its water is fairly dirty and must be cleaned almost every month. The second well is also spring-fed, perhaps even dirtier than the first. It is mainly used for washing clothes, watering livestock, and making tunta. The third well is a spring containing water that is very "sweet" and clear. It is considered the best well in the Cayaca zone. For this reason it is protected by a wellhouse built in the form of an oven. Unfortunately, this third well dries up during several months of the year, thereby obliging its users to draw their water from more contaminated sources. All three wells were built by their ancestors, and each has a depth of three meters.

Felicidad Calle de Apaza, from Ojtaya, draws water for her family's drinking and cooking needs from one well, but for washing dishes and clothes she uses water from two other wells. The first well is spring-fed and the only source of sweet water in Ojtaya. Most local residents draw their water from this well. It is lined with rock, with a depth of 50 cm and a diameter of 60 cm. Since the well is uncovered, it must be cleaned every one or two months. This cleaning chore is not well-organized; but left to the voluntary cooperation of user families, the well gets cleaned regularly--perhaps because the small size of the well does not make cleaning an odious task.

The sweet water well is located the furthest from Felicidad's house. The other two are quite close. She uses these for her dish and clothes washing chores because of their convenient location.

WASHING DISHES AND COOKING UTENSILS

Washing dishes and cooking utensils is a daily task for highland women. These chores are definitely considered a female responsibility and therefore are rarely conducted by men except when the wife is absent or sick. Without the benefit of running water or sinks, the washing of dishes is a very cumbersome process. Dishes are normally washed in a large, metalic basin--the same vessel used for taking baths, washing the hair, and other hygienic activities. Usually, warm water is used together with a powdered detergent--such as Ace, a product manufactured in Peru. Soap suds are then rinsed off with clean water. In other words, highland women probably wash dishes much like anyone else--given similar circumstances and facilities.

However, while the act of washing dishes may be similar, the timing and sequence of the task is exactly opposite those of an urban housewife or maid. In the city it is customary for dishes to be washed after the meal; but in the Bolivian rural household, dishes are washed immediately before they are to be used. This is quite logical behavior when one considers that most highland kitchens have no cupboards; hence, there is no place to store washed dishes under reasonably sanitary conditions. Furthermore, cupboards are not necessary because the average household has such few plates and cups. Indeed, in some families there are not enough utensils to allow all members of the household to eat together at the same time. Thus, dish washing becomes an integral part of the process of food preparation, something that is done just before food is served. The stove is already hot. It can be used both for cooking as well as for heating water for washing. This eliminates the need to heat water a second time, after the meal has been concluded, thereby saving time and fuel.

Furthermore, when dishes are washed in urban families, it is usually the case that the dishes will be cleaned first, after which the same soapy water will be used to wash the pots and pans. In other words, pots and pans are usually left until last. However, in the Altiplano the reverse is true. It usually happens that, after the meal is served, the cooking pot will be filled with clean water with absolutely no suds. The object is to dissolve all food residues into a liquid broth. Into this broth is added all existing wet garbage such as potato peels, onion skins, and so on. The resulting concoction is then served to pigs or other livestock. Thus, no scrap of food is wasted, nor is any liquid thrown away in which vegetables or meat have been boiled. Once the contents of the cooking pot have been pre-rinsed and served to animals, the pot itself is easier to clean. This final washing is done with warm water and detergent, again just before the pot is to be used to cook a new meal.

WASHING CLOTHES

Washing clothes is another chore which is considered a female responsibility in most families. Nevertheles, there are households where each member of the family--with the exception of infants--is expected to wash their own clothes. The frequency with which clothes are washed is quite variable, depending on the urgency of other farm tasks. During the very busy planting and harvest seasons, clothes may be washed no less frequently than twice a month. At other times, clothes may be washed weekly. A mother with an infant may find herself washing her baby's diapers almost on a daily basis.

A common day of the week for washing clothes is Sunday. It is also common for the female head of household to bathe her body and wash her hair on this day. As is true with so many daily or weekly tasks of the rural household, they are often scheduled so that more than one task can be accomplished simultaneously. For example, if a woman takes her livestock to water at the river, she may take advantage of this trip to do her washing of clothes or personal bathing. When clothes are washed at the farmhouse, this requires repeated trips back and forth to the well to fetch water; given an abundant supply of water, it makes sense to use the same day to wash one's body as well.

The following description of washing clothes at home is provided by Valentina Mamani de Ramos of the community of Killay Belen.

The clothes to be washed are placed to soak in a large wash tub filled with water. The tub and its contents are placed to heat in the sun, usually around mid-day when the sunshine is most intense. If possible, white and delicate clothes should be separated in one tub, while heavy, colored fabrics placed to soak in another. The cleaning detergent--which cost 13 pesos per bag (US$0.52) in late 1981--is sprinkled directly on the clothes, and each piece of clothing is then rubbed vigorously. The white or delicate fabrics should be washed first. When apparently clean, these clothes should be squeezed nearly dry and placed to soak in a tub or bucket of clean water. They are then squeezed and rinsed and squeezed and rinsed again to remove the suds. The soapy water remaining from the washing and rinsing of delicate fabrics should be poured into the second tub and utilized to wash the heavier garments. The procedure is then repeated with the latter.

Once washed and rinsed (three or four changes of water are required), the clothes should be spread to dry on the grass, large flat rocks, bushes, or clothesline. The clothes are collected when dry and are ready to wear. It is not customary to iron them first.

PERSONAL BATHING

Given the difficulty of gathering and heating water, the lack of bathing tubs or showers, the discomfort of the cold Altiplano climate, and the unending chores which compete for one's limited available time, the act of taking a complete bath is not very frequent among the adult members of the highland farm family. Excluding the splashing of one's face with water or wetting and combing the hair in the early morning, washing the body is not a daily activity. In times of intense agricultural activity--planting and harvesting season especially--a complete bath may occur no less frequently than once a week. Possibly the dominant bathing model in the Altiplano is that of the partial or progressive bath: one day the hair is washed, the next day the body is washed from the head and shoulders to the waist, and the third day the body is washed from the waist down. If there is one day that can be considered the most likely for bathing, it would be Saturday or Sunday--because highlanders wish to look their best when they attend church services or go to the market. The most likely hour for baths to be taken is near mid-day, when the air is warmest and the sunshine at its brightest. Frequency of bathing and shampooing partly depends on age or sex. Babies are washed daily. School children usually wash daily--either before they leave home or at a stream on their way to school--so they will look their best in class. Because of their long hair, women shampoo more frequently then men. Also, because women are responsible for watering livestock, fetching water, and washing clothes, they are in more frequent contact with water sources and therefore face bathing opportunities more often than men.

Whether she bathes at home or at a river or well, the highland woman washes herself by stages. First, while fully dressed, she washes her hair. Some women use detergent, such as Ace, while others use simple soap or a tiny plastic bag of shampoo. Once thoroughly lathered, the hair is rinsed twice or with two changes of water. If bathing at home, the soapy water resulting from these rinses can be saved and used to soak clothes that are due to be washed. The wet hair is then wrung and partly towel dried. In the second stage of her bath, the woman washes from her shoulders to the waist but without removing her skirts. Upon drying herself with her towel, she immediately puts on her undershirt, blouse, and sweater or jacket to prevent becoming chilled. Next, the body is washed from the waist down with plenty of soap and water, then dried. She dresses again, first putting on her panty, then a body shirt, then a narrow skirt known as mankancha, then another mankancha, and finally her pollera or outer skirt. Finally, the woman combs her damp hair, braids the hair in two, and then ties these braids together behind her head with a piece of brightly colored wool yarn known as tullma or kanaña. Her bathing ritual is now complete.

MENSTRUAL HYGIENE

In Aymara, menstruation is called phajjchi-wila. Phajjchi means "from month to month"; wila means "blood". At the approach of her period, the woman prepares several pairs of clean panties and a number of sanitary napkins. In earlier years it was customary to use napkins made of vegetable fiber, or absorbent material cut from sacks or cloth. But today many highland women use a commercial sanitary napkin with the brand name Mimosa.

The menstruation lasts three days. During this period it is recommended that one avoid bathing of any kind, particularly in cold water. If one needs to wash and cannot postpone it, this must be done in warm water heated on the stove. It is believed that bathing in cold water during menstruation can cause the retention of blood and residues that might otherwise be lost normally, and this can result in clots. Similarly, it is recommended that during menstruation the woman refrain from consuming certain foods. These include sheep or cow's milk, eggs, hot peppers, and cold beverages in general. Such items are believed to make menstrual cramps more intense.

The used sanitary napkins should be washed in water that has been warmed by the sun. This should be done as soon as possible after use. At the end of the period, the washed napkins (including disposable Mimosas) are wrapped in a cloth and stored in a secret place until the following month.

CHILDBIRTH

Of course, childbirth practices vary considerably from one community to another and even between families of the same community. Some births are attended by a midwife, others by the husband. However, rural women in the Altiplano have an intense fear of giving birth in a hospital, so it is extremely rare for children to be born anywhere except at home. The largest differences in childbirth practices are evident after the baby is born. They involve length of stay in bed, disposition of the placenta, customs for washing the baby, higiene of the mother, visitation by friends and neighbors, and other aspects. Some differences arise not regarding the practices themselves, but rather involve differences in how those practices are justified or explained. In the following pages we provide a composite description of childbirth practices as reported by women from the communities of Killay Belen and Jaruma.

PRE-NATAL PREPARATIONS

Apparently there are very few special practices which are followed in the highland communities observed regarding the care of expecting mothers. In Killay Belen a practice was reported called the thalantadas. At different points during her pregnancy, the expecting mother is made to lie down on a blanket stretched on the floor. Between two and four people grab different ends of the blanket, lift the woman off the ground, and gently toss her up and down for a few minutes. This practice is intended to cause the fetus to settle into the correct positions inside the womb so that it will eventually be born normally and easily.

But in general, during their pregnancy rural women are expected to eat the same diet as the rest of the family, and they will be actively engaged in the normal farming activities until the moment they feel their first labor pains. For example, Leandra Trujillo de Huallpa--from Jaruma--was harvesting potatoes when she felt her first contraction. Petrona Marca de Condori --also of Jaruma--was weeding onions when her labor began; and even after returning home she continued to work on a weaving she had started, and was preparing her family's evening meal when the birth began. Nicolasa Illa de Quispe, of Killay Belen, probably triggered her labor by giving a little jump to the ground while climbing over the fence of her pig pen.

Once the birth pains begin, however, several pre-natal preparations are customary. One is for the pregnant mother to prepare and drink one or more different kinds of mates or herb teas, usually without sugar. Mate de romero is made from a herb which apparently stimulates body heat. Mate de azucena serves as an anasthetic for minimizing the discomfort of the birth pains. Mate de altamisa is believed to speed the delivery itself. Some women prefer to chew coca leaves, which in addition to having a proven anasthetic effect is also believed to keep evil spirits away.

Another preparation is to construct the bed where the mother will rest--not before but after the child is born. Known as the patajate, this bed is constructed with a base of adobe bricks. This base is covered with a layer of straw, a layer of sacks and rags to form a mattress, but most importantly a sheepskin mantle to keep the mother as warm as possible. The patajate is often constructed in the kitchen, which tends to be the warmest room of the house.

GIVING BIRTH

Highland women seldom give birth lying down, but rather in a squatting position. Sometimes the husband steadies his wife from behind--usually by holding her head rather than her body--or massages her stomach with chicken grease, which causes a great sensation of heat. As the child emerges, the husband (or midwife) gently receives the infant, makes sure it is breathing properly, and sets it aside. His first responsibility is to remove any blood from around the eyes and ears, if any, or to keep blood from touch-

ing these parts--which is believed will cause blindness or deafness. The infant is kept covered with a cloth or mantle to keep it warm until the emergence of the afterbirth. This can take anywhere from a few minutes to an hour. If the afterbirth is delayed, it is the husband or midwife's task to prepare a home remedy for this situation. One remedy used in Killay Belen is to make the mother drink a cup of warm, soapy water. On top of this, the mother is also made to drink a mate de romero or other herb tea; these beverages should facilitate the cleansing of all residues left in the womb and uterus.

upon the appearance of the afterbirth, the umbilical cord must now be severed from the infant. First, a piece of wool is used to tie off the cord at a distance of about two finger-widths (30 cm) from the baby's stomach. Just beyond this tie the cord is cut in two. Depending on the family, this task will be done with one of several instruments: scissors, a piece of sharp glass, the sharpened lid of a tin can, etc. Once the cord has been cut, the mother is taken to her special bed to rest. A wide cloth or huaka is wrapped snugly about her abdomen; it will help to maintain warmth in this area of her body. Then a handkerchief is rolled up and tied about the mother's head--a practice intended to prevent headache.

POST-NATAL ACTIVITIES

After the cutting of the umbilical cord, the infant is bathed in a basin containing a warm solution of water with medicinal herbs. One such herb, known as tunu wari, is believed to enhance the baby's strength. Romero water is often used as well because it produces a sensation of warmth. Some families wash the infant in such liquids together with soap; others do not believe soap is advisable. Either way, the baby is washed, rinsed in additional herb water, and dried. It is then wrapped snugly in several layers of swaddling clothes made of absorbent materials. The baby is finally placed with its mother. However, it will not be allowed to nurse for 24 hours.

Once the baby has been washed and returned to its mother, it is necesary to dispose of the afterbirth. The placenta is washed--with two changes of water--to remove all traces of blood. If the infant is male, the placenta will be buried somewhere outside the farmhouse. But if the infant is female, the placenta must be buried inside the home. This is done in a corner of the dwelling where chuño or potatoes are stored; it symbolizes the hope that the female child will someday contribute to a house full of produce. Following the disposal of the placenta, it is also necessary to either wash or bury all the rags and clothing that have been bloodied during the birth process. If washed, this chore must be done inside the house. If buried, this should take place inside the house during the day, or outside only after sunset. There exists a fairly widespread belief that if the sun's rays "see" blood, this will surely result in a hailstorm.

Soon after a mother goes into labor, members of the immediate household (or neighbors and relatives) slaughter a sheep. The meat of this animal will be used in special meals prepared for the mother over a two week period. The most common meal for new mothers is a broth prepared with meat, chuño, and rice. Hot peppers and onions are not included in this nourishing soup because they are considered unsafe for the patient. Likewise, the broth has very little salt; however, the quantity can be gradually increased over the recuperation period. The mother will be served this nutritious meal as soon as possible after giving birth--irregardless of the hour--and thereafter at least twice a day (lunch and supper) for a period of two weeks. Following each meal, the mother is served a herb tea such as mate de romero.

The mother is expected to remain completely bed-ridden for at least six days. In Killay Belen there exists a custom that the mother should always be accompanied--day and night--for the entire week. Some families have a practice of keeping the mother awake at night and asleep during the day. The companions' responsibilities are to make sure the mother sleeps on her side (otherwise there is danger of smothering the infant), while keeping constant watch over the baby until it has received a name (the Devil steals infants which have not yet received a name or been baptized). A further control is to prevent visitors from standing in the doorway of the room occupied by the new mother (believed to cause clouding of the eyes in newborns).

The mother will begin nursing her baby a full day after its birth. Thereafter, the infant will be allowed to suckle as frequently as it desires or as the mother is able to provide for it. Before being allowed to nurse, the infant will first be made to swallow two tiny spoonfuls of child's urine. This is a practice which is believed to prevent stomach ache. To prepare herself for nursing, the mother first soaks each nipple and breast with a warm, wet cloth. She then extracts with her fingers the first milk or colostrum (which is considered of inferior quality) before offering her breast to the baby. (Additional information on nursing is given in a following section. See BREAST-FEEDING PRACTICES)

For at least several weeks after birth, the infant will have its swadling clothes changed once a day. At this time the baby will also be given a bath in warm water. The mother will bathe for the first time after spending a full week in bed. She will wash and rinse herself in romero water that has been warmed on the stove. The residue water from this bath will be emptied <u>inside</u> the farmhouse, lest traces of blood be seen by the sun. Following this bath, the mother will return to her bed for a second week of rest. However, some women will begin to do light domestic chores--like cooking--sometime during the second week of their recuperation. But in normal circumstances the mother is not allowed to leave her house or resume routine farming activities before she has rested for 12-15 days following her childbirth.

BREAST FEEDING PRACTICES

Unless there are mitigating circumstances, the norm among rural mothers in the Bolivian highlands is to nurse their daughters until the age of two, and their sons until they are three years old. This makes breast-feeding much more than a custom; it becomes the basis for a comprehensive parenting system. During the daylight working hours, a nursing child practically lives on its mother's back. Wrapped snugly in an aguayo (mantle used by women for carrying loads), the infant eats, sleeps, and observes its world for endless hours without its feet ever touching the ground. When hungry, a comforting breast is made available to this infant within seconds of its first cry of irritation. When tired, the baby is rocked to sleep by the rhythms of its mother's movements as she herds livestock, prepares meals, fetches water, spins wool, weaves textiles, assists with planting and harvesting tasks, or buys and sells in the marketplace. The baby feels its mother's warmth at all times. It can rarely experience fear or lonliness because the infant is seldom left alone. This integrated system of nutritional, emotional, and physical support is possibly the closest imitation of the womb ever divised by human beings.

Such an efficient support system has fairly simple and economical support costs. Its maintenence primarily depends on the mother's ability to produce a sufficient milk supply to satisfy her child's demands. As rural women see it, lactating mothers have a responsibility to consume plentiful amounts of liquid on a daily basis. Accordingly, those women drink hot beverages at least four times a day--at breakfast, lunch, tea, and supper --together with soups taken at least once a day. Pacesa Quispe de Huallpa of Jaruma explains it very simply: "I drink much liquid so as not to make my baby cry."

For the most part, deficiencies in this support system are practically self-correcting. The body signals its inability to keep up with the lactation responsibility by producing less milk than the baby needs. The baby makes this deficiency known by its crying. To some extent the infant's feeding deficit can be met with bottle feedings and additional amounts of non-liquid food (at least in older infants). But the purchase of powdered milk for supplemental feedings represents a minor disaster for family finances, because the subsistence strategy of farm households is based on limiting cash purchases to a minimum. It is therefore cheaper for the family to invest in improving the nutritional status of the lactating mother--so she can produce more milk--than to buy maternal milk substitutes. Thus, if a rural mother's milk supply becomes inadequate for her baby, there is a high probability that a sheep will be slaughtered and the mother put

on a special diet of meat and vegetable soups. If possible, milk from cows or sheep--that would normally be destined for cheese making for market sale--will be redirected for consumption by the mother and her infant. Such nutritional measures will most likely be complimented by the washing and massaging of the breasts with warm water mixed with medicinal herbs.

Aside from nutritional deficiency which can result in inadequate milk supplies, the lactating mother is advised to be careful about certain foods which can cause problems for her infant. Women in Yuka believe that heavy use of garlic, or a spicy wild plant known as kata, will cause careless mothers to lose their milk supply. Lactating mothers are also cautioned not to drink alcoholic beverages for six months following their childbirth, and after that only in moderation. In Jaruma, mothers are recommended not to eat abundant quantities of greasy foods such as peanuts and fried plantains, because these foods frequently cause constipation in nursing infants. Lactating mothers are likewise cautioned against breast feeding if they have experienced a chill, because this will result in their baby suffering a stomach ache. Incidentally, the antidote for stomach ache is to give the infant a small spoonful of child's urine.

As indicated earlier, there is a compelling economic logic for rural mothers to extend the lactation period as long as possible: maintaining adequate maternal nutrition and milk supply is cheaper than purchasing substitutes for maternal milk. In this regard there exists an economic incentive for Altiplano mothers to avoid frequent pregnancies and to space their children so as not to disrupt the lactation norms of 2-3 years per child. However, in the Bolivian Altiplano as well as elsewhere in the world, even the best efforts at family planning often end in failure.

For this reason, one of the nightmares of the Altiplano mother is the occurrence of diarrhea in her nursing infant. Because according to the experience of many highland mothers, one of the principal causes of infant diarrhea is the child's having drunk leche de embarazo or "pregnancy milk". If the mother becomes pregnant again while still nursing her previous child, the quality of her milk supposedly changes, and this change causes diarrhea in her nursing infant. This diarrhea is only cured by weaning the child.

On the other hand, long lactation periods can make for extremely traumatic experiences for the child of two or three years, when its time for weaning finally arrives. The usual procedure is for the mother to coat her nipples with a distasteful substance. A second strategy is to paint the breasts with images that frighten the child. A final way is to simply leave the child with its father for a couple days.

TREATMENT OF MAJOR DISEASES

One of the central realities of rural life in the Bolivian highlands is the scarcity of professional medical services. None of the Altiplano communities participating in the Traditional Practices Project have a resident physician, nor receive the visits of a doctor on a scheduled basis. With the advent of a serious medical problem, the highland mother's first line of defense is her own knowledge and experience. This may include herbal teas, plasters, special baths, a few store-bought remedies (like aspirin and Alka Seltzer), and a large number of medicinal plants she has been taught to use. When the medical initiatives of the household fails to alleviate the problem, the second line of defense is to consult the knowledge of neighbors and relatives. Included here are the paid services of curanderas or traditional healers who are community residents. There is even a third alternative for medical assistance at the local level: consultation with a resident school teacher.

The above-mentioned actions exhaust all the inexpensive solutions to a medical problem. They are inexpensive because they do not include modern medicines and treatment procedures. But once the highland mother must seek assistance outside her community, the costs of solving health problems quickly escalate. She will probably seek out the sanitario or health practitioner located at the weekly market fair. This individual is her first --and usually only--source of affordable modern medicine, particularly injectable antibiotics. The patient, no matter how sick, must be taken to the health practitioner's office; home visits are out of the question. The consultation alone will cost about twice the daily wage for agricultural labor in her community. And when medicines and transportation expenses are added, she can easily expect to spend the equivalent of US$12 or more--which amounts to one week's wages for a hired farm laborer--to finance a one-time use of health services by a medical paraprofessional.

Such investments in health care are almost prohibitive for most subsistence households. It is therefore not difficult to understand why rural families fail to seek out professional health services on a timely basis. As a result, both adults and children face health risks that are unusually high, and which result in preventable deaths or unnecessary complications and suffering for the patients. Dependency on traditional medical knowledge is much like a game of chance: home remedies seem to work about as often as they fail. In the following pages we present several descriptions of how different highland mothers have attempted to cope with serious diseases--scarlet fever and mumps--suffered by their children. The information is provided in the form of personal testimonials in order to offer more authentic detail on both the resourcefulness and limitations of traditional medical practices.

SCARLET FEVER (ESCARLATINA)

The Story of Pacesa Quispe de Huallpa

On May 14, 1981 my two year old daughter Hilda Huallpa Quispe took sick with scarlet fever. She had a cough as well as a fever, but it was her temperature that worried me the most. It grew worse at night, and by the second evening she could not sleep even though she was quite exhausted. I lit my stove, and in a tin can I heated some urine combined with granulated salt until it boiled. Once it had cooled a bit, I bathed my daughter from the waist down. Then, without removing her clothes, I bathed her armpits, her tiny hands, her face, and wrapped her up in a blanket. From this moment she was able to sleep, although she coughed now and then.

The next morning she was very thirsty. I gave her warm (boiled) water with lemon juice mixed with two spoonfuls of sugar. Later I made her drink a glass of water in which I had dissolved an entire tablet of Alka Seltzer, and thus her fever dropped during the day. As for food, I gave her what the rest of the family was eating, but she ate very little--perhaps only three spoonfuls of soup. Every time she asked me for water, I gave her mate de eucalipto (tea made of Eucalyptus leaves). And every night I bathed her again in the solution of warm urine and salt, which helped her to sleep. This went on for several days. She showed no improvement, but neither did she grow worse.

Then one day a friend came to visit, and I told her about my sick daughter. She told me that I should serve my daughter leche de burra (donkey milk) mixed with burnt sugar. Since we own burros, and the female has her colt, that same afternoon my sister-in-law milked the animal while my husband steadied the beast. I prepared the medicine immediately. After lighting the stove, I placed four spoonfuls of sugar in an empty condensed milk can. I cooked the sugar until it turned almost black. Then I removed it from the stove, immediately added the fresh donkey milk and let the liquid steep for five minutes. While it was still warm, I served my daughter two tablespoons of this medicine. After that she immediately dropped off to sleep for quite a while, perhaps an hour and a half.

But once again she awoke, still exhausted. I gave her some more eucalyptus tea. I also gave her a solution of burnt sugar to help her cough. She continued to have a fever, and I continued her baths and her teas day after day. She remained sick exactly two weeks. Then one morning--which was the last day of her existence--she woke up and appeared to be much improved.

I thought that the baths had done her much good. So that morning I bathed her again, after which she slept for half an hour. She awoke again about ten O'clock in the morning, and I took her out to the patio so she could catch a little sun. But my neighbor said to me: "Why, then, have you brought your daughter outside? Can't you see she has little blisters all over herself? Besides, you don't bathe anyone when they have fever." She suggested I seek a physician. This was something my husband had never bothered to recommend to me, but I was in no position to make a long trip because I had nobody with whom to leave my other children, and besides there was nobody to look after my livestock, and all these things prevented me.

So I left my daughter in her room, alone, and I quickly took my sheep out to pasture with my oldest daughter (five years old) and left her in charge of them. Then I immediately hurried back to my home. The hour must have been about 10:30 A.M. because I had only been gone for a few minutes. When I reached the house I could not hear a single sound; it was as if there was nobody inside. I went quickly to where I had left my daughter and found she had not moved from that spot. She appeared to be asleep. But then I touched her and found that her little body was cold all over, and when I touched her lips they were cold and stiff. I was unable to cry or shout. I was speechless, dry. Then I ran out to find my husband. He was harvesting barley for our cattle. In tears I told him what had happened, and he became very saddened to learn his little daughter had died. He left quickly for home, leaving me behind.

When I reached the house, my husband was leaving. He said he was going to call on his brother to assist him. In only half an hour my husband returned with Leonardo, his brother. Leonardo touched my daughter's head and began to cry. When the crying was ended, my husband said they should then go to bury the child. She was wrapped in her diaper cloth and the bundle was placed in the basket of our bicycle. They took a shovel and a pick with them. It was two O'clock in the afternoon when the two of them left.

We did not wash my child's dead body. Nor was she buried in special clothes. We in the country do not bury our dead--with mortaya (shrouds)--as do folks in the city. Neither do we have a carpenter make a coffin. We simply wrap the dead and bury them. In our religion we do not practice the wake for the deceased, because we belong to the Adventist Church. Instead, I washed the clothes my daughter was wearing when she died. I also prepared a supper of trigo mote to feed my family and brother-in-law. The men returned from the cementary at five O'clock in the evening.

In this zone of Cayaca, of the community of Jaruma, already four children have died this month of May from scarlet fever. In one single family three children died. The disease has visited all the zones of Jaruma this winter.

The Experience of Victoria Deheza de Torrez

On September 30, 1981, my daughter Nelly caught scarlet fever. She was just 18 months old. She began to run a high fever, and also began to cough. At first I didn't know what disease she had. I began to treat her by giving her small spoonfuls of a cough syrup called Jarabe de Mentisan which I had bought in the City of La Paz.

The next morning I climbed the mountain to collect the fruit of a spiny bush we call ayrampu. They consist of cherry-colored berries, and when you put them in water it turns it cherry as well, but the berries have no odor. Then I acquired some choquekalla, kalla, and amorseco. Choquekalla leaves come from the valley region of Inquisivi; they are light green in color, almost white. Kalla also grows in Inquisivi, and for medicinal purposes only the leaves are used. Amorseco grows in the valley region of Luribay. It is not a tree but a small plant with long leaves surrounded by tiny spines. For medicine we use both the leaves and the stems.

Once I had all my ingredients, I boiled them in two liters of water. I then let the liquid cool. Each day I made my daughter drink this medicine --not warm, but cool as a refreshment, because she had fever. On the third day I prepared a plaster of egg yoke. I beat the egg yoke in a small dish until it was foamy, like snow. I then took pieces of newspaper, covered them with the egg white, and then dusted each plaster with corn starch which I had bought at the market. I placed a plaster under each of my daughter's armpits, and another on each sole of her feet. With these treatments she recovered from la scarlatina.

Petrona de Coaquira's Story

We had an outbreak of jhamfha (scarlet fever) in Huacuyo in 1974. It effected children seven years of age and younger. The sickness lasted for two weeks, so those children who were just beginning their schooling were seriously held back in their studies.

The symptoms for jhamfha are the following. First, the child catches a chill and begins to shake. He has a fever inside and is so restless he can barely sleep at night (and the adult who looks after him will also spend several sleepless nights). He loses his appetite, and for three days he will not try any food. The sickness will cause the child vomiting and diarrhea, so food will not do him any good anyway. Then, the patient begins to have a runny nose, and this leads to a dry cough which leaves the child hoarse. Finally his face begins to swell and little blisters about the size of quinua grains break out all over his body on about the fifth day. The child is exhausted and sleeps fitfully, throwing off his covers.

Here in the country we have several medicines for this sickness. One is not supposed to bathe the child. Instead we prepare a medicinal beverage and make the child drink it continually. First we gather a number of special plants. These include paja brava, anochaphi, carlo santo, kalla, chancoroma, and leaves of eucalyptus, and pine needles. These ingredients are boiled in a cooking pot filled with water. Then the water is strained and left to cool, after which it can be drunk by the patient.

