Agrobarealis

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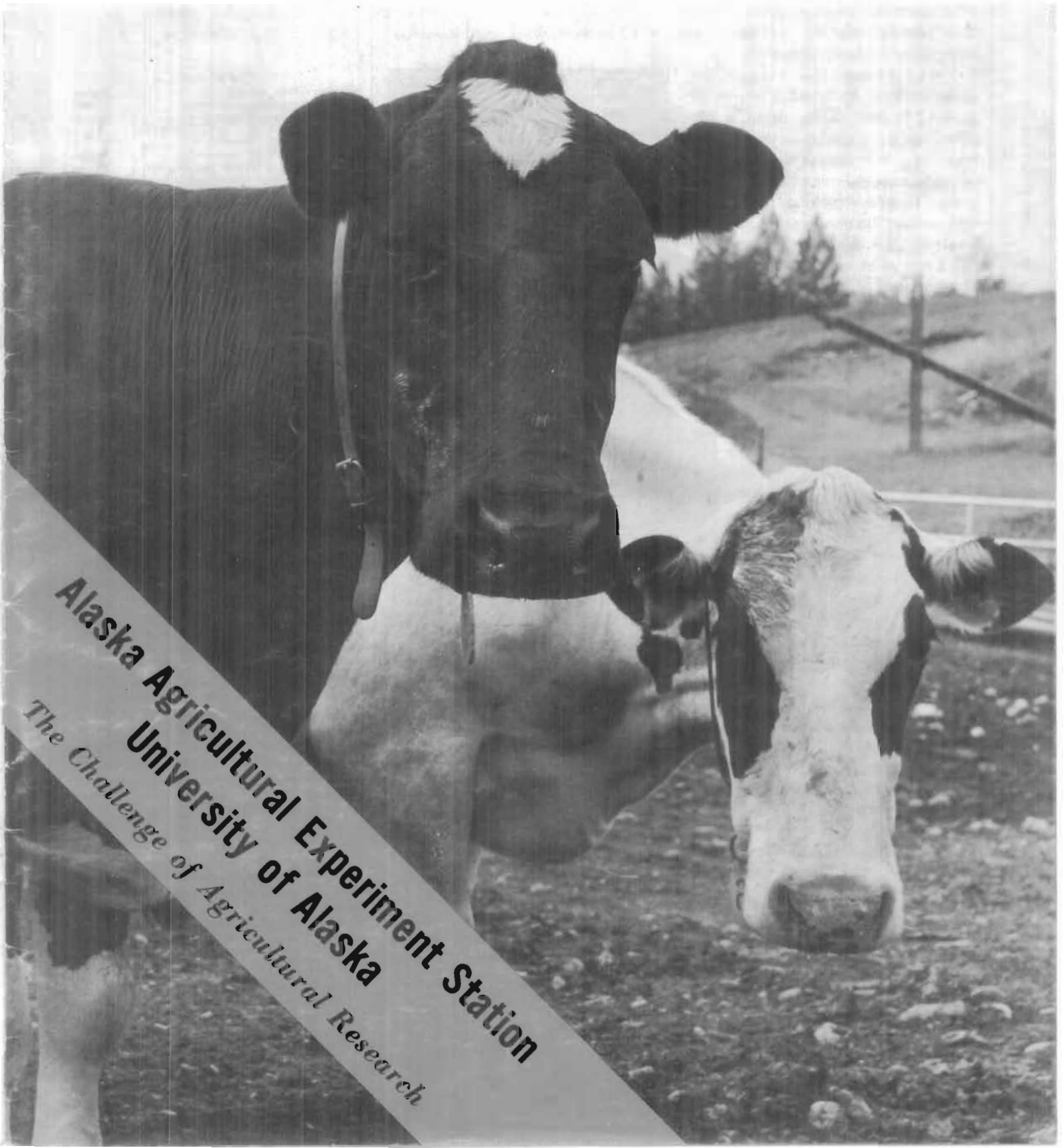

Alaska Agricultural Experiment Station
University of Alaska

The Challenge of Agricultural Research

from the

Director's Desk . . .

