

Possibilities of Livestock Farming in the Philippines

Vicente Araneta

NATION'S NEED FOR MILK

It is a common idea that tropical climate has deleterious effect on the health, stature and working energy of the people. This has always been said about us, the Filipino as a whole. If one delves into history, he will notice that there are certain races in the tropics that are more vigorous, better built, and longer lived than are other people in the same zone. We know for example, that Arabia is an inferno, considerably worse with respect to temperature than our Philippines — but the Arabs now and as far as observed have always enjoyed a most excellent physique coupled with an enviable energy. Napoleon's surgeon general, on the great commander's Egyptian campaign described these lean, sinewy hawks of the desert as more perfect in physical structure than most Europeans. The Arabs feel that it is *milk* which contributes to their fortunate health for the fare of their pastoral people is mostly milk, supplemented with only moderate amounts of meat, cereals, and dates. The milk is that of goats, camels and sheep and because of the intense heat is soured at once and eaten in the form of curds.

A British scientist in India, Dr. D. McCay, has found that the pastoral Indians of the few good dairy regions of that country are always vastly superior to the more numerous natives who live only on cereals.

In the early years of this century Prof. Eli Metchnikoff, famed bacteriologist who wrote on the prolongation of life, decided that one of the principal ways to increase longevity was the consumption in quantities of an organism which soured milk, called *Bacillus bulgaricus* as he had ob-

served that longevity was a characteristic in numerous places where soured milk formed the "piece de resistance" of the diet. The particular microbe which is effective in the intestinal tract as known today by science however is not the *bulgaricus* but the *Acidophilus bacillus*, and from the evidence at hand today, the explanation observed by Metchnikoff on the long lives could be attributed not so much to the bacillus which sours milk as to the beneficial effect of milk itself. Scientists have proclaimed *milk* as *the most nearly perfect of human foods* for it is the only single article of diet which contains practically all the elements necessary to sustain and nourish the human system.

That milk is an essential food in the diet of all people is therefore an established fact. That this essential food is not available to most of our city people and particularly to the working class because of the high cost of milk is wellknown to us. In fact it is a problem which the nutrition committee of the National Research Council would like to solve. Because of the absence of a dairy industry in the Islands, the problem of malnutrition sadly extends even to our agricultural districts because whatever small quantity of milk is produced by the milking fauna of the villages is sold to increase the scanty revenue of the poor farmers. The absence of milk in the most economical fare contributes to the high incidence of tuberculosis in the Islands, as well as to the poor constitution of most Filipinos.

Various plans have been suggested for the development of the dairy industry in the Islands. There are those who proposed the development of the industry through selection and propagation of the "caraballa"; others insist on the necessity of developing a cattle breed for the Philippines that will stand the tropical climate and pro-

duce plenty of milk without the necessity of giving the cow the customary care and feed she gets in temperate countries where dairy farming is so highly developed. A third proposition is to expand dairying on the limited merits of the Scindi breed which has already been tried in the Islands.

A number of years before the war, these three plans were often the topic of discussion among experts in animal husbandry of the National Research Council, Bureau of Animal Industry, and the College of Agriculture. If positive steps have not as yet been taken by the different agencies concerned, it is very likely that such hesitation was due to the following hazards:

1. It is so difficult to find good milking carabaos and even if selection is made of the best available females the process of breed improvement will take scores of years.
2. The formation of a new breed will likewise require the same length of time that the carabao proposition will require, if not more.
3. With Red Scindis we will not only have the difficulty in finding sufficient number of cows to develop dairy farming at as good a pace as the nation's need for milk demands, but will also find that with her low production milk will not be produced economically.

The above mentioned drawbacks, without mentioning others related to the three plans are really not trivial; it is now therefore in order for us to discuss a fourth proposition — *the utilization of western breeds of dairy cattle in an up-grading program, in order to speedily develop dairy farming which is so imperatively required by the nation to feed its people sufficiently with milk as early as possible.*

If dairy cattle from temperate countries have not won favor with our animal husbandmen, the reason undoubtedly is the belief that agencies such as climate, parasites, lack of adequate feeds and epidemic diseases, make impossible the acclimatization of these breeds in the Islands. Among all these factors, there is only one which in the opinion of the writer could constitute a serious hazard — epidemic diseases, such as rinderpest, anthrax, and foot and mouth disease. We know however, that our laboratories have developed adequate vaccines to immunize cattle against the first two mentioned diseases; while foot and mouth does not cause a high mortality rate, and can be controlled by suitable measures as adequate fences and care by attendants from going to infected farms.