Another important medicine for jhamfha is donkey milk, from a black-haired burra. It should be drunk uncooked, because we believe this is a holy remedy. Another medicine is to catch a toad, cut off its head, and collect its blood in a dish. This blood is then mixed with water in which rosy ayrampu berries have been boiled. It is served to the sick child during the first week until the blisters disappear. Still another medicine is to prepare a huallake or broth with the meat of the toad. The patient is forced to drink this concoction. This should gradually awaken his appetite for other food after the fourth or fifth day of his sickness.

Once the fever declines and the blisters disappears, the child will continue with a cough for another week. He can begin to eat normal food during the second week. He can drink sweetened lemon juice mixed with water, but nothing of other fruit. The patient should not be bathed during the period of his sickness, nor should his clothing be changed. Only when the sickness has passed, the child can be bathed with more of the same medicinal water prepared earlier (see above), and his clothing changed. Then he can return to school and catch up with his studies.

MUMPS
(PAPERA)

The Story of Justina Oruña de Mamani

On October 7, 1981 my eleven year old son became sick. His name is Jhony Mamani Uruña. At first he had a lot of fever, during the day as well as at night. The first evening I bathed him with a solution of urine and salt which I had boiled on the stove. I only bathed his feet and his hands. The next day I gave him a suppository with the brand name Proctopicina. I gave him one in the morning and another in the afternoon and still another in the evening. But these suppositories had no effect whatsoever. My son was very sick for three days. He didn't even want to drink anything. But I made him drink lemon teas and mates de ayrampu. I also gave him a half tablet of Alka Seltzer dissolved in luke warm water every now and then. But his fever remained very high. By the fourth day he was unable to swallow any liquids. That same evening one side of his face became swollen.

The next day I took my son to the Wednesday market at Lahuachaca. As soon as we arrived we went directly to the office of the sanitario, Manuel Quenallata. He saw my son and said it would be necessary to give him an injection to reduce his inflamation of papera. So he gave my son a shot of Hostamicina, and then he gave me three suppositories with the brand name Rexirol and another called Proctopirina. One of the suppositories was applied during the consultation. For everything, Mr. Quenallata charged me 87 pesos.

When we arrived home, I gave my son another suppository just before going to bed. He was better now thanks to the injection, and he was able to swallow liquids. I gave him lemon water each time he asked me for something to drink. The next day I applied the suppositories just as the sanitario had instructed me. Over the next few days my son's health gradually returned, thanks mostly to the injections he received in Lahuachaca.

The Story of Leandra Trujillo de Huallpa

At the beginning my daughter had a slight temperature. It was the harvest time and I did not give her enough attention. We were working continuously. My daughter began to cry a lot more than usual. I noticed she didn't want to eat anything and she was nursing very little, but still I did not prepare any special medicine for her, and here in Cayaca, of course, we do not have a health center or even a store where medicines are sold.

It was only when my daughter's face became swollen that I got scared. My grandmother knew how to cure people, and remembering back to what she taught me I prepared a compress of hualla leaves soaked in urine. I boiled the leaves for about fifteen minutes, then placed three of these leaves on the swollen area of my daughter's face and covered it with a handkerchief. This plaster was applied in the morning. That day my mother-in-law suggested I also use ground cottonseed with the plaster. So in the evening, after my daughter was asleep, I ground the seeds into a flour and added a little urine to make a paste. This paste I added to some fresh hualla leaves and placed the plaster on my daughter's face while she was sleeping.

The next day my daughter continued with her plaster, and I kept it damp using warm water. The following day her face was still swollen and red so I continued with the plaster. That day at midnight my daughter awoke crying. I began to bathe her face with a little cold water, and that's when I saw that the swelling on her face had split open and the wound was oozing pus. I washed the wound with warm water, changed the plaster, and wrapped it in place again. Every day thereafter I washed her face and changed the plaster. I also took care to keep my daughter out of direct sunlight, and protected her well from the cold at night. Gradually the wound healed and my daughter's health returned.

The Story of Elumenaria Ramos de Apaza

My daughter Martha became ill. After she had run a fever for two evenings, on the third day I prepared plasters of cactus seed and urine. I applied these to the soles of her feet and to both her armpits. The following day I prepared another kind of plaster using egg whites, but before application I dusted the skin of her feet and armpits with powdered linseed.

By the fourth day her fever had dropped, but now her face became swollen. I took my daughter to the home of Professor Lucana. He is the Director of our private school here in Chiarhumani, and he gives us medical assistance in times of emergency. Professor Lucana gave my daughter an injection to alleviate inflamation. He also gave me a pomade called Yodán. For the injection he charged me 100 pesos and for the pomade 80 pesos. With this injection, together with the pomade with which I rubbed her face, my Martha recovered her health. I have seen other children whose faces have split open from the swelling. Because I didn't want this to happen to my daughter, I sought medical attention early. Also, I got rid of the fever with the urine plasters, and this also helped the swelling to end quickly.

The Story of Rosa Mamani de Apaza

My daughter Loyda became sick. At first she only had a fever. I bathed her with urine mixed with salt. The following day her throat became so swollen she could not swallow hardly anything. She asked me for water and nothing else.

To cure the swelling I prepared for her a plaster made of the fruit of the cactus phuskalla. The seeds inside this fruit must be ground up into a flour. Next, it is necessary to take ollin (carbon deposits on cooking pots) and mix it with the phuskalla seed. The two are then mixed with a little urine to make a paste. The paste is cooked on the stove in a tin can for about five minutes. When it has cooled sufficiently, this paste must be placed on the swollen area and quickly covered with a binding of cloth. I applied such a plaster to my daughter, and when I removed it the next day the swelling was well down.

She still had a little fever, however. So I took some Cokaquina (a popular softdrink) and brought it to a boil on the stove. To this I added a tablet of Alka Seltzer and let the liquid cool. This is what I gave my daughter to drink every time she said she was thirsty. With these remedies I cured my daughter's mumps.

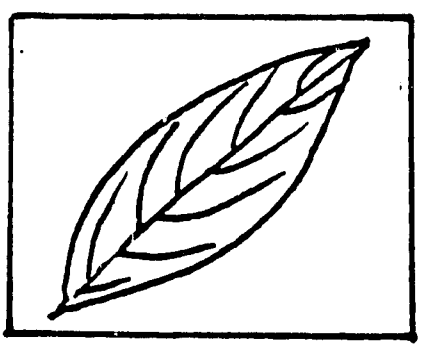
MEDICINAL PLANTS

There are hundreds of medicinal plants used by rural families in the Altiplano. Each household may have its own preferred remedies which are different from those of their neighbors; and remedies may vary greatly from one community and region to another. If the desired plants (leaves, stems, seeds, or flowers) can not be obtained locally, many can be purchased by sellers of natural medicines at the nearest weekly market. And since any given ailment will usually have several natural remedies, the rural household faces numerous medicinal alternatives.

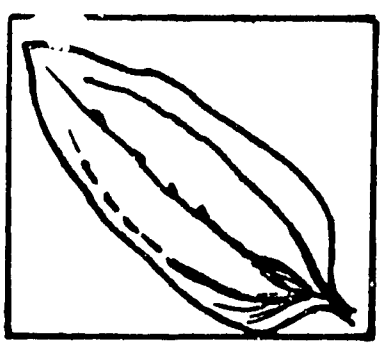
The principal ailments for which medicinal plants are used include fever, diarrhea, swelling, cough, stomachache, kidney disorders, post-natal hemorrhage, bruises, fractures, and nervous discomfort such as "fright". The most common preparation of medicinal plants is by grinding up the dried plant material, then boiling it, and finally serving it to the patient as a mate or tea. For external applications, the water in which the plant is boiled is used to bathe the effected area, or leaves are used whole to make plasters and poultices.

As an example of the wide assortment of medicinal plants utilized by highland households, we present a collection gathered by Victoria Pari Quispe of the community of Huacuyo. On her own initiative, Victoria created a notebook of pressed and dried plants entitled "Album of Medicinal Plants from Yungas and the Altiplano".

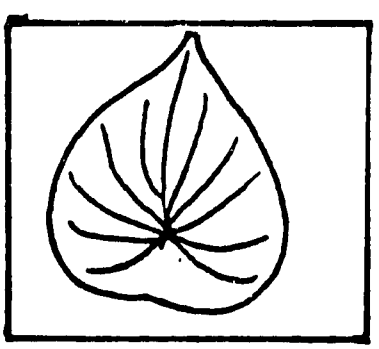
PLANTS FROM THE YUNGAS REGION



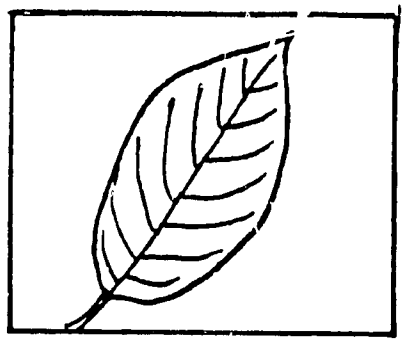
1. Mateco is a leaf used to treat rheumatism and fractures.



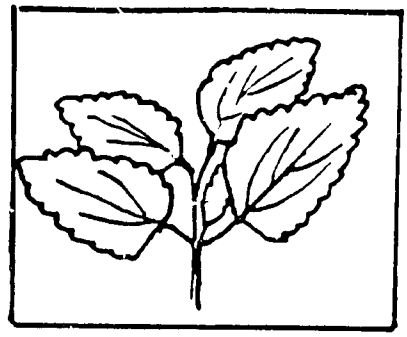
2. Raiz de China is boiled and the leaves applied to fractures.



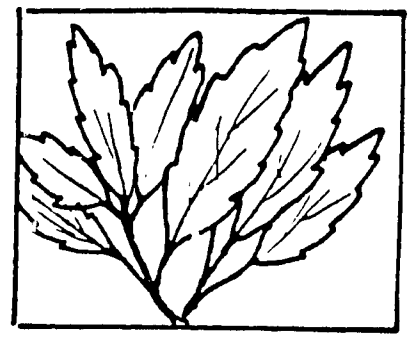
3. Sipho Sipho is boiled and the leaves applied to bruised and swollen areas of the body.



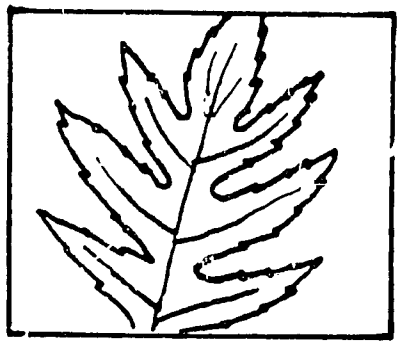
4. Hoja de Palta (avocado leaf) is prepared in a tea to alleviate stomachache or diarrhea.



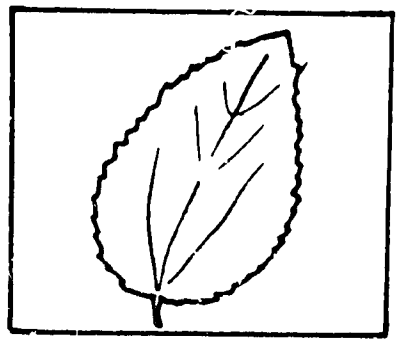
5. Torongíl (melisa) is boiled as a tea for use in alleviating stomachache.



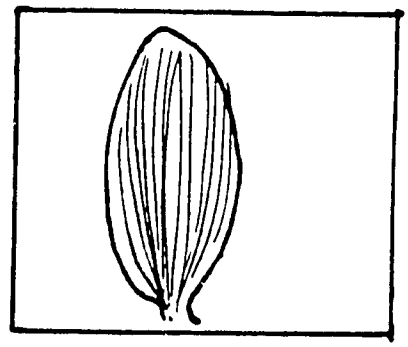
6. Packho: its leaves are boiled as a tea and used to treat stomachache or diarrhea.



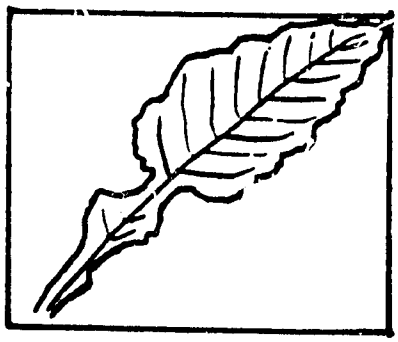
7. Amakhari is used to cure stomachache.



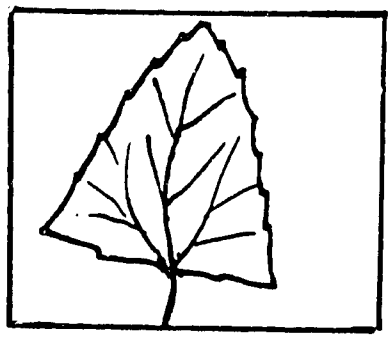
8. Kholomona is boiled as a tea and used to cure kidney discomfort



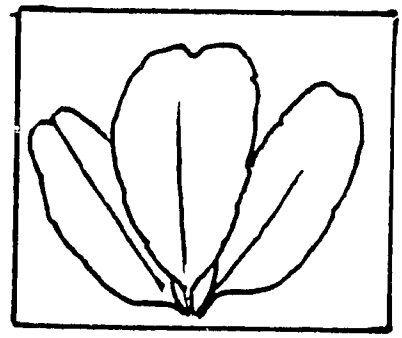
9. Caña Caña is crushed and soaked in hot water, then squeezed into a damp mass. It is used to bathe the body to reduce fever.



10. Marancíl is used to alleviate fever. The water in which leaves are boiled is used to bathe the body. The wet leaves are applied to the skin.

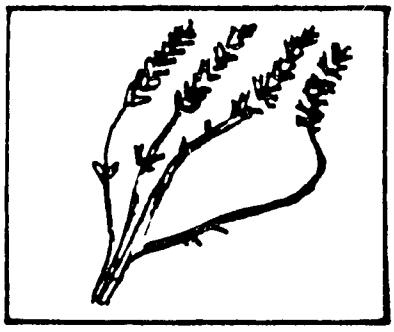


11. Tokho Tokho: the leaves are boiled and applied to wounds and sores.

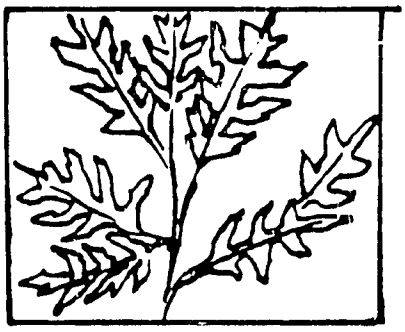


12. Siedro is boiled as a tea. It is used to treat an ailment known as colerón.

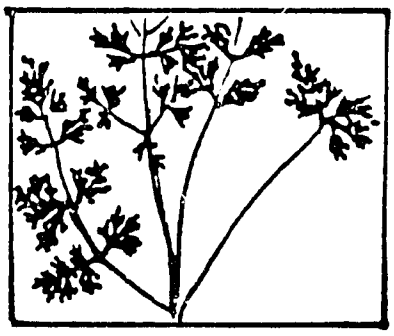
PLANTS FROM THE ALTIPLANO REGION



1. Sello Sello is prepared as a tea and used to treat kidney discomfort. The tea should be drunk in the morning, before breakfast.



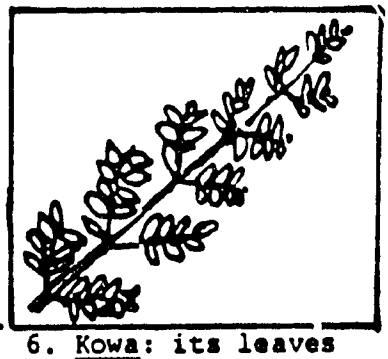
2. Markhu: its leaves are also used to make tea for treating kidney disorders.



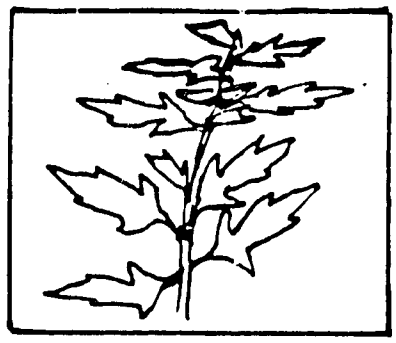
3. Ketha (a variety of parsley) is used in a tea to treat stomach inflamation.

4. Perejil (parsley) is used to treat stomachache.

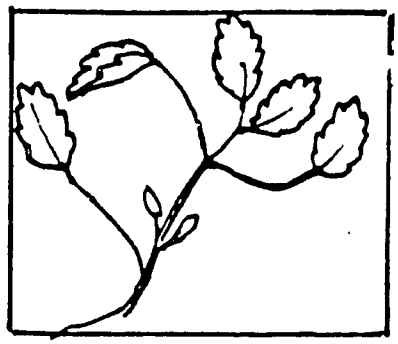
5. Romero (rosemary) is taken in the form of a tea to alleviate upset stomach. Mate de romerc is a very common breakfast drink.



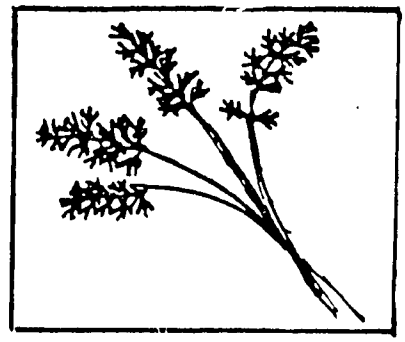
6. Kowa: its leaves are ground to make tea for alleviating diarrhea.



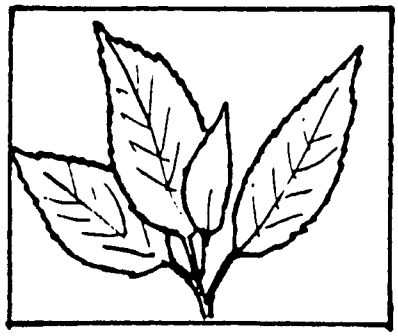
7. Pakho leaves are used to make a tea for curing diarrhea



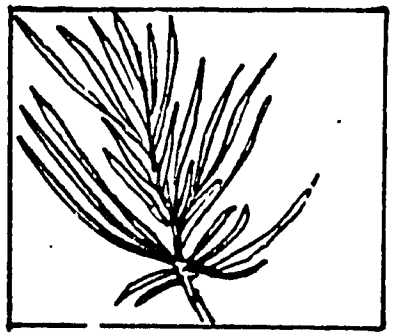
8. Verbena is still another plant that is made into tea and drunk to alleviate diarrhea.



9. Semarona is boiled as a tea to treat fever.

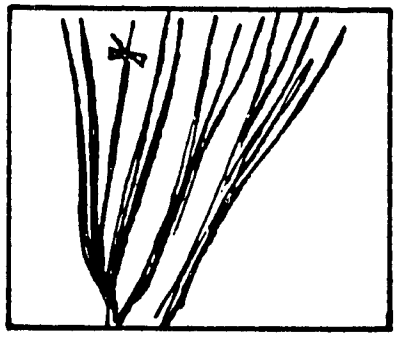


10. Guinda leaves are boiled to make a tea which lowers fever

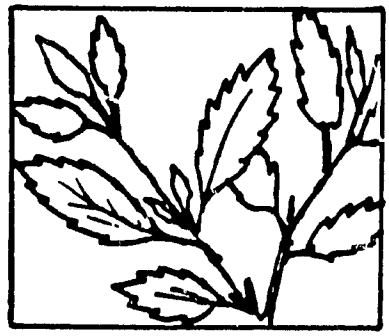


11. Vaecha is also used to make tea for treatment of fever.

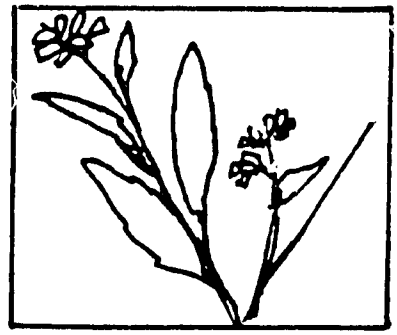
12. Mesiko is still another plant used to prepare tea for treatment of fever.



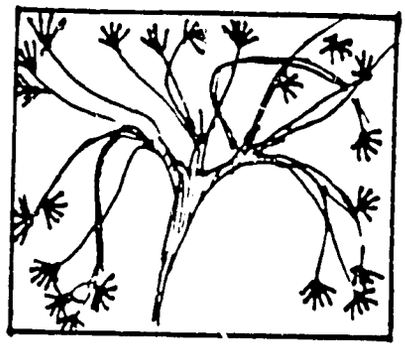
13. Pimpelenal is ground and used in tea for the treatment of post-natal hemorrhage or sobreparto



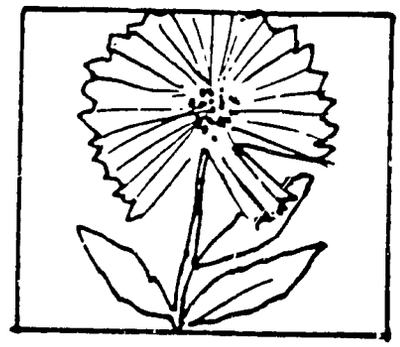
14. Chirira leaves are also used in tea to treat sobreparto.



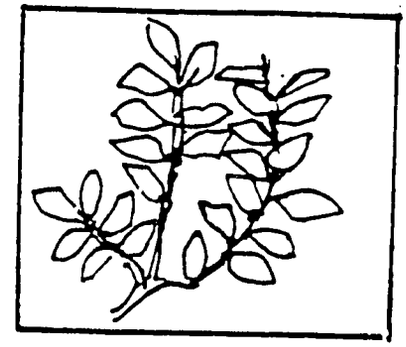
15. Mostasa (mustard): its seeds are ground into flour, then applied as a plaster to alleviate congestion.



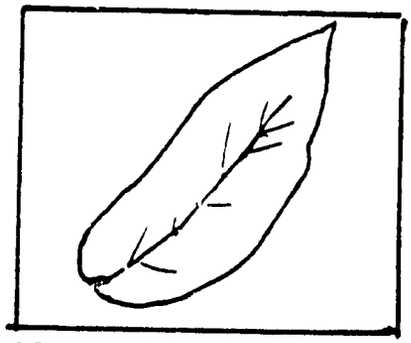
16. Velalavo is ground and boiled, then drained and applied hot to fractures or pulled muscles.



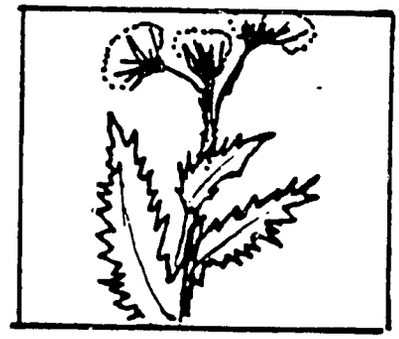
17. Girasol leaves are boiled and applied hot to treat swelling in different parts of the body.



18. Moñeka leaves are made into a tea which treats discoloration (spots) on the face.

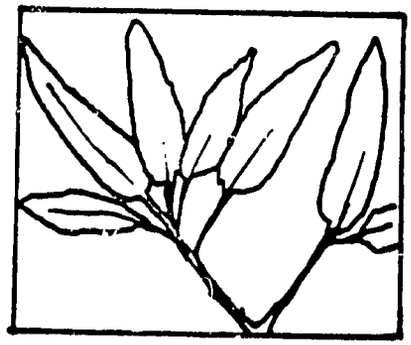


19. Eucalipto: its leaves are boiled a a tea and used to alleviate coughing.

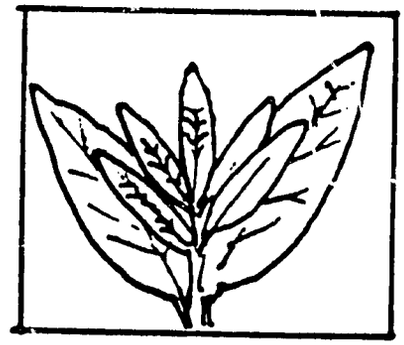


20. Khanapakho (amargón) is boiled to make a tea for treating diarrhea.

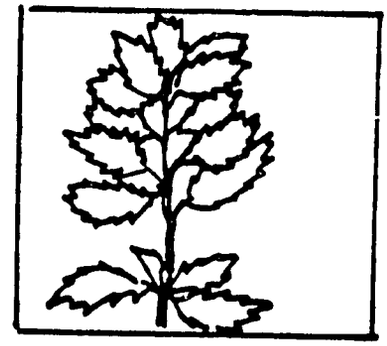
21. Uva Silvestre del Altiplano is used to make a tea for reducing fever.



22. Salvia is made into a tea which is commonly drunk in the early morning to alleviate upset stomach.



23. Kolle: its leaves are boiled to make a tea which facilitates childbirth.



24. Ortiga is made into a tea for treating a wide number of disorders, and particularly susto or fright.

HOME REMEDIES FOR DIVERSE SYMPTOMS

The following narratives describe the application of home remedies to a wide variety of health problems--with adults as well as children. The ailments include the common cold, fever, headache, stomachache, diarrhea, cough, hemorrage following abortion, and physical discomforts credited to such causes as fright (susto), loss of spirit (ánimo), and excessive sunshine (soleado). The descriptions provided below are based on interview transcripts with female participants of the Traditional Practices Project.

THE COMMON COLD (RESFRIO)

Reymunda Mamani de Rojas

Here in Chiarhumani we prepare a cold remedy. It is a liquid made entirely from medicinal plants, and it is called cargado (well loaded). First it is necessary to collect the ingredients, some from the mountains and others must be bought at the market. The ingredients are (1) eucalyptus leaves, (2) chacataya, (3) molle, (4) lemon juice, (5) chijchipa, (6) ninosanko, (7) andrés huaylla, and (8) sugar. The eucalyptus tree grows in the Altiplano, but its leaves have a more insipid mint taste than those grown in the valleys region. Chacataya is a medicinal plant that grows in the valley of Maca Maca; it is a bush, and both its leaves and stems are used for medicine. Molle is a normal tree found in the Altiplano and the valleys regions; only its leaves, which are quite long, are utilized. Chijchipa is a weed that grows everywhere in Chiarhumani, even on the rooftops; it is a small plant, and all of its parts are used--leaves, stem, flower, fruit, and seeds. Ninasanko is a weed that grows in the furrows of our potato plots; its flowers are cherry-colored, and all parts of the plant serve for preparing the medicine. Andrés huaylla is a small plant with long leaves which grows locally; we only use its leaves. Lemons are only produced in the valley and tropical regions, and so these must be purchased at the market. For the medicine we only use the juice. The sugar is the granulated type, just like what we use for breakfast.

To make the cargado, one first takes seven small stones and places them in the fire of the stove until they are red hot. While the stones are heating, all the medicinal plants are placed in a wash basin. They are next sprinkled with sugar and then 3-4 spoonfuls of lemon juice. The hot stones are then placed in this basin and rolled around amid the ingredients using a

mixing spoon. Gradually the ingredients turn black as they are burnt by the stones. Once everything is blackened, it is time to add two cups of cold water. Quite soon the water should begin to boil; if it does not, this means the stones were not hot enough. The liquid should be allowed to boil for ten minutes, then strained to make a tea. This medicine must be served to the patient while it is still steaming hot. The patient must remain in bed, well covered. Soon he will begin to sweat, and this will purge the fever or cold from his body. We always administer the cargado in the evening.

Justina Mejía de Morante

On September 10, 1981 I fell sick. I felt strong aches in my back, and I shivered from fever, and I couldn't even bend over. I kept in bed for three days. I took no medicine nor had any appetite for food. On the fourth day, my husband went to fetch the curandera who lives here in Chiarhumani. Her name is Feliza de Ramos. After my husband implored her, she arrived at eight O'clock in the evening.

The first thing she did was to chew some coca. Then, spitting the coca saliva into her hands bit by bit, she gave my body a complete rubdown. After the rubdown was complete, the healer began to prepare a medicine made from the following ingredients: chijchipa, romero, ninasanko, and alcohol. I already had all of the plants in my home. She placed the ingredients in a wash basin, added rocks she had heated in the stove, and finally added several cups of water. The liquid was boiled for 15 minutes. I drank it while it was still very hot. Very soon, inside my bed, I began to sweat heavily. My husband paid the healer ten pesos. The next morning I woke up almost completely cured.

FEVER

Felipa Chipana de Morante

On September 12, 1981 my two sons both fell sick. First they only had a cough, but then they both caught a fever. The first evening of their fevers--at midnight--I bathed them both with a mixture of urine and salt which I had boiled on the stove for ten minutes. The following day I gave them a mate de linaza (linseed tea), which had been boiled for five minutes, and in each cup I put three spoonfuls of lemon juice and a spoonful of sugar. Once again I bathed them with urine and salt. When neither of them showed much improvement, my neighbor suggested I prepare for them a medicine we call cargado....The third day both my sons showed little improvement, so I took them with me to the market fair at Patacamaya to visit the sanitario, Señor Ramirez. He gave each of my sons an injection and charged me 35 pesos apiece. That evening my sons slept all night long

without awaking. In the morning they were much improved, and that is how they were cured.

