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A SCIENTIST VISITS SOME OF THE WORLDS OLDEST PEOPLE

"Every Day Is a Gift When You Are Over 100"

By ALEXANDER LEAF, M.D.

Photographs by JOHN LAUNOIS

BLACK STAR

IN THE LITTLE VILLAGE of Kutol, in the foothills of the Caucasus Mountains of the southern U.S.S.R., lives a sprightly lady named Khfaf Lasuria. She is small—not five feet tall—white-haired, and full of humor. I visited her one spring morning and found her in her garden, surrounded by children, pigs, and chickens. I was greeted in warm Georgian fashion, and we toasted each other first with vodka and then with wine as we talked.

She talked about her life, the present and the past, about things she remembered. She had a lot to tell because her memory was good—and she was more than 130 years old.

She told me about her first marriage at age 16; her husband died during an epidemic some twenty years later, and she married again when she was about 50. A son lives in the stone house next to hers. He is 82 years old.

She remembered as a recent event the big snowfall in 1910. "My son was already an adult then, and I was about 70. The snow was more than two meters deep, and I helped him shovel it from the roof."

The present? She was just back from a visit to relatives in a distant village. She simply got on the bus alone and went visiting. She had worked on the local collective farm since it was formed some 40 years ago, retiring only in 1970; in the 1940's, when she was already more than 100 years old, she had held the record as the farm's fastest tea-leaf picker.

As she sat talking, she smoked cigarettes, inhaling each puff. She had started smoking in 1910, and has consumed about a pack a day for 62 years.

As a physician and teacher in a large general hospital, I see many of the medical misfortunes that befall the elderly, and have grown interested in how a healthy, vigorous old age can be attained. Today more than twenty million Americans are age 65 and older—nearly 10 percent of our population. Yet our

understanding of aging is minimal, especially in explaining the factors that produce a Khfaf Lasuria in one instance and wasting senility and sickness in another.

Villages Where Time Moves Kindly

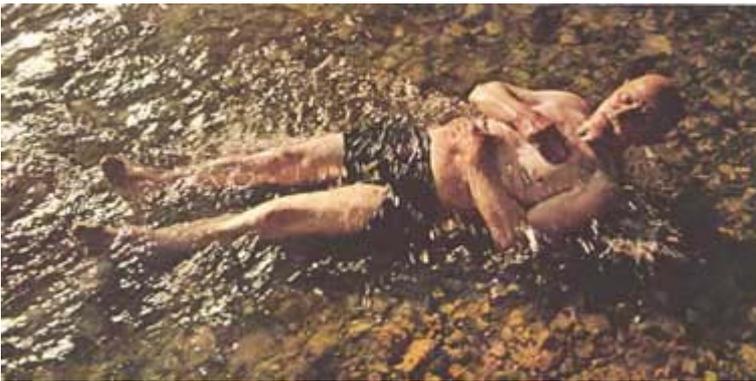
There are places in the world where people are alleged to live much longer and remain more vigorous in old age than in most modern societies. During the past two years, taking advantage of a sabbatical and of support from the National Geographic Society, I have visited the best known of these regions, all relatively remote and mountainous: the Andean village of Vilcabamba in Ecuador, the land of Hunza in the Karakoram Range in Pakistani-controlled Kashmir, and Abkhazia in the Georgian Soviet Socialist Republic in the southern Soviet Union (map, page 96)—where I met Khfaf Lasuria, oldest of the many centenarians I interviewed. Other research groups in the three areas generously gave me access to their information, some representing years of study.



Serene at the summit of a long life, Khfaf Lasuria—more than 130 years old—watches the world from the porch of her home in the Soviet Union's Abkhazia, an autonomous republic in the Georgian S.S.R. She was nudged into retirement from her job as a tea picker two years earlier. Still active around the house, Mrs. Lasuria enjoys a little vodka before breakfast and a daily pack of cigarettes.



Guiding a favorite mount through the tea plantation where he labored most of his life, 100-year-old Temur Tarba (**above**) displays the superb horsemanship characteristic of Abkhazians. Among the medals he wears is the prized "Hero of Labor" award.

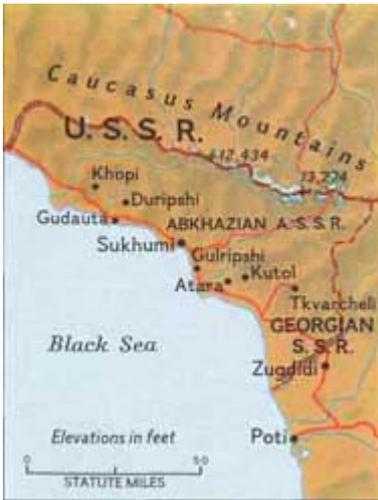


Bracing dip holds the key to longevity, believes Markhti Tarkil, who has taken a daily swim winter and summer during most of his 104 years. To get to the chill stream from his home in Duripshi, Abkhazia, he has to scramble down a steep half-mile-long trail.

"I was amazed at such exertion by a man over a hundred," says author Alexander Leaf, "but wherever I went, the level of physical activity among such old people was high."

Testing a centenarian's reflexes, Dr. Alexander Leaf pursues a lifelong quest to fathom the mysteries of the elderly. He is Chief of Medical Services at Massachusetts General Hospital and a professor at Harvard University Medical School, both in Boston. To gather material for this article, Dr. Leaf traveled to three areas of the world where people are known to live to extreme ages: Vilcabamba in Ecuador, the Caucasus, and Hunza.

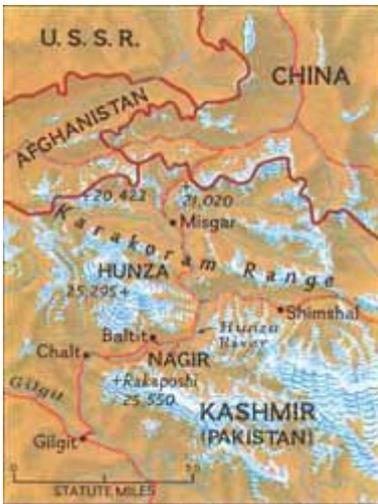




FERTILE GARDEN of tobacco, tea, and citrus, Abkhazia lies in the wettest region of the Soviet Union.



