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INSTITUTE OF CURRENT WORLD AFFAIRS

WHM - 16
Quinua

Hotel Ferrocarril
Cuzco, Perú
August 17, 1955

Mr. Walter S. Rogers
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522 Fifth Avenue
New York 36, New York

Dear Mr. Rogers:

In the beginning was the potato. The Conquistadores discovered this odd, edible tuber and shipped it home to Spain, from which nation it spread through Europe and America to become an important item in the diets of millions of people from Idaho to Ireland. In the future, another food product may be added to Perú's list of gifts to world agriculture. The crop, a grain, is called quinua (also spelled quinoa), and its chief developer is Victor Aubert of Cuzco.

Last week I went to see Mr. Aubert. We talked about his work with the quinua plant and walked through his factory where the grain is processed and packaged. Aubert spent twelve years in Chicago and married an American. His English, needless to say is excellent - a lucky break for me when the conversation touched on such technical topics as genes and vitamins.

Quinua is native to Perú and Bolivia, Aubert told me. It is thought to have originated in the vast basin of Lake Titicaca. The plant is tall (up to 2.5 meters high), annual and herbaceous; from its thick single stem sprout several seed-loaded shoots. Growing in altitudes of from three to four thousand meters (roughly, from 10,000 to 13,000 feet) can withstand frosts, rains and dry periods which would kill other grains. Chief area of production in Perú is the Department of Puno. It is grown there as a secondary crop in the ancient system of rotation in which fields are first planted to potatoes, then quinua, then barley, and then allowed to rest for several years before the planting cycle begins again. So rich is the grain in minerals, carbohydrates and proteins that it has helped to sustain life in areas where milk and green vegetables are seldom included in the diet of the Indian families.

According to several historians, quinua was sacred to the Incas. To show his respect for its nutritive powers, the Inca himself would go to the fields on the first day of the planting and open the ceremonial furrow with a golden digging stick. The grain was sacrificed to the sun along with coca and the traditional organs of llamas.

Despite the fact that it was grown extensively throughout the altiplano, the changeover in agriculture introduced by the Spaniards caused an appreciable decrease in the quinua harvest. Wheat, coca and other crops were grown on land formerly planted to quinua and native grains like cañihua. In the four centuries since the

Conquest, the situation has been little improved; production figures for 1953 listed the quinua harvest at some 42,000 tons.

The grain is planted from September to November, the usual method of sowing being that of broadcasting the seed on the ground. Regular rows between ½ and 1 meter apart have been found to be the most efficient system, but seeds continue to be strewn on the ground in the old manner. If the soil is right (for quinua a loose soil rich in silicates, calcium, potassium and manganese is preferred, although the plant will grow in almost any soil) the seeds may germinate in as little as two days, although 8-10 days is the average time required. The plant matures in from five to seven months, depending upon the altitude and the variety of the quinua - there are over one hundred. It is then cut, placed in piles and left several days to dry in the sun. The reapers beat the individual stalks on the ground to release the tiny kernels, and thereby lose a large percentage of the grain. Winnowing and the washing operation are performed by hand; the washing is absolutely necessary, as the matured grain is covered with a husk which contains a high percentage of bitter substances which would render the kernel inedible if not removed. The bitter saponin can be removed after two or three thorough hand washings.

Aubert told me that quinua could never be grown in the coastal regions due to the lack of labor there. "Quinua harvesting requires an abundance of very cheap labor," he said. "The coast just cannot compete with the sierra when it comes to a cheap labor force."

Once washed, the quinua is used by the Indians as a rice or soup stock. Crushed grain is used to make a particularly tasty chicha, the leaves are eaten as a salad and the stalks are burned to produce the llipta or tocra - the lime which aids the coca-chewer to extract the alkaloids.

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Aubert and his protégé

Why has Mr. Aubert spent so many years of his life trying to develop quinua into a commercial crop instead of investigating the food crops already making money in the country? Because, says Aubert, quinua is one of the most nutritive grains yet discovered or produced by man. It far exceeds such cereals as wheat, rice and barley in protein and mineral content.[1] It is also easily digestible (the rate of digestion has been set at 15-18 minutes by one local chemist). Taking these facts into consideration, Aubert decided that commercialization of the plant would be a safe gamble.