The first issue of *Agroborealis* focused attention on the Experiment Station as we attempted to give you an idea of what we are doing now. This time we'd like to take a look into the future of agriculture itself and to indicate what we think we could do to aid in its development. What crops could be grown here profitably? What quantities could we produce? How much of this could we use in Alaska? Is there a chance that we could export some of it? In short, what could agriculture mean to the economy of Alaska?

Director Horace F. Drury

Everyone knows that Alaska is not an agricultural state. As a source of income, farming is way down at the bottom of the list. And yet we who live here know that ours is not a land of permanent ice and snow. We know that grasses, flowers, vegetables, berries, and wild animals flourish here. Most of us have seen sleek dairy cows in the fields and a few of us know about the herds of beef cattle and flocks of sheep that graze almost unattended in some parts of the state. Why hasn't agriculture taken hold in Alaska?

What would you think of a family that lived in a house with no indoor plumbing, no telephone, no electricity, no refrigerator, no TV? That wore homemade clothing, had no car, no insurance, no retirement, no access to a hospital? That expected to pay the doctor with a sack of potatoes and was satisfied to limit its children's schooling to reading, writing and arithmetic? For three centuries that was the American way of life for homesteaders. They had warm, comfortable houses, serviceable if unstylish clothing, all the food they could eat, and no possibility of boredom. All they lacked was money. There are just not enough hours in the day for a man to make or grow everything he needs and still have enough time left over to make money.

Commercial farming is something else again. A successful farmer doesn't have time to chop weeds with a hoe or water a hundred cows with a bucket, much less milk them by hand. On the average, he produces enough food for 40 other people and he does this by making maximum use of machinery, fertilizer, and weed killers and with the aid of the most up-to-date information he can obtain and the best seed and livestock available.

The dairy farmer's 100 cows would be worth $50,000, for example. His land, machinery, and buildings would cost another $100,000. In addition he would need working capital for seed and fertilizer. His total investment would compare very favorably with that of the motel keeper, the downtown merchant, the lumberyard proprieter, and the air taxi service operator. And, with a gross income of $120,000, his rate of return would be just as high. He and his family could live well, pay off their debts, buy an airplane, take a vacation in Europe, retire in comfort and security. All of this is being done right here in Alaska by farmers who are contributing to the general wealth of the community. We could not live as well as we do without them, and we could live a good deal better if we had more of them. They can raise the quality and cut the cost of our food.

How can you as a citizen speed this development? What can we in the Experiment Station do to help? Read on!

Agroborealis

September/1969

Volume 1 Number 2

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ABOUT THE COVER . . .

Pictured on the front of this magazine are two registered Holstein-Friesians bred and raised by the Alaska Agricultural Experiment Station. The black cow in foreground — Alaska Presto Burke — produced 21,850 pounds of milk, 732 pounds of fat in 365 days twice daily milking at five years, five months of age. Alaska Inka Genlin Perfection — the cow in the background — produced 18,876 pounds milk, 673 pounds fat in 365 days twice daily milking at five years, three months.

Answering
Tomorrow's Questions
Today

All research conducted by the Experiment Station is carried out solely for the ultimate benefit of the citizens of Alaska. In most cases this is obvious. The articles in this magazine outline some of the questions for which we already know that we need practical answers right away, and it is not hard to anticipate some of the problems that are sure to arise in the near future so that we can start trying to solve them ahead of time.

But it is almost impossible to predict exactly what pieces of information may come in handy or even be vitally needed for the solution of some unforeseen problem in the future. We would be shirking an important part of our responsibilities if we did not make an attempt to gather the information today that we may need to answer questions which will arise tomorrow.

Man Can't Rush Everything

If you want to build a bridge faster, you can always hire more men. Or pay them overtime, if time is more important than money. But there is no way in the world to speed up most natural processes. No matter how big and fancy your barns nor how many men in white coats you hire, it still takes nine months to produce a calf and another two years before you can even start to find out if the calf's father carries desirable traits for milk production.

If you find a tall, green, tough grass, it may take several years of patient work, at one generation a year, to find out if you can separate out the tall, green part from the tough to combine with some tender, juicy, but dwarf variety. And it may be many years later before you learn that the troublesome, tough characteristic is just what is needed now to provide resistance to damage by some new kind of insect pest introduced accidentally from another country.