BASTIONS OF LONGEVITY. Vilcabamba, Abkhazia, and Hunza contain unusually high numbers of elderly, vigorous people—a phenomena that excites the curiosity of gerontologists.



CLIFFSIDE REALM of Hunza, once a princely state, today is part of Pakistani-controlled Kashmir.

A primary question plagues all who take to the field to study longevity: How can you be sure of the ages of those who claim to be centenarians? There is no way to "date" a living human being.

In Vilcabamba the community was Catholic, and church baptismal records confirmed some of the ages claimed there. Some could also be supported by the number of generations of offspring, and by testimony from friends and relatives of similar age. A census taken in 1971 showed that Vilcabamba, with a population of only 819, had nine individuals above the age of 100. In the United States, by comparison, the figure is about three centenarians per 100,000 population.

Memories Constitute Hunza's Records

In Hunza (population 40,000) the dating problem was particularly difficult. Hunzukuts live in high valleys near the China and Afghanistan borders, so remote that their language, Burushaski, bears no relationship to any other language on earth. There is no written form, so no records exist. In some instances, however, the Mir (ruler) of Hunza could, from personal knowledge of his state's history, verify ages.

In short, I was not able to confirm exact ages in Hunza. Yet I had the definite impression of an unusual number of very vigorous old folk clambering over the steep slopes that make up this mountainous land. It was the fitness of many of the elderly rather than their extreme ages that impressed me.

The largest number of people above 100 years old, and the best documented, exists in the Caucasus. The documentation is due in large part to the work of Professor G. E. Pitzkhelauri, head of the gerontological center in Tbilisi, Georgia, who told me of the methods he uses to validate ages.

First, documents of dates of birth hold highest area of the Soviet Union lies near the border and is closed to outsiders. Neither I nor any other Westerner that I know of has been granted permission to interview the man. His fragile health, Soviet officials say, prevents him from leaving his home village for interviews elsewhere.



RUGGED ANDEAN TERRAIN and a nearly impassable road keep Ecuador's tiny Vilcabamba isolated.



Taking a break from moderation, Georgians honor their elderly at a banquet of chicken, mutton, beef, goat cheese, bread, tomatoes, cucumbers, green onions, garlic, spicy sauces, and wine. Such feasts occur infrequently, however. Aged Georgians consume around 1,800 calories a day, 600 less than the U. S. National Academy of Sciences recommends for males over 55. In a Soviet study, the plasma cholesterol level of centenarians averaged less than half the accepted normal amount for Americans aged 50 to 60.

In the autumn of their long love, Karum Utiashvili, 98, clasps his 80-year-old wife, Keke in an affectionate embrace ratified by the smiles of relatives and friends. Get married and extend your life, concludes Soviet gerontologist Dr. G. E. Pitzkhelauri after studying 15,000 elderly persons. He found, with few exceptions, that only the married reach advanced age.



Much of my research was done in a region within Georgia called Abkhazia. The peoples here are a mixture. The census identifies ten ethnic groups in a total population of almost half a million.

The old people are found in agrarian settings; many of the men have worked as hunters and shepherds as well as farmers. The standard of living is much higher than that of Vilcabamba or Hunza.

Since we are composed of what we eat and drink, I was particularly interested in dietary habits in my three study areas.

In 1968 a nutritional study published by the U. S. National Academy of Sciences made these recommendations for diet among people above age 55: For males, 2,400 calories, including 65 grams of protein; for females, 1,700 calories, with 55 grams of protein (28 grams equal an ounce).

In the United States, though, nearly everyone consumes more. A U. S. Department of Agriculture study lists average daily intake for Americans of all ages at 3,300 calories, with 100 grams of protein, 157 grams of fat, and 380 grams of carbohydrate.

Scant Diet Promotes Long Life?

By contrast, I found the diets of Vilcabamba and Hunza strikingly similar to each other—and substantially lower than the U. S. recommendations. In a survey of 55 adult males in Hunza, Pakistani nutritionist Dr. S. Maqsood Ali found an average caloric intake of 1,923, with 50 grams of protein, 36 grams of fat, and 354 grams of carbohydrate. Furthermore, meat and dairy products constitute only 1½ percent of the total. The absence of pastureland makes animal husbandry nearly impossible, and the few livestock are usually killed for food during the festival season in winter. Fats of animal origin are scarce; instead, oil obtained from apricot seeds is generally used for all culinary purposes.

Dr. Guillermo Vela of Quito found a strikingly low caloric consumption also among the elderly of Vilcabamba. The average daily diet provided 1,200 calories. The daily protein intake was 35 to 38 grams, and of fat only 12 to 19 grams; 200 to 260 grams of carbohydrate completed the diet. Protein and fat again were largely of vegetable origin, with only some 12 grams of protein daily from animal sources. Needless to say, one sees no obesity among the elderly in either Vilcabamba or Hunza; neither were there signs of undernutrition.

The weight of current medical opinion would concur that a diet such as described for Hunza and Vilcabamba would delay development of atherosclerosis—that is, fatty deterioration of arteries of the heart.

Georgians Muddle the Myth

My confidence in the importance to health and longevity of a low-animal-fat, low-cholesterol, low-caloric diet was somewhat shaken, however, by eating habits in the Caucasus. There Dr. Pitzkhelauri and a colleague, Dr. Deli Dzhorbenadze, have studied the dietary habits of 1,000 persons above the age of 80, including more than 100 centenarians. The old people consume 1,700 to 1,900 calories daily, considerably more than do most people of such advanced age.

Sixty percent ate a mixed diet of milk, vegetables, meats, and fruits. Seventy percent of the calories were of vegetable origin and the remainder from meat and dairy products. Seventy to 90 grams of protein were included in the diets. Milk was a main source of protein; sour milk and cheese were widely used at all meals in all seasons. Georgian cheeses are low in fat content, however, so that the daily fat intake was only 40 to 60 grams.