Though I do not pretend knowledge on the matter, the next chapter "PROPER NUTRITION-THE SOLUTION TO ACCLIMATIZATION" is a strong opinion which I have from years of experience in the care and feeding of Jerseys and Holsteins at the Hacarin farm. In it is discussed where the mistake was, in all previous attempts to acclimatize breeds from temperate climate.

The present time is a particularly interesting one in which to consider a program for developing dairy farming in the Philippines, if it is desired to make the country self-sufficient in dairy products. If it is the program of the government to industrialize for self-sufficiency, the dairy industry should stand paramount among the different industries which should be developed, because an annual drain from the Nation's wealth of P9,000,000.00 caused by the importation of dairy products, should be of great concern to our leaders.

If we in the Philippines should ever consume milk at par with the per capita consumption of leading countries of the world, for a population of eighteen million the dairy industry may mean a total annual output valued at no less than P300,000,000.

In order to get a fair view of the status of the importations of dairy products, a detail is here copied from available statistics for the years 1939 and 1940.

FARMING AND COOPERATIVES



(USIS cut)

Prize-winning Holstein calves raised by a U. S. boy. It requires education and patience to raise livestock but if our ex-servicemen will go into it with heart and soul, they are as competent as this U. S. boy.

	1940		1939	
	Kilos	Value	Kilos	Value
BUTTER		P 636,260		P 649,385
Fresh	566,260	556,487	505,346	518,057
Canned	64,204	79,773	107,587	131,328
CHEESE	372,981	264,530	555,664	384,989
MILK		P8,384,715		P7,667,600
Buttermilk	30,476	6,352	24,150	8,146
Fresh, Nat.	410,768	116,390	994,517	254,066
Evaporated	16,522,041	5,102,239	14,906,890	4,300,490
Condensed	6,377,858	2,626,530	6,448,937	2,610,919
Malted milk	129,418	166,169	139,281	201,699
Compounds, etc.	5,172	3,115	4,687	4,670
Powdered	471,791	363,920	423,764	287,610
TOTAL VAL. OF IMPORTS		P9,285,511		P8,701,974

Some 25,000 dairy cattle will be required to produce the raw milk necessary to have the above listed products in the quantities imported. In developing the industry our goal should not exclusively be, that of curtailing all importation of milk, but should at the very least aim to make possible for every Filipino to consume an average of half pint of milk daily, in which case 900,000 milking cows would be necessary. At this stage, we can understand how extensive our dairy industry would be if we realize that two hectares would have to be dedicated to produce all the concentrates and the roughage

necessary to feed each cow. This indeed would be a blessing to Philippine agriculture for we know that dairy farming will then play an important role in the conservation of the fertility of our soil.

The grain yield of every acre of the agricultural lands of Denmark, England, Germany, the United States and other countries where dairy farming has been followed for a period of years has materially increased during the past fifty years. Dairy farms where legumes are the staple crops, do not suffer as the soil is not depleted of nitrogen even if hay crops or seeds are sold. On the contrary,

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Possibilities . . .

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due to the accumulation of nitrogen from the air into the roots, this important element is increased in the soil when the crops are grown. And when we consider that with the establishment of permanent pastures not only will erosion be controlled but will also make possible the saving of as much as 70% of the manure voided by dairy cattle, we can realize the important role that dairy farming will play in our agriculture with all the manure returned to the soil.

The cattle population of this country according to the 1939 census was only 1,168,190 head, an increase of only 60,396 head in eleven years. Considering that the per capita consumption of beef in the Philippines is only 1.46 kilo per annum compared with such countries as Argentina, Australia, Canada, United States, and the British Isles where the per capita consumption per year is respectively, 76, 72, 33, 30 and 29 kilos, we can assume that our cattle industry needs a certain impetus to bring about, at least a satisfactory progress. Could it be that the cattle in the markets are so degenerated and underweight that profits of cattle raisers are not encouraging enough? Perhaps it is a question of better blood and better pastures.