HEADACHE

Albina Chipana de Apaza

On September 29th my daughter woke up with a strong headache. She is 11 years old and is in the sixth grade. She didn't want to eat breakfast and said she felt dizzy. So first I prepared a small quantity of what we call millo. It comes in a little block, and it is necessary to beat and grind the stuff with a stone until it becomes powdery. I buy this product at the Patacamaya market--for 10 pesos per package--in the section where they sell misterios (mysteries). With the millo I prepared a plaster, wrapping her head with paper. Immediately my daughter fell asleep. She slept for an hour until 8:30 A.M., and when she woke up she felt much better and ate some breakfast. I prepared for her a tea made of nuez moscada. This is a coffee-colored leaf that grows in the tropical lowlands. It must be shreded first before boiling. Into this tea I also scraped in some copal. This product comes from the Department of Beni, in the Apollo Valley. With these ingredients my daughter's headache went away. By 9:00 A.M. she left for Chiarhumani (we live in Machacuyo) to attend school. Once she had left, I took the used millo and burnt it up in the fire of my kitchen stove.

STOMACH PAIN

Alejandra de Aruquipa

On July 10, 1981 I became sick with bad stomach pain. It was not from eating too much, but rather it felt like I had a big ball inside my stomach. The pain was so bad it took my breath away. After a week I could hardly walk, and moved about on the tips of my toes. My mother-in-law suggested we might go to the city of La Paz and see a doctor. On July 22nd we made the trip. I had a consultation with Dr. Romero of the Hospital General. He told me I had an inflamation of the gall-bladder, and he gave me some instructions on what medicines to buy. But I didn't buy any because they were too expensive.

When we returned from La Paz I went to my father's house in Aroma to inform him of my problem. The following day my father traveled to Viluyo to bring a curandero named Don Pedro. So that this healer might cure me, my father ordered that we prepare the following items: some koa (incense), a llamb fetus, two eggs, two pounds of coca, two packs of Astoria cigarettes, two complete mesas dulces (packaged ingredients for burnt offerings), two liters of alconol, and two 12-month-old sheep (males). All this was ready for the healer when he arrived at six O'clock in the afternoon.

The healer prepared his mesas. My mother killed one of the sheep and removed its heart. This heart was brought to me immediately, while it was still hot. I was in a room with the healer, my husband, and my father. They put the heart on my stomach. The heart was removed half an hour later, completely dry. The second animal was butchered and roasted that same afternoon, and we ate at nine O'clock in the evening. The meal included caldo de arroz (rice soup) and phuti de chuño (steamed chuño). My parents, the healer, and I all ate, but the healer told us not to throw away the bones. These were collected and placed on a sheepskin on the ground. Then the healer requested his payment--1,000 pesos--and my father paid him. After that, they sat around chewing coca and smoking the cigarettes until midnight. At that hour the healer asked for burning coals and went outside --the sheepskin with the bones in one hand, a bottle of alcohol in the other--to burn the bones. I remained inside the house and did not see how the bones were burnt.

When he had finished, the healer returned. He asked for the carcass of the first animal to be brought to him along with the remaining mesa. He elevated the burning offering and passed it over and around my body to cleanse it. He did the same holding the sheep in the air. Then he loaded the animal on his back and departed.

For the rest of that evening I was accompanied by my parents, a cousin, and my husband. Nobody slept. My husband and cousin remained with me all of the following day. For two days and a night I was not left alone, and nobody other than the four of us was allowed to enter the room where I was, nor could I leave the room. A week I remained at my father's house before returning to my own. Since the night the healer cured me, I have been able to walk normally and I have completely lost the pain in my stomach.

GENERAL ACHES AND PAINS

Reymunda Mamani de Rojas

I will tell you how I make a parche (plaster), containing only medicinal plants found in the Altiplano, for treating aches of the body. First of all, the parche is made with three plants: (1) umachijlla, (2) jamillo and (3) tolantola. Umachijlla is a little tree. Only its leaves are used for medicine, and these can be bought at the weekly market. These leaves have a shiny coating, as if they had been soaked with sugar water. Jamillo is a moderate sized tree that grows very well in the region of Kericani. Only the seeds are used. They are dark colored, about the size of peanuts. Tolantola is a plant that grows extensively in the Altiplano. We often use it to stoke the fire in the kitchen. For the parche, we use both the leaves and the stem.

These three plants are gathered and finely ground with a batán or handmill. To this pulp one adds some urine, little by little. The grinding can take quite a while until the material is just right. It should look like a sticky cream when it is ready. This cream is then placed in a small can and brought to boil on the stove, again adding more urine a little bit at a time. The concoction should be brought to a boil and cooked for about five minutes. Then it should be removed from the stove and allowed to cool.

Meanwhile, one takes a piece of newspaper and perforates many holes in it with a piece of wire. When the paper is ready, the plaster cream should be spooned on top and spread evenly over the entire surface. This parche is now ready to place on the effected area--for example, the spinal column. Once in place, it must be bound securely with a cloth. The patient should then be wrapped in a blanket to avoid becoming chilled. The parche should be applied in the evening and should be left for two days.

DIARRHEA

Venancia Trujillo de Nina

On December 1, 1981 my daughter Leticia became sick with diarrhea. She was six months old. I first noticed her ailment while at the market fair at Lahuacacha, and I discovered she had a fever as well. I therefore bought a

soft drink and a tablet of Alka Seltzer, which I dissolved and mixed together in a little cup. My daughter drank some of this, and that afternoon her fever went down. But by the time we arrived home, her diarrhea was very strong. I gave her nothing to eat nor did I nurse her that night. When she wouldn't stop crying and refused to sleep, I bathed her once with water in which I had boiled tola. This cut the fever, but the diarrhea continued.

She continued with diarrhea for an entire month. She became very undernourished. Then one day one of my neighbors, Doña Pacesa de Huallpa, suggested I give my daughter a soft boiled egg mixed with a little ground incencio (incense). This remedy did my Leticia a lot of good; it was the only thing that stopped her diarrhea. She is healthy now, although still too skinny. And of course I am continuing to breast feed her.

Justina Oruña de Mamani

I didn't know I had become pregnant again, so I was still breast feeding my two year old son. He began to suffer from diarrhea, and nothing would cure it. Then one Saturday, at the market, I was talking to a relative about this problem. She suggested that I was pregnant, and that the diarrhea was caused by leche de embarazo (pregnancy milk). She advised me to stop nursing the child. To cure his diarrhea, she suggested I make him drink some ñuñumaya water. She said it would be good to bathe my son with the same water at least twice a week.

I bought the ñuñumaya from a man who sells grapes and medicinal plants which he brings from the Luribay Valley. I bought 15 pesos worth. The ñuñumaya berries are similar to grapes but much smaller. In the center of the berry are many tiny seeds. I cooked the ñuñumaya fruit which I had bought in five liters of water. The next day I gave my son five spoonfuls of this medicine, but he refused to drink more. When I tasted what I was forcing him to drink I discovered it was too bitter, so I sweetened it with more sugar. Next, I took his blankets and heated them in the sun. Then I bathed him with the ñuñumaya water. That afternoon he slept in the aguayo on my back for several hours. He awoke hungry and I fed him. That evening I fed him some more food, as well as some tea and bread. At midnight he awoke crying and wanted to nurse, but I refused my breast because I had been told my milk was infecting my child. For three more days I continued to bathe my son in ñuñumaya water, and each time I gave him a few spoonfuls of this medicine. With this remedy his diarrhea came to an end.

COUGHING

Rosa Mamani de Apaza

On October 20, 1981 my six-month-old son became sick. He coughed constantly. First I gave him a cough syrup called Jarabe de Mentisan--two small spoonfuls every four hours. Then I gave him a rubdown with pomade. I also boiled some urine and salt, of which I made him swallow two small spoonfuls. The following day I bathed my son with eucalyptus water. I boiled the eucalyptus leaves for a half hour. Right after the bath I placed on his chest a plaster made from beaten egg white. In the evening I gave him a tablet of Desenfriol and the following day another one. With these remedies his cough was alleviated, although it has not gone away entirely. So far, I have finished one bottle of Mentisan syrup and have started another. I always give him two small spoonfuls at a time.

HEMORRAGE FOLLOWING ABORTION

Ancela Trujillo de Mamani

On March 15, 1982 I was on my way to the market fair in Jaruma. I was carrying my two-year-old son Carlos on my back, and in my hands I was carrying a heavy bag of chuño. I had just about crossed the river when I suddenly slipped. My son flew off my back and hit the ground; I fell forward on top of the bag I was carrying. But I got up quickly. I allowed my son to nurse because he was crying, and again hoisted him on my back. We soon reached the market, I sold all the chuño, and I purchased my supplies for the week.

Once we returned home, I began to feel ill throughout my body. It felt as if somebody had been hitting me. I felt so sore that I remained at home the following day, even though I was needed for harvesting barley. I began to feel even worse as the day advanced. My husband came home in the late afternoon and saw that I didn't even have the energy to cook supper. So he put me to bed and did the cooking himself.

That evening I became very sick. About ten O'clock at night I began to feel terrible pains in my stomach, just like the pains of childbirth. I rose from my bed and prepared myself a tea with coca. I was just feeling a little better when I felt another sharp pain. At that moment I began to bleed, and I knew then that my unborn child had terminated its existence. The bleeding continued for perhaps an hour. When it had ended, I prepared for myself another mate de coca, and only then did my strength begin to return.

The following day I stayed in bed. My husband did the cooking in two separate pots--one for me and the other for the rest of the family. My food consisted of rice soup, chuño, and meat, but all without salt. I kept to this diet for three days. I did not leave the house for a week. During this time I drank hot medicinal teas four times a day. These were prepared from chijchipa and ninosanko. With nothing but my special food and these teas I was cured.

FRIGHT (SUSTO)

Albina de Apaza

One morning my daughter awoke with a headache and general discomfort. She didn't want to leave her bed and she seemed completely exhausted. I believe she had been frightened at school. At eight O'clock in the morning I rolled up three pieces of millo (see HEADACHE) in a piece of paper and secured it about her head. As I did this I prayed an "Our Father" against her chest. Next, I gave her a half tablet of Alka Seltzer mixed with half a cup of water, which she drank. I left her in bed and went to prepare almuerzo for my family.

After the meal I returned to see how she was getting on, because I had to leave for work in the field (we were in the potato harvest). I woke her up to ask her if she wanted to eat anything. She said she didn't. When I touched her I could tell she had a fever. So I prepared a can of urine with plenty of salt and boiled it on the stove. Once it had cooled a bit, I used this liquid to bathe my daughter's body. I removed the millo from her forehead and put her back to bed. Leaving my youngest daughter to look after her sister, I left for the harvest. I took the millo with me, and I burnt it far from the house. I learned this cure from a healer. It also worked once before with one of my sons. The remedy of bathing I also learned from the healer.

I returned home at seven O'clock in the evening. My daughter was out of bed and took tea with the rest of the family. That night she slept peacefully all night long. By the next day her health returned.

LOSS OF SPIRIT
(ANIMO)

Victoria Deheza de Torrez

My daughter fell ill two weeks ago (October 4, 1981). She had a lot of diarrhea and cried a great deal. Some nights she awoke crying as many as three times, others only once. It continued for so long that finally my mother suggested that we bring the curandero to call my daughter's spirit. The healer's name is Policarpio Nina. He lives in Cayaca.

One afternoon--it was a tuesday--the healer from Cayaca arrived at our house in Iquiaca. He asked me to provide him with a little copal, my daughter's hat, some hot coals, and a breadroll. He took everything outside and told the rest of us to remain inside the house. After a long while he entered the house and began to call my daughter's name: "Nellycita come to me, come to me...Nellycita." He brought with him her little hat, and he gave her the bread and made her drink some tea as she ate it. He also had us put the hat on Nelly's head.

Then he departed. He had instructed us not to allow anyone else to enter the house until the next day. We paid him 20 pesos and he left that same evening, around eight O'clock. That night Nelly slept all night without awakening. The next day her health was much improved. Little by little her diarrhea disappeared. The only thing I did for her was to buy a suppository called Dinemobron in the Jaruma market. It cost me 8 pesos, and with that she was completely cured.

Francisca Quispe de Torrez

My son started vomiting while we were in La Paz. The only thing I did was to get him to drink a little soda. We took a bus home to Jaruma and the trip took quite a few hours. By the time we reached home, my son was too exhausted even to nurse. I put him to bed, but he awoke at midnight with fever. I bathed him with boiled urine, then wrapped him snugly in two diapers, and nursed him. Before the night was out I had to bathe him once again, and only then did he sleep.

The next day I went to fetch the curandero, because they had told me that my baby's spirit had been frightened away at Pillapi (where project participants attended a regional conference). I sought out Manuel Mamani, who lives in Jaruma. That afternoon he came to my house and said I had to buy the following items: a mesa dulce (for a burnt offering), a package of

copal, some sweet wine, six blocks of sugar, a half bottle of alcohol, and a lamb fetus. I didn't have to buy the fetus because I already had one. Since it was a saturday I was able to obtain these things at the Jaruma weekly market. So on the evening of the same day Don Manuel called the spirit of my son. He prepared his offerings, asked for some coals to burn them with, and also took with him my son's hat. That night we paid him 50 pesos. The following day he called my child's spirit for the second time, and on this occasion he only asked for a little copal. I paid him with some chuño and some potatoes. But none of this seemed to help my son's health, because he showed no improvement whatsoever.

By the third day I thought my child was about to die. A neighbor recommended that I take him to see Felix Alliaga, who lives in a house facing the main plaza in Jaruma. My husband came with me. Don Felix gave my son an injection. He also gave him a suppository called Dinembron and made him swallow a couple pills. He charged us 55 pesos for everything, including four more pills which I brought home and was instructed to give to my son one every four hours. With the injection and the suppository and the pills my son recovered completely.

EXCESSIVE EXPOSURE TO SUNSHINE (SOLEADO)

Manuela Patzi de Yanarico

I will explain how the residents of Yuka utilize the mustard plant, and also the salvia plant, both of which are required to cure the illness known as soleado. One acquires this ailment by going to sleep in the sun --out in the open--perhaps because one is tired, or drunk, or sick. This sickness is quite complicated, and not even in hospitals are there sure medicines to cure it. When a person is soleado, he shakes with fever, and the entire body goes numb; and he suffers from headache, vomiting, dry cough, pain in all the limbs, and--worst of all--from the waist down the body feels ice cold.

The sickness is cured with the medicinal plants mustard and salvia, which must be collected green among the crop lots of barley, peas, and others. These should be gathered in a man's poncho which is black in color, and best of all is a poncho woven from sheep's wool. This poncho is left to heat in the sun. Meanwhile, the plants must be ground up gently in the handmill, making sure they do not dry out. These medicinal plants are then spread about on the poncho. Immediately the patient must lie down on the poncho, whereupon his body is wrapped up tightly from the waist down. Then the entire body is wrapped in a sun-warmed blanket. The patient is left to sweat inside for up to an hour. By that time he will no longer

have a headache nor will he continue to shake from fever. Slowly the wrappings are removed. They must be left to dry in the sun. The medicinal plants must also dry completely; then they will be thrown away because no longer are they any good. It is necessary to make sure the patient remains well protected from cold air and chills following his treatment. He should wear extra clothing for the rest of the day, and he should not leave his house until the following day.

CHAPTER VII.

ARTISAN CRAFTS

The artisan crafts of the Bolivian highlands are well-known throughout the world. To adequately identify and describe the full range of artisan products and skills represented among the co-authors of this study would require a separate book altogether.

In this chapter we attempt to focus mainly on those aspects of artisan activity which support family subsistence directly and do not involve the sale of commercial products. We begin with a description of sheep wool classification and uses. This is followed by descriptions of the common four-stake handloom and some of the products woven with it: blankets, ponchos, belts, and aguayos. Also covered briefly is a description of home-made dyes and the knitting of sweaters. The last half of the chapter is devoted to an assortment of weaving activities using wild straw, horsehair, and corn husks. These involve such products as twine for roof-making and straw mats, ropes for livestock management, and a form of corn storage.

Many other artisan skills and their respective products have been explicitly mentioned throughout this book. The reader is specifically referred to FARMING TOOLS and STORAGE STRUCTURES in Chapter II, KITCHEN EQUIPMENT in Chapter V, WELL CONSTRUCTION in Chapter VI, and HOUSE CONSTRUCTION in Chapter VIII. In the last analysis, subsistence farmers must continually practice a remarkably broad number of skills. They simply can not afford to be specialists who must buy a large number of products and services from others.

SHEEP WOOLS: THEIR QUALITIES, COLORS, AND USES

SHEARING

The shearing of sheep is usually conducted in March or April--typically around Easter and Holy Week--when sheep are two years old and are well nourished. The shearing instrument is quite frequently the lid of a sardine can which has been doubled in half; the cutting edges are sharpened on a stone. The animal's four legs are tied together and then laid on its side. The shearing begins in the area of the ribs, continues on the shoulders and neck, and ends with the legs. This is a task done almost exclusively by women. The wool of a single sheep is known as a *quesana de lana*. Its quantity varies from about a pound and a half to two and a half pounds.

CLASSIFICATION OF DIFFERENT WOOLS

Wools are generally classified into two basic categories: "good" and "bad." Then, within each of these two groups there are sub-categories based on quality and color. "Good" wools are those from animals which were born during the rainy season, a time of flush pasture; this wool is soft and silky. "Bad" wools come from sheep born during the winter season; it tends to be shorter and tangled.

The sub-categories for classifying wool quality are four: (1) *Khoña* or soft and silky; (2) *K'acha*, when the wool has a zig-zag pattern (usually from the area of the loins); (3) *Iru* or coarse wool; and (4) *Churis* or *Q'ultis*, when the wool ends are dirty and tangled.

The color classification of wools is divided into six basic categories: (1) *Jango* (white), (2) *Khella* (lead), (3) *Paruchi* (vicuña or brown), (4) *Ch'añito* (gray), (5) *Wila Chuchi* (tan), and (6) *Ch'eara* (black). This listing could be considered a prioritization from most desireable to least desireable. However, there are exceptions to this generalization from one community to another. For example, black is considered the worst color in Jaruma, but in Yuka black is the most popular color.

USES OF DIFFERENT CATEGORIES OF WOOL

Provided it is white, khoña wools are always used to weave *bayeta de tierra*, because this material usually is dyed. Bayeta is a flannel which is used to make the *polleras* or skirts of highland women, and also pants and shirts for men. When khoña wools are black, they are often used to

weave mantles for ordinary use. Most of the intermediate-color khoña wools are used to weave ponchos.

White k'acha wools are used to weave mantles and blankets that are destined to be dyed. In other colors their use is for the weaving of miscellaneous textiles--sweaters, gloves, cargo sacks, etc. Iru wools--particularly in non-white colors--are generally used to weave blankets and mantles for ordinary use. Churis wools, irregardless of color, are used to weave cargo sacks, blankets, and heavy socks. The throw-away wool of this category is frequently used for the stuffing of matresses.

For the most part, the only wools that are marketed are those in the colors of black and white. All other colors are almost exclusively for domestic use and never sold.

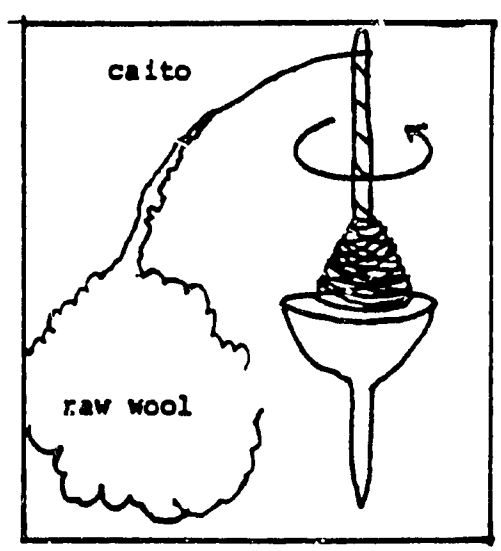
WEAVING A BLANKET

Most weaving by Altiplano farm households is done on a ground loom secured by four stakes. Almost without exception, all preparations for weaving--namely, the shearing, cleaning, spinning, and dyeing of wool yarn--are completed by women. Furthermore, the weaving itself is usually done by women--but not always. In Yuka, for example, most of the weaving on four-stake looms is done by men.

PREPARATIONS

The first and primary activity in preparation for weaving is spinning the wool. Spinning is something Altiplano women do almost every day, something usually combined with another activity--like herding livestock, or walking to and from market fairs, or while attending a meeting. The spinning of yarn is done with an implement known as the rueca. It resembles a top. The raw wool is stretched out gently into a narrow finger-like protrusion, then twisted deftly into a single, continuous thread. This thread is gathered into a cylindrical ball on the rueca. When an adequate quantity of thread has been spun, it is removed from the rueca. Next, this thread is combined with a second finished thread and spun once again using the rueca into a double-strand yarn.

The madejas or skeins of yarn are removed once again from the rueca. They are washed and then dyed (see DYEING THE YARN). In Yuka, only three colors are used for woven blankets: green, blue, and pink. After dyeing, the yarn is wound tightly in a ball in order that it "sleep" (allow the yarn to become smooth).

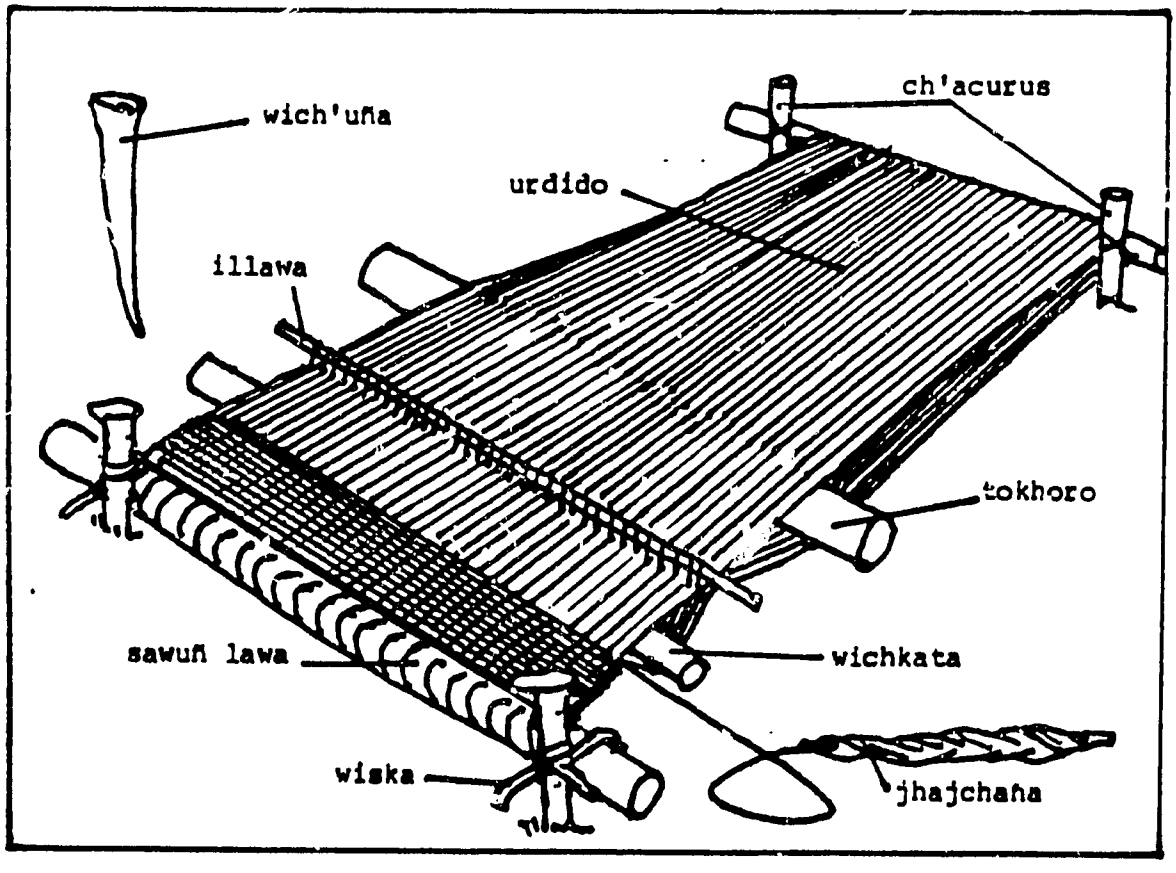


Rueca for Spinning Wool

When the woman has spun the wool of six large sheep (equivalent to six quesanas of 2.5 pounds each or about 15 pounds of wool), she knows that she has enough material to weave a blanket. As a general rule, five "sheepskins" of wool are required for the warp and one sheepskin for the woof. This entire spinning task should require about three weeks to complete.

IMPLEMENTS

The weaving of a blanket requires the following implements or materials: (1) four stakes of ch'acurus (of wood or metal), which are sunk into the ground at what will be the four corners of the future textile to be constructed; (2) a pair of sawuñ lawa or poles for each end of the loom frame (these should be cylindrical, about 1.3 meters long and 8 cm in diameter) between which the threads of the warp will be stretched; (3) two pieces of wiska or braided wool rope for tying the lower loom frame to the stakes; (4) a hollow bamboo pole or tokhoro, which serves to separate the urdido or warp into a lower and an upper layer of threads; (5) a second but smaller cylindrical pole (6 cm in diameter) known as the wichkata, which keeps the two layers of warp separated at the point of weaving so that the trama or woof can easily be passed horizontally back and forth through the loom; (6) a pointed yarn pick or wich'uña, which is made from the leg bone of a llama; (7) a very thin cylindrical pole (about 2 cm in diameter) to which are attached dozens of strings tied to the lower layer of threads of the warp; (8) a spindle-shaped shuttle or jhajchaña, which holds the yarn of the woof.



Implements and Materials for Weaving on a Four-Stake Loom

THE WEAVING PROCEDURE

Before weaving preparations begin, it is customary in most rural families to acullicar or conduct a ritual chewing of coca leaves. Small pieces of coca are also stuck inside the balls of yarn. Next, the four stakes are set at the four corners of the blanket to be woven. The loom ends are set in place, and the bottom sawuñ lawa tied to its respective stakes with wiska cord. The threading of the loom (connecting the warp) is considered a job for two people. One person threads on the eastern side of the loom, the other on the western side. In Yuka there exists a custom that when a visitor arrives at the moment the loom is being threaded, the weaver must not withdraw without picking up a stone and holding it for the duration of the visit. This stone symbolizes the balls of yarn, and holding the stone is done to prevent the yarn from escaping while the weaver is distracted. Also, while conversing with his visitor, the weaver must always sit in a squatting position--never flat on the ground with his legs extended--because this will cause the weaving to "fall asleep", which means the pace of the weaving will slow to a crawl. Finally, when the visitor departs he should never say "I am going", because it is believed that some of the yarn may follow him and there will not be enough left to complete the warp.

In conducting the weaving itself, one first connects the lower threads of the warp to the illawa. Next, upon lifting the illawa, the shuttle is passed through the warp; when the illawa is dropped, the shuttle makes its return trip back. After every one of these round trips with the woof, the weaver takes his wich'uña and gently beats the yarn tightly into place. These procedures are repeated sequentially until the weaving is completed.

Most looms are fitted with a backstrap--known as the ch'ukurkata--which is attached to the near-end loom brace. As the weaving progresses, the woven fabric is rolled up around this bottom brace. This shortens the length of the warp, which means the textile must be lifted away from the stakes. The backstrap allows tension on the warp to be sustained while the weaving is separated from the stakes and the stakes themselves are being moved up. Finally, when the full length of the original warp has been woven, this is called a mankhalli or one half of a blanket. For the completion of the finished blanket, two mankhallis must be woven; subsequently these separate halves are sewn together. A skilled weaver requires a week to finish a mankhalli, or two weeks to complete an entire blanket.

WEAVING A PONCHO

Ponchos are also woven on four-stake looms. The implements, materials, and procedures are practically identical as in the case of weaving a blanket. The major difference is that the poncho takes less time to weave. The following description was provided by Manuela Patzi de Yanarico, of the community of Yuka.

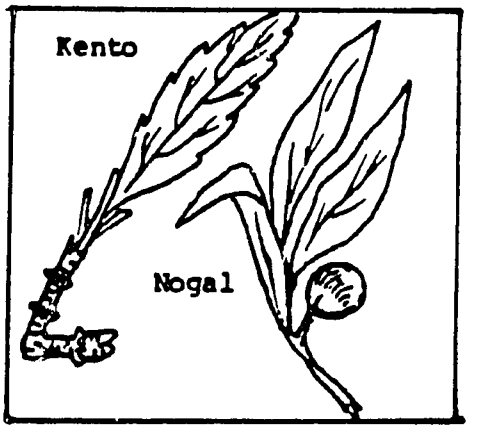
I will describe the weaving of a man's poncho on a rustic loom of four stakes, using two people working four hours in the morning and four hours in the afternoon, or eight hours to complete each mankhalli. First we prepare the material. The yarn is made from sheep's wool mixed with a little llama yarn. To prepare this yarn, it took two people a couple of months each to spin, wash, dye, and wind it. After all that, the yarn must be allowed to rest for a time because this will facilitate the weaving. The yarn must be of "two-pound wool" (from sheep giving at least two pounds of wool per shearing) and it must be well-wound. The yarn for the woof should be a combination of llama or alpaca wool with sheep's wool. To prepare the weaving instruments, each weaver needs four stakes, two sawuñ lawas, a tokhoro, an illawa, a jhajjchaña to move the woof, a wichkata to lift the warp, several wich'uñas of different sizes to tighten and even the weave, rope to tie the loom ends to the stakes, and fine threads to tie the warp to the illawa.