Bread provides the major source of carbohydrate. In central Georgia, marvelous flat, pointed loaves—two feet long and curled upward at one end—are baked in an outside oven and stacked, still crisp and warm, on the table. In the west we also saw *abusta*, a boiled, unflavored cornmeal-mush patty. Dipped into a variety of sauces spiced with sharp red pepper, it is eaten with the fingers.

Breakfast generally consists of cheese, bread, tea, and sometimes honey. The usual beverage is sour milk with cold water added. Every household has its vineyard and makes its own wine, which is quite dry and drunk fresh. The old people consume two to three glasses daily with their meals.

When I visited the centenarians in their homes, I was invariably invited to stay for food and drink. Within minutes the women of the household would have a table buried under its load of bread, cucumbers, onions, tomatoes, garlic, cheese, roasted and boiled chicken, sauces and spices, boiled mutton, goat's meat, and beef. Fresh fruits and occasionally pastry or a platter of chocolate candies completed the setting.

Feasting Fosters Camaraderie

Toasts would then be drunk, starting with homemade grape "vodka" or a Georgian brandy, the first a real firewater and the latter the boast of the Georgians. Then the drink changed to the local wine, and the toasting settled down to a steady pace throughout the meal—which would continue for three to five hours.

Every person and every honorable and friendly sentiment provided subject for the toasts. The tumblers were promptly refilled as the old people, our-



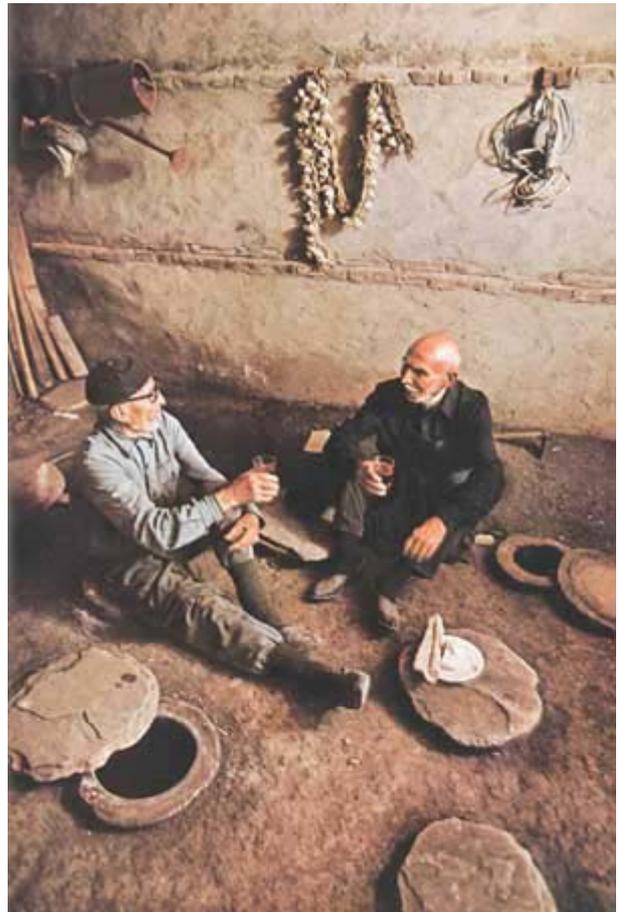
Indefatigable at age 117, Gabriel Chapnian carries a pail of newly harvested potatoes home for lunch up an Abkhazian hill that exhausted the author. The lifelong farmer continues to work half a day in the fields. His prescription for longevity: "Active physical work, and a moderate interest in alcohol and the ladies."



"If I get any closer, I'll have to kiss her," joked Abkhazian Seliac Butba, sitting beside his wife, Marusia. Butba said he was 120, his wife 109. After interviews, Dr. Leaf estimated their ages at 113 and 101.



Oldest living person? If Shirali Mislimov was born in 1805, as Soviet gerontologists maintain, he is now in his 168th year. The old man, here listening to a transistor radio, lives in the village of Barzavu in Azerbaijan, west of the Caspian Sea. Authorities have permitted no Western journalists or medical men to interview him, and they judge him too frail to travel. Even so, he still rides horseback and tends an orchard he tells of planting in the 1870's. Mislimov says that he married his 120-year-old wife 102 years ago.



Cordial friends, Michael Mchedleshvili, 95, and Giorgi Gvetykashvili, 87, sample homemade Georgian wine in the cellar of Giorgi's house. Each of the sunken ceramic vats holds 40 gallons.



Piping away the time, 108-year-old Magul Surmeneliani of Abkhazia recalls his lonely days as a shepherd, when music was his best company. He now lives with his daughter, takes daily walks, and mildly complains that his children won't let him do anything. "I never had a single enemy," he told Dr. Leaf. "I read no books and have no worries."

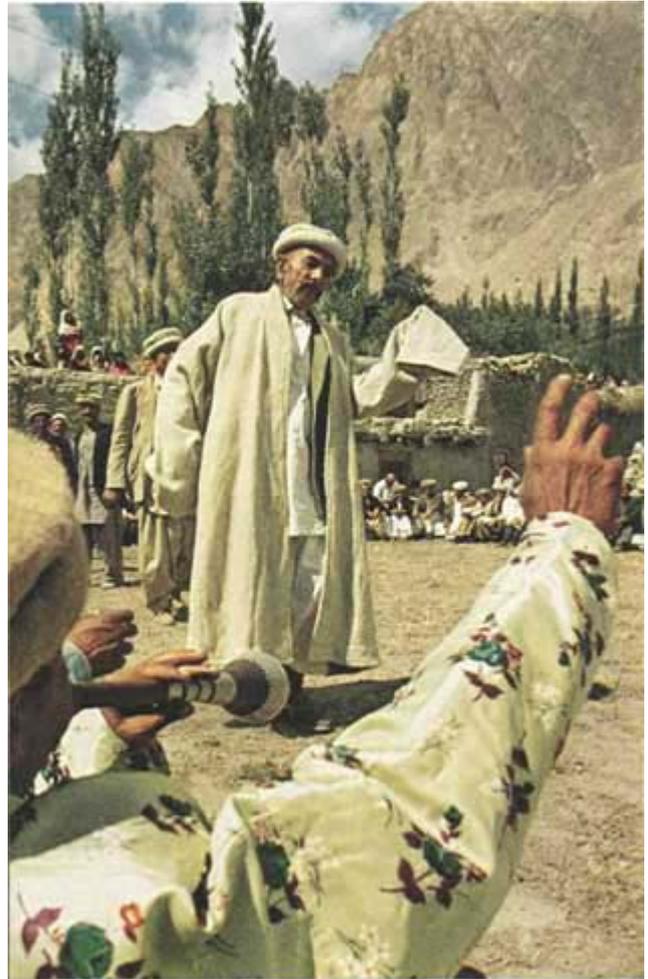
selves, our driver, our parents, our children, peace, friendship, and understanding were separately toasted.