Our interest in the beef cattle industry of the Islands lies in the plan to use its cows in the dairy upgrading program for producing the bulk of our future milk producers. Along with this upgrading plan, there must be an extensive development of permanent pastures. These programs properly coordinated will result in a greatly improved steer for the beef market, and a heifer that on an average will easily produce 5 quarts daily in the first cross and as much as 9 quarts in the second generation, (3/4 improved blood).

We now see how vital it is for the Commonwealth, for our people's nutrition, not only because of its milk requirements but also its beef supply that the importation of western breeds of dairy cattle be adopted, so as to speedily develop the dairy and beef industries in the shortest possible time.

In the following chapters, the writer exposes his happy success with imported dairy cattle, in the hope that the Commonwealth will take advantage of his pioneering work, and further suggests ways for developing dairy farming into a nation-wide industry.

"The former assumption that in the practical feeding of people and of farm animals all this can be safely left to chance is not correct... different food materials differ greatly in the absolute and relative abundance of the different elements."
—DR. H. C. SHERMAN, COLUMBIA UNIVERSITY.

"Minerals affect the normal body processes in many ways. It is extremely difficult even for the scientist to predict in just what direction the failure to supply feed with adequate mineral content will first show itself and how extensive the supply may cause stunted growth, damage will be. An inadequate anemia, udder troubles, bloody milk, brittle bones, goitre and any one of a score of body ailments that depend for correction upon restoring the mineral intake."—from "THE NEW WAY TO FEED MINERALS."

PROPER NUTRITION—THE SOLUTION TO ACCLIMATIZATION

The solution to the problem of acclimatization of imported livestock from temperate climate countries lies in *proper and adequate nutrition*. Perhaps, the simplest of all livestock undertakings is beef cattle raising. Unlike dairy cows and poultry, beef cattle do not produce any food during their life-time so we can well say that everything consumed by them is purely for growth, maintenance and the development of the fetus in cases of pregnant cows. It is this fact that has made most of our cattlemen embark in the easy going and awaiting enterprise of stock ranching or shall I say "cogon digging?" Contrary to this "cogon digging" enterprise, the progressive practice in beef cattle raising in the United States, Argentina, Australia, and other agriculturally advanced countries presupposes the planning and development of pastures that will supply roughage even in the dry months of the year. It is not, as practiced in this country, of letting the cattle eat up all the cogon during the rainy months while they are left to starve after all the grass is consumed during the dry months.

In the rural economy of the largely agricultural countries, the development of pastures is an essential tool to profitable livestock farming. The variety of grasses sown makes possible a grazing season which extends even to the end of the dry season. Alfalfa's wonderful drought resisting properties have attained for it a prominent place in pasture development.

While we know that our pastures have not had the benefits of Alfalfa, now we also have scientific proofs of the following facts about pastures and other crops intended for roughages which were not taken into account when the various attempts to acclimatize cattle from temperate countries were made with discouraging results:

1. Stage of growth determines the protein and mineral contents of the herbage.
2. Matured pastures is less palatable than when cut monthly or bimonthly.
3. Low mineral contents of the feed is traceable from the condition of the soil and deficiency of minerals under range conditions is associated with low protein intake.
4. Carotene attains its maximum value just before the beginning of flowering: it is also found to be high at the beginning of summer and lower during the hottest part of the season; while proper and adequate fertilization of the soil increases the carotene in plants.
5. Grasses in temperate countries are comparatively richer in nitrogen and minerals than those found in the tropics, because the cooler weather causes a slower rate of maturation thus giving more time to secure the necessary substances from the soil.
6. Plants take up less calcium and phosphorus during severe drought; but when mineral matter in the soil is high, pastures remain greener longer during drought.
7. Absorption of minerals is more or less influenced by the amount of rainfall; the increase in moisture as in the case of greater rainfall im-

proves the condition of the growing vegetation but calcium absorption is adversely affected.

8. The phosphorus content of both legumes and non-legumes is dependent on the phosphorus content of the soil upon which they are grown.
9. Regardless of the species or the fertility of the soil, young pastures grass contains more of both calcium and phosphorus than do mature plants.