The weaving is done as follows. First, the four stakes are placed according to the size desired for the poncho. On both ends the sawuñ lawas are secured to their stakes. These poles are not the same size. The one at the cabecera (head of the loom) should measure 250 cm while the far piece should be 185 cm. The width of the loom will only be 80 cm, which is the normal size for one-half a poncho. The weaving begins from the cabecera and proceeds toward the opposite end. Two separate shuttles of yarn are used--one for each side--and these can be passed through the warp in both directions. Two keep the threads of the warp from slipping about on the loom ends, we sprinkle a little water on them.

DYEING THE YARN

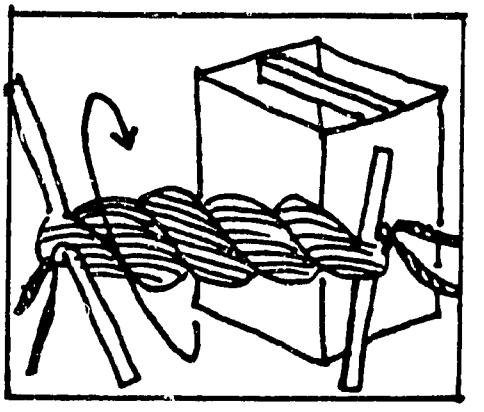
One of the most popular colors for dyeing of wool used in ponchos is nogal or walnut. The dyeing process for this color is as follows. First, the spun yarn must be collected in loose skeins or madejas. These must then be washed with detergent using four consecutive changes of water or rinses. The clean skein is then wrapped around two sticks--one at each end--and twisted until wrung dry. Meanwhile, it is necessary to heat a 20-liter can of water--filled half full--on the stove. This is enough water for dyeing six skeins of wool.

Before hand one must have already prepared the required plants, of which there are two. The first is the walnut, the second is a plant called Kento. All of the walnut--stem, leaves, and fruit --are utilized for dyeing. In contrast, the kento's leaves are removed and only the root is used. This root must be carefully washed to remove all dirt. Both the walnut and kento are then ground up into small pieces using a stone handmill or batan. Before the water on the stove has come to a boil, a third of the ground plant material is added to the can, then two skeins of yarn, then another third of the plants, and so on until all ingredients have been utilized.



Dyeing Materials

The contents of the can are now brought to a boil. On a strong flame, the mixture should be boiled for about two and a half hours. The skeins should be stirred with a stick every now and then. One watches the color being acquired by the yarn and stops the process when the desireable hue has been reached. The skeins are removed, wrung dry using two sticks, and left to air-dry on flat rocks. The water in the tin can is of no further use and should simply be thrown away.


Dyeing Implements

WEAVING A BELT

In the community of Chiarhumani, there are women who weave aguayos (mantles for carrying loads), chuspas (bags for carrying coca leaves), and belts. Their particular specialty is weaving in letters into these textiles. The weaving is done almost exclusively for home consumption or for gifts. It is the older women who are most expert at this craft; the younger women are less interested in weaving. In the following narrative, Lucía Quispe de Apaza provides a description of belt-making.

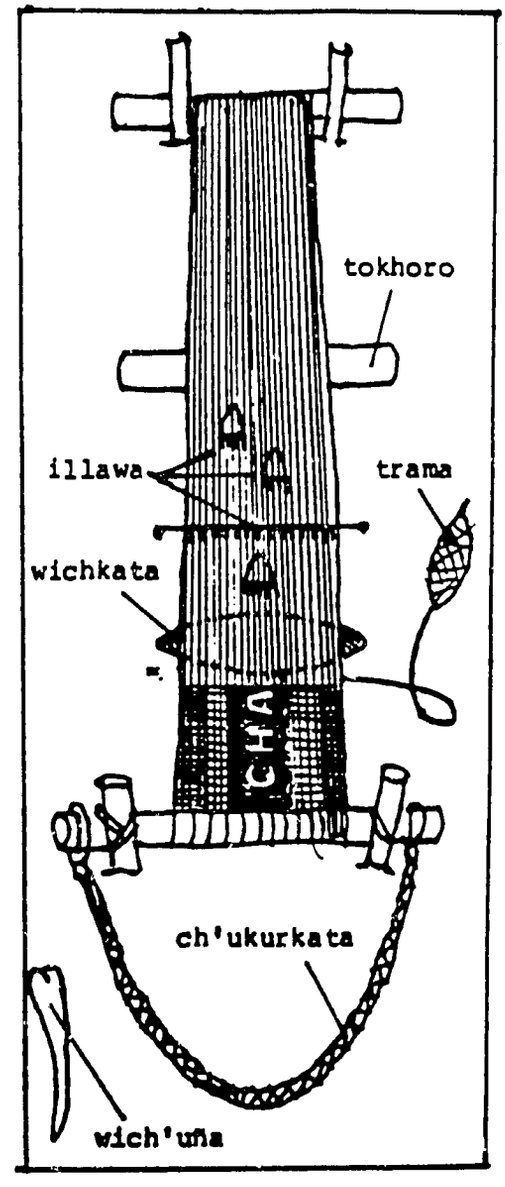
Here in Chiarhumani, we do not use the wool of our sheep for weaving. We prefer instead to buy synthetic yarns from the sunday market at Patacamaya. For making a belt it is not necessary to buy whole madejas (skeins) of yarn, only the little ones, but they should be of several different colors. In Chiarhumani our favorite color is pink. The other colors needed for weaving a belt are white, green, red, and sky-blue. The pink yarn is used in a special trama (shuttle) to create the background for the letters.

The necessary implements for weaving a belt are the following: (1) four stakes; (2) two end-pieces, which should be 60 cm wide and 6 cm in diameter, between which the warp is stretched; (3) the tokhoro of bamboo for separating the warp; (4) a wichkatu--not a pole such as we use in larger weavings, but a flat piece of wood about 30 cm long that is used specially for belts and skirts; and (5) several illawas. With regard to these illawas, we use four. The widest is made of No.8 wire and is 30 cm long. The others are made of string and are used to separate the different colors used in the decorations and lettering.

It is first necessary to know the waist size of the person for whom the belt is intended, so we know where to set the stakes and how long to make the urdido (warp). Whatever is the waist size, it is necessary to add another ten centimeters, because the weaving will result in a shrinkage of that amount. To prepare the warp requires 42 pairs of thread stretched lengthwise. These are attached in different colors. Then we attach the illawas--first the wire one, and then those of string to make the saltas (letters or decorations). For example, you need one for pink (the background), one for white (the letters), and another for pink to fill in the background between the letters. The warp for the white lettering alone will require about 26 pairs of thread. The letters are shaped two pairs of threads at a time.

The weaving progresses by a sequence of lifting the illawas and passing the tramas back and forth. For every color in the belt there is a separate trama. One trama is used exclusively for the white letters. The yarn is tapped firmly in place using the wichkata and also the wich'uña.

It usually takes me about a week to weave a belt. Of course, I can't work full time at it because I also have to do the cooking, the washing, and take care of my animals. Not counting my own time, it costs (in January 1981) about 100 pesos (US$4) to weave a belt.



Implements for Belt-Making

In Jaruma, Leandra Trujillo de Huallpa made a belt during the month of December. She bought all her yarn at the Saturday market, selecting six colors in all: yellow, green, red, cherry, pink, and sky-blue. Her total purchases came to 91 pesos (US$3.64). The belt measured one meter in length with a width of six centimeters. Leandra does not use wool she has dyed at home because she has found the commercial yarns offer colors which are more permanent; she also finds their colors more pleasing. This weaver did not use letters in her design but instead decorated the belt with eight-point stars, which is a popular motif in the temperate valleys region of Luribay. As a matter of cultural interest, Leandra explained that the wich'uña is not merely made from any leg bone of the llama, but from the right leg only.

WEAVING THE AGUAYO

The aguayo is an all-purpose cargo mantle used by highland women. About half the size of a poncho, the aguayo is mostly used for relatively small loads of an arroba or less. Its most common use is to carry infants and children who are still being breast-fed. Other important uses include carrying prepared food for the merienda, loads of weeds and straw for livestock fodder, market purchases, and produce for barter or sale. The aguayo is as much a part of the highland woman's dress as are her derby hat and bright polleras (skirts).

The aguayo is woven with a finer wool thread than is the case with blankets or ponchos. Since these are garments composed of many different stripes and bright colors, rural weavers usually buy commercial yarns for their aguayos. If the yarn is not purchased, it is almost certain that the colors with which it will be dyed will be commercial rather than home-made. Aniline (synthetic) dyes are readily available in the weekly markets of the Altiplano. In mid 1981, two small teaspoons of aniline dye--for any color--sold for ten pesos (US$0.40) in the Jaruma market. The dye is added to water that has been warmed (but not boiled) on the stove. Ten liters of water for every two teaspoons of dye seems to be the most common ratio. The dye is mixed-in with a stick until completely dissolved, and only then are the skeins added. The solution is then boiled until the yarn acquires the desired hue. The yarn is then removed with a stick directly to a basin of cold water for rinsing. However, it is not customary in Jaruma to wring out the dyed skeins--neither with the hands nor by twisting with sticks. Instead, the wet yarn is simply hung from a wire or clothesline. This process continues with one batch of yarn after another until all the desired colors and quantities of yarn have been obtained. When the dyed yarn has dried, it is spun one more time on the rueca, then wrapped tightly in balls.

The aguayo is woven on a four-stake loom employing the same implements described elsewhere for other home-made textiles. However, the weaving procedure with the aguayo is somewhat different than with blankets or ponchos. This is because the aguayo has many different colors and therefore requires two weavers--one to manipulate the illawas, wichkata, and wich'uña; the other to handle the back and forth movements of the many different tramas. Furthermore, it takes two people an entire 8-hour workday just to thread the loom (warp) for weaving the aguayo. Then to complete the weaving requires another five days--with two people--just

finish one half. By the time both halves have been completed, the total labor investment will have been 24 person days. In Huacuyo, an aguayo sold for 500-600 pesos (US$20-24) at prices prevailing in August 1981. The more expensive aguayos have more elaborate designs and therefore require more labor and possibly higher costs for dyes and yarn preparation. Antonia Ramos de Mamani, of Huacuyo, weaves aguayos on a commercial basis, but only against specific orders and a cash advance by the clients.

KNITTING A SWEATER

For the most part, highland women buy factory-made sweaters, but of course there are exceptions. In Jaruma, for example, several women knit chompas (sweaters) as do several men. They prefer to buy the yarn rather than dye their own--first because commercial wools hold their colors better than home-dyed yarn, and secondly because home-dyeing is so time consuming. Manufactured yarns are purchased at the weekly market in Jaruma, or when a trip is made to the city of La Paz. The sweater for an adult will require about one kilo of yarn--which amounts to ten skeins--at a cost (in late 1981) of 130 pesos (US$5.20).

The skeins of yarn must first be wound into balls. The knitting itself is done with a pair of metal knitting needles. First, the back and shoulders of the sweater are knit, which requires a length of about 160 puntos (stitches). Next the front is knit, to a length of some 80 stitches. Finally the sleeves are knit, about 80 stitches in length apiece. The types of stitches used are quite variable depending on personal preferences. The ordinary sweater can be completed in about two weeks of part-time work. Knitting is almost always conducted in addition to another activity, like herding livestock or walking to and from the market.

THE WEAVING AND USES OF CH'ILLIWA

One of the most useful raw materials for Altiplano farm households is a wild straw known as ch'illiwa. Its primary uses are for making twine and rope. The twine, also known as fhala or esparto, is used to bind roofbeams, braces, and straw in the construction of thatched roofs. The rope--which is three times thicker than the twine--is known as chinuña and is used to tie up livestock. A secondary use of ch'illiwa is to build finas or temporary storage silos for tuber crops.

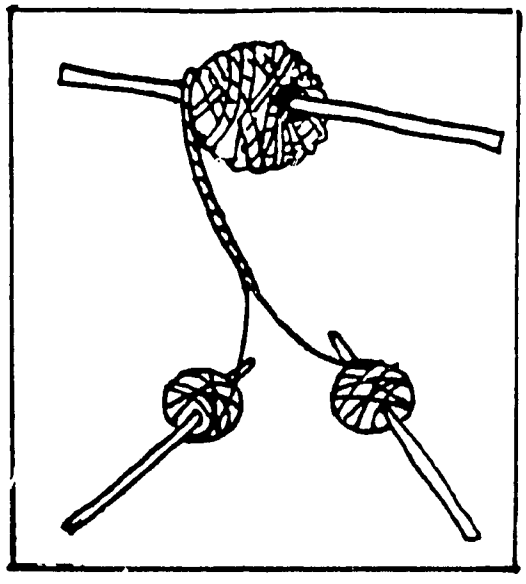
The availability of ch'illiwa is quite variable from one community to another. For example, in Huacuyo this straw is quite abundant--so much so that residents of neighboring Killay Belen come up to steal ch'illiwa when they need it for specific uses. In Yuka, the straw is so scarce that local families send their members to walk for kilometers up and down riverbeds in the region in search of grass long enough for weaving use. A few families in Yuka have actually transplanted young clumps of ch'illiwa to their farmhouse properties. There they must carefully tend the grass for about two years until it reaches about a meter in length. All the while, these plantings must be protected from their own livestock.

To make twine and rope, one must select ch'illiwa grass that is as long as possible, preferably at least 80 cm in length. Next, it is necessary to cut off the green leaves and stem tips, called llagas, leaving only the stems. These stems must be soaked in water for 2-3 hours. The wet straw is then placed on a flat stone and beaten with a light rock. At this stage one must be careful not to split the stems; the object is only to soften or flatten them so they can be twisted more easily. When this is done the straw must again be soaked in water.

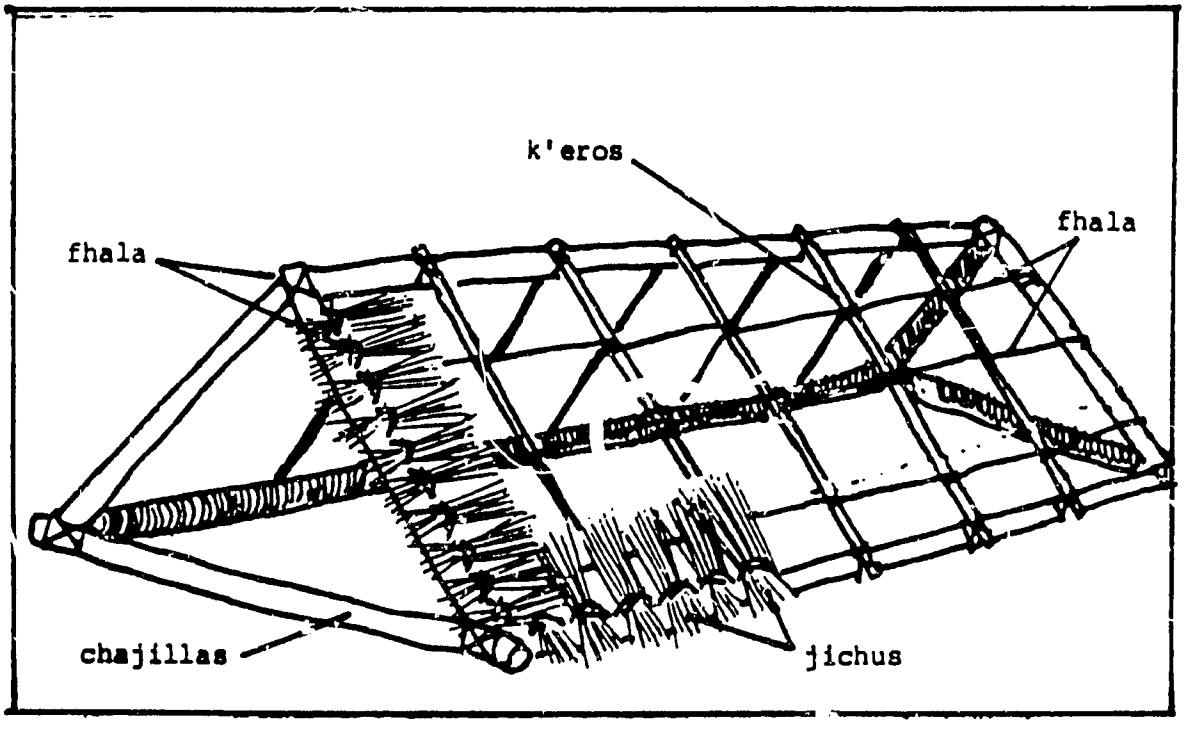
The straw is once again removed from the water. Each stem is twisted into a single strand. Before the stem end is reached, a second flattened stem is overlaid and twisted in with the first to create a continuous strand. This strand is attached to a stick, and as it grows it is wrapped into a ball. This process continues until about half the damp and softened straw has been utilized. Next, a second strand is begun and gradually wrapped into a ball just like the first. The final step is to take both strands and twist them into a single double-strand twine, which is called fhala doble. As it is completed, this combined twine is also rolled into a ball.

For the roof of an average house with 20 square meters of thatching area, an estimated 92 meters of esparto (fhala doble) will be needed. In thatched-roof houses, the palizada or framework is bound together, not nailed. To bind the major roofbeams or chajillas will require about 22 meters of cord. Then, to bind the secondary braces or k'eros will require 52 meters of twine. A final 20 meters of fhala will be needed to tie the thatch into clumps or jichus, and these clumps to the braces.

To make 94 meters of fhala, it would take a single man or woman a full day of work and possibly more. The value of the twine--at 1981 prices--would be about 100 pesos or US$4.

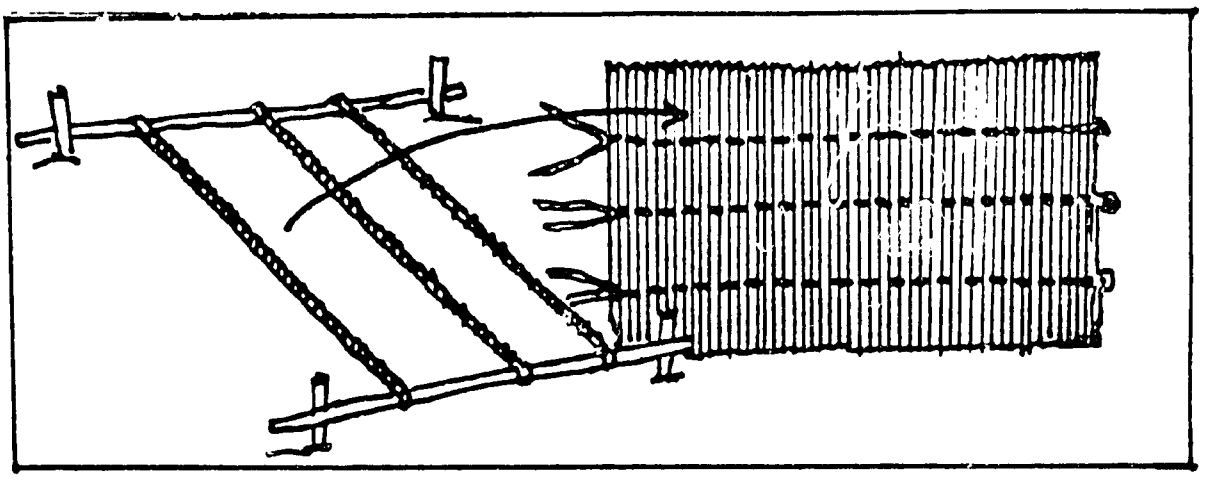


Making a Fhala Doble



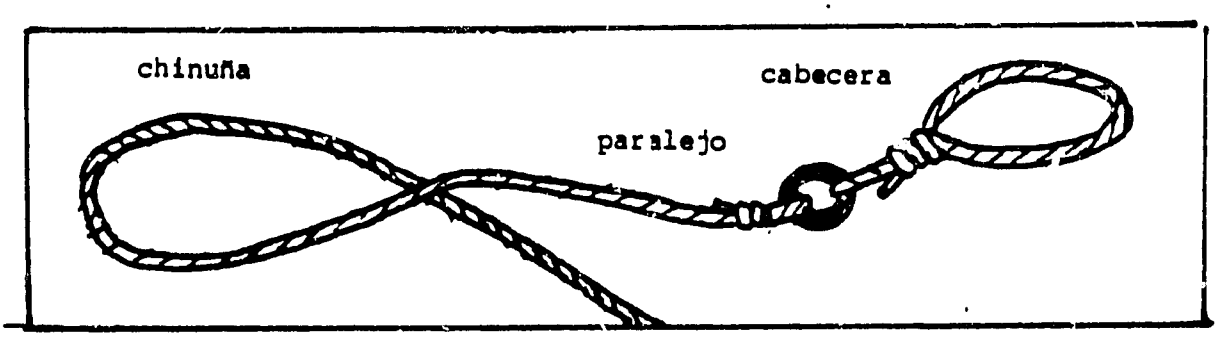
Components of a Thatched Roof, Bound with Straw Twine

Another use of ch'illiwa twine is for binding together reeds (or the stems of a very stiff variety of wheat) to make straw mats. These mats are principally used to make cylinders for the storage of produce inside the farmhouse. They are known as sejes. To make the straw mat, one first places four stakes in the ground--one at each corner of the mat's intended size. Two poles are attached to these stakes, one at each end. Next, three separate lengths of fhala doble are attached to connect the two poles. Finally, individual pieces of reed or wheat stems--all cut to uniform size--are inserted through the strands of the twine and bound tightly in place.



Straw Mat Made With Reeds and Ch'illiwa Twine

Straw ropes for tying up livestock are known as chinuñas. These are made of three pieces of fhala twine (or six strands in all). There are actually two parts to the rope: (1) the chinuña proper, and (2) a head or noose called the cabecera, which is made of the same material. Both pieces are connected to each other by a metal ring called the paralejo. Such ropes are usually home-made, but some farmers prefer to obtain them from Peruvian merchants in exchange (barter) for agricultural products. In mid-1981, a Peruvian rope of nine brazadas (24 meters) could be purchased for 13 pesos (US$0.52).



Rope Made From Ch'illiwa

DIFFERENT STRAWS AND THEIR USES IN KILLAY BELEN

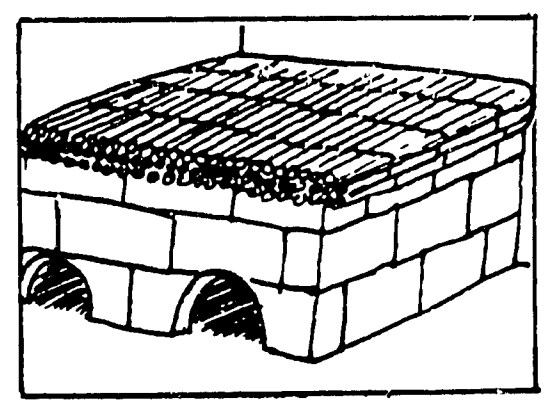
The residents of Killay Belen use five different kinds of wild or cultivated straw, and each has its special use. These are (1) Tallo de Trigo, used for making mats known as sejes; (2) Matara, an aquatic reed, used mostly to feed cattle; (3) Agavi, a wild straw used for rope making; (4) Ch'illiwa, another wild straw, mainly used for binding sejes and in roof making; and (5) Waylla, a soft wild straw used for storing harvested produce.

TALLO DE TRIGO

The tallo de trigo or wheat stems are not all equally suitable for weaving purposes. In Killay Belen they use a variety known as ch'ila, because it is so strong and resistent that not even cattle will eat it. The stems are quite stiff and are therefore stitched together rather than woven to make mats. Since firmness is desireable, the stems are neither soaked nor beaten before use. The primary use of wheat-stem mats is to make cylindrical baskets for storage of produce. When stood upright, the mat adjusts to a variety of different sizes (see STORAGE STRUCTURES, Chapter II). Another common use of these mats is to make a roof for the cobayo (guinea pig) shelter, which is often located in the kitchen. By folding the mat into two or three layers, one achieves not only a sturdy roof but also a matress; thus, the housewife has a place to sit or lie down to rest while she is cooking.

MATARA

Matara is an aquatic reed, a smaller variety of the well-known totora reed that grows abundantly along the shoreline of Lake Titicaca. The primary use of matara is fodder for cattle. However, some residents also use it in roofing their homes and in making sejes.



A Cobayo Shelter Roofed With a Straw Mat or Seje

AGAVI

This is a wild straw which is often used in place of ch'illiwa. It is less desireable mainly because it must be initially soaked in water for 2-3 weeks (whereas ch'illiwa requires only 2-3 days). But it is treated similarly--first by soaking in water, then by beating it with a stone to soften it, and finally twisting it into strands by rubbing the stems between the palms of the hands. Like ch'illiwa, it is used to make chinuña six-strand ropes. It is said that the rope made of ágavi will only last for 4-6 months under normal circumstances. For it to last longer, it is necessary to soak the roap in water, which keeps it from drying and breaking. Agavi is also used to tie together straw mats, and to secure roofbeams and thatch. A brazada (2.7 meters) of ágavi cost five pesos (US$0.20) in 1981.

CH'ILLIWA

Killay Belen has no ch'illiwa. This is because the community enjoys a protected, temporate climate whereas this grass prefers the colder, windswept Altiplano plateaus. Yet the community's next door neighbor, Huacuyo, has relatively abundant ch'illiwa. It is the longest straw of its kind to be found anywhere in the Province of Manco Kapac, so residents of Huacuyo guard it jealously--for their livestock, their silos, ropes, and basketry. To get their hands on this prized resource, families in Killay Belen are forced to steal it. Now and then they organize trips up the mountain at 3 A.M. to steal straw from Huacuyo while its owners are asleep.

WAYLLA

Waylla is a shorter wild straw that grows only 40-60 cm high. It is used specifically for constructing the straw floors where produce are to be freeze-dried into chuño, caya, tunta, and other dehydrated products. Following the harvest period, there is a scarcity of waylla as well, and once again families from Killay Belen often have to steal it from their neighbors in Huacuyo. The waylla is also popular for preparing nests of straw for storing fresh produce following the post-harvest selection. After it has been used once, the waylla can not be reused for the same purpose because it becomes easily shredded and broken. However, it can still be used as fuel--both in the kitchen, or outside to build bonfires when it appears that a hailstorm is approaching.

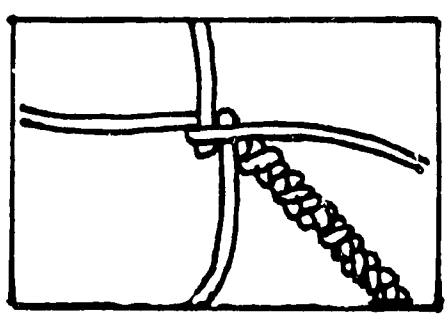
MAKING CATTLE HAIR ROPE

The Altiplano farm family uses rope continuously for the management of its livestock. Rope is needed to secure loads, to lead cattle to and from pasture, to tether pasturing animals, and so on. Accordingly, rural households experiment with different kinds of rope materials to determine which will last longest or are most economical. Some of the different ropes in common use are made of jute, leather, llama wool, straw, cattle hair, nylon, and rubber (cut from automobile tires).

One of the most successful ropes are those made from the tails of cattle. Their hair is known as cerda. The cutting of this hair is done in April because that is the flush pasture season for livestock; to cut their hair at other times of the year is believed to contribute to the animals' becoming undernourished. The cerdas should be cut at a length of at least 50 cm. This is done with scissors. Rural households are carefull to cut only the hairs from the center of the tail while leaving the exterior hairs to cover the cropping and so safeguard the esthetic appearance of the animal.

The cut hairs are placed on a mantle stretched on the ground. The hairs are twisted counter-clockwise--a few hairs at a time--into a single strand. This strand is wrapped around a stick with a 3-5 cm diameter and gradually collected into a ball. New hairs are gradually fed into the strand so that it becomes continuous. The twisting continues until the ball of hair twine is about 2-3 cm thick, or until all the cut hair has been twisted into the strand. Next, the strand is unraveled to a length twice that of the length of the desired rope. This unraveled section is doubled in the middle and then woven together to create a two-strand cord. This same procedure is repeated three more times until the artisan has four two-strand cords of equal length.