One respected member was elected president of the table by acclaim—"empty your glass if you approve his election," we were told. He then served as toastmaster. I watched with awe as, after proposing a series of toasts, the toastmaster might accumulate five tumblers of wine, which he would then down ostentatiously in rapid succession.

These festivities hardly seemed consistent with the moderate habits I had been told the old people practiced. However, I noted that the centenarians often would forgo the vodka, and their wineglasses were smaller than those of the others. Also, of course, such feasts were not a daily event, nor had food always been so plentiful.

I was often told by the old people that "things are much better now." One Armenian in Abkhazia explained: "In Turkey, and when we first came here, we had only beans and other vegetables to eat, but now we have meat and wine every day." It is well documented in animal experiments that a low-calorie diet during early life will extend the total life-span. Thus dietary habits of early life may be as pertinent to long life as exercising moderation in middle and old age.

In Vilcabamba and Hunza the old people were generally quite slim, but in Georgia one occasionally



Stately dancer, 99-year-old Kabul Hayat keeps time to the reedy wail of an oboelike instrument during wedding festivities for the crown prince of Hunza. Inhabitants of the tiny mountain land esteem their aged; elderly Hunzukuts counsel the mir, or head of state, daily on matters great and small.

saw an overweight centenarian, a phenomenon I would not have thought possible. I visited Quada Jonashian, an obese 110-year-old Armenian, on a farm near Gulripshi. He told me, "If one is healthy, it is obligatory to drink one liter [34 ounces] of wine daily, and on holidays and at weddings 17 to 20 tumblers are common."

Sonia Kvedzenia of Atara is 107 and very fat. When I asked how long she had been overweight, she laughed and said:

"I became fat when I stopped having children. For 60 years I have been fat as a barrel and all my children are like me. My mother was fatter, stronger, and warmer than I!" I learned that her mother had died only recently—and had been the oldest person in that region at the time. These, of course, are the exceptions, but nevertheless striking to this physician who was taught and has taught that obesity is an unmitigated health disaster.

Workaday Vigor Vital to Health

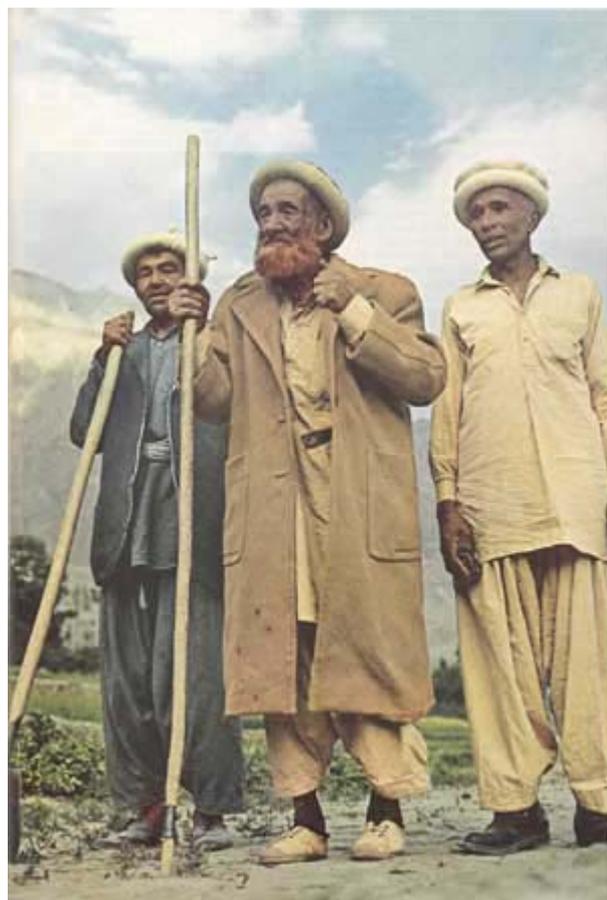
Whether slim or not, the old people of all three cultures share a great deal of physical activity. The traditional farming and household practices demand heavy work, and male and female are all involved from early childhood to terminal days. Superimposed on the usual labor involved in farming is the mountainous terrain. Simply traversing the hills on foot during the day's activities sustains a high degree of cardiovascular fitness as well as general muscular tone.

Dr. David Kakiashvili, a Georgian cardiologist who has been studying gerontology for the past 12 years, is convinced that exercise is a major factor in longevity. He has tested the hearts and lungs of these old people, using modern investigative techniques, and he finds that they have all kinds of cardiovascular diseases.

He asked, "Why do people in the small mountain villages tolerate myocardial infarction [heart attack] much better than their urbanized relatives?" Getting no response from me, he continued, "The constant physical activity required of them improves cardiopulmonary function so that the oxygen supply to the heart muscle is much superior to that in city dwellers." Thus, though the old people did have heart attacks, they apparently were "silent"—not felt by the victims.

The importance of physical activity—or lack of it—to the occurrence of myocardial infarction has long been suspected by the medical profession, and was given support by a classic study among British postal workers. Those doing desk jobs suffered a higher incidence of and mortality from heart attacks than did their more active colleagues employed in mail delivery.