Without a knowledge of the above mentioned facts, we will easily understand why the Herefords which the government imported in the year 1920 made the poor showing described by Gonzalez:

"As a rule, the Philippine environment presented combined factors which were detrimental to the well being of the Herefords kept on open range. Not one treatment or agency such as food, temperature, humidity, insect bites and the like could be singled out as being responsible for the rapid dying of practically all the Herefords that were found to reduce in flesh gradually even when additional grain feed was supplemented to their pasture allowance. The coat became rough and dull and the skin pale and unhealthy. The animals looked dejected and at midday they panted even under shade and were listless. Apparently much relief was afforded if they could wade in the mud; if possible, they congregated in such places in the daytime. During the fly season, the tender parts of the hoofs became badly punctured by maggots which had hatched from eggs laid therein. If maggots were not removed in due time and the sores properly treated, subsequent infection and lameness of the feet affected would ultimately cause the death of the animal. Reproduction went on fairly well but a number of young were either weak or born dead. Those that survived became stunted thus failing to reach normal size at maturity." (1926 — Proceedings of the Third Pan-Pacific Science Congress, Tokyo: 1142-1150)

These observations were identical to those observed by our writer during the first years of the Haccarin farm and besides, sterility was common in our milking herd. That reproduction in the Herefords went on fairly well is explainable since beef cattle do not have the drain upon their system to the extent that dairy cattle

have, to produce their daily milk. The poor result with the calf crop however, demonstrates deficiency in absorption of the essential minerals such as calcium, phosphorus, iodine, potassium and many others. It should be of interest to livestock men to know that this condition is not peculiar to the tropical countries, as it is not caused by warm and humid weather as is supposed by those who claim, that adapting cattle from temperate climate countries into the Philippines is futile. As evidence there are thousands of cows in the United States and other temperate countries which still show this same condition which is known to be caused by the lack of minerals in the animal's organism.

While it must be admitted here, that the facts now known about the behavior of the different elements in herbage under different conditions were not perfectly known to the writer, continuous observation made evident that mineral deficiency was causing all the trouble in the herd. Inasmuch as facilities were not available to analyze all feeds and our farms' soil to make feeding more scientific, we introduced Man-A-Mar in the ration of our cows. Altho at that time it was the opinion among some livestock authorities that Man-A-Mar was nothing more than a product backed by plenty of advertising, the writer felt that a product which originated from the bottom of the sea would naturally contain a saturation of organic minerals which the cows could easily assimilate. After a few months trial, we doubted that Man-A-Mar would solve our troubles, but luckily, we discovered that not enough was being added. Man-A-Mar was made 10% of the ration for 4 months, and this later reduced to 5% when our cows began improving in health. This experience, also shows the necessity of studying the feeding methods of the herds in which the cattle to be imported from are raised. For a cow raised with deficiency in minerals, may not show signs of this deficiency upon arriving in this country, but will fall an easy prey to the process of acclimatization.

Even in temperate countries, where science is more advanced,

compared to what we know here about livestock raising, there still are cows that "reduce in flesh gradually even when additional grain feed was supplemented to their pasture allowance. The coat became rough and dull and the skin pale and unhealthy." If "the animals looked dejected and at midday panted even under shade and were listless" it was just the effect of the unthrifty condition of the animals which becomes pronounced with the heat of the day. This is why in temperate climate, panting is not so noticeable or not noticed at all. That these cows cannot resist the temperature and humidity of the lowlands is not correct, because the Haccarin farm had a good number of cows which did not show any signs of panting even under the sun at midday while they grazed in a succulent pasture. The reason for this encouraging condition of the cows undoubtedly was *proper and adequate nutrition* in spite of the tropical climate.

The three agencies responsible for the unsuccessful attempts of acclimatization of cattle from temperate zones, according to the skeptics who claim that further experimentation on this matter is unnecessary, are the following: climate (temperature and humidity), diseases and nutrition.

Further proof in favor of our climate being satisfactory, if proper nutrition is being maintained was gathered in my observations on the different importations of cattle which usually were small in number. As was natural, the first importations of Holsteins were from California where the climate is not too cold. The largest number of these cows came from a particular farm which sent cows, that were good producers but which lost condition after a few months of production. These not only decreased in production but also became unthrifty and finally died. Another farm also in California shipped cows whose productions were not as good but maintained condition for a longer time. Later, offers were received of cows from farms in the Northwestern states which were of better breeding. Most of these cows proved to be better producers than those received from California,