In short, if you want to have the answers in time, if you want to know what to do ***before*** the new disease wipes out your crop, ***before*** your milk production falls so low that you go broke, ***before*** the Department of Highways asks you what to plant on the highway embankments, you have to start working way ahead of time.

You Can't Win Them All

Now, no matter what you do, you can't win them all. You can't do every possible experiment just on the chance that the results might come in handy. But the kind of scientist we like to hire is a pretty good guesser. He's curious. He wants to know what makes things tick. Everything. But the things he picks to work on more often than not turn out to be the important ones. Partly this is good luck. Mostly, it's just one

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Dairy Production:

Major Enterprise Within the State With a Good Potential Future

Alaska's dairy production, which in 1968 was valued at nearly $2 million and represented 36 percent of the total value of all agricultural products in Alaska, is a major enterprise within the state.

Although the dairy cow population here has declined from 4,400 animals in 1962 to 2,800 in 1968, production per animal has jumped more than 1,000 pounds per year, thus offsetting a cutback in the herd.

A Developing Trend

This trend in dairy farming closely parallels the pattern in other states where increased productivity through research has enabled farmers to reduce their herds yet continue stable production. Between 1961 and 1965, for example, dairy cattle in Alaska were averaging about 8,650 pounds of milk each per year. In 1967 this production figure had reached 9,665 pounds, which increased to 9,935 during 1968.

Information contained in this article was supplied by the Commodity Committee on Milk of the University of Alaska Agricultural Experiment Station, A. L. Brundage, chairman.

Sustained Research a Must

The dairy industry in Alaska appears to have a promising future, although considerable sustained research will be necessary to help keep our cattle in step with those in other states. New production levels are continually being reached and breakthroughs in dairy development are made frequently through research. Although many of these new ideas can be applied directly to the Alaska herd, there are a number of unique problems here which prevent some of the latest techniques from being used. Thus, Alaska must continue its own research in the field of dairy production in order to insure that milk produced within the state can remain competitive with milk imported from other states.

In fact, the argument goes a step further. Increasing population pressures on fresh milk sources in other areas may make it mandatory that Alaska become more self-sufficient in the production of this basic food.

A projected look at Alaska's population buildup in future years indicates that substantial work must be accomplished in dairy production to guarantee that milk produced within the state continues to supply at least the same percentage of the market it now satisfies.

Estimates show that if dairy production should remain at its present level where it serves about 35 percent of the Alaska market, this percentage would drop to about 26 percent in 1975 because of population increase and a mere 18 percent by 1985.

These figures, of course, show that an immediate surge in milk production is imperative. The production should be at least doubled by 1975 and perhaps quadrupled by 1985 to keep pace with the population projections.

Present Study Inadequate

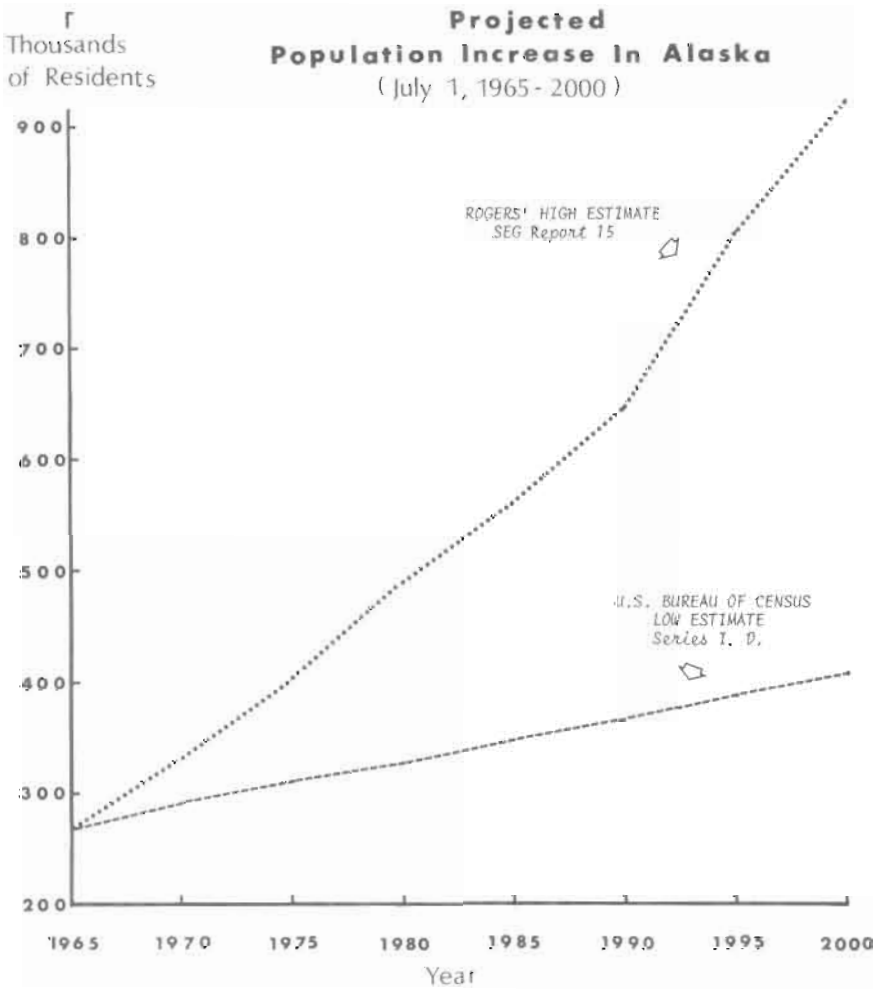
Present research being devoted to dairy production is grossly inadequate. State and federal scientists together spend 4.65 science man years (SMYs) annually in this research, but actually less than one SMY is devoted exclusively to animal science - - in this case the dairy cow.