Aubert's plans along these lines date from 1937. At that time he was manager of several flour mills in and around Cuzco. He designed his first quinua harvesting machine - to do away

1. See page 6

with the heavy loss of grain resulting from hand threshing - and devised a method of getting rid of the bitter saponin by means of a dry-washing process (water discolors the grain). His early experiments in the dry-washing field proved uncomfortable in the extreme; after each cleaning, the Aubert family developed what appeared to be severe chest colds - inflammations resulting from breathing the saponin-laden dust from the machines. Aubert invented an air-tight cleaner and went on to build his grinding and rolling mills. In one year a factory took shape in a two-storey adobe building next to his house. Today, although it is still in the experimental stage, that factory can turn out whole quinua grain and four other sub-products: rolled and rolled-toasted grain, toasted flour and a natural quinua flour which makes the wheat variety look like gravel in a comparison of texture.

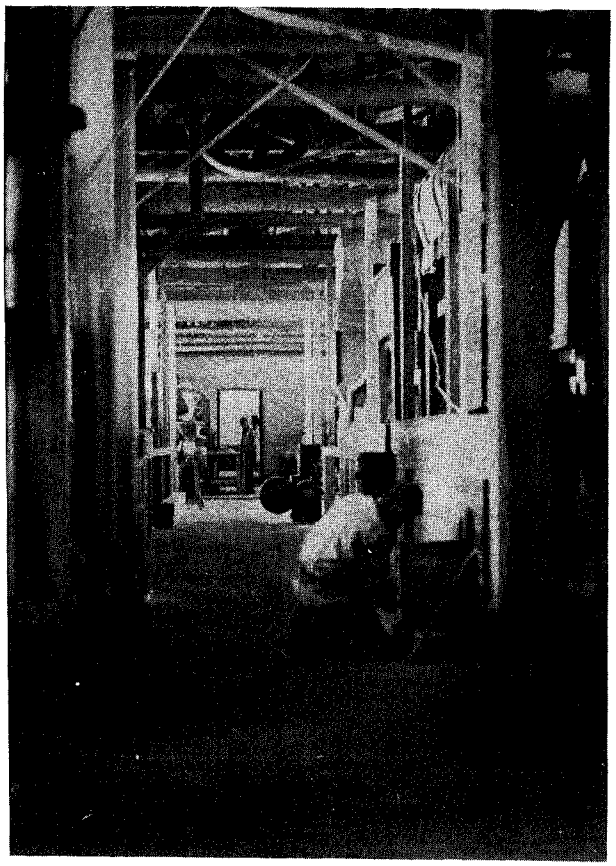
To stimulate production of quinua in the Cuzco region Aubert pays high prices for the raw product. A fanega (265 pounds) of barley brings about 70 soles on the open market, an equal amount of wheat 140. For one hundred pounds of quinua, however, Aubert will pay up to 100 soles - especially if the quinua happens to be of the Quinua Real or white variety, a type which contains less saponin than the others.

Further stimulus has recently been provided by the Peruvian Ministry of Agriculture, whose officers have urged Aubert to go on into large scale production as soon as possible. The Ministry is working on an advertising campaign to help sell the products nationally and is giving seeds to farmers in an effort to further increase production. A similar attempt to promote sales of quinua was made a few years ago, but it was badly organized and failed to bring home to the buying public the importance of quinua by demonstrating the nutritional powers of the grain. Aubert believes that the new campaign will be successful in spite of the social barrier it must break down.

Quinua sub-products. Clockwise from top: whole grain; rolled grain; toasted flour; rolled-toasted grain.

That social barrier may prove to be a tough one, if what I have observed in Arequipa and Lima holds true here. The gente of the coastal cities have an aversion toward anything that is connected with the Indian, be it language, customs or food. Since quinua is a grain consumed almost entirely by the Indian population, it may be very difficult to convince the proper housewife of Lima that she should buy it. It may take a very clever sales scheme to persuade the "decent people" that eating food prepared with quinua is not a socially degrading thing to do.

To help overcome this anti-indio prejudice in the coastal markets, Aubert plans to sell his products along what he calls "American" lines. The grain and flour will be packaged in attractive one-half kilo boxes, and selling will be preceded by high pressure promotion campaigns. Whole quinua grain will be sold in the



The factory

north and the fancy sub-products in the cities.

Waste material - a floury substance containing the bitter husks of the grain - has already found a steady market; Cuzco's chicha makers happily buy up all that Aubert can produce, for they have discovered a secret which is putting money in their pockets. It seems that when chicha made from this waste product is poured into a glass, it foams up to make a head that would put beer suds to shame. The chicha makers can charge the same amount for a glass half full of foam as they do for a mug full of the old, honest and non-foaming brew. Needless to say, they are delighted with the discovery.