The four cords are tied to a single post. From this point on they are braided by doubling each of the four cords on a consecutive basis. The four cords are held with the fingers of both hands such that each one is perpendicular to the next. Making cattle hair rope is considered to be a man's task. It is usually conducted while he is pasturing his cattle. Cattle hair rope is made exclusively for use by the rural household; it is never made for market sale



Braiding Cattle Hair Rope

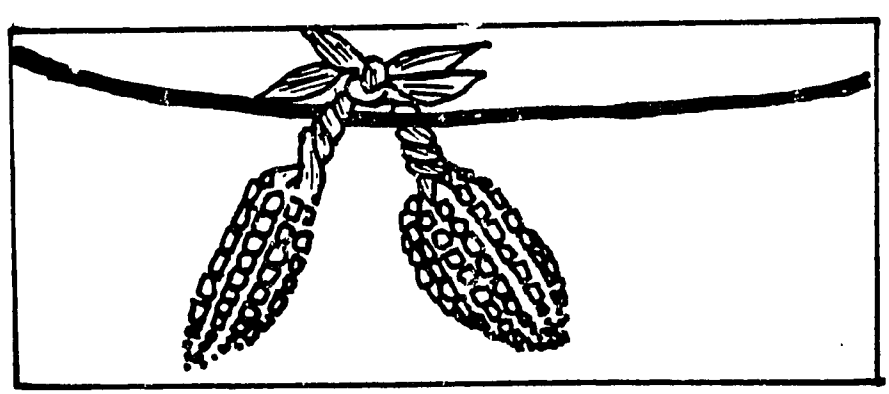
MAKING HUAYLUNCO IN KILLAY BELEN

This final activity description could be classified both as an artisan and a food preservation practice. In the artisan area it involves the braiding or weaving of vegetative material--like straw rope-making--but the final purpose is to store dried corn during the rainy season to prevent it from dampness, mildew, and rot.

To begin with, in Killay Belen the precious corn crop is predominantly husked and left in whole ears for domestic storage. The principle storage container for corn is the seje. However, a portion of the corn harvest is usually set aside to make huaylunco or ears that are knotted together with pieces of their husks--in pairs--and hung from wires or rafters.

While still in their husks, the ears destined for huaylunco storage are soaked in a washbasin for at least a couple hours. This soaking softens the husks and makes them pliable enough to be twisted and knotted without tearing. One by one the ears are husked of all except two of their hojas or leaves. These are twisted together with the fingers to form a single strand. This strand is then knotted to the strand of another ear. When all ears have been paired and knotted, they are hung in assorted locations about the farmhouse, as high as possible from the ground.

Huaylunco is last-resort corn. It is usually consumed only after all other supplies are exhausted. The practice is also common in households with small children, where it is considered expedient to keep this produce out of their reach. Huaylunco is also a barter good, like chuño, or can be sold to meet emergency cash needs. In late 1981 a pair of huaylunco ears sold for four pesos (US$0.16).



CHAPTER VIII.

HOLIDAYS AND CELEBRATIONS

The life of the subsistence household in the Bolivian Altiplano may indeed be hard, full of drudgery, badly exposed to health risks, and almost devoid of material conveniences. Yet ironically, farm families appear to celebrate even more than their urban counterparts. Perhaps as an antidote to their very poverty, they need and maintain an intense social life--particularly at the communal rather than the individual level. No understanding of the rural poor in the Bolivian highlands would be complete without an appreciation of when, how, and with whom these people seek to enjoy themselves.

In this chapter we first present descriptions of the major celebrations which are fixed events in the social calendar of most Altiplano farm communities. These fiestas include the termination of office of annually-elected officials (January), Carnival Week (February), Holy Week (April), the feast days of St. John the Baptist and St. Peter (June), All Saints Day (November), and Christmas (December). This is still a very partial listing because it does not include Fiestas Patrias (August), several minor holy days, nor what is often the most spectacular celebration of all: the patron saint's day of each community.

The remainder of the chapter is devoted to a sampling of celebrations that do not have a fixed date every year, or are unique to individual communities. Our sample covers marriage, a child's first haircut, the local public school anniversary, the last supper ceremony of the Adventist church, community fasting in Jaruma, house construction and roofing ceremonies, a mock bullfight, celebrating boat repairs, a set of ceremonies for repelling hail in Killay Belen, and funerals.

CELEBRATION OF THE DEPARTING AUTHORITIES

In most highland communities there exists an Agrarian Syndicate which is the body responsible for local government. It consists of 13 separate posts including the Secretary General and secretaries for Minutes and Records, Finances, Agriculture, Livestock, Justice, Conflicts, Roads, Education, Organization, Communications, Cooperatives, and Female Participation. The holders of these positions are elected on an annual basis, and most terminate their period of office at the end of the calendar year. Upon his departure from office, it is customary for each authority to celebrate this event with a party given for his relatives and friends. These fiestas are private affairs, with each authority responsible for selecting his own guests or acompañantes.

Known as the fiestas de las autoridades salientes, these celebrations usually constitute the very first events of the new year in the social life of the rural community. The following description of festivities is based on the example of the community of Yuka.

A week before his fiesta, the departing authority begins to make his preparations. He first contracts for a band of musicians from either his own or a neighboring community. In January 1981 a group of eight musicians could be hired for an entire day for 400 pesos (US$16) in Yuka. The authority must also purchase five pounds of coca leaves (worth US$48 in 1981), eight liters of cane alcohol (US$16), many cases of beer and soft drinks, perhaps a dozen packs of cigarettes, and any foodstuffs he can not supply from family stocks. Meanwhile, the authority's god-children--or other relatives who owe him favors--are expected to order some pillos. These are circular loaves of bread which will be hung about the authority's neck on the day of his celebration. When the costs of food are included, the official's departure from office could easily cost him 5,000 pesos or the equivalent of US$200 in 1981. For this reason it is usually necessary for the authority to sell a bull or cow to finance the celebration.

On January 1st at 8 A.M. the host or pasante receives his guests at his home. From there he and his companions walk to the town of Escoma (about five kilometers away), where a mass will be said in his name as well as that of the other departing authorities. Practically all of Yuka's residents show up for this event, with each authority accompanied by his respective group of companions. Upon the conclusion of the service, the authorities first toast each other with a round of alcoholic drinks; then each moves off with his group to a separate location adjacent to the town plaza.

The celebrations within each group commence with the exchange of congratulatory hugs and the throwing of confetti. Those participants who have prepared the pillo loaves now place them on their host and his wife. At this point the authority's hired musicians begin to play. The group then proceeds to dance several times around the plaza of Escoma. All the while they wave a large white flag. Next, the group withdraws to one side of the plaza. The companions of the authority now appear with uñanta or paper money (10, 20, 50, and 100 peso notes) which they pin to the lappels of their host. "Uñanta" is also used to describe those who contribute bottles of alcohol and circulate them among group participants. Both the money and the alcohol are regarded as an ayni or exchange of favors. At about 2 P.M. the host brings out the merienda for his companions. It will consist of roast lamb or guinea pig, potatoes, tunta, and chuño. Some participants will cooperate by contributing additional food for group consumption. Once everyone has eaten, the music begins once more and the group resumes its dancing. After a swing or two around the plaza, the group dances all the way back to Yuka. Arriving at the home of their host, the participants will continue drinking, dancing, and eating until late in the evening.

Very early the following morning, the authority raises a large white flag from the roof of his house. This is a signal to community residents at large--whether official acompañantes or not--that they may now join the leader's celebrations. Flocking to the home of their host, the women are separated from the men and each group forms their own circle. In the middle of each circle is placed a mantle containing a bag of coca leaves. The authority's wife takes the first ration or q'intu--containing 4-5 leaves--and begins to chew. She then passes a q'intu of coca to each member of her circle. Upon the completion of this circuit, the second member of the circle begins to serve coca leaf rations to each participant, one by one. The process continues until absolutely everyone has taken a turn serving the coca. The same procedure is followed by the men's group. In this fashion the remainder of the day will be spent--in chewing coca and drinking alcohol.

On the third day, the authority and some of his companions count the uñanta payments and identify which persons participated in this system of reciprocity. Their names are recorded in a notebook. As an example, when Calixto Yanarico (ex-Secretary of Justice) left office in January 1981, he received a total of 1,800 pesos (US$72) in uñantas.

The new authorities do not attend the celebrations of the departing authorities. They are not permitted to attend fiestas until they have been sworn in to their new posts. But they too will celebrate the end of their period in office twelve months later. And so these celebrations continue, one year after another.

CARNIVAL WEEK: LIBATIONS TO THE FIRST PRODUCTS (CHA'LLA A LOS PRIMEROS PRODUCTOS)

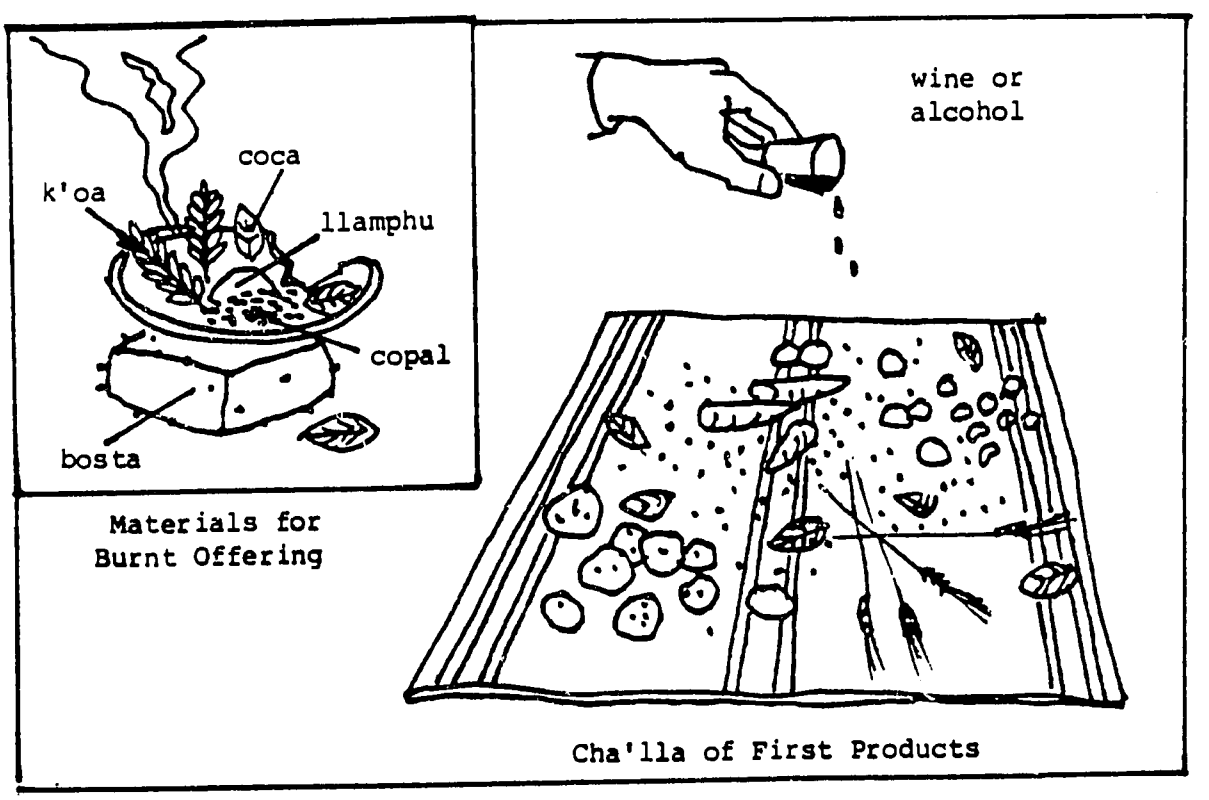
Carnival week follows the third sunday in February. Since the major harvest season begins in April, Carnival is essentially a pre-harvest festival--a time to celebrate the prospect of abundance. It is truly one of the central holiday periods of the year for the rural household. The very first and possibly the most important event of Carnival is for farm families to make libations to their first products. This ritual involves burnt offerings, toasting with alcohol and coca, throwing confetti, and decorating their crop lots with flags and streamers. Known as cha'llas, such rituals are conducted in each and every one of the family's principal crop lots. They are intended to "motivate" a final burst of growth from their cultivated plants, and at the same time to appease the Pachamama or Earth Mother so She will allow a plentiful harvest. The cha'lla of new products is mostly practiced by Catholics, and the ritual itself is largely carried out by women.

The preparations for this celebration begin several days before with the collection or purchase of a variety of essential ingredients. First, the family must obtain tissue paper in different colors and perhaps 2-3 dozen sticks or charos; these are used to make little flags which will be placed in the fields. Additional ingredients will include a pound of coca leaves, a bottle of alcohol, streamers, half a pound of confetti, two pounds of candies, some copal, and wool of different colors for decorating plants. Some families also add k'oa (an aromatic bush) and llamphu (llama grease) as part of the contents of the burnt offerings.

In Jaruma, field visits occur on Jisk'a Anata or the Monday after Carnival. The women in charge of the ceremony leave their homes about 10 O'clock in the morning. The first field visited will be that where the first potato planting was completed; the remaining visits are then scheduled in accord with the declining order of importance of the crop lots. After arriving at the field, the women will first select a location on one of its borders for conducting the burnt offering. On top of a chunk of bosta or manure will be placed a piece of broken ceramic. After the fire is lit, some copal will be sprinkled into the hot dish along with a few coca leaves. As the resulting smoke wafts over the crop, one of the largest and healthiest plants is chosen. Two of its tubers are harvested and placed in a sack. The plant is offered a pinch of coca as compensation. Next, two flags are erected in the field--at its upper and lower boundaries. Then, to the plants with the best flowers, pieces of colored wool are attached to their

branches. Such decorations are known as pillos. To conclude the ceremony, confetti and streamers are scattered over the crop.

In Chiarhumani, field visits are conducted somewhat differently. To start with, the visits are made on Mestiza Urupa or Ash Wednesday rather than Monday. Secondly, the woman in charge of the ceremony (female head-of-household) will be accompanied to the fields by other members of her family. Often they will contract several musicians so that everyone will be able to dance and sing as they make their rounds, but also to "lure" produce away from neighbors' plots. The burnt offering is not conducted at the edge of the field but in the center. The musicians as well are asked to play from near the center of the field; were they to remain on the edge, it is believed that potatoes might wander in the wrong direction--to the plot of a neighbor. Still another difference is that members of the visiting party carry lúcuma fruit with them into the field. Once the largest plant has been selected and two of its tubers harvested, family members begin to strike the produce with their lúcumas while scolding them: "Don't you dare leave!"And finally, the visitors select the most beautifully flowered plant in the field. They cover it with streamers and confetti while instructing it to protect the other plants from any harm that might come. Upon its departure, the family leaves this caretaker plant with gifts of a lúcuma, some candies, and a few coca leaves.



Materials for Burnt Offering

Cha'lla of First Products

These procedures continue one crop lot at a time until the field visits have been completed. The first products which were harvested are brought back to the farmhouse. The housewife proceeds to prepare a merienda, with enough food for her family and any relatives or friends that are likely to visit. Meanwhile, if there is a band, dancing will continue. At least among Catholic families, large amounts of alcohol will be consumed. Arriving guests are expected to provide a t'inkha or gift of alcohol. When it is time to eat, the meal will be spread out on a blanket in the patio of the farmhouse. To one side of this blanket will be placed all the newly-harvested products of that day. These will now be individually submitted to a cha'lla with sprinklings of coca leaves, confetti, and alcohol. All members of the family participate in the cha'lla while repeating the words--"Come to us, products, come to us." Residents of Huacuyo have the custom of sticking coca leaves in the eyes of the new potatoes they have harvested so that these will serve as "guides" for the remaining produce. The first products harvested will be kept until the following sunday, at which time they will be prepared into a special (meatless) soup.

CARNIVAL: LIBATIONS TO HOMES AND PROPERTY

On Jacha Anata or the Tuesday of Carnival it is a custom among most rural families to conduct the cha'lla of their homes and personal property. In this ritual it is the male head-of-household who takes charge. His task is to place on the roof of his house at least 16 flags. These are the same tissue paper banners like those used in the crop lots, except that their poles are shorter. In the very center of the roof the homeowner places a wooden cross. Its significance is that it is expected to protect the house and all its occupants from harm. Next, the homeowner drapes streamers all over the house. He sprinkles the house with confetti, candles, coca leaves, and alcohol.

Next, the family conducts a similar cha'lla of its possessions. These may include a radio, sewing machine, musical instruments, new clothing, and so on. Each item is wrapped in streamers and sprinkled with the now-familiar cha'lla ingredients. By doing this, it is believed that one's possessions will double from one year to the next. Upon the conclusion of this ceremony,

EASTER CELEBRATIONS IN ESCOMA (JAKHE CAPITANA)

Yuka as well as many other neighboring communities celebrate several of their annual festivals in the town of Escoma, the cantonal capital. These celebrations involve large numbers of trained and elaborately-costumed dancers from each community. Competition between rural communities is intense --to display the best dancing, the best costumes, the best musicians. Musical groups are hired from as far away as Oruro, while costuming is bought or rented from as far away as La Paz. Beyond the dancing, the competition extends to horse racing; and in order to participate with a decent animal, some residents will go to Peru to rent their horses. Furthermore, to keep festival participants supplied with food, drink, and shelter for the duration of the celebrations requires a complicated logistical support system.

Such efforts entail huge expenditures. Some of the costs are borne by individual participants--for example, the rental of costumes and horses. But the bulk of the expenses are adsorbed by selected "sponsors" from the community. The responsibility can be ruinous for the families selected, and for this reason it is both voluntary and rotational. The sponsor will be forced to sell many animals, perhaps borrow from relatives and friends, call in many favors owed him, and possibly seek temporary wage employment outside the community. A sponsoring household can be left decapitalized and indebted for several years. Yet to serve as a sponsor brings great prestige to the family accepting the responsibility; few turn down the opportunity when asked, and some even volunteer.

The following information describes the sponsorship system with regard to the Easter celebration. The details were provided by Julio Maquera Yanarico and Justo Yanarico Calle, both of the community of Yuka.

PREPARATIONS

There are two sponsors for the Easter celebration. The first is known as Jakhe Capitana or Indian Captain. The second is called Abanderado because he carries the community's flag throughout the entire fiesta. Although the Captain is considered the principal sponsor, both must finance almost equal levels of expenditures.

Two months before Easter, the dancers begin their rehearsals. These are held at the respective homes of the Captain and the Flagbearer. In each group there are about 30 female dancers and 30 male dancers. To become a member of these groups, one must contribute a bottle of alcohol and pledge to finance the acquisition of a suitable costume or clothing required by the sponsors. There will be organized two major rehearsals by each sponsor. Each will last most of the day. Local musicians will be hired for these rehearsals, but the musical groups to play during the future fiesta will be professionals contracted from outside the region. The dancers practice their steps and routines by dancing around and around the sponsor's house. Some of the dances make fun of the military; these follow music that vaguely resemble marches, but with strange rhythms and discordant notes.

At nightfall, the rehearsal ends and all participants are invited by the sponsor to eat and drink. The women and men are separated. Blankets are placed on the ground for groups of either sex. These are loaded with dishes of roast meat, potatoes, chuño, and other food. Drinks include beer and alcohol, while soft drinks are made available to non-drinkers. At 1981 prices, it is estimated that for a single rehearsal the Captain or the Flagbearer must provide 1,900 pesos (US$76) in drink and 835 pesos (US$33.40) in food. This means that the sponsor must invest in rehearsals alone some 5,500 pesos or US$220 <u>before</u> the Easter celebration begins.

FESTIVITIES IN ESCOMA

On the morning of Good Friday, the Captain and his Flagbearer assemble all their equipment and supplies needed for the fiesta and transport it into the town of Escoma. Unless they have a relative or their own house in town, they must rent a dwelling for the weekend. It must be a large structure, because here all the dancers will sleep three consecutive evenings, and they will also need space--separate quarters for men and women--to change in and out of their costumes. The sponsors must bring with them kitchen equipment, cooking and eating utensils, glasses, washbasins, and cooking fuel. They will need assistants for cooking meals and serving drinks. They are expected to provide their companions with breakfast--consisting of a cup of milk and bread--as well as a mid-day meal with two courses (soup plus a plate of meat with rice). Nobody worries about the evening meal because almost everyone is drunk by the end of the day. Furthermore, each companion or dancer is to receive a cuota of two large bottles of beer per day; this is in addition to liquor and other drinks he or she will receive throughout the daily dancing. Finally, the sponsors must pay the full lodging expenses and fees of the professional musicians, and provide fodder for the animals participating in the horseraces.

At 1981 prices, the total cost of the three-day Easter celebrations (which would be divided equally between the two sponsors) would exceed 27,000 pesos or the equivalent of more than US$1,080, as follows:

Estimated Cost of Easter Celebration

	Bolivian Pesos	U.S. Dollars
-Meat: 6 sheep, butchered	1,800	72
-Potatoes: 7 cargas (35 arrobas = 875 pounds)	2,450	98
-Chuño: 1 carga (5 arrobas = 125 pounds)	1,500	60
-Rice: 10 pounds	100	4
-Noodles: 4 sacks	100	4
-Condiments	200	8
-Sugar: 15 pounds	100	4
-Bread: 750 small loaves	375	15
-Milk: 60 liters	900	36
-Beer: 10 fardos (240 bottles)	5,000	200
-Alcohol: 3 jawas (30 liters)	2,400	200
-Coca: 1/2 cesto (cargo basket)	1,500	60
-Barley hay: 7 loads, for horses	700	28
-Payment of the musicians	10,000	400
	27,125	$1,089

Although the sponsors must spend considerable quantities of money, they also receive gifts from other members of the community to assist them in meeting their responsibilities. Such gifts are called arcos. During the festivities themselves, friends and relatives pin paper money to the lappels of the sponsor or to the shawl of his wife. Individual donations of this type are seldom less than 100 pesos and often 200 or 300 pesos. The smaller donations tend to be entirely voluntary, while the larger ones are usually payments (or installments) on some debt or favor owed the sponsor. Arcos can also be paid in products--for example, a carga or 125-pound load of potatoes, or a carga of barley for the horses. Others contribute entire cases of beer. All the above donations are considered within a system of reciprocity. One does it, without obligation or pressure, because he knows he may someday be responsible for sponsorship of the celebration and will need the generosity of his neighbors.

At the end of the mass given on Easter Sunday--in the presence of most of the residents of Yuka (and neighboring communities)--the persons selected as sponsors for next year's Easter celebration are presented to the public. They receive their responsibility solemnly, for they are being entrusted with an opportunity to serve their community and to acquire the highest prestige their community can bestow upon them.

CARNAVAL: VISIT TO THE MARRIAGE GODFATHER (CHAYAHUA)

When a young couple gets married it is customary for them to have a padrino de matrimonio or godfather for this event. The role of the padrino is to help defray the costs of the marriage celebration. The young couple is expected to formally express their gratitude to the godfather during the period of Carnival. The event is known as Chayahua. It is an all-day affair that, if successful, should become a colorful fiesta in which most of the community will participate.

To prepare for the chayahua, the young couple weave several istallas or bags for carrying coca leaves; the wool of one sheep must be reserved for this purpose. The couple must then reach an agreement with their godfather as to an appropriate day and hour for the celebration to commence. Word of the event is passed through the community. The ahijados or godchildren next construct two large, white flags--one for the husband, the other for the wife. In addition, they must buy coca leaves, candies, alcohol, beer, confetti, streamers, and fruit. They contract a band of musicians for the event. They set aside a sheep, which will be given the godfather as a gift. Finally, the couple prepares two bags of clothing which contain a set of garments for both a man and a woman. Meanwhile, the padrino prepares two similar bags of clothing, for both sexes.

On the day of chayahua, the Secretary General of the community arrives at the house of the ajiados to make sure everything is in order. When the musicians and all the companions (friends and relatives) have arrived, the music begins and the group sets out for the home of the godfather. They arrive dancing, with the white banners fluttering high. The young husband is given a gift of six bottles of beer by the godfather. He reciprocates by giving his padrino an istalla filled with coca leaves. They begin to chew together, and to serve their companions as well, who have arrived with alcohol, coca, and other gifts. The ajiado now gives his godfather the gift of the sheep. The animal is beautifully adorned with streamers and confetti. The godchildren now dress their godparents in the clothes they have brought, giving each a woven istalla. The godparents, in turn, dress their godchildren. Once properly dressed, godparents and godchildren begin the dancing. Soon all participants have joined in and the party begins to roll. The festivities are likely to continue all evening. At the party's end, the clothes are returned, except for the istallas.

EASTER: ATTENDING THE PILGRIMS TO COPACABANA

Huacuyo is one of the geographically largest communities in the Province of Manco Kapac. It is strategically situated, because through Huacuyo's lands pass the only highway connecting the shrine of Copacabana with the rest of Bolivia. By this highway, Huacuyo lies about ten kilometers from Copacabana. However, there is a secondary trail--known as El Pajonal--that crosses through Huacuyo and reaches Copacabana much more directly. This optional route is preferred by most of the pilgrims who travel to Copacabana on foot. During Holy Week, the traffic on El Pajonal rises to hundreds of pilgrims per day. More than a dozen Huacuyo residents set up temporary businesses along this route each year during Holy Week to sell the pilgrims food, beverages, and transport services.

What is most noteworthy about these businesses is that they are not exploitive. They offer genuinely useful services at very modest prices. And because the pilgrims are traveling through 24 hours a day, the owners of the businesses remain at their work day and night.

The sellers of food have little tent restaurants every 500 meters or so along the route. Each establishment consists of little more than a small kitchen, a table and bench to accommodate at most a half dozen clients at a time, and an awning protecting both proprietor and clients from the wind. The dishes include plato paceño, sheep broth, thimpu (lamb with rice, potatoes, and chuño), aji de papalisa, chairo, and others. The prices charged for these meals are unbelieveably inexpensive. For example, Petrona Coaquira's mother was selling a plato paceño for five pesos (US$0.20) when its price in Copacabana would have been 30 pesos (US$1.20). Nonetheless, she was satisfied because she had "made money". She explained that her only cash outlay was for kerosine to cook with, because all the produce used in her meals came from her own farm and had therefore not cost her a cent. Even the corn she used had been obtained through barter.

Similarly, the non-exploitive pricing of food also prevails with breakfasts, soft drinks, and alcohol. In 1981, a breakfast consisting of a cup of coffee and a piece of bread sold for 8 pesos (US$0.32), while a cup of milk and the same bread sold for 7 pesos (US$0.28). One seller explained that the breakfast with coffee was more expensive because she had had to buy all of its ingredients--coffee, sugar, and bread--while in the case of breakfast with milk she had only had to buy the sugar and bread; the milk came from her own cow. A seller of soft drinks was charging 8 pesos per bottle, only one peso over cost. When a pilgrim reprimanded her for charging too much, she promptly lowered the price to 7 pesos. When asked why she did this, she explained

it was not always necessary to make a profit on her soft drinks because she was making profit elsewhere--selling food. With regard to the sellers of alcohol, their product was rubbing alcohol--to alleviate the blisters of feet that had walked from as far away as La Paz--which sold in small bottles for a mere 2 pesos (US$0.06) each. While they saw their profit as reasonable, because the alcohol was bought in bulk and rebottled to sell at higher unit prices, these women did not consider the value of their own time in gathering and washing dozens upon dozens of the bottles they were using to sell their product.

Some Huacuyo families provide a transport service for tired pilgrims, again on highly reasonable terms. The distance covered by the El Pajonal path as it runs through the community is about 800 meters. The transport service is based on burros with padded cargo saddles. There were 12 animals working this route during Holy Week 1981. The pilgrim mounted his burro at the Ajanani boundary and would be led all the way across the community to the Sopocachi boundary--almost a kilometer for 2 pesos--and both the animal and its owner had to walk back to Ajanani to pick up their next passenger. This service continued day and night throughout Holy Week.

The best money-making venture developed on El Pajonal was the construction of a toll bridge. Halfway through the community of Huacuyo the route crosses the Ajanani River. Traditionally, all pilgrims crossing this stream had to remove their shoes and wade across. The water is quite cold in April, particularly at night, and many pilgrims would prefer to avoid this experience. So a Huacuyo resident had the bright idea of building a footbridge to one side of the Ajanani crossing, and charging a modest toll for its use. During Holy Week 1981 he was charging one peso per user of his bridge. On the average, for every 24 hours he received 200 customers, or about 8-9 per hour.But this required his presence at the bridge day and night, and at night his expenses increased because he had to keep his kerosine lantern burning.

EASTER: CLIMBING PUCARA MOUNTAIN

On one side of the community of Killay Belen stands a steep mountain known as the Cerro de Pucara. The climb to the summit takes at least an hour. There is no trail. The slopes are littered with standing rocks the size of people, wild pasture grass known as paja brava, and spiny cacti. The summit of Pucara is hollowed like a soup bowl, and to one side of that bowl is located an ojo de agua or spring. Its waters are believed to have special medicinal powers. During Holy Week, hundreds of people from Killay Belen and neighboring communities climb the mountain to seek its healing waters.

According to local custom, the trip should be made at night--preferably after midnight. To prepare for the trip, one should obtain some incense, a little kindling or dry manure, matches, and a vessel for carrying the medicinal water to be drawn from the spring. One can make the climb alone or accompanied. But what is most important is one's attitude; the water only heals those who have true faith in its powers.

Once at the summit, it is necessary to find a location apart from other pilgrims. One then looks for a flat rock. The fire is kindled and allowed to burn to hot coals. Meanwhile, one prepares the incense into a powder and wraps it up in a small piece of paper, ready for use. When the coals are ready, they are scraped onto the flat rock. Immediately the incense is sprinkled into the coals. One then lifts the flat rock into the air with both hands; the offering rises toward the heavens. This act is done on one's knees while praying an "Our Father" or other prayers.