The list of subjects covered in present research is a good illustration of the wide-ranging studies necessary to advance dairy production. Included on the list are dairy cattle production and

management; farm management and marketing; agricultural engineering (housing, feed production and handling); plant introduction and development; plant pathology; forage management and production; small grain research, soils and soil fertility; entomology and forage breeding.

Obviously, dairy research is a big subject and requires more effort than the 4.65 SMYs now being spent each year. Even if the research level were tripled, experts connected with the dairy industry would consider the program a minimum for adequate study of all aspects fo dairy science. However, this minimum program is the one now sought by the Experimental Station. It would increase annual SMYs from 4.65 to 12.0. Even at this level of support, however, individual scientists would hold primary responsibility for extensive areas of research within the basic animal, plant, economic and environmental sciences. The dairy cow would simply be emphasized in the program.

Dairy science is a farreaching field covering everything from artificial insemination to public health. Because of Alaska's unique climate, many modifications must be made in the management of herds here. In fact, as the state's dairy industry develops, it is expected to become more intensive with controlled environments replacing the open shed. Under these conditions it will not be necessary to breed a unique cow for Alaska, the highly developed lines of dairy cattle available in the Lower 48 will be able to serve as a genetic base for the Far North as well.



Graph shows two estimates of Alaska's projected population trend over the next 35 years. The low estimate was made by the U.S. Bureau of Census. The high estimate was made by George W. Rogers, *Alaska Regional Population and Employment*, Institute of Social, Economic & Government Research, University of Alaska, S.E.G. Report No. 15, December, 1967, Page 87. Both estimates show a steady increase in Alaska's population, although the Rogers estimate indicates a sharp rise from 1990 to 1995. Alaska's population in 1965 was estimated to be about 275,000.

Importance of Genetics

The study and understanding of genetics is a major part of dairy science and such research must remain a basic part of the program in Alaska. With the development of frozen semen and artificial insemination, any bull in the United States can be mated to an Alaskan cow - - all it takes is a phone call and a small package in the mail.

Further research into reproductive physiology in Alaska must be carried out in order to insure high conception. Although any bull in the U.S. is available to Alaska farmers, sometimes there are problems in maintaining adequate rates of conception. Only continued research can provide the answer.

Similarly, studies into animal health must be made to guarantee a wholesome, disease-free dairy product. As cows are developed which can produce up to 100 pounds of milk per day, they must be watched closely because as their production increases, so does their dependency on man. This, too, falls under the scope of dairy science.

Nutrition and the quality and quantity of feed must be closely considered. New balances in feeding must be developed and the peak energy requirements of a top-producing cow must be determined and satisfied.