and as time went on and more cows were imported, it was noticed that animals of a particular farm maintained better conditions more easily. From this experience, it became apparent that the warmer climate of California was no benefit to acclimatization of the cattle in the Philippines. By this time also, our observations had convinced us of the necessity of supplying minerals which as Mark H. Keeney puts it in his "COW-PHILOSOPHY" are the spark of life—vital and all essential. He continues: "Absence of minerals, or lack of proper amount and character, may prohibit or greatly retard many body functions. Their importance in nutrition extends far beyond their function of building bone. They are the activating property of many of the glands and of the digestive juices, and they are the stabilizers of the body fluids. Their functions are often closely interwoven with those of the vitamins, and while there is much to be learned of both the mineral and vitamin subjects as they relate to the practical feeding of dairy cow, yet the more advanced knowledge of nutrition emphasizes the importance of minerals." This likewise leads us to the conclusion that it was the care given to the feeding of the growing heifer, which would determine the ability of the imported cow to thrive in the Philippines. These imported cows can thrive in this country provided intelligent care is given and the feeds the animals receive contain the necessary constituents of proteins, fats, and carbohydrates with ample amounts of vitamins and all the major as well as minor minerals.

That the acclimatization of cows from temperate countries has been solved, is proven by the number of cows which have been maintained at the Hacarin Farm on the

scanty concentrates available during the three years of war while the cattle pastured all day long in well drained pastures containing only a fair amount of roughage. Here the cows braved both rain and the midday sun without suffering any ill effects. Except for a few cases of Texas fever caused by ticks, which the absence of ingredients to make the dipping solution made control of the ticks impossible, we had very few diseases. Foot rot was not observed and sterility cases became rare. When the cows were unthrifty, the cure of most diseases was difficult if not impossible, but once the problem of nutrition had been solved, diseases were reduced in kind and frequency and cures were effected more easily.

A lone Jersey cow, born and raised at the Hacarin farm which

the writer was able to keep for himself in Manila, after the Japanese forces occupied the farm, never suffered from any ailment from April 1944, when the cow was brought from the farm. In October of the same year she calved a heifer calf, expelling her placenta one hour after freshening. The interesting fact about this calving is that it came only ten months after her previous one. This regularity in breeding only comes when the cows are in perfect health. If one realizes that the production of this particular Jersey with the limited variety of concentrates (rice bran and copra meal) and grass was over eleven liters a day for the first four months of her lactation or until she was burned in the Ateneo, there should be sufficient grounds to assert that dairying in the Phil-

IMPORTED:

Lovely Girl.....	365 days - 13,932 lbs as 1st calver
	365 days - 15,000 lbs as 2nd calver
Happy Girl.....	365 days - 13,631 lbs as 1st calver
	273 days - 11,422 lbs as 2nd calver
Pleasant Girl.....	365 days - 13,087 lbs as 1st calver
	335 days - 12,241 lbs. as 2nd calver
	(Little improvement on second lactation as she was dry only 12 days between lactations)
Lonely Girl.....	300 days 10,287 lbs as 1st calver
	365 days 10,832 lbs as 2nd calver
	(Lower production on second lactation as she was only 7 days dry between lactation)
Glenciff Segis Maid.....	365 days 11,334.5 lbs as 1st calver
	365 days 9,386 lbs as 2nd calver
	(Lower production on second lactation as she was only 15 days dry between lactations)
Carnation Ella Sensation....	365 days 11,275 lbs as 1st calver
	273 days 10,272 lbs as 2nd calver
	(No improvement on the second lactation as she was only 24 days dry between lactations)

GENERATION:

Nellie Entranbelle Carmelita.....	305 days 5,473.5 lbs as 1st calver
	365 days 12,598.5 lbs as 2nd calver
Liberty Export Carmelita.....	365 days 7,109.8 lbs as 1st calver
	365 days 12,419 lbs as 2nd calver
Evelyn Carmelita.....	365 days 10,648 lbs as 1st calver
Miriam Carmelita.....	265 days 7,906 lbs as 1st calver

SECOND GENERATION

Hacarin Estate Vina.....	365 days 8,479.5 lbs as 1st calver
	365 days 9,664 lbs as 2nd calver
Liwayway Hacarin Export.....	305 days 7,936.5 lbs as 1st calver
Gaynor Hacarin Best.....	335 days 8,362 lbs as 1st calver
White Hacarin Beauty.....	365 days 7,122.5 lbs as 1st calver

ippines can be made a profitable industry for all the farmers in the nation.

Records still available, show that in 1938 a herd of 43 cows, (14 Jerseys and 29 Holsteins) in the Hacarin farm had an average production of 7,227.96 lbs. per cow in 365 days or over 9 quarts of milk daily. The Lugo farm in Cebu reported to have attained an average production of 7,749 lbs.