The four sub-products of the whole quinua grain are modelled after existing food products, but differ from them in taste and potential uses. Rolled kernels are used to make cookies similar in appearance to oatmeal cookies and with a delicate nutty flavor; rolled-toasted kernels can be used as a breakfast food which surpasses Wheaties in what a Jack Armstrong announcer might term "rich energy goodness"; toasted flour makes a drink surprisingly like Ovaltine, and the ordinary flour may be used as a thickener in soups or mixed with wheat flour to make cakes and pastries. Mrs. Aubert has experimented with the various sub-products in her kitchen and has come up with results which make the mouth water. (There are some recipe books in print which devote a section to dishes made with quinua, but they are for the most part criollo cookbooks - strictly not for these gente decente who wish to appear above that sort of middle class cookery.)

Aubert realizes that an international market for his quinua is still a long way off. Current production could barely supply the demands of a national market. Several businessmen in the U.S. are interested in the future of the industry, and some have asked for quinua samples. However, as so often is the case when American business interest is aroused by some fledgling industry in this country, the number of pounds of samples requested came close to exceeding the total annual production. The point is, however, that there is a potential market for quinua products. When Aubert's factory starts rolling at full capacity, and when he is joined by other industrialists, the problem won't be one of looking for markets. Of that the Ministry of Agriculture is sure. The production problem will be that of finding enough quinua to fill the maws of the factory machines. Taking advantage of Aubert's high prices, farmers are sowing more and more land in quinua. National production must soar, however, if it is to supply a constant and adequate supply of the grain to the

factories of the future.

Last month President Manuel Odría showed what he thought of Victor Aubert's efforts to develop quinua. At the agricultural fair held in honor of Cuzco Week, an extremely important roundup of dairy and farm products from regions all over the sierra, Aubert was presented with the Presidential Cup and a diploma - tokens of the Government's great interest in the project of setting the quinua plant in the footsteps of the potato.

Sincerely,

William H. MacLeish

William H. MacLeish

A Translation of part of a brochure written by Victor Aubert's son, Victor, in connection with his thesis on quinua which he will present to the University of Cuzco authorities in the near future.

THE NUTRITIVE AND INDUSTRIAL VALUE OF QUINUA

1. One may appreciate the great value of Quinua by studying the following analysis of the grain distributed by the U.S. Department of Agriculture:

Total humidity	8.83%
Ash or mineral matter	3.43%
Fatty substances	7.68%
Proteins	15.60%
Carbohydrates	62.35%
Cellulose	2.60%

2. Mintzner's analysis of quinua ashes gives an idea of its high mineral content:

Phosporic acid	39.0%
Silicic acid	2.2%
Sulfuric acid	3.3%
Sodium chloride	1.3%
Potassium	36.7%
Calcium	4.4%
Magnesium	11.6%
Iron oxide	1.8%

3. The Nutritious value of quinua as compared with those of the principal cereals:

PER EACH 100 GRAMS OF WEIGHT

NUTRIMENT	RICE	MAIZ	WHEAT	QUINUA
Water gr.	36.6	17.2	16.5	12.0
Calories	253	335	328	353
Proteins gr.	5.9	8.4	9.2	10.7
Fats gr.	----	.3	1.5	5.7
Carbohydrates gr.	56.5	72.9	71.6	69.2
Fibre gr.	1.2	3.8	3.0	4.3
Ash gr.	1.0	1.2	1.1	3.2
Calcium mgr.	8	6	36	141
Phosphorus mgr.	143	267	324	449
Carotene mgr.	----	0.2	----	----
Iron mgr.	----	3.7	4.6	6.6
Thiamin mgr.	.11	.30	.30	.32
Riboflavin mgr.	.08	.16	.08	.20
Niacin mgr.	3.30	3.25	2.85	1.60

4. Analyses concerned with the industrial point of view clearly show the multiple uses of Quinua and its derivatives.

An analysis by Dr. Wolker produced the following results:

Starch	38.72%
Sugar	5.12%
Gum	3.94%
Fatty materials	4.18%
Casein and albumin	7.47%
Gluten	11.71%
Woody fibres	7.90%
Mineral compounds	4.32%
Water	16.01%

5. The comparison between bread made of Quinua and that made of wheat (white bread) gives the following results:

	WHITE BREAD	QUINUA BREAD
Carbohydrates	60%	56%
Proteins	10%	22%
Fats	2%	4%