Dairy Husbandry

Dairy husbandry - - the production and management of dairy cattle - - represents the application of research to all phases of the dairy enterprise. In this area a scientist must find the limitations of the cow and then devise alterations in the cow's environment which can stretch these limits.

Economic evaluations of dairy research in Alaska have so far been confined to statistical summaries of things past, facts which have occurred. A more dynamic approach would be the inclusion of projections for the future, for it is this type of research which can

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contribute most to assessing additional needs in dairy science.

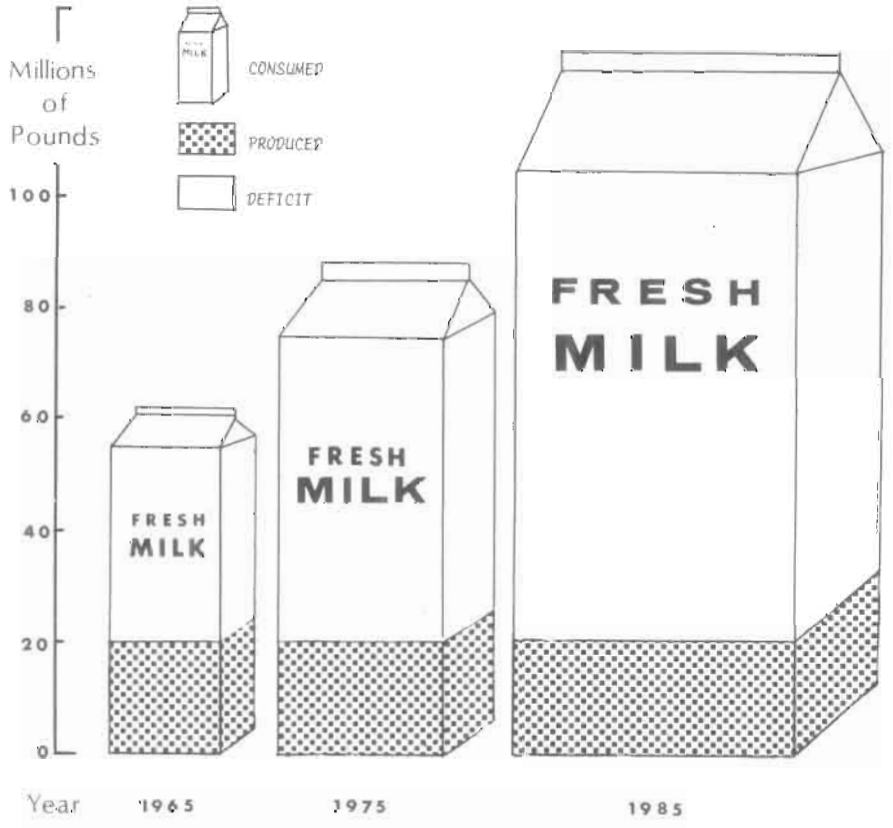
Population projections must be made and potential markets must be analyzed. Wise economic analyses can lead to far better spending, both for the individual farmers and for government agencies attempting to cover the overall dairy picture in Alaska.

Resources must be evaluated and various combinations of resources must be scrutinized. This takes in everything from land and land use to machinery, capital, labor, technology and practically everything connected with the industry.

It has been said that money isn't everything. But in the dairy business, it's way ahead of whatever is in second place.

Economic measures are the measures of success of all aspects of the dairy industry's growth and development. Therefore, it's just good sense to establish a good economic research program which can monitor the financial pulse of milk production in Alaska.

Potential Fresh Milk Market in Alaska'



* Excluding Southeastern Alaska due to distribution system.

This graph illustrates the expected increase in the potential fresh milk market within Alaska through 1985. The checkered areas in each milk carton represent the milk production which is maintained at 20 million pounds a year. If milk production is not increased, it is obvious the deficit within the state will multiply rapidly, thus reducing the percentage of the Alaska market now being served by dairy farmers in the state.

Alaska Dairy Cows Enter 'Beauty Contest'

During April this year the University of Alaska Agricultural Experiment Station Holsteins joined 200,000 other Holsteins throughout the United States that were classified during the past 16 months in the descriptive type classification program of the Holstein-Friesian Association of America. This might be compared to a giant beauty contest, a beauty contest for dairy cows with a purpose.