During my last few days in Abkhazia, I heard that one old man from the village of Khopi was, as usual, spending the summer months with his herd of goats in the high alpine pastures—altitude 5,000 to 6,000 feet. Since I was told he was more than 100 years old,



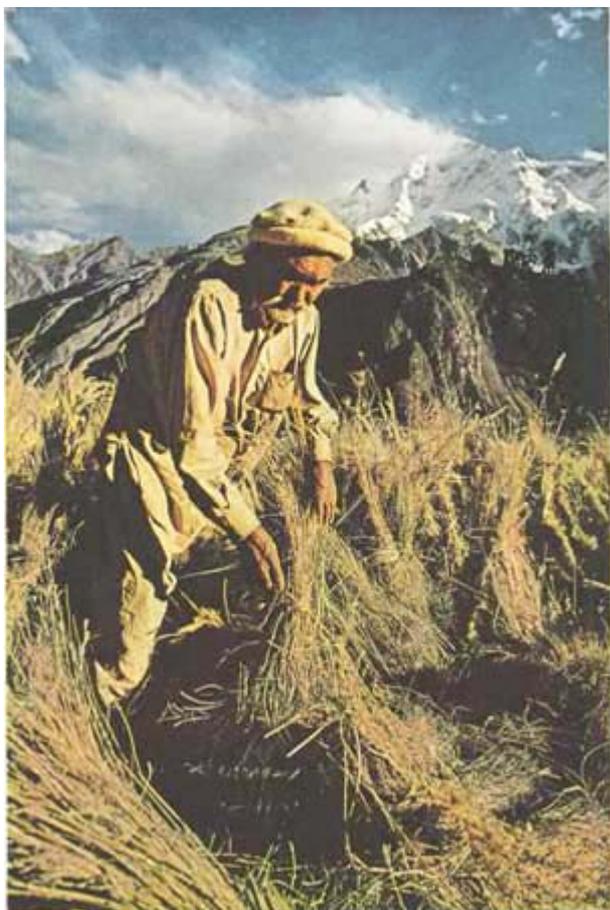
Revered as the oldest Hunzuket, Tulah Beg, flanked by his sons claims to be 110. Dr. Leaf regards this as approximate, since no written records exist in Hunza. "It is the fitness of many of the elderly rather than their ages that impresses me," he says. Photographer Launois was also impressed when Beg's sons, both in their sixties, shouldered heavy cases of his photo gear and bounded over the forbidding terrain "like agile mountain goats."

I decided to visit him there, and to learn firsthand the physical exertion involved in his daily activities.

With three companions I set out at dawn for the six-hour hike up the mountain. The trail was muddy, slippery, and so steep that we were often climbing rather than hiking; two of our party, in fact, gave up and headed back downhill.

At times I felt like following them, but finally, about one o'clock, we came out of the woods onto a high grassy slope and found Kosta Kashig, who claimed to be 106 years old. He lived with two men and a boy as companions in a lean-to built of wood saplings with a sheet of plastic for the roof and goat-skins covering the floor. Their outdoor kitchen consisted of an iron caldron suspended from a pole over an open fire. In it they cooked abusta, which they stirred with a large wooden spoon and ate with red

Binding hay for animal fodder, 95-year-old Akbar Khan makes use of a niche of level land on a steep Hunza hillside. "It seemed no slope was less than 30 degrees," Dr. Leaf reports. "Just getting through the affairs of the day conditions the hearts of the Hunzukuts."



peppers off aboard; their diet also included cheese (which they make), and soured goat's milk.

Since one of the dropouts on the way up the mountain had been my interpreter, interrogation of Kosta was difficult, but I think he probably is 90 rather than 106. Whichever is correct, to be able to spend four months of the year bounding over the hillside from dawn till dusk in pursuit of his agile goats seemed incredible enough.

My own elation over getting up to the pasturelands was quelled when I was informed that the old man made the same trek in just half the time it had taken me.

Science Probes Genes for Answers

Most students of longevity are convinced of the importance of genetic factors. It has long been noted that very old individuals had parents who lived to be very old. This was strikingly brought out when I talked to the centenarians. Almost all had at least one parent or sibling who had lived for more than 100 years.

There is no known gene for longevity; there is only the absence of "bad" genes—those that increase the risk of fatal disease. Thus in a small, interrelated community like Vilcabamba it seemed possible that a few individuals lacking such genes might have been the progenitors of an isolated pocket of centenarians. The mountainous setting might have kept this genetic strain pure—and prevented the introduction of "bad" genes.

In Hunza one is dealing with a much larger population and territory. Again, however, the isolation has been extreme. Although the state of Nagir lies immediately adjacent to Hunza, there is virtually no intermarriage between the two peoples.

A careful study of the health and longevity of people in Nagir and comparison with the Hunzukuts would be invaluable. Since environmental influences would seem to be nearly identical, any significant differences might safely be attributed to genetic factors. Unfortunately, I did not have the time, the facilities, or permission to conduct such studies in Nagir. I was told repeatedly in Hunza, however, that the people of Nagir were not so long-lived as the Hunzukuts.

Driving through Nagir after leaving Hunza, I encountered only two 80-year-old men—and they and others repeated all that I had heard about the superior health and longevity of the Hunzukuts.

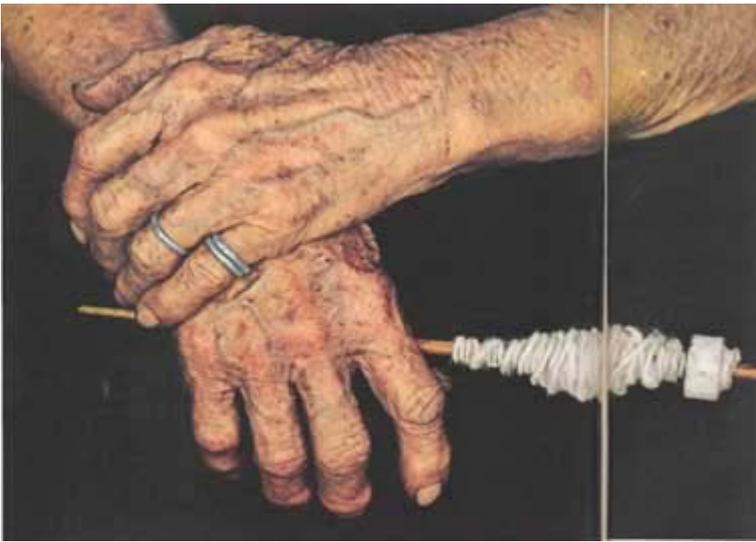
Interest in Opposite Sex Persists

In the Caucasus area, however, any notion of a pure genetic strain is promptly banished by the fact that one sees centenarians from so many different ethnic groups. I saw Georgians, Azerbaijanis, Russians, Georgian Jews, and Armenians all more than 100. Yet here, too, despite the diversity of ancestry, I found that most of the old people were born of long-lived parents.