After the ritual offering is concluded, one goes to the spring and takes a drink. One then washes his face and hands--some people once, others as many as three times. Finally, one fills his container to take this medicinal water home. Once the water has been brought home, the rest of the family will wash themselves with part of it. Another portion will be drunk by all family members the following morning before breakfast. The remainder will be carefully stored, to be used in case of an illness.

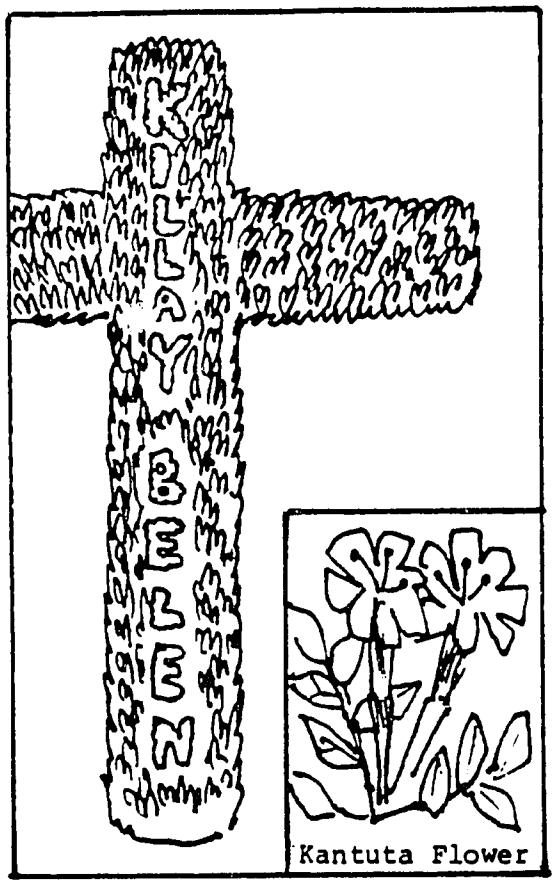
GOOD FRIDAY IN KILLAY BELEN

Of the five Altiplano communities which participated in the Traditional Practices Project, Killay Belen is the only one where local residents conduct a ceremony of praying to the dead during Holy Week. This event takes place on Good Friday. Since Killay Belen has its own church, the ceremony takes place there. But before this can happen it is customary to decorate the chapel, and it is the activity of decorating which makes the activities of Good Friday so interesting.

Each year the community nominates a person to be in charge of the Good Friday ceremonies. In 1981 this responsibility fell to Pedro Illa Choquehuanca. His title is that of Altarero, because he is in charge of decorating the altar of the church with flowers and candles.

On the morning of Good Friday, every man in the community must go out and collect more or less four handfuls of kantuta flowers and bring them to the churchyard. Awaiting them are two large wooden crosses about five meters high and three meters wide. These are to be entirely covered with the flowers. The kantuta blossoms are tied in place with ágave vines. Once the timbers have been completely covered, bunches of white flowers are superimposed and formed into letters running up and down the vertical brace of each cross. The letters spell "KILLAY BELEN". The work is done entirely by men. As each cross is completed, it is taken inside the church and secured beside the altar--one on each side.

With this handiwork completed, the men retire to the home of the Altarero where they will be served a meal. They return to the church in the afternoon, each carrying a large candle. These candles were manufactured previously by the Altarero from the recycled wax of all candles burned in the church during the last year. Since Killay Belen is located within a half an hour's walk of Copacabana (following the lakeshore, not the road), and is itself something of a religious center because of its famous medicinal waters on Pucara mountain, the community is visited each year by large numbers of pilgrims. These visitors burn candles in the church, so wax residues are plentiful. It is the responsibility of the Altarero to collect this used wax, melt it down, and cast it in molds to make new candles. Eight of these new candles are placed inside the church on both sides of the altar. They are lit for the afternoon ceremony of prayer to the dead.



Cross of Flowers Constructed on Good Friday

About 3 P.M. the women of Killay Belen begin to assemble in the churchyard. Each one brings with her a cooking pot containing a special meal she has cooked. These may include ají (spicy stew) made with rice, potatoes, papalisa, or noodles; or fried guinea pig; or humintas (corn cakes) made in memory of a dead child, and so on. Some women will bring milk and coffee, while others will provide coca leaves or alcohol.

The women form a large circle in the churchyard. They begin to fill small ceramic plates or chuas with portions of the food they have prepared. These dishes are presented to selected members of the gathering. Upon presenting the dish, the offerer announces the name of the deceased individual she wishes to honor: "Please pray for the soul of my cherished (name of person) ...", while the recipient replies: "Let (his/her) soul receive this prayer." Following the prayer, part or all of the contents of the dish is eaten by the recipient. The most respected women in the community are served the largest number of dishes to pray over.

Since everybody has cooked something, there is more food than can be eaten during the ceremony, which continues until evening. At its conclusion, each participant recovers her respective chuas. Any comida rezada ("prayed-over food") not yet consumed she empties back into her cooking pot, or into a plastic bag she brought to collect leftovers. The candles in the church are snuffed out and the women return to their homes.

EASTER: HONORING THE SCHOOL TEACHER

In Killay Belen it is a custom to honor their school teacher with a special celebration held at Easter. Responsibility for organizing the event is in the hands of the Secretary General and the Alcalde Escolar or authority responsible for local education. A day and hour for the celebration is agreed to with the teacher. The community leaders organize local residents to contribute and collect a wide assortment of gifts. These include potatoes, corn, habas, and flowers. The corn and the habas are donated with their stalks. These gifts are loaded into a large aguayo. The authorities also have prepared a merienda of meet, potatoes, and chuño; they assemble enough alcohol and coca leaves to get their party off to a good start.

The authorities then carry their load to the home of the teacher. They give him the load of produce as a gift, and the teacher is supposed to place the load on his back to symbolize his reception and gratitude (but he is respected to return the aguayo later). The teacher now begins to drink and chew coca with his visitors. Then they eat the merienda together. At this juncture a band of musicians arrives along with other residents from the community. Each visitor brings his own gifts. The school teacher is made to dance, first with the authorities and then with each of his other visitors.

This celebration continues for the rest of the day, with continuous drinking and dancing. Visitors will be arriving all afternoon and into the evening hours. Most of them will stay only a few hours, but the Secretary General and the Alcalde Escolar will remain to the very end of the party. The event will result in a large quantity of produce for the teacher--usually enough to meet most of his food requirements for the remainder of the year. In return, argue the party organizers, the teacher will feel a greater commitment to the community and will work harder to give their children the best education he can.

THE EASTER SUNDAY MEAL

In highland Bolivia, Easter Sunday is one of the few very special days when the farm family prepares a sumptuous meal. It is almost certain that the family will slaughter and roast a lamb; but if not that, at least a chicken or guinea pigs. And if the family does not have an appropriate animal to butcher, it will buy one from a neighbor. What follows is a description of what the typical Altiplano farm household would eat for Easter Sunday, and how it would be prepared.

A short while after breakfast, the housewife will select an appropriate sheep from her flock. It will be butchered and prepared by her husband. He will then stoke a fire in the round, earthen oven standing behind the farmhouse. The fire will consume a burro load of firewood before it is ready. Meanwhile, the housewife must grind up and mix the condiments to be used on the roast--namely chili peppers, garlic, and salt. If the potatoes, ocas, or other vegetables are to be roasted with the meat, they must be washed and left to dry in the sun. When the oven is ready, the meat is placed in a metal roasting pan or sheet. The vegetables are placed on another. Once these are inside, the oven mouth is closed with its cover and the cracks around the door filled with wet clay. Male members of the family are responsible for supervising the roasting.

Females are responsible for the rest of the meal. This may include ears of boiled corn and steamed chuño or phuti. The latter is prepared in a ceramic cooking pot modified with a false bottom made of sticks and straw--the "floor" on which the chuño will steam. Some rural households also prepare a lettuce salad for the Easter Sunday meal.

The roast will take about two hours to cook. The meal will probably be served shortly after mid-day. In most households it will be eaten with the fingers, with all food drawn from a single pan located in the center of a blanket or mantle stretched on the ground. The Easter Sunday meal is only rarely eaten by a single family alone. Instead, two or more families (usually close relatives) gather together to share this repast. Then too, since not all families have ovens, it frequently happens that a single oven will be used to prepare roasts for several separately consumed meals. In such cases, all oven users are expected to provide their own firewood.

SAINT JOHN'S DAY
(DIA DE SAN JUAN)

June marks the beginning of winter in the Altiplano. It is the month when frosts begin to occur almost on a daily basis, which is why farmers wait until June to make their chuño and other dehydrated products. Saint John's Day is June 24th, and the evening before is celebrated as the coldest night of the year. To symbolize the need for protection from cold, farm families light bonfires in many different locations--on mountain summits, pampas, plateaus, and hillsides using wild grasses and shrubs as fuel; in the patios of their farmhouses; and inside their livestock corrals. The customary drink to accompany this festival is a ponche made with milk, sugar, spices, and cane alcohol or pisco (grape brandy).

The morning after--on Saint John's Day proper--it is customary to play with water. Family members fill their water containers and seek out neighbors and friends. The object is to catch others by surprise, soaking them with a shower of water. The significance of throwing water is related to the fact that Saint John baptized Jesus.

SAINT PETER'S DAY
(DIA DE SAN PEDRO)

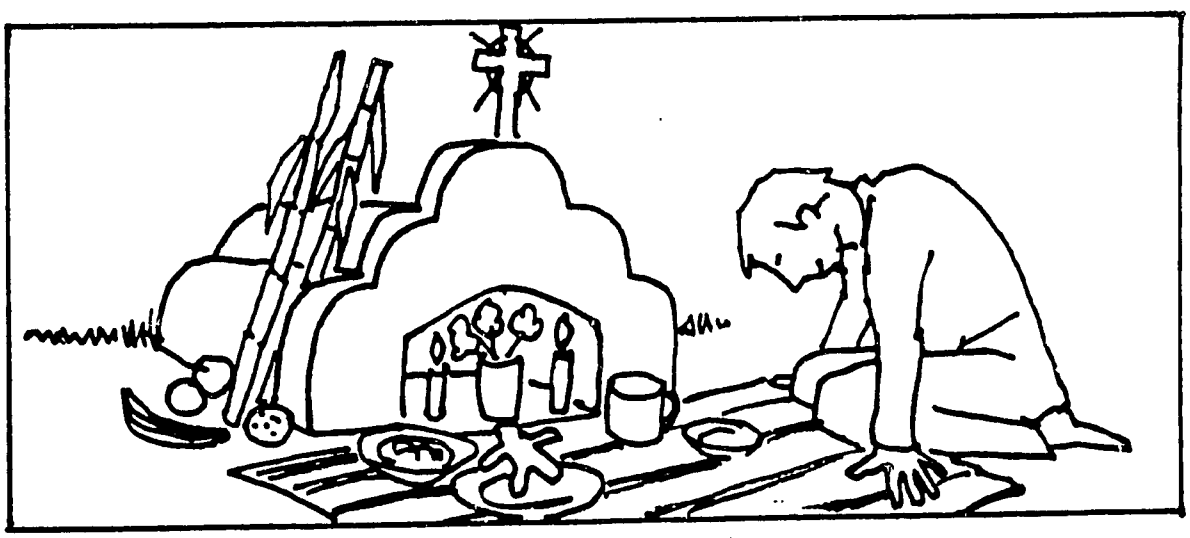
Saint Peter's Day is celebrated only five days after Saint John's--on June 29th. This is considered a special day for reading the future, both the weather and one's personal fortunes. With regard to the weather, the day is commonly known as San Pedro Laka Tutuka or Saint Peter of the Winds. If strong winds have appeared before June 29th, this is a sign for advancing one's planned planting dates. Similarly, if the windy season begins after Saint Peter's Day, plantings should be delayed. Winds arriving on the day itself indicate a normal planting schedule is appropriate that year.

To predict personal fortunes on Saint Peter's Day, one places a jik'y (ceramic oven) on the stove to heat. Once it is hot, one throws inside a chunk of lead. This is left to cook about 30 minutes until it is completely liquid. The lead is then poured quickly into a washpan of cold water. Immediately the pan is covered with a hat or a cloth. After about five minutes the pan is uncovered and the lead removed. It will resemble a thicket of stringy or clustered shapes. One must examine the lead patterns carefully to determine what they resemble, and what is their possible meaning.

ALL SAINTS DAY
(TODOS LOS SANTOS)

The festival of Todos los Santos is one of the most important celebrations of the year for highland farm families. It begins on November 1st, which is All Saints Day proper, and continues into November 2nd, Día de las Almas (Day of the Souls). Altiplano households feel very close to their deceased loved ones. For one thing, the deceased are often buried on or near the farmhouse itself rather than in a distant cementery. For another, the worship of spirits is nearly universal in Altiplano farm communities. The Pachamama of Earth Mother is the prime example of this faith. Thus, granting spirituality to the souls of the deceased is but a minor extension of the same faith that finds spirits in the soil, water, wind, plants, and wild animals. And one of the primary characteristics of such spirits is that they are considered to have many of the same needs that humans do: they feel hunger, thirst, and long for attention.

Behind many farmhouses one will find one or more structures that resemble a miniature church or shrine. In Yuka, for example, these are actually mausoleums erected on top of burial sites. The typical shrine is built of smooth adobe, usually painted white or light blue. It will probably have a tiered facade at one end with a cross on top. This facade has a broad entrance which opens into a chamber perhaps 30-50 cm deep. It is here where flowers are placed and candles lit. This structure is known as a tumbula, and it is the focal point for the All Saints Day celebration.



A Family Tumbula on All Saints Day

In the community of Yuka, All Saints Day ceremonies officially begin with the explosion of several sticks of dynamite in the early minutes of the first day of November--just after midnight. This is the customary signal for residents to prepare to honor their dead. On this day, the female head of household will spend most of the day in the kitchen cooking special meals to honor departed family members and close relatives. Every soul to be honored will have a separate dish cooked in their name. Even more special, there are many different kinds of breads that are only made on All Souls Day. These are shaped in the form of ladders, houses, animals, women, men, babies, birds, rings, stars, squares, and so on.

The result is a progressive meal for the family and the souls it is honoring that day. A blanket or aguayo is stretched on the ground in front of the tumbula. Two candles are lit on either side of the entrance. As each food is prepared, a single serving is placed on a white plate--accompanied by different shaped breads--and placed before the entrance tc the shrine. The male members of the family kneel to pray facing this entrance; the females kneel to one side. Once each offering has been prayed over, family members may then serve themselves additional portions of the same food. The men eat first, then the women. Then a second kind of food is brought from the kitchen to the tumbula, and the ritual of praying over the offering is repeated. Each "course" is accompanied by bread of different shapes.

For most families, the All Saints celebration is a happy affair. The ritual meal with the dead may begin in the afternoon and will almost certainly continue far into the next day. Family members accompanying the dead will probably chew coca leaves, consume alcohol or soft drinks, smoke cigarettes, play musical instruments, and perhaps even dance. Nobody sleeps before midnight. Some families go visiting their neighbors to share in the vigils of others. In Yuka, it is customary for bands of children aged 9-15 years to make their rounds of all homes in the community. Making considerable noise with their instruments, they will continue their visits until well past midnight. For many households, the vigils only end when its adult members are too drunk or too exhausted to continue.

A FAMILY CHRISTMAS IN JARUMA

In Jaruma, Noche Buena or Christmas Eve is celebrated with a special supper and the creation of a nativity scene from local materials. Preparations for the building of the manger must begin while there is still daylight. One member of the family is sent to a spring to bring back three or four chunks of moss or pastora; this will serve as the floor of the manger. Another family member is responsible for bringing home about five kilos of clay soil. The responsibility of the housewide is to make sure she has all the ingredients she needs to prepare the Christmas supper--meat (lamb), potatoes, chuño, rice, hot peppers, onions, grease, and condiments.

While the wife prepares the supper, the husband and children mix the soil with water to make a fine textured and workable mass of clay. This activity will be completed before supper, which is served about 10 P.M. and consists of a special lamb stew. Following supper, the entire family sits in a circle in the middle of the largest room in the house. In the middle is placed a bed of moss. The rest of the manger is constructed with sticks and pieces of straw to form a dome-like roof. Next, different members of the family are given some clay so they can begin to model different animals. They will make cattle, sheep, horses, and llamas. It is not customary to model pigs, because since this is an animal which always moves about with its eyes on the ground, the belief is that pigs have been cast away from God. As each model animal is completed, it is placed on the moss inside the stable. The entire stable scene is known as the Nacimiento or Birth.

This stable with its clay animals will be left in the center of the room until Christmas Day, at which time it will be moved into a corner. After New Year's Day, the clay animals will be collected and buried in the corrals of the family's livestock. The clay cows will be buried in the cattle corral, the clay sheep in the sheep corral, and so on.

This modeling of animals for a nativity scene also occurs at the community level as well. The Preste or authority assigned to organize the annual Christmas festival in Jaruma calls local residents to a ceremony held at the church. The participants mold hundreds of clay animals; all fit inside a large Nacimiento. After New Year's, most of the model animals are sold to outside visitors at the Jaruma market fair. Each animal was sold for 1-2 pesos in early 1981, and this brought in over 1,000 pesos of income which was used to support the maintenence of the church.

A COMUNAL CHRISTMAS CELEBRATION IN CHIARHUMANI

In conjunction with the Mothers Club, the community authorities of Chiarhumani constructed a nativity scene in front of the entrance to the Mayor's Office. It was built of eucayliptus branches, posts, straw, and covered with a white mantle. Next, the authorities (Corregidor, Mayor, and President of the Community Council) took it upon themselves to elect the actors for the Christmas pageant to be held on December 24, 1980. For their part, the Mothers Club took up a collection of five pesos each per member, and with this they bought milk, chocolate, bread, and pasankalla (popcorn) as gifts for the children.

The Christmas ceremony began at 4 P.M. in the afternoon with the singing of the national anthem. Short speeches were given by the Mayor, Corregidor, and Council President. Finally, the Christmas drama began. It started out with a group of women singing religious hymns. Then appeared a little shepherd girl carrying a baby lamb. Next, the Virgin Mary made her appearance from a corner of the town plaza. She was mounted on a burro which was led by Joseph, who carried a stick in his hand. From the corner they advanced down one side of the plaza toward the stable which had been built by the Mothers Club. As they approached, Joseph knocked on one door after another asking for refuge; everybody turned him away. When the couple arrived at the stable, Mary promptly began her childbirth.

In Act II, King Herod appeared, angry with the news of the birth of the Christ Child who was called the King of the Jews. Next appeared the three wise men. They were costumed with blankets and had white beards made of wool. The wise men first stopped at Herod's house and informed him of their mission following a star. He authorized them to continue their trip on the condition that they return in three days to inform him if the Christ Child's birth was really true. When the wise men reached the stable, they gave Jesus two sheep as a gift. Then, advised by an angel, the wise men left the plaza by a different route without returning to Harod's house.

King Harod began the third act. He strode out of his house in a fury because he had waited in vain for the wise men to return. Immediately he issued a decree ordering the death of all children two years or under. He gathered his soldiers together and sent them marching across the plaza toward the stable. Advised of the danger by an angel, Mary and Joseph escaped with the infant Jesus. When the soldiers cut through the crowd watching the pageant, many small children of the local residents threw themselves to the ground to represent the slaughter of the infants. This brought the Christmas drama to a close.

After a few minutes of "intermission", a group of women sang some more Christmas hymns. Then suddenly Papa Noel (Father Christmas) made his appearance. He was played by a man disguised with a poncho, a hat, glasses, and a white beard. He was carrying a big sack loaded with individual packages containing pasankalla and two candies each. These he distributed to all the children present. As the final event of the Christmas ceremony, the community authorities invited all in attendance to come to the Government House for a cup of cocoa and some bread.

MARRIAGE

When a young man and woman wish to get married, it is customary for the man to inform his parents first. It is their duty to approach the woman's parents to report this news and to confirm that she indeed wishes to marry their son. Unless there is a major objection by either family, the first step in the marriage process is to agree upon a date for a ceremony known as Irpaka or the asking of the hand.

Irpaka involves the participation of a third party who serves as sponsor of the ceremony and guarantees its sincerity. The groom-to-be must seek out an elderly couple to serve as his Ara Auqui or marriage godparents. To obtain their consent he must "implore" them in their own home, with gifts of coca and alcohol. Once they accept, the godparents must prepare the necessary supplies for the ceremony including two fardos (48 bottles) of beer, two kilos of coca, four liters of alcohol, and two candles. On the day of Irpaka, the Ara Auqui go to the home of the bride-to-be in advance of the rest of the invited guests and the groom's parents. These godparents speak to the woman's parents as if the matter had never been discussed before, ascertaining if the parents really do wish for their daughter to marry her young man, and asking the bride-to-be whether this is what she really wants as well. A formal agreement is reached. It is then sealed with the chewing of coca leaves by the godparents with the woman's parents.

By this time relatives and friends of both families, as well as the groom himself, have arrived at the young woman's home. They are asked to enter --all except the groom. Everybody greets each other with great respect, they chew coca and converse. Then the godparents place on the table in the middle of the room an istalla of coca leaves, two beers, and a bottle of alcohol as a gift to the woman's parents. Next, the two candles are lit; these signify the bride and groom-to-be. All participating guests are served liquor, beer, and coca. After a while it is time for the young couple to make their appearance. The groom enters the house first, on his knees, and from this position he greets his future in-laws, his parents, the godparents, and the guests. He then sits down in between the Ara Auqui to the left of the godfather. Now it is time for the bride to enter the room, which is also done on her knees; when she has concluded her greetings, she sits down between her husband-to-be and her godmother. As of this moment the couple is considered officially engaged. The bride's parents now call the young man their son, and the groom's parents refer to his bride-to-be as their daughter. Everybody present at the ceremony now congratulates the marriage couple.

Following the giving of congratulations, it is time for the father of the bride to give his bendición (blessing). This may consist of a variety of gifts including cash, an arroba of potato seed, an arroba of dry chuño, an arroba of dry tunta, an arroba of dry habas, and a gift of any clothing he considers necessary. The couple kneel and receive the bendición of the bride's parents. The parents of the groom now provide the bride's parents with a gift of a half-dozen beers, two bottles of alcohol, and some coca. With this the groom's family and guests take their leave and return together to his home singing and playing musical instruments.

Following the Irpaka, the next step is to formalize a marriage date. For this purpose another padrino or sponsor is named. His purpose is to obtain a date for the couple to appear before the Civil Registrar so that their marriage can be legalized. The responsibility of the Ara Auqui in this second stage is to obtain (buy or rent) a white wedding dress for the bride, a suit for the groom, two rings, and a chain. The responsibility of the groom's father is to prepare the wedding celebration. He must contract musicians, procure food, liquor, beer, coca, and kitchen help. When the economic situation of the family is poor, it may take as long as a year to raise sufficient resources to finance this celebration. In this event, the wedding date must be postponed--sometimes indefinitely.

At the earliest possible date, the young couple makes their appearance before the Civil Registrar. They are accompanied by their padrinos and two witnesses. From the civil Registry the wedding party adjourns to a rented salon. Here the newly-weds are greeted by their families and wedding guests, and by a band of musicians. A lunch is served to all the participants. After lunch the parents of the bride and groom present their gifts, then other members of the wedding party present theirs. Many gifts are paid in beer, alcohol, and agricultural products. Others make gifts of money, which they pin to the lappels of the groom or the shawl of the bride. Then the dancing and drinking begins. The godfather makes the newly-weds dance first, after which everyone dances. At the appropriate moment, the godfather sends his godchildren off to their quarters to rest.

The following morning the godparents wake the newly-weds and hold another party in their honor. The day after that the newly-weds are invited to lunch at the home of the bride's parents. On that day the parents give the newly-weds additional gifts--for example, tools, kitchen utensils, etc. --and the other wedding gifts are assembled and cash gifts counted. All the gifts are celebrated with a cha'lla or libation for good luck. The family dances once more to express its happiness. This ends the marriage celebrations.

NON-CATHOLIC MARRIAGE

A growing number of Altiplano families are no longer Catholics but belong to the religion of the Seventh Day Adventists. Aside from differences in their respective beliefs and services, what most separates the Adventists from the majority of rural society is that their religion prohibits the consumption of alcoholic beverages. Perhaps for this one reason more than any other, Adventist families must create a social life of their own with other members of their same religion.

In the absence of beer, alcohol, and coca, the customs of the Adventists are considerably different from their Catholic neighbors. In this narrative we will present an example of such differences using marriage as the example.

When a young couple wish to get married, the first person they announce this decision to is their pastor of the Adventist Church. It is the pastor's responsibility to discuss the convenience of this match with the man's parents as well as the woman's. A date is agreed upon for Irpaka. It will be celebrated with godparents, but instead of alcoholic beverages all guests will be served soft drinks and fruit juices. Furthermore, because the groom's parents do not have to finance a huge investment in alcohol, beer, and coca, the costs of the marriage ceremony will be much lower; thus, the celebration can be concluded quickly. For example, the Irpaka of the daughter of Reymunda Mamani de Rojas occurred only two days before the marriage ceremony itself. Following the civil and religious marriage ceremonies, the guests were invited to the groom's home in the district of Machacuyo, where they were served chocolate milk and <u>buñuelos</u> (a fritter made of cornmeal).

A DAUGHTER'S INHERITANCE FOLLOWING HER MARRIAGE

When an Aymara women gets married and leaves her parents, she goes with two complete sets of clothing. Most of her garments should have been made by the bride, not her mother. The bride's clothing should include two outside skirts or polleras de verdad, two sweaters, two blouses, six manccanchas (a narrow skirt or slip), two aguayos (mantles for carrying loads), three mantas (shawls), two hats, a pair of shoes, and a pair of abarcas (sandles made from automobile tires).

In her first year of marriage, at the time of the harvest, the daughter's parents will give her one or more arrobas of potatoes, ocas, papalisa, and other tubers, plus an entire stack or calcha of habas, wheat, or other graincrops. With these products, the parents will also supply as a gift the cargo sacks in which the produce was delivered. The sacks or costales will have been woven of llama wool on a loom of four stakes, and the daughter will probably be given about seven of them. Furthermore, she will receive a couple ropes for securing cargo loads on pack animals.

Beginning with her daughter's marriage and continuing through the first year or so, the mother will weave her additional gifts such as an aguayo, blankets, and a coca pouch. After two years have passed, the daughter will begin to receive gifts of livestock--for example, a cow, a flock of sheep, a burro, and a couple pigs.

All these gifts are known as the herencia (inheritance) of the bride. As they are received, each gift will be given a ch'alla for good luck. The daughter and her husband will formally thank the parents for these gifts--in different occasions--paying them a visit and bringing them in return gifts of coca and alcohol. During such visits the newly-weds will deliver their thanks on their knees, which is considered to be the utmost gesture of respect. The newly-weds are also expected to assist their parents or in-laws with contributions of labor--usually one day a week.

THE FIRST HAIRCUT
(RUTUCHA)

In highland farm families, a child's first haircut is an important occasion. There is no special date for this event, but it usually occurs when the child is 2-3 years old. Most often, the haircut is postponed until it can be made to coincide with a major holiday—like Easter or Christmas.

First it is necessary to select a padrino or godfather for the cutting. With this individual a date for the hair cutting is determined and also, if necessary, an hour. The place where the ceremony is to occur is variable. Some families take their child to the godfather's house; others invite the godfather to their house. This question of the location is not a trivial one because godfathers selected for Rutucha are usually acquaintances from outside the community--often residents from La Paz, Oruro, or other cities. As the date of the haircut approaches, personal invitations to participate in the ceremony are extended to relatives and friends.

The cutting usually occurs in the early afternoon, so guests are invited to consume a special lunch. It will consist of a dry plate--probably rice with roasted meat--followed by a soup. The dry meal is extended in abundance on a mantle placed on the ground and eaten with the fingers in the style of a merienda. Before and after the meal the guests are treated to rounds of alcoholic beverages and offered coca from a large bag. In such meals as these it is customary for the women to eat separately from the men.

When the meal has been consumed, the child is given some candies and perhaps a toy by his godfather. He is made to stand in the middle of a mantle stretched on the ground. The godfather is served a drink of alcohol, after which he cuts a lock of the child's hair and then places a cash gift on the blanket next to the cut hair. The godfather's wife has her drink and cuts another lock, also leaving some cash. One by one each of the guests is also asked to have a drink, cut a lock, and leave a cash gift. After all have so participated, the final locks are cut by the child's father and mother.

Upon the conclusion of this ceremony, the godparents name two "secretaries" to make the official count of the money that has been contributed. The count itself is preceeded with a swallow of alcohol by each secretary. The final sum is announced. The money is next blessed with a cha'lla for good luck. The party then continues with drinking, dancing, and general merriment until the evening.

CELEBRATING THE SCHOOL ANNIVERSARY

Most public schools built in rural areas of Bolivia were built with a combination of Government support and local resource contributions from community residents--in cash, materials, and labor. This hard-won achievement is a great source of community pride, and it is in the interest of local residents to protect this investment for the sake of their children. For this reason, every Agrarian Syndicate has a secretary entrusted with Education. In turn, he relies on the assistance of usually two alcaldes escolares or "school mayors". The reason there are two or more educational authorities is to share the school support burden, which can be considerable. One of the principal support responsibilities is to provide the food for an annual celebration of the school's anniversary.