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for a period of 300 days from a herd of 11 Holstein cows, or over 12 quarts a day. Before the war, a few Holsteins made some outstanding records that these should be mentioned here.

(See table on page 34)

While records of the imported stock from which came the first and second generation heifers reported here are not available, because these have been lost, it should be observed that the group of heifers with the suffix "GIRL" have all come from the same farm in a Northwestern State after we were able to determine among the different shipments, which of the farms sent the best animals. The lower production of our first and second generation heifers should not be compared in anyway to the "GIRL" group. This much can be said, — our first and second generation heifers were producing at least as much as their dams and positively more than any of the imported stock we have received from different farms in the United States and Australia. It should be borne in mind that the production averages were made under conditions that were not as adequate as we now would like their pastures and concentrate feeds to be.

The late Prof. Clarence H. Eccles, when interrogated by the writer in 1932 if he thought that the Holstein breed would thrive in the Philippines, answered "I see no reason why the Holstein breed will not thrive in your country, if properly attended and adequately fed, when in Cuba where the climate is very similar to that of your Philippines, Holsteins are doing wonderfully." We also have the authority of Prof. F. B. Morrison, who in March 1937 stated while visiting the Islands, "that he could not concede it was not possible to adapt some dairy breeds of cattle from America in certain regions of the country." With these authoritative statements and the successful experiences at Lugo Farm in Cebu with Holstein cows and with the Jersey and Holstein breeds at the Hacarín Farm, there is every reason to assure that dairying can be converted into a nationwide industry, if pastures are properly developed, and nutrition given the importance it should occupy in all herds.

In his article "Acclimatization FARMING AND COOPERATIVES

of Foreign Livestock a Problem", Manresa cites Sir Arthur Olver, animal husbandry expert of the Imperial Council of Agricultural Research in India as saying about cattle — "European breeds have proved generally unable, even under the best conditions, to maintain themselves satisfactorily within the tropics. This general principle has been found to apply in the case of milk goats also, but in the case of poultry, imported European breeds thrive well and seem on the whole to be less susceptible to diseases than ordinary village fowl". This statement, well studied undoubtedly implies that once proper care and feeding of imported poultry was solved, acclimatization of imported poultry was also solved. The term "under the best conditions" is very elastic and in this particular case, we know that it is limited to the amount of knowledge on care and feeding of cattle obtainable in India at the time Sir Olver made his observation. In this country too, there was one time when many of our experts in animal husbandry would not concede that the Leghorn and other imported poultry would do better than the Cantonese or the native fowl. But this was during those days when poultrymen insisted on feeding the imported bird with not much more than what the native fowl was consuming. With our success in rearing Leghorns and R. I. Reds as well as various breeds of imported hogs from temperate countries, it is not obvious to the livestockman after the achievement in complete acclimatization of the Jersey and Holstein breeds by the Hacarín farm, that proper nutrition in the solution to the acclimatization of imported cattle. In view of the high production at-

tained in both the Hacarín and Lugo farms in Bulacán and Cebu respectively, it seems logical to conclude that dairy farming can be a profitable and nationwide agricultural industry.

Before closing this chapter, may I refer to a cattle disease, which for years was a problem in different districts in the United States and Australia. Cattle apparently being fed with good quality hay and grains would develop these symptoms — general emaciation, incoordination in gait, and depraved appetite. This condition is termed "salt sick" in Florida, "neck ail" in Massachusetts and "coastal disease" in South Australia. Research has found that cobalt deficiency of the soil in which the hay and grain are grown is the cause of this disease. This is only one of the several diseases attributed to mineral deficiency. In the Philippines, there is a mistaken idea, that osteoporosis for which calcium therapy is indicated, is the only serious disease caused by mineral deficiency. Science however, has shown that there are almost as many diseases caused by mineral deficiency today, as there are kinds of minerals.

It should be natural to understand, that to avoid difficulties in acclimatization, imported cattle must be fed sufficient minerals of the varieties known by science as necessary for development, maintenance and the production of milk. Proteins, fats and carbohydrates with ample amounts of all vitamins must also be supplied. Be sure to attend to this first, and nature will take care of acclimatizing the cattle, if we give them access to good and ample pasture with some shade, plus common sense management.

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