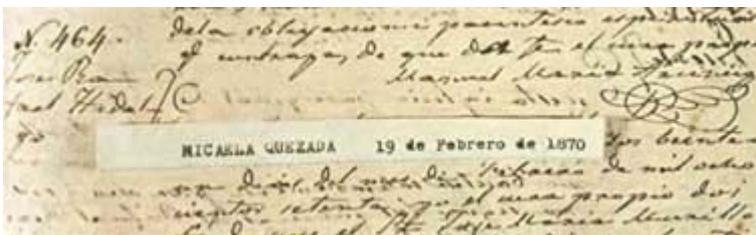
An active interest in the opposite sex is popularly regarded as the *sine qua non* of vigor and vitality. Although the ovaries of women do age and stop functioning at the menopause, usually in the late forties or early fifties, this has little effect on libido. In the male, too, aging is associated with a gradual decrease in the number of cells in the reproductive organs.

Still, sexual potency in the male may persist to advanced old age. In the United States, Herman Brotman of the Department of Health, Education and Welfare states that each year in America there are some 35,000 marriages of persons above age 64, and that "sex as well as companionship and economy are given as the reasons."

Miguel Carpio, age 123, the oldest citizen of Vilcabamba, smokes and drinks, and his daughter says that he still likes to flirt with the girls. According to her, "he was quite a ladies' man in his younger



Hands that toil and spin: Micaela Quezada, 102, gathers strands of sheep wool in front of her adobe house in Ecuador's Vilcabamba, a mountain village where 16.4 percent of the inhabitants are above the age of 60, in contrast to 4.6 percent for the rest of rural Ecuador. Senorita Quezada had a sister who died at 107 and 12 brothers who lived past 90. A baptismal record (**below**) verifies her own age. She does not drink or smoke, but smilingly confides that "I have to have my five cups of coffee each day."



days." Says he, "I can't see them too well anymore, but by feeling, I can tell if they are women or not." Then he laughs, happy at the reaction of his audience.

In the Caucasus I asked the old people to what age they thought youth extends. Gabriel Chapnian of Gulripshi, age 117, gave a typical response, "Youth normally extends up to the age of 80. I was still young then." The youngest age cited was 60.

Quada Jonashian, aged 110, also of Gulripshi, was embarrassed

at the question, since I was accompanied by a woman doctor from the regional health center. He thought "youth" meant engaging in sexual activity and admitted that he had considered himself a youth until "a dozen years ago."

Professor Pitzkhelauri has collected some figures relating marital status to longevity. He found from studies of 15,000 persons older than 80 that, with rare exceptions, only married people attain extreme age. Many elderly couples had been married 70, 80, or even 100 years. He concludes that marriage and a regular, prolonged sex life are very important to longevity.

Women who have many children tend to live longer. His figures showed that among the centenarians only 2.5 percent of marriages were childless, whereas 44 percent of the women had four to six children, 23 percent had only two or three children, 19 percent had seven to nine children and 5 percent had ten to fifteen. Several women had more than twenty children!

The importance of a happy marriage was emphasized by a 100-year-old Azerbaijani who had married his seventh wife only three years before. "My first six wives were all wonderful women," he reported, "but this present wife is an angry woman, and I have aged at least ten years since marrying her. If a man has a good and kind wife, he can easily live 100 years."

A striking feature common to all three cultures is the high social status of the aged. Each of the very elderly persons I saw lived with family and close relatives—often an extensive household—and occupied a central and privileged position within this group. The sense of family continuity is strong.

There is also a sense of usefulness. Even those well over 100 for the most part continue to perform essential duties and contribute to the economy of the community. These duties included weeding in the

fields, feeding the poultry, tending flocks, picking tea, washing the laundry, cleaning house, or caring for grandchildren, all on a regular daily basis.

In addition, the aged are esteemed for the wisdom that is thought to derive from long experience, and their word in the family group is generally law.

In Hunza this last point was evident even in the way the state is governed. The mir holds court daily at 10 a.m. with a council of elders. The council is comprised of some twenty wise old men of the state. They sit in a circle on carpets spread at the foot of the mir's wooden throne and listen to disputes among citizens and to other domestic problems. After a lively discussion (often marked by three or four elders talking simultaneously) with the mir presiding, a consensus is reached, and the mir announces his government's decision.

In none of the three communities is there any forced retirement age, and the elderly are not shelved, as occurs in most of our industrialized societies. Khfaf Lasuria, the former tea picker, had retired only two years before I met her. When I asked Seliac Butba, age 121, if he was helping in the construction of a new house springing up next to his own, he responded, "Of course, they can't do without me."

Temur Tarba, a vigorous horse-riding member of the collective farm at Duripshi, had celebrated his hundredth birthday just three weeks before my visit. He showed from his bearing and happy manner that he felt he had "arrived." A few years earlier he had been designated a "Hero of Labor"; he was awarded this high Soviet honor for his cultivation of corn.

He smoked a good deal while I talked to him, but he did not inhale. He devotes the mornings to picking tea and cultivating his garden. "It is best to be a youth," Temur states, "but I have good health, feel well, have wonderful children, and I enjoy myself greatly now." He paused a moment in thought, and then added, "Every day is a gift when you are over a hundred."