For example, in Chiarhumani the public school celebrates its anniversary on May 10th. In 1982 one of the alcaldes was Daniel Morante, a Supervisor of the Traditional Practices Project. For this celebration, Daniel was required to slaughter a sheep. The other alcalde did the same. With the assistance of their wives, they prepared a noodle soup, a dry plate or segundo of roast lamb, and a banana for dessert. Each student and school teacher were required to bring their own eating utensils.

CELEBRATING THE HOLY SUPPER

Every three months on the last saturday of the month, the members of the Seventh Day Adventist Church celebrate the Holy Supper. The deacons of the church are responsible for obtaining the ostias or hosts and the wine. The ceremony begins with a concentration of the faithful at the church at mid-day. It is customary for participants to wear their very best (new) clothes for this service. The service consists of prayers and hymns. Midway through the service the ceremony of the Holy Supper begins. But first, the deacons bring out washpans filled with water. The participants must then wash their feet, and each must bring their own towel to dry off with. The deacons then distribute the hosts to each communicant along with a little bit of white wine. The service concludes with the collection of voluntary contributions, followed by the singing of hymns under the direction of the pastor.

COMMUNITY FASTING IN JARUMA
(AYUNA COMUNAL)

Aroma is one of four ex-haciendas that comprise the community of Jaruma. This former hacienda has its own church, and inside it will be found the community's patron saint--Santa Vera Cruz Tatitu. When local residents repent their sins, they prefer to do it before this saint alone and none other. They are careful to do this at least once a year--before planting --because any unrepented sin could cause the saint to punish them with a poor harvest. In fact, local residents believethat if only one sinner failed to repent, the entire community might be punished as a result. For this reason, every year Aroma organizes an activity of obligatory repentence. Absolutely all residents--males and females, adults and children--are required to participate in a three-day period of fasting and prayer. No family is allowed to plant its crops until it has completed this fasting commitment.

Several people are entrusted with leadership responsibility during the event. First, there is the Ojra (same as jilacata) or highest traditional authority of the community; his is an annually rotated office. The second is the Tatan wajt'ir wawapa, a person specialized in community rituals, who also must be a man suffering from a physical disability. The third leadership responsibility actually is shared by several people. These are the pasantes or sponsors. They are chosen according to a list (the responsibility is rotational), and their function is to butcher, cook, and serve one or more sheep for the community banquet that ends the fast.

THE FIRST DAY OF FASTING

The first day of fasting occurs on September 23rd. On the morning of that day all residents leave their homes and gather at the church. They should have had nothing to eat since the night before; nor can they have drunk water or chewed coca. The Ojra calls everyone together at 8 A.M. and the Tatan leads them to a hill about 500 meters from the church known as El Calvario (Calvary). Everyone goes to their knees; nobody wears a hat. Forming a big circle around the hilltop, the participants are led in praying the rosary and other prayers. Meanwhile, everyone moves on their knees from left to right until they have circled the calgary three times. Each person has his hands clamped palm to palm in prayer until mid-day.

At noon all participants go back to their homes. They return again at 2:30 in the afternoon. Starting at the church, they move on their knees all the way to the calvary. Throughout their slow pilgrimage the participants remove and throw to one side any small stones they may find along their path. They do this because they say this path is the cielo thaqui or road to Heaven. When one reaches the calvary, he or she is free to return home for the rest of the day.

THE SECOND AND THIRD DAYS OF FASTING

The second day of fasting is conducted exactly like the first. Everyone meets at eight O'clock in the morning, circling the calvary in the morning and following its path from the church in the afternoon.

The third day is the most important of the three, and for this reason it is called Diosan Urupa or Day of God. There are ten pasantes, and each arrives at the church with a sheep about eight in the morning. They are joined there by the rest of the residents. First, there occurs a coca chewing ceremony called T'ika Perdón or Sheep Pardon; everyone participates in the chewing, including children. The animals are slaughtered in front of the church. Each participant comes forward with a small jug or cup to receive some of the animals' blood. This blood is taken and emptied in different directions; as he does this, the participant offers the blood in the name of different mountains and sacred places about the community. The ten sponsors each take one of the dead animals back to his home to be cooked. Each will prepare a lamb stew. In butchering the animals it is essential that no bone be broken, because this is considered as an insult to Tata or God. When the stew is cooked, it is emptied into a 20-liter can and taken to the church for the mid-day meal.

About 11 A.M.--under the direction of the Tatan--all community residents circle the church three times on their knees. The children go first and the adults follow. When this is completed, everyone removes their sandals and enter the church. They go up to the altar, ask forgiveness for their sins from the patron saint, and kiss the altar. Once this ritual is completed, each participant leaves the church and joins in one of two circles to receive the banquet that has been prepared. The outer circle is divided into two semi-circles facing each other, one for adult women and the other for men. The inner circle is composed of children (ages 6 or under) in a sequence of boy-girl-boy-girl. Among the men, their semi-circle is organized in a right-to-left sequence of oldest to youngest, but all facing east. Similarly, the women are organized by age sequence and must face west. The children eat separately because they are considered to be free of sin, and therefore God listens to them more. Both adults and children are served by waiters provided by the pasantes. Five helpings of food are served, with two pasantes responsible for serving each helping. During this banquet, everyone is careful not to break any bones; and nobody dares to give a bone to a dog. The bones must be carefully saved, because later in the ceremony they will be collected and burnt at the calvary.

The banquet lasts several hours. Most of the participants bring merienda food from their own homes to supplement that provided by the pasantes. This may include potatoes, tunta, chuño, cheese, and even corn. These are added to mantles stretched on the ground for use of the three groups of men, women, and children. Any leftover food is given to the Tatan. In addition to this, each of the pasantes is required to save an entire leg of lamb (or ten from all pasantes) to be given to the Tatan as compensation for his efforts during the fasting.

When the banquet is finally over, all participants kneel facing eastward and ask for God's blessing. The Ojra then requests everyone to turn over their bones, which are placed in a mantle. Next comes a coca chewing ceremony or aculli. Standing in line by age sequence, each adult--men and women--takes out their coca bag. The oldest member of the group begins the chewing by taking one or more leaves from the bags of each and every one of the participants. The next oldest person does the same. The process continues until all have chewed coca from each other's bags. Upon the conclusion of this ritual, the participants exchange embraces and handshakes all around and say farewell. The final act of the afternoon is at sunset when a group of six people take the bones of the banquet to the calvary for burning.

About 11 P.M. all residents return once more to the church to prepare for a midnight ceremony. It is said that God listens better in the evening because the sky is clear, and anything asked of Him at that time will be granted. So residents pray in the church for an hour or more. Then at midnight all participants remove their clothing until they are naked from the waist up--men, women, and children. They begin a procession on their knees: the children first, followed by the Tatan, then by the men, and finally by the women. The procession circles the outside of the church three times, from right to left. It ends with each participant asking for forgiveness and kissing the altar. Then everyone dresses and returns to their homes.

HOUSE CONSTRUCTION

In most rural communities of the Altiplano, house construction is a collective undertaking conducted jointly by the homeowner and his relatives and friends. In fact, house construction more closely resembles a community project than one by an individual family. Labor contributions by community residents are normally distributed over several workdays--for example, one to dig the foundations, another to raise the walls, and a third to complete the roof. Collective work days are also the custom when roofs on existing homes need to be replaced. Indeed, in certain communities it is considered the obligation of every resident to contribute materials to the roofing of a house.

Recruiting labor assistance for house construction is not a requirement to be taken lightly. Workers must be procured one family at a time, and --with the possible exception of the roofing event--participation is strictly by personal invitation only. Every time a workday is planned, the homeowner must visit each family whose help is desired and "implore" their cooperation as he would a favor or a loan. This process entails a ritual of amenities involving gifts of coca and alcohol and gestures of supplication. Furthermore, every day of outside labor"donated" to the homeowner creates a debt obligation that must be repaid in kind when requested at some future date.

Aside from broad design guidance regarding the location and features of the house, the homeowner's primary responsibility is to make sure all the materials required for any given construction stage have been collected before the workday for that stage begins. Prior to digging the foundations, the homeowner must collect rocks, screened clay, stakes, twine, molding boards, and (if necessary) sand and cement. Before the walls go up, the homeowner must already have constructed hundreds of adobe bricks--which is itself an extremely slow and laborious process. Before the roof is constructed, the homeowner must have made ready the necessary beams, poles for joists, binding twine or nails, and roofing materials (if not to be provided by the community). For each workday the homeowner is also responsible for providing his collaborators with special food and drink--just as he would with guests invited to a party. However, it is also customary for participants to make food contributions as well, and to bring gifts of coca and alcohol.

DIGGING THE FOUNDATION

On the day the foundations are to be dug, it is the custom in Yuka for homeowners to plant four iron rods in the ground in the location of the four corners of the future dwelling. These rods must be buried vertically, below the level of the foundation itself. The rods symbolize strength, and the hope that the home will last forever. The ceremony of burying these rods is accompanied by libations with alcohol (ch'alla) and the chewing of coca leaves.

Hilaria Quenallata de Yanamico explains that only men participate in the digging of foundations and other construction activities. The principal contribution of the women (that is, the wives of those participating in the physical construction) is to prepare different foods for the mid-day meal. There is no organization among the women as to who will prepare whar dishes; the choice is left to the woman's preference. The food brought by the different families is shared by all participants. Men and women eat together. When the meal is concluded, the women return to their homes.

ROOFING THE HOUSE

When a house is roofed in Chiarhumani, all residents must stop their normal work and attend the event. This is considered a moral obligation--just as important as when there has been a death in the community. It is a local custom that each family attending the ceremony must bring a load of straw for the roof. In acknowledgement of his neighbor's contributions, the homeowner will butcher one or two sheep and prepare a special banquet for his collaborators.

For the ceremony to be held, the walls of the house must be completed, the principal roofbeams in place, and if possible the rafters as well. This armazón (framework) is held in place with woven twine made of wild straw or ch'illiwa. A layer of straw is placed over the armazón. This is covered with a thick layer of clay, which is smoothed out as if it were a ceiling. Finally, the clay is covered in its turn by the final layer of straw. The thatching of a house requires about six hours. When the roof is completed, it is blessed with a ch'alla using libations of alcohol and wine, paper streamers and confetti. With the roof completed, the resulting celebration will be conducted with soft drinks--in the case of Advent-

tist families--and with alcoholic beverages in the case of Catholic families. Most roofing ceremonies are accompanied with a group of musicians. The dancing and drinking will continue into the late evening and, in some cases, be continued the following day.

On December 22, 1981, Eusebio Nina Cuba and his wife Venancia, of the community of Jaruma, hosted a workday to roof their house. They had decided on a metal roof. The sheets of roofing were purchased at the Patacamaya market for 1,000 pesos (US$40) per quintal of 100 pounds. The entire roof required three quintals of metal sheeting.

The work began at 10 A.M. with two carpenters and most of their friends and relatives from the zone of Cayaca. The wives came to help in the kitchen and the men worked on the roof. First, the listones (roofbeams) were set in place. These were nailed together with five inch nails. The sheets of roofing were nailed directly to the roofbeams, but with much smaller nails with wide heads. While some of the men did the nailing, the others passed up the sheets from the ground. It rained lightly all afternoon but never strong enough to stop the work, which was completed by seven O' clock in the evening.

When the work was done the meal was served. That day the Cuba household butchered a sheep. For the mid-day meal a noodle soup was served, and in the evening the meal was roast lamb with boiled potatoes, chuño. A case of soft drinks (liter bottles) was served, because all the guests were of the Adventist religion. When the roof was completed there was no ch'alla because this is not an Adventist custom. Nobody--not even the carpenters --received any wage payment for their assistance. However, when any of them decide to roof their home, it is the obligation of other residents to assist them.

A COMMUNITY BULLFIGHT IN KILLAY BELEN

It is a custom in Killay Belen that a mock bullfight be held following the conclusion of the roofing of a new home. The occasion is a time for celebration, because so many people have participated in the construction of that house--carpenters and their assistants, godfathers, godchildren, relatives, and close friends--all drinking and dancing and conducting the cha'lla of the new home. The idea of holding a mock bullfight has a double meaning. The wild bull stands for strength, which should be a characteristic of the finished house. The laughter and general merriment resulting from the bullfight also symbolizes that the new home should be filled with happiness and fun.

The organizers of this fiesta obtain a bull costume which is carried by two persons. A pretend bullring is constructed by selecting a level piece of bottomland, placing four poles in the ground, and tying a rope between them to create an enclosed area for the forthcoming activities. Personal invitations are sent out to all community residents, each signed by the community authorities. Most important, different cabecillas or sponsors are named to organize groups of dancers with their respective traditional costumes and musical instruments.

The owner of the newly-constructed house serves a special lunch for all participants in this celebration. Then, in the afternoon the different musical groups enter the improvised bullring and begin their dancing. In the midst of these groups, the wild bull dances around here and there trying to catch people with his horns. Spectators take turns as brave bullfighters--using ponchos for capes-- who constantly attempt to distract the bull. Like most fiestas, this one involves the consumption of abundant amounts of alcohol, so many participants are drunk. But this only exaggerates the comic aspects of the bullfight itself. Everybody makes fun of each other and of themselves.

CELEBRATING BOAT REPAIRS

About a week before the beginning of Carnival, a resident of Killay Belen who is one of its few fishermen took his boat out of the water for general repairs and maintenence. For five days he patched the holes and seams and finally painted the boat. It was his custom to cha'llar or bless the boat for good luck before returning it to the sacred waters of Lake Titicaca. So on February 15, 1982 he invited community authorities, relatives, and friends to participate in the ceremony.

First, the boat had to be tested. It was lifted between six people and carried to the water's edge. After rowing it around in the lake for a few minutes, the owner was convinced his repairs had been successful. The boat returned and the owner invited his guests to a merienda. It consisted of fhuti de chuño, huma caya, boiled potatoes, habas, and corn. It was served on two separate mantles extended on the ground, one for women guests and the other for men. After the merienda the boat owner offered everyone coca. Following the chewing, the libation to the boat was conducted with coca and alcohol. As these libations occurred--in which all guests participated--the guests implored the spirits of the lake to allow the fisherman to persue his labors without accident or complications, and that he bring back abundant fish for his community.

After the cha'lla, the Jilacata (traditional authority) of Killay Belen offered the fisherman and the guests two bottles of alcohol and two istallas (bags) for coca--one of each for the male guests and the other for the females. Into the istalla for the men's group the Jilacata placed a quantity of coca leaves; his wife did the same with the istalla for the women's group. Then, one by one, each guest placed a gift of coca into the respective istallas. Several guests also contributed half bottles of alcohol. Such gifts are called apjata. They are to be consumed collectively by the hosts and the guests at the ceremony. It is a way community residents share the costs of holding a celebration.

This party continued for several hours. Then, one by one the guests began to excuse themselves and leave for their homes. The fisherman thanked everybody for accompanying him in the ch'alla of his boat. The two istallas (empty now) were returned to the Jilacata.

CEREMONIES TO REPEL HAIL
(DESPACHO DE GRANIZO)

The traditional means of defending crops against hail in the Altiplano is by lighting fires to create abundant smoke, making noise, imploring the heavens, and prayer--all this in the moment that the dark clouds are approaching the community. However, in some communities measures are taken to repell hail in advance. The following narrative describes how such hail repelling ceremonies are conducted in Killay Belen.

Before the start of the rainy season, community authorities must begin their anti-hail preparations. A quota for cash contributions from all resident families is determined. For example, Killay Belen has 60 land-holding families, and in 1980 a total of 600 pesos (US$24) was collected from them. The contribution is obligatory. The funds are turned over to the Secretary General and the Jilacata of the community, who are responsible for purchasing the necessary materials for burnt offerings of different kinds. These include four dulces mesas prepared exclusively for hail rituals, a pound of incense (to burn the hail), a pound of copal, two kilos of wool yarn in red and green colors, a pound of llama grease or untu, a package of Astoria cigarettes, a pound of coca, six bottles of alcohol, a bottle of wine, black and white wool from sheep that have been slaughtered by the wild fox, some branches of k'oa (aromatic plant), a mold of cane sugar or chankaca, hair from the mountain cat or tity, and still other ingredients as well. Part of the collected funds are also spent to contract a Ahijchi Achachila or spiritualist. There are three of these in Killay Belen. The authorities try to recruit the one with the best luck in reading coca leaves and with alcoholic libations. It is necessary to go to his house to implore his participation two nights in a row until he agrees.

JACHA DESPACHO

There are two separate hail repelling ceremonies. The first is known as Jacha Despacho and the second as Arkjata. The Jacha Despacho ceremony must be conducted on a thursday or saturday. The Secretary General and the Jilacata call a general assembly of residents. Everyone meets at the church together with the spiritualist. The ceremony begins with a lunch served by the sponsoring authorities, each of them responsible for serving two courses apiece or a total of four courses between them. Next it is necessary for all participants to acullicar (chew) cocac leaves. With these formalities concluded, the preparation of burnt offerings begins.

The Ahijchi Achachila is given all the necessary materials for preparing these offerings, of which there are eight. The first four are dulces mesas (desserts) to placate the Pachamama or Earth Mother. These are composed of candies, sugar cubes, candied fig, dry cherry, miniature wax bottles filled with a sweet liquid (called t'inkas), nuts, cookies, and misterios or little wafers stamped with different images. The second four offerings are known as llampu mesas, which are intended for the mountain spirits. They contain twigs of k'oa, some copal, some llama grease, mountain cat hair, chunks of cane sugar, and a few other ingredients. Each offering is prepared inside a paper box made from a newspaper; in turn, the box rests on a glazed plate.

While the spiritualist prepares the offerings, other participants spin two wool threads, colored red and green, into a single strand. They do this on a rueca (hand spindle), with the spinning done to the left (counter-clockwise). Later in the ceremony, the spiritualist will tear these strands apart. This symbolizes the break-up of the clouds and the departure of the hail to other locations.

Meanwhile, community authorities assemble three commissions (ten individuals are selected) to carry the offerings to the four mountain summits that surround Killay Belen. The Jilacata will take a single commission of five people to the summits of Calvario and Liwifusa, the two most important peaks. The Secretary General will take another commission up to the summit of Janko Kawa. A third authority will lead the final commission up the slopes of Pucara. Before the commissions depart, their respective offerings--one dulce mesa and one llampu mesa for each mountain--must be blessed for good luck with a ch'alla by the spiritualist and each one of the participants. Each commission is given two bottles of alcohol, coca, a pack of cigarettes, ten candle stubs, and a piece of wool yarn that has been torn out of the green and red strands spun previously.

The commissions make their departure in accordance with the distance they must travel. Each must reach its destination before sunset, because that is the time the offerings must be made. Once at its appointed site, the commission must conduct its prayers, complete a second ch'alla of its offerings, conduct the coca chewing ritual, and finally commence with the burning as the sun sets. Meanwhile, those who remain at the church with the spiritualist do so to watch him make his divinations--in which he uses coca leaves and interprets their meaning--as to how well the burnt offerings are being received by the achachilas or mountain spirits.

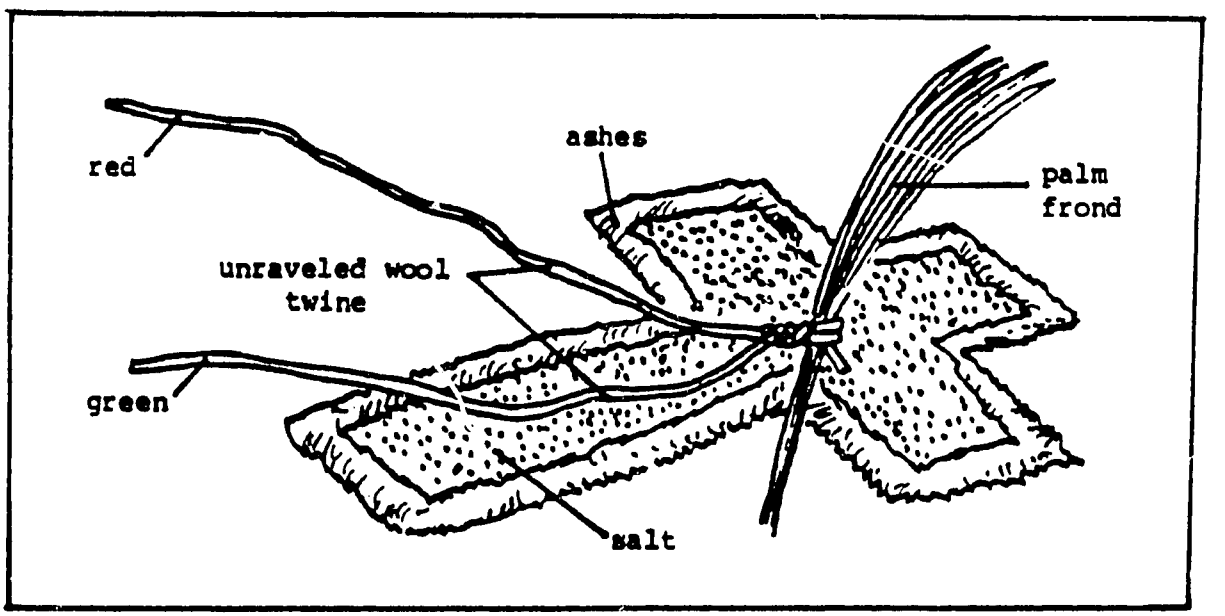
When the commissions return to the church, the rest of the community is waiting to greet them. The members of each commission are given two rounds of alcohol apiece and thanked for their services. Next, with the commission members seated in the middle, community residents form a large circle and are served a special supper. After supper the drinking continues until midnight, and with that the ceremony of Jacha Despacho is concluded.

ARKJATA

After a month has passed the second hail repelling ceremony occurs. The Jilacata and the Secretary General again are responsible for the procurement of specialized supplies. These include four killos of salt, 50 pounds of ashes, an armful of palm fronds or ramos (such as are used for Palm Sunday celebrations), incense, copal, two bottles of alcohol, half a pound of coca leaves, and five packs of cigarettes.

The community leaders and their contracted spiritualist meet at the Titicaca lakeshore. Their responsibility for the day is to walk from this point in a complete circle about the community's boundaries. At selected locations indicated by the Ahijchi Achachila, they are to construct crosses on the ground. These are made by sprinkling salt in the form of a cross, then adorning the edges of this cross with a boundary of ashes. With each cross is left a palm frond wrapped in dual-colored wool twine. And as the commission withdraws toward the next location, it unravels this twine over a short distance to symbolize the breaking up of hail clouds.

The commission will be accompanied by relatives and friends. They will depart about nine O'clock in the morning and return about seven O'clock in the afternoon. A merienda (carried by women accompanying their husbands) will be served at the half-way point of the treck. When the commission returns, it is customary to assemble at the home of the Jilicata for a special meal followed by drinking until midnight.



Anti-Hail Defenses Constructed Along Community Borders

DEATH AND BURIAL CUSTOMS

In October 1981, Modesta Yanarico de Maquera, of the community of Yuka, lost two of her children to jhamfha or scarlet fever. Her daughter Santusa, age nine, was sick with high fever for a week. The parents tried to cure her with the services of several yatires or healers but without success. Finally they took her to a doctor in Escoma, who gave her injections of antibiotics, but not even this could save her. She died on the fifth day of her illness. Five days later, Santusa's younger brother Juan also died of the same disease.

Santusa died at 10 A.M. and was buried at five O'clock in the afternoon of the same day in the lot behind her parent's home. The family hired an elderly woman, a widow, to wash the corpse with muña water. The widow then dressed the child in its burial clothes. While relatives and neighbors were gathering to accompany the bereaved parents in their mourning, two male cousins took over the task of digging the grave. The grave was dub 1.8 meters deep, and neither parent participated in its preparation. When all the guests had assembled, the comida de duelo or meal of mourning was served, followed by the chewing of coca and a round of alcoholic drinks. Then everybody accompanied the Maquera household to the tomb, and with wailing and prayer witnessed Santusa's burial.

On the eve of Easter Sunday, 1982, the grandmother Constancia Surco de Yanarico died at the age of 87 years. She was survived by four sons, two of them participants in the Traditional Practices Project. She had been sick for six weeks, and in her last weeks had refused to take food of any kind. Her sons had taken turns remaining by her bedside. When she died she was accompanied by her son Tomás Yanarico.

Members of the family, relatives, and neighbors were immediately advised. The Yanarico brothers contracted two elderly widows to take care of washing and dressing the corpse for burial. They also washed the clothing of the deceased. The brothers evenly divided among themselves the cost of preparing for the day of mourning and the burial. Between them they slaughtered a sheep and collected potatoes, chuño, habas, and condiments for the meal of mourning. They purchased alcohol, coca, and soft drinks for their non-Catholic neighbors. A casket was bought. Two friends of the family dug the tomb. The guests at the funeral began to arrive at mid-afternoon. They were served drinks and all chewed coca together. The meal was

served about four O'clock in the afternoon. The women ate separately from the men. Then the participants are again invited to chew coca and drink alcohol, particulary those who have been named to carry the coffin to the burial site behind the house. The guests then followed the coffin outside and witnessed the burial. The immediate members of the bereaves family--the dolientes--remained inside the house, as is the local custom. Following the burial, the guests returned to the house to offer the bereaved gifts of alcohol, coca, and cigarettes.

In Chiarhumani, it is the custom that nobody conduct agricultural activities during New Years Day, Carnival, Holy Week, May 1st (the community's anniversary), and Todos Los Santos. Furthermore, every time a person from the community dies it is the rule that everybody rest that day. Some will rest from their normal labors to be with the family of the deceased and join in the mourning; others will rest out of respect for the dead. There exists a local saying: "When a person dies, it's the same as when a person roofs his house." Both events have a sacred significance. Nobody can live without a house, and nobody can live forever. Nonetheless, having everybody stop working when a local resident dies is not a law that is enforced. Nobody is forced to stop working, and there are always a few families which continue with their normal routines. Against these individuals, the only community sanction is simply criticism.

In Killay Belen, the death of a local resident--whether male or female, child or adult--makes that day a sacred one, and the entire community has a moral obligation to participate in the wake and burial ceremony. Even if one has an emergency to attend to, he should not continue working once he hears the news that a neighbor has died. The person who disobeys this custom runs the risk of dire consequences. For example, in periods of limited or nil agricultural labor, it is forbidden to build walls, construct corrals, or do spinning and weaving, because any one of these activities will result in a personal tragedy that will leave the family with llaki or remorse. To prepare the soil (with the handplow or ox-drawn plow) after hearing of a resident's death is to steal the kallapus or "tools of the spirits", and they will punish this lack of respect with a bad harvest. Crops planted on a day of mourning will not sprout, or will produce plants that give "blind" (sterile) seed known as t'ujuriwa.