Death Stalks the No Longer Useful

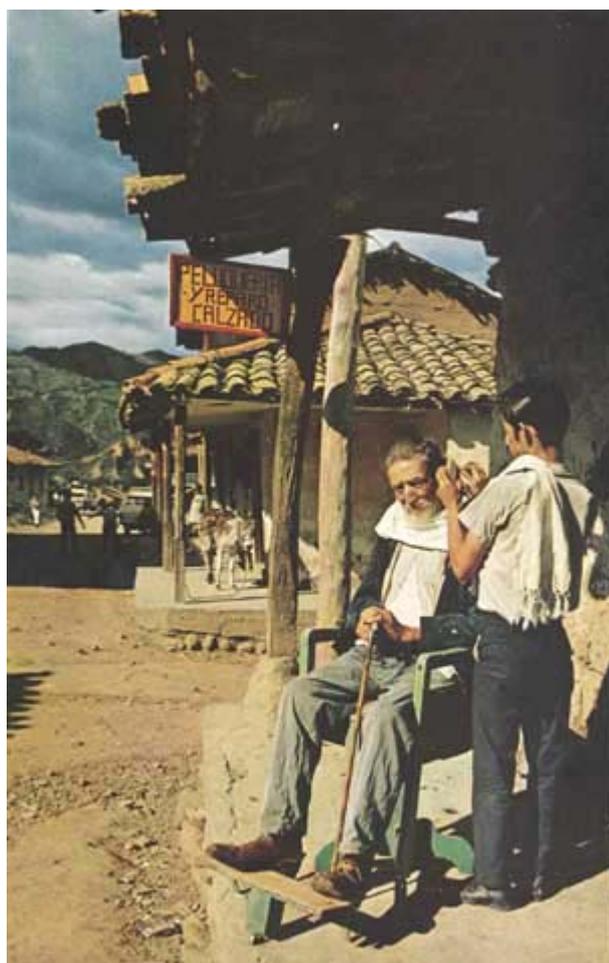
To sum up: Of the 15,000 persons above the age of 80 whom Professor Pitzkhelauri has studied, more than 70 percent continue to be very active and more than 60 percent are still working. They die quickly once they lose useful roles in the community.

Many of the centenarians emphasized the importance of being independent and free to do the things they enjoyed and wanted to do, and of maintaining a placid state of mind free from worry or emotional strain.

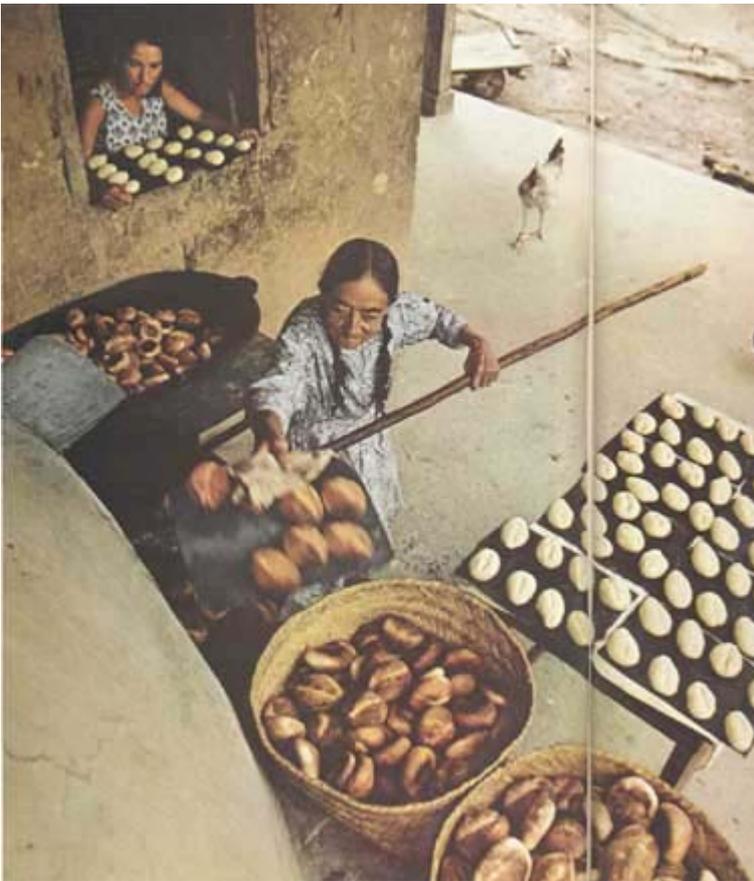
"Now everywhere people don't live so long because they don't live a free life," commented Sonia

Kvedzenia of Atara, age 109. "They worry more and don't do what they want." Gabriel Chapnian, 117, of Gulripshi expressed a similar thought when told that few Americans attain his age. His response: "Hmm . . . too literate!"

Expectation of longevity may also be important. In America the traditional life-span is three score and ten years. But when we asked the young people of Abkhazia how long they expected to live, they generally said, "To a hundred." Dr. Georgi Kaprashvili of Gulripshi confirmed that the public has the notion that the normal life-span of man is 100 years. For exaggeration when proposing toasts, they may say 300 years, but everyone expects to be 100. Are we in the United States perhaps a mortality-ridden society, programming our lives to a shorter existence?



"Oh, to be 108 again!" One of Vilcabamba's patriarchs at 123, Miguel Carpio sits for a haircut. Once a hunter who roamed steep Andean hills, Carpio retired from that arduous pursuit 50 years ago and took up farming. "I would not like to be young again," he said, "but if I could take 15 years from my age—wonderful!"



Spilling fresh-baked loaves into a basket, Hermelinda León, 95, labors at her job in a Vilcabamba bakery. She works here a day or two each week to earn a little money.

Active in her garden from first light till dusk on other days, she cultivates bananas and beans, ingredients for *repe*—a soup laced with white cheese, salt, and lard. Señora León does not own a clock, has never seen television, and scoffs at reports of men on the moon.

Unlike the Abkhazians and the Hunzukuts, most aged Vilcabambans find little joy at the peak of their long lives, which they regard as only a tedious circle of drudgery broken by religious ceremonies and an occasional fiesta. "Life has been hard," Señora León said. "I would not want to live it again."

Scientists Gather to Compare Notes

After my weeks in the Caucasus seeing the old people, I went to a scientific meeting in the city of Kiev in the Ukraine: the 9th International Congress of Gerontology. Students of gerontology from 41 countries were there—scientists, social workers, physicians, and other professionals interested in the understanding and care of the elderly. In all, they presented 553 reports during the week of meetings.

I came away with a feeling that very little that was said there bore much relation to the old people I had just seen. Yet there are many interesting studies in progress on the nature of the aging process and the problems of the elderly in society.

Basic questions about longevity are being raised and studied.

Is the aging process programmed initially into the genetic material of every cell? Or do, say, atmospheric or other noxious environmental factors damage the chromatin in the cell nucleus throughout life, so that eventually the genetic message gets so scrambled the cells no longer function normally?

Normal connective-tissue cells from human embryos, when transplanted and grown in tissue culture, have been found to divide some 50 times before they die. If the natural cell division is stopped at any point by freezing and then started again by thawing, the

cells will complete only the remainder of the 50 divisions and no more. This makes it seem likely that the limit of 50 divisions was programmed into the nuclear material of the original parent cell.

The relatively early senescence of the ovaries in women, which occurs at the menopause—often long before other cells and organs begin to fail—suggests that the ovary is responding to its own self-contained aging program. Is some critical organ of the body programmed as the pacemaker that sets the tempo of aging? While investigations and speculations seek an answer to this fundamental question, other scientists have noted that macromolecules—the very large molecules of proteins and nucleic acids—themselves undergo a process of aging. Collagen, the main protein of connective tissue, constitutes approximately 30 percent of all human protein. As we grow older, it undergoes a continuous spontaneous chemical change—"cross-linking"—that increases its rigidity and reduces its solubility. Such a stiffening of this important structural component of our bodies could in turn lead to rigidity of blood vessels, increased resistance to blood flow, reduced delivery of blood to nourish tissues through such hardened arteries. As a final consequence it could cause loss of cells and of function—the essence of aging.

New Theories of Aging Emerge

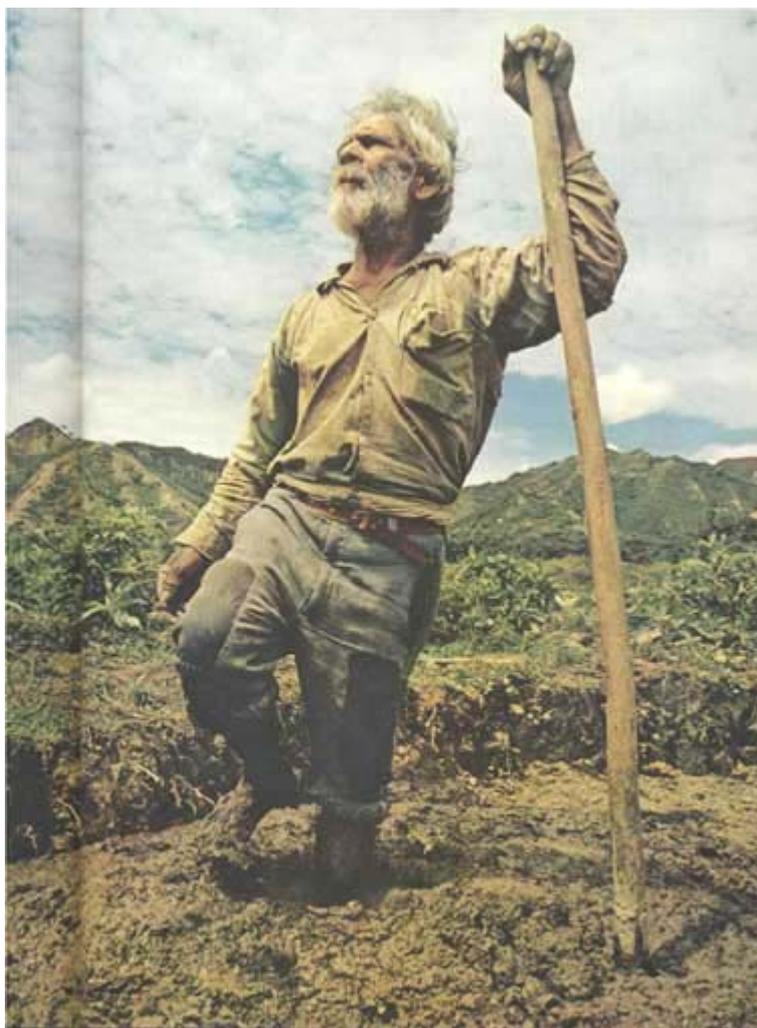
A new area in aging research appears to be opening up from studies of the so-called "immune system" of the body. This system provides antibodies against bacteria or foreign substances introduced into our bodies. It also maintains a surveillance function that recognizes and destroys abnormal or foreign cells. When these functions of the immune system diminish—as occurs with age—the antibodies formed may attack normal body cells and destroy them or reduce their function, possibly hastening the aging process.

Some researchers think rejuvenation of the immune system may be possible. However, the hope that some medicine will be discovered that will prevent aging seems very distant to me, certainly until the nature of this fundamental process is understood.

It is encouraging that more support for research is becoming available in several countries. In the United States, establishment of a National Institute on Aging seems imminent; it would give recognition to the importance of this field and impetus to further research.

As I listened to the learned papers and discussions at the Gerontology Congress, I often caught myself daydreaming about Abkhazia. I thought of the response of Kristina Azuba, age 110 years, when I asked her why she had lived in such good health for so long. "I can't explain in scientific terms," she said, "but there just seems to be something special in the life here." Her statement is a fair summary of my present understanding of the problem.

Or I would wonder about Markhti Tarkil, who walks half a mile downhill to his daily bath in the river and then climbs uphill again. Surely any day a man can do this he must be too fit to die. The next day he repeats this physical activity and so on, day after day while the years roll by, and at 104 Tarkil is still much too fit to die!



Sturdy as his staff, Jose Maria Roa, 87, slogs through the Ecuadorean ooze from which he makes adobe. Forty years at the task have deformed his feet but increased the ability of his heart to fuel his body with oxygen. Sedentary urbanites can do likewise, says Dr. Leaf, by a sustained regimen of running, swimming, or cycling. The doctor, aged 52, took up jogging when he returned home