GLOSSARY

A

ABANDERADO: Flagbearer, one of two principal co-sponsors of Easter celebrations in the community of Yuka
ABARCAS: Sandles made from automobile tire
ACHACANA: Cactus
ACHACHILAS: Mountain spirits
ACOMPAÑANTES: Companions or guests at a social event
AFRECHO: Bran
AGAVE: A vine used in community of Killay Belen to tie flowers to a wooden cross for Holy Week celebrations
AGREGADO: Non-locally born community resident
AGUA DE CHUÑO: Water in which chuño has been boiled
AGUAYO: Mantle for carrying small loads on the shoulder, used particularly by women
AHIJADERO: Annex of land used exclusively for pasturing livestock; same as apacheta
AHIJADOS: Godchildren
AJI DE PAPALISA: A spicy stew made of papalisa
AJARA: Wild quinua, eaten as an emergency food
ALCALDE: Mayor or local authority; often Alcalde Escolar, an official entrusted with support of community school
ALLINA: A stick with a bag of rags at one end, used for stirring toasted grain
ALLPI: A thick, hot beverage--usually made of corn meal--that is drunk at breakfast
ALTAMISA: A medicinal herb
ALKATITI: Worm that attacks oca
ALMACIGO: Plant nursery
ALMUERZO: Second meal of the day, served between 8 A.M. and mid-day depending on circumstances, and usually consisting of a hot soup
ALTARERO: Community resident assigned to take care of church, usually a rotational position; same as Regidor

AMAKHARI: Medicinal plant, used to cure stomachache
AMANCE DE NOVILLOS: Training of young steers and cows for plowing with the wooden plow
AMARRO: Stack of dried stalks, usually applied to habas and peas
AMAUTA: Local authority; same as Jilacata
AMORSECO: Medicinal plant
ANAQUIRIS: "Guides" or "Guardians"; potatoes that have been decorated with coca leaves
ANDRES HUAYLLA: Wild grass with medicinal properties
AREQUIPEÑA: Variety of onion seed imported from Peru
ANACHAPHI: Medicinal plant
ANIMO: Spirit or soul
ANAT DOMINGO: Sunday of Temptation, one week after Carnival
APACHETA: Livestock pasture annex; same as ahijadero
ARA AUQUI: Marriage godparents; same as padrinos de matrimonio
ARADO: Wooden plow
ARCOS: Gifts of paper currency, pinned to lappels of host giving a party
ARKJATA: Second of two cereminies for repelling hail in the community of Killay Belen
ARMA: Wooden plow; same as arado
ARMAZON: Rafters; framework for the roof
ARROBA: Unit of weight equivalent to 25 pounds
ARTEZA: Wooden trough, washbasin
APORQUE: Hilling dirt around the base of plants
APJATA: Gifts of liquor (alcohol) and coca brought by guests attending a party
AYLINCO: Potato stalks
AYLLU: Indigenous community, legally recognized
AYNOCA: Production zone where crop lots are all contiguous and where all are planted to the same crop
AYNI: Exchange labor arrangement; a "loan" of labor to be repaid in kind by the borrower at a future date
AYRAMPU: Cactus
AYUNA: Fasting

B

BAÑO ANTISARNICO: Sheep dip; chemical bath for livestock to treat external parasites
BARBECHO: Second plowing or segunda reja, usually conducted in April
BATAN: Hand grinding stone
BATEA: Wooden trough or washbasin; same as arteza
BARQUILLA: Collar of woven wool yarn used to decorate cattle, llamas, and other livestock on certain festivals
BAYETA: Flannel cloth; usually home-made, principally used for making polleras (skirts) of highland women, and also men's shirts and pants
BARRETA: Crowbar
BRAZADA: Armload; a unit of measurement about 2.7 meters long

C

CABECERA: Loom brace nearest weaver
CABECILLA: Sponsor of a group of dancers for a community celebration
CABEZA: Unit of measurement applied to onion seedlings, equivalent to the circumference of buyer's head
CACHIBACHERO: Seller of bicycle parts and miscellaneous goods
CAFE DE GRANO: A dark beverage resembling coffee, made from toasted barley grain
CAL: Quicklime, particularly used to purify well water
CALCHA: Upright haystack
CALVARIO: Calvary or hillside place of worship; ailment in cattle believed to be caused by grazing in pasture previously struck by lightning
CAMPESINO: Peasant farmer; person who lives in the campo (rural area)
CAÑA CAÑA: Medicinal plant, used to cure fever
CANCHON: Walled-in area for growing onions
CANASTA: Basket for harvesting potatoes, equal to one arroba (25 pounds)
CARACHI: A small fish of Lake Titicaca
CARGA: Load carried by a pack animal, equal to 4-5 arrobas (100-125 lbs)
CARGADO: Herbal tea containing an assortment of medicinal plants, used to cure common cold
CARLOSANTO: Medicinal plant
CARMA: A horizontal pile for field-drying corn, used when stalk length is quite short
CATO: Unit of land measurement equivalent to 50 paces by 15 paces or about 750 square meters
CAYA: Dehydrated oca
CEDRON: Medicinal plant
CENA: Final meal of the day
CERDA: Hair cut from tails of cattle
CH'ACURUS: stakes located in four corners of loom
CHANKACA: Unprocessed brown sugar, molded in a loaf or block
CHAJILLAS: Roofbeams
CHALA: Corn stalk residues
CHALA RALEO: Selling of agricultural products on a small scale basis, by single- or double-handfuls
CHA'LLA: Libations for good luck, usually with alcohol, wine, confetti, and streamers
CHAIRO: Soup made of chuño
CHAÑITO: Grey, a natural wool color
CHANCOROMA: Medicinal plant
CHARQUI: Dried meat, particularly llama meat
CHAPALLIRI: One who assists the turning-over of sods during the task of plowing with the footplow or huiso, usually a woman
CHAROS: Tissue paper flags placed inside crop lots during Carnival
CHAYAHUA: Formal visit of newly-weds to their matrimonial godparents, usually conducted during Carnival Week
CHEA: Unit of length--equivalent to 20 cm--formed by distance between end of thumb and end of index finger of an outstretched hand

CH'EARA: Black, a natural wool color
CHELLKE: Unit of linear distance equal to a single pace (about 1 meter) used to measure parcels of land and task areas
CHELLWA: A wild grass
CH'ENKHATA: Damaged potatoes
CHEMBA: A wild grass
CHICHA: An alcoholic beverage or grain beer; chicha can also be prepared as a non-alcoholic refreshment
CHICOTE: Whip used to drive a team of draft animals
CHIJCHIPA: Medicinal herb
CH'ILA: A variety of wheat with very stiff stem, used to make straw mats
CH'ILLIWA: Wild straw used for making twine and rope, also serves to cover temporary storage silos and as fodder for livestock
CHIÑUÑA: Rope made from Ch'illiwa
CHIPHA: Leather net for carrying onions
CHIRO: Sack of onion seedlings sufficient to yield a harvest of 25 gangochos
CH'ISME: Light pink, a variety of oca
CH'ITI USO: Bloat or timpanismo in cattle and other livestock
CH'IWA: Quinua leaves, used as an emergency food
CHORJRI USO: Bruises in livestock
CHOMPA: Sweater
CHONTA: Flat leather strap, used to bind yoke to horns of draft animal
CHONTILLA: Digging-hoe; same as lijwana
CHOQUEKALLA: Medicinal plant
CHUA: Small ceramic dish
CH'UKURKATA: Backstrap attached to four-stake loom
CHUKU CHUKU: Medicinal plant, leaves used in compresses for fractures
CHULLA: Unit of weight equal to six pounds; same as markha
CHULLPA CANAGUA: Wild plant used as emergency food; same as illama
CHUÑO: Dehydrated potatoes
CHUÑO SILLPI: Fly that hatches during February, an indicator of best potato planting sites
CHUÑUÑA CH'IJE:"Place of low cropped pasture", dehydration site
CHUÑUTA: A potato affected by frost
CHURIS: Dirty, tangled wool
CHUSI: Ordinary blanket
CHUSPA: Bag for carrying coca leaves
CH'UPU USO: Swelling of the jaw in livestock
CHIRIRA: Medicinal plant
CHOJLLA: A wild grass
CISA: Market tax on sale of livestock
COBAYO: Guinea pig; same as cuy
COLILLA: External parasite of sheep
COLONOS: Resident workers of an hacienda
COMUNIDAD ORIGINARIA: A native or indigenous community, with lands legally held in collective tenure

COMIDA DE DUELO: Meal served to funeral guests
COMIDA REZADA: Food prepared to honor the dead and which has been offered with prayer
COSTAL: Woven wool cargo sack
COTENCIO: Long pole with a rag at one end, used for cleaning ashes from a clay oven prior to baking bread
CRIA: The offspring of livestock
CRIOLLO: Mixed-breed
CRUZ DEL SUR: Southern Cross
CUAJO NATURAL: Rennin, an enzyme that coagulates milk, made from stomach of lamb which has been deliberately overheated in the sun
CUARTILLA: A woven sack, 20 cm by 20 cm, that holds a half-arroba or 12.5 pounds; same as kunka kunka
CURANDERA: Traditional healer
CUTIRPU: Fifth consecutive year of crop planting in a single plot
CUY: Guinea pig; same as cobayo
CUCHA: Fraction of a larger task area; a stopping point or day's work of a multi-day task area.
CEBADA EN GRANO: Barley for grain
CEBADA EN BERZA: Barley for silage

D

DEPOSITO: Storage chamber for fresh produce
DESAYUNO: Breakfast
DIOSAN URUPA: Day of God, last of three-day communal fast in community of Jaruma
DOLIENTES: The bereathed

E

EKHA: Unit of area 40 by 60 meters, or 20 by 30 lokas, used as a unit for determining land inheritance
ESPARTO: Twine made from straw; same as fhala
ERA: Threshing floor
ESTERA: A round straw mat used (as the top or the bottom) as part of a cheese mold
ETZETILLA: An external parasite of sheep
EUCALIPTO: Eucalyptus tree; its leaf is used for medicinal tea and to prepare a home-made cough syrup.

F

FARDO: Bundle of firewood; also 24 bottles of beer
FERIA: Weekly market day
FERIA DE CAMBIOS: Barter Market
FHALA: Twine made from straw; same as esparto
FINAWIRI CANCHON: Storage yard, patio of farmhouse
FINCH'ERE: Woman who turns sod dug with the footplow; she is a member of a four-person team known as an uma
FOGON: Stove

G

GANGOCHO: Load of onions; same as chipha
GARBANZO: A wild plant which, when eaten inadvertently by lambs, is believed to cause the fatal disease Muyu Muyu
GARRAPATA: Tick
GAVILLA: A row of cut handfuls of stalks, applicable to any grain crop
GIRASOL: Sunflower; medicinal use to alleviate swelling
GUANO: Pure animal dung, dry manure
GUINDA: Medicinal plant, used to cure fever
GUSANO BLANCO: White worm that attacks potatoes

H

HABAS: Broadbeans
HABAS USMAYO: First-class broadbeans, used for toasting
HEMBRA: "Female" rock (smooth) used in building outdoor fogón or stove
HINOJOS: Green herbs
HORNILLAS: Burners on a stove
HUAKA: Wide cloth wrapped around woman's abdomen following childbirth to maintain extra warmth
HUALLAKE: Fish soup
HUAYLUNCO: Pairs of corn ears attached together by their braided husks and hung from the rafters of the farmhouse
HERENCIA: Gifts of the brides parents at the time of her marriage as well as the following two years
HUAYLLA: A wild straw
HUISO: Andean footplow
HUMA CAYA: Dehydrated "luxury" oca prepared by a month of soaking in water

I

IPIS: Tiny fish used to make a broth
IRPAKA: The ceremony of asking for a woman's hand in matrimony
IRU: Coarse wool
ISTALLA: Bag for carrying coca leaves; same as chuspa
ITAPALLO: Nettle, an indicator of best planting dates

J

JACHA: First of a three day period
JACHA ANATA: Tuesday of Carnival
JACHA DESPACHO: First of two hail repelling ceremonies practiced in the community of Killay Belen
JAIRI: Day of the third quarter (waning) moon
JAKHE CAPITANA: One of two co-sponsors (the other is the Abanderado) of Easter celebrations by the community of Yuka
JALLU MARA: Rainy year
JAMAQ'O: External parasite, louse; same as jamakus
JAMILLO: Tree which produces a fruit of which its seeds are used for curing
JANCH'Y: Undissolved lumps of quinua dough during the making of chicha from quinua flour
JANKA: Solid bedrock
JANU K'ARA: A weed which grows among barley that is poisonous to cuyes
JANQUO: The color white; a variety of oca
JAUK'AÑAS: Threshing poles, of which the long ones are curved
JAWIRA: Milky Way
JHAMFA: Scarlet fever
JIK'Y: Ceramic toasting oven
JILACATA: Traditional community authority
JIPI: Husk of the quinua grain, which is burnt and its ashes used to make llujtha, a catalyst in the chewing of coca
JIRI: Very wet, decomposed manure, used for greasing potato seed
JIRUÑA: Utensil for stirring
JISKA ANATA: Monday of Carnival Week
JORNALES: Labor days
JUMENTHA APILLA: Yellow and thick variety of oca
JUQO USO: Blindness in livestock
JUFA ARCO: Silo of quinua grain
JUFA CHAACA: Bridge of quinua consisting of transverse rows of quinua planted in a potato plot
JUIFI CAYA: A dehydrated oca product
JUSI: Hand sickle; same as hoz

K

KAIRAS: Frogs
KALCHA: Upright haystack; same as calcha
K'ACHA: Twisted wool, in a zig-zag pattern
KANAÑA: A piece of yarn which connects the two braids or pigtails of an Altiplano woman behind her hair; same as tullma
KARE: Plot where barley was grown the previous year
KARWA THAJA: Llama droppings
KASARJE: Cracking of the hooves in livestock exposed to mud and damp for long periods of time
KASAWIRA DE QUINUA: Fried quinua cakes
KATA: Spicy wild plant, believed to cause loss of maternal milk
KATI CH'OKES: "Sweet" (non-bitter) variety potatoes
KATUQUIPAS: Wholesale intermediaries
KAMANA: Agricultural authority--usually Secretary of Agriculture--in charge of supervising crop lots and aynocas
KAÑI: Cleared, flat area within a crop lot where harvested produce is collected; same as khaya
KAWAÑA: Hilling; same as aporque
KAWAYAS: Small ponds or puddles located near Lake Titicaca shoreline
K'AYA: Second quality dry manure, used for cooking fuel.
KANTATI SONAK'E: Day of first quarter moon
KANTUTA: A purple flour, used for floral decorations during Holy Week
KAROMA: Cargo blanket for a pack animal
KALLAPUS: Tools of the spirits
KALLA: Medicinal plant
KELA KELA: A plant that is believed to cause blindness in sheep
K'ELLU: Yellow; a variety of corn
KELLASUNTI: A variety of yellow oca
KELLUNCHU: A crop pest that attacks newly sprouted plants
K'EPA: The three day period August 7-9
KETHA: Medicinal plant, used for inflamation of the stomach
K'EWILI: Sheep born without tails
KENTO: A plant used for dyeing wools
K'EROS: Roof braces
KHANANU: A plot used for potato cultivation the previous year
KHAYA: A cleared area in a row to gather harvested produce; same as kañi
KHANAPAKHO: Dandylion (amargón), with medicinal use to cure diarrhea
KHOFADA: Task of busting sod
KHOFAÑA: Wooden mallet for busting sod
KHOFERI: Person who busts sod
KHOLLY: First plowing (of three) following a period of fallow; kholly is always conducted in anticipation of potato planting
KHOLOMONA: Medicinal plant, used to treat ailments of the kidneys
KHOÑA: First quality sheep's wool--soft and silky

KHONA: Large milling stone
KHORAÑA: Weeding
KHUMU: Load carried by a pack animal; same as carga
K'ICHE: Pinching open the haba pod
KOCHA: Onion seedlings
KOILLO APILA: Yellow-reddish, a variety of oca
KOWA: Medicinal plant, used for diarrhea
KOLLE: Medicinal plant
KOLLERI: Plowman, or one who uses the footplow or huiso
KONA: Handmill, made of stone
KOTO: A morning star
KULLI: Purple, a variety of corn
KUNKA KUNKA: A unit of measurement equal to one-half arroba or 12.5 pounds; same as cuartilla
KUTIRPU: A plot where potatoes were planted again for the following year; same as KHANANU

L

LAKA CH'ULLA: Oversized teeth in lambs
LAKOTA: A wormy potato
LAMANA: Mixing pan
LAP'A USO: Lice in pigs; same as laram lapa
LARAM LAPA: Same as above
LASRAÑA LAWRA: Heavy post about 3.5 meters long and at least 20 cm in diameter which is pulled by draft animals and is used to level land and bust dirt clods
LATICO: Leather ring which connects plow stem to the yoke, serving also the function of a swivel
LAZO: Leather rope
LEKE LEKE: Wild bird of highlands, an indicator of planting prospects
LINAZA: Linseed, with medicinal applications
LIP'ICHI: Sheepskin
LISTONES: Roofbeams
LIJWANA: Digging hoe; same as chontilla
LOKA: Armload; same as brazada
LOMO SURK'A: "High Planting", superficially buried near surface, not in bottom of the furrow
LLAQAS: Green stem ends and leaves which must be cut from straw before it is woven
LLAVIJO: Yokepin of wooden plow which keeps plowstem attached to latico
LLAWUNTHA: Tapered but ends of a wooden yoke
LLAMPU MESAS: Burnt offerings intended to placate the mountain spirits
LLUCHU: Pink, a variety of oca
LUKY: Bitter variety potato, good for dehydration into chuño

LLUTHA: Alkaloid substance which enhances the narcotic effect of chewing coca
LARI: Person who cuts out pieces of ears to mark livestock
LLAGUA DE MAIZ: Porridge made from corn meal
LECHE DE EMBARAZO: "Pregnancy milk", causes diarrhea in nursing children when mother becomes pregnant again
LECHE DE BURRA: Milk of the female donkey, considered to be the "holy remedy" for a variety of illnesses, particularly fever

M

MADEJA: Skein of wool yarn
MALLCUS: Traditional community leader; same as jilacata
MANOJO: Double handful, a unit of barter
MAÑAZOS: Livestock intermediaries who buy large numbers of animals
MANDONES: Traditional authorities; same as jilacata and mallcus
MANKANCHA: Narrow inner skirt (pollera) of highland woman
MANKHALLI: One half of a textile, each half woven on a 4-stake loom
MANTA: Shawl
MARANCIL: Medicinal plant, used for fever
MARAQUETA: Stiff-crusted breadroll
MARKHA: A linear distance of two meters
MARKHU: Medicinal plant, used to alleviate distress of the kidneys
MATARA: Aquatic reed, used to construct straw mats
MATE: Herb tea; the most common form of utilizing and consuming traditional medicines
MATECO: Medicinal leaf, applied to fractures and also for rheumatism
MATA: Lesion or swelling on a cargo animal, the result of excessively heavy loads
MACHO: A "male" rock with a rough exterior, used in building outdoor fireplaces
MEDIA-HECTARIA: Unit of area 50 paces x 20 paces (1000 square meters)
MENAJES: Kitchen pots and utensils
MERIENDA: Mid-day meal eaten in the field, usually consisting of "dry" food
MESIKO: Medicinal plant, used for fever
MESA DULCE: A burnt offering consisting of sweet ingredients, destined to placate the Pachamama or Earth Mother
MESTIZA URUPA: Ash Wednesday
MILLO: A medicinal mineral, used for compresses to relieve headache
MILLU: Yellow
MISTERIOS: Small wafers imprinted with diverse images and used as one of the ingredients of the mesa dulce
MITA: Irrigation water turn
MITANI: Irrigation water user

MOJCH'Y: Masticated quinua dough, used as a yeast to ferment chicha
MOÑEKA: Medicinal plant for treating discolorations or face spots
MOQUILLO: Epidemic among burros which caused the deaths of several animals in Jaruma during 1981
MORAYA: Lowest quality harvested produce that is soaked in cold water for a month and then freeze-dried to create an ordinary tunta-like product
MORTAYA: Burial shrouds
MOSKHO: Low quality dehydrated product, similar to chuño
MOSTASA: Mustard, a medicinal plant used via plasters to alleviate congestion
MONDA: Next to the largest class of potatoes, reserved for family consumption and market sale
MURIATA: Old age in cattle, indicated by worn permanent teeth
MULLU TALLA: Ailment in livestock known as "fright"
MUYU MUYU: A fatal disease in young sheep which results in the brains turning watery

N

NIEVES: Day of Snows or August 1st, a day to consult planting indicators.
NINOSANKO: Medicinal plant
NUCLEO ESCOLAR: Rural education center offering five years of primary and one year of intermediate schooling
NUEZ MOSCADA: Medicinal plant
ÑUÑUMAYA: Medicinal plant
ÑUÑU LAKA: Milk teeth in cattle—indicating 1.5 to 2 years
ÑUSATA: Any potato showing signs of rot
ÑUKU: Loose net bag fitted over pack animals snout to keep it from eating cargo carried by others
NOGAL: Walnut, a plant used for dyeing ponchos

O

OCHOCOLO: A variety of small habas
OJRA: Traditional authority; same as jilacata
OJO DE AGUA: Spring
OLLIN: Black from cooking pots, used in medicinal remedies
OLLA: Cooking pot; variable unit of barter involving pottery and produce wherein the vessel must be filled with the produce for which it is exchanged
ORIJILLA DE MUNA: Plowshoe of the wooden plow
ORIGINARIO: Native-born resident of the community
OSTIA: Communion wafer

P

PAA LAKANI: Two permanent teeth in cattle, indicating 3 years of age
PACHAMAMA: Earth Mother
PACKHO: Medicinal plant, used for diarrhea
PADRINO: Godfather
PAJA BRAVA: A wild straw
PALTA: Avocado; the leaves are used for medicinal purposes
PAPAS K'IFAS: Potatoes left behind, "abandoned"
PAPAS WATIA: Baked potatoes, prepared on hot coals buried underground
PAPERA: Mumps
PARALEJO: Metal ring connecting loop to body of a straw rope
PARCELA: Crop lot
PARCHE: Plaster or compress, used in traditional medicine
PARUCHO: Brown or vicuña colored wool
PASANKALLA: Popcorn
PASANTE: Host or sponsor of a party
PASTELA: Disease in livestock involving swelling of the jaw; same as ch'upu uso
PASTORA: Moss
PATAJATE: Special bed where mother rests for at least a week following childbirth
PATIO: Produce storage yard of farmhouse
PATRON: Hacienda owner
PELON: Cylindrical pile of silage barley; same as cebar arco
PEREGIL: Parsley, a medicinal plant used to cure stomachache
PEROL: Frying dish
PESADA: A unit of measurement equal to six arrobas and 6 pounds
PESCKE: Quinua soup
PHAJCHI KILA: "Monthly blood" or menstruation
PHASA: A mineral (manganese) often consumed with merienda as a substitute for meat
PHINA: Temporary storage silo for fresh produce; same as fina
PHIRI: A porridge made with milk and cereal grain
PHOQ PHOQ: A wild mushroom which is ground to a powder and used to treat blindness or other eye disorders in sheep
PHUCHUS: Well
PHUTI: Steam-cooked chuño or other dehydrated produce
PHUSKALLA: Cactus, used as a planting indicator and also for medicinal purposes
PICOTA: Pick-axe
PILLCHA: Bundle of stiff weeds attached to base of plowshare to facilitate pushing dirt aside and constructing a wider furrow
PILLILLIDOS: Second sproutings of barley stubble following an irrigation
PIRWA: Permanent dry storage shelter separate from the farmhouse
PITO DE CAÑAGUA: Cañagua flour
PILLOS: Large, round loaves of bread (that can be hung around the head) used to celebrate departure of annually-elected officers

POKE: Mother's first milk or colostrum
POR PARTES: Planting separate crops in adjacent patches, but not intermixed by rows
POLLERA: Skirt (flannel) worn by Andean women
PLLERANI: Type of temporary storage silo constructed of several layers of straw resembling the skirts of women
PONCHE: Punch containing milk and alcohol
POCU: Grey, a variety of corn
POROMA: Land that has spent several years in fallow
PRESTE: A community authority
PRENDA TEJIDA: A unit of barter exchange, produce for textiles
PUCU PUCU: A wild bird, harbinger of abundant pasture
PUÑADO: A single handful of produce (a unit of barter) equivalent to one-half manojo
PUNTOS: Stitches
PUSI LAKANI: Four teeth; an animal with four permanent teeth, indicating four years of age as well
PUTUTOS: Musical instruments made from cattle horns

Q

QUESANA: The wool of a single sheep; a sheepskin of wool
QUESO HUMACHA: Cheese sauce eaten with boiled potatoes
QUINTAL: Unit of weight equivalent to 100 pounds or four arrobas
Q'INTU: Individual serving (ration) of coca leaves
QUISPIÑA: A flour made from quinua
QUINUA: A cereal grain indigenous to the Altiplano, cooked similarly and resembles rice
QUINUA: Royal quinua, white in color
QUI'LLPAS: Pieces of ears cut from livestock as a means of identifying their owners
QUI'CHI: Task of conducting the ear cutting

R

REATA: A rope of five brazadas, equivalent to 12-13.5 meters
RIEGO: A single irrigation
REGIDOR: Community resident elected every four months to take care of the community church, if any
REJA: Metal plowshare made from the leafspring of truck; a first, second, or third reja refers to three sequential plowings
REQUEZON: Cottage cheese, a derivative of making other cheese
RASTRILLA: A curve-necked rake for removing bread from the oven
REFRESCO: Non-alcoholic drink
ROMERO (Rosemary): A medicinal herb
RAIZ DE CHINA: Medicinal plant, used to heal fractures
RUECA: hand spindle for spinning wool yarn
RUTUCHA: Child's first haircut, a special ceremony

S

SABACERO: Variety of oca
SAJAÑA: Sieve
SAJRA: Meat which "has the Devil inside"; meat of a sick animal
SALTA: Letters or decoration within a weaving
SALVIA: Medicinal plant, used for stomach upset
SANITARIO: Medical practitioner (not a professional)
SAN PEDRO LAKA TUTUKA: Feast day of St. Peter (of the winds), June 29
SAN ISIDRO: Feast day of Saint Isidro, May 15th; San Isidro is the patron saint of cattle
SAN JUAN: Feast day of St. John the Baptist, June 24
SANKAYO: Cactus plant; its flowers indicate best planting dates
SARNA: Mange in livestock
SAUMERIO: Vaporizing a sick patient (or animal)
SAWUN LAWA: Loom braces for the four-stake loom
SAYAÑA: Property where farm house is located
SEJE: Cylindrical basket for storing produce, made from a straw mat
SELLO SELLO: Medicinal plant, used to cure the kidneys
SEMARONA: Medicinal plant, used to cure fever
SIEDRO: Medicinal plant, used to cure diarrhea
SILK'EÑA: Hand tool for husking ears of corn
SILO: Storage silo
SILLUTA: Potatoes which have been pinched or bruised
SIPHO SIPHO: Medicinal plant, used to heal bruises
SINCHA: cinch
SCARLATINA: Scarlet fever; same as j'hamfha
SEGUNDO: Second course of a meal, usually consisting of "dry" food
SOBRANTES: Land-poor residents (not original community members) without full water use rights
SOLDA QUE SOLDA: Medicinal plant, used in plasters for fractures
SOPAIPILLAS: Fritters made of wheat or cornmeal
SOLEADO: Sunstroke
SUJ'THA LAKANI: Animal with six permanent teeth, indicating fibe years of age
SULTANA: A substitute for coffee
SURTIJILLAS: Tendrils of pea plants
SUSTO: Illness believed to be caused by "fright"
SURK'A: A type of planting where seed placed as low as possible in the furrow, anticipating a dry year

T

TACERO: One who pays the land tax
TACHO: Large plastic cistern, used by some rural households to store drinking water
TAJLLI: Unit of measurement equivalent to four finger-lengths (8 cm)

TAIPI: Second 3-day period of August
TARI: Woven wool mantle (preferably of llama or alpaca) for keeping cooking pots warm for hours
TARWI: A bitter, indigenous cereal grain
TATA: God
TATAN WAJT'IR WAWAPA: Person specialized in community rituals
TAWRA K'ARARTI: Shedding of wool in sheep
TEMPORA: Fasting period
THALANTADA: Practice of tossing a pregnant woman about in a blanket so that the fetus will settle into the correct birth position
THIMPU: lamb soup
THORE: Dark tan, a color of wool
THAQUI: Road to Heaven, or path to Calvary (Jaruma)
TIJI VILLA: "Skinny blood" in livestock, believed to be lost when animal's tail is cut
TILIRA: Support brace on wooden plow
T'IKA PERDON: Sheeps' pardon, part of a fasting ritual in Jaruma
T'INKHA: Gift drink, usually given during livestock transaction
TIMPANISMO: Bloat in livestock
TRIQUINA: Trichinosis in pigs
T'IKACHA: Ritual of adorning animals
TOKHORO: Hollow bamboo pole, used to keep warp divided in 4-stake loom
TOKHO TOKHO: Medicinal plant, used in cureing sores and bruises with plasters
TONKO SILK'EÑA: Husking corn by hand using the silk'eña
TORONGIL: Medicinal plant, used for stomachache
TOSTADO DE GRANO: Toasted cereal grain, a snackfood
T'OJO: Potatoes without eyes, "blind"
TOLA: Medicinal plant, used to treat fever
TOLANTOLA: Medicinal plant
TRIGO MOTE: Boiled wheat
TROJE: Permanent storage silo, made of adobes; same as pirwa
TRAMA: Shuttle containing the woof, passed back and forth during weaving
TUMBULA: Shrine to the dead
TUNU WARI: Medicinal herb
TUNTA: Potatoes soaked in water for a month, then freeze dried
TUQA USO: Malnutrition in livestock caused by scarce pasture
TUPU: Woven wool sack which holds slightly more than 100 pounds; mark placed 60 cm high on such a sack
TULLUMA: Yarn connecting pigtails of woman
TUIRO: Yarn wrapped between the horns of cattle

U

ULLUCU: Papalisa
UMALLAK'E: Ailment of blistered and cracked hooves in livestock
UKORURO: Watercress, an indicator of planting dates
UMA: A unit of land area, determined by what can be plowed in a single day by a 4-member team using huisos or footplows
UMANTA: Gifts of paper money
URTA: Shelter for lambs
UNTU: Llama grease
URDIDO: Warp
URU URU: A morning star
UVA SILVESTRE: A medicinal plant, used for fever

V

VAECHA: Medicinal plant, used for fever
VELALAYO: Medicinal plant, used in plasters for fractures
VERBENA: Medicinal plant, used for diarrhea
VENTEO: Winnowing grain from chaff by tossing it into the wind
VICO: Unit of length for 15 cm indicated by distance from base of thumb to tip of index finger

W

WACULLA: Ceramic cisterns, used for water storage and making chicha
WINCHA: Belt for tightening mold around cheese
WICHUÑA: Weaving pick made from right legbone of the llama
WILA CHUMPI: Light tan, a natural wool color in llamas
WICHU: Wild straw, very resistent to moisture
WICHU USO: Diarrhea in livestock
WISKA: Woven wool rope
WICHKATA: Pole that separates the warp nearest the weaver

Y

YATIRI: Traditional healer; same as curandero
YAWIRKHA: Leather strip for binding plowshare to plowshoe
YUGO: Wooden yoke
YUNTA: Team of two draft animals trained to pull the wooden plow