In this case beauty is truly more than skin deep. The animals are scored for twelve descriptive characteristics - stature, head, front end, back, rump, hind legs, feet, fore udder, rear udder, udder support and floor, mammary quality, and teats.

In addition, each animal is given a numerical rating for the sum of four major considerations - general appearance (30 points), dairy character (20 points), body (20 points), and mammary (30 points), somewhat similar to a grade on a final examination. She is given a percentage of the total score for each item depending on how closely she approaches the ideal for the breed.

The final grade and descriptive scores for each animal can be compared with the average of all other animals in the breed that have also been evaluated under this system. Characteristics which exceed or fall below the breed average reveal basic strength and weaknesses in the animal and suggest possible points of emphasis in the breeding program.

For example, a cow with poor feet and legs could be bred to a bull whose daughters possess strong feet and legs. Basic faults in the herd and in individuals can be corrected over a series of generations by sire selection of bulls for the breeding program.

Dairymen in Alaska milk cows for a livelihood, however; what difference does it make how the cows look?

It is true that most dairymen keep cows for their ability to produce milk not because of their beauty, and inherent ability to produce milk is of

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Vegetables In Alaska:

Current Demand Indicates Market For $3 Million Farming Industry

Current demand for fresh produce in Alaska suggests the possibility of a $3 million a year industry for farming operations within the state. This figure could double in the next 20 years.

The most successfully grown vegetable here, the potato, presently supplies only about 37% of the demand for the unprocessed product. Local farming supplies about 15% of the cabbage demand, 14% for the carrot demand, 10% for lettuce, five to six percent of a number of minor vegetables and none of many other vegetables which could be produced here.

The vast area of the sparsely-populated state contains limited, scattered potential agricultural soil but efficient use of what is available in the way of land and modern agricultural technology is the initial key to reaching a local market which could reach $6 million annually in the next 20 years based on predicted increases of population in the state. This would mean developing the land to grow not only currently produced items but other vegetables adaptable to growth in Alaska. Capturing and holding that potential market depends on research and development in areas of processing and storing and, finally, marketing of produceable products in demand in the state.

The Experiment Station has a tremendous job ahead if it is going to contribute significantly to the achievement of the goals of the state's agricultural planners.

Overall state goals are to increase Alaska's self sufficiency for vegetables, develop agricultural export products, make a more efficient use of limited agriculture land and establish a supplementary income for suburban and rural residents. In the process, state officials want better control of agricultural pollution, such as discarded low grade products and trimmings.

In surveying the potential markets as well as production areas within the state, we find that the major population concentrations are in the Anchorage-Matanuska Valley, Tanana Valley, Kenai Peninsula, and Southeastern Alaska. The suitable vegetable growing land lies in the Tanana Valley, Matanuska Valley and on the Kenai Peninsula. There is some scattered land in southeastern suitable for vegetables also. The very favorable climates of Gustavus, Haines and a few other locations may increase the importance of these sites. The Kuskokwim and Yukon Valleys have numerous areas known to be productive enough to justify development.

The vegetables which can easily be grown in Alaska include: potatoes, carrots, cabbage, cauliflower, lettuce, brussels sprouts, peas, beets, celery, green onions, rhubarb, broccoli, cucumbers, tomatoes, zucchini, rutabagas, turnips, radishes and parsnips. Other vegetables that could be grown in Alaska are: beans (green and broad), chives, corn, eggplant (greenhouse only), fiddlehead fern, greens (beet, mustard and turnip), horseradish, kale, kohlrabi, mushrooms, parsley, peppers (greenhouse only), spinach, squash, swiss chard, and summer squash.

It should be realized that some of these varieties may never be developed to the point of the desired goals. To derive the greatest impact from limited research and development resources, agriculture researchers approach the problem by evolvement of a choice of priorities from the present state of knowledge of individual crops, available land and micro climate, knowledgeable and interested producers, available storage, processing and marketing facilities and that which provides the greatest

Information contained in this article was supplied by the Commodity Committee on Vegetables of the University of Alaska Agricultural Experiment Station, C. E. Logsdon, chairman.

Plastic Is Used in Experiments Involving the Growth of Corn at the Experiment Station in the Matanuska Valley

assurance of success in terms of financial returns to the producer. In evaluating each vegetable in terms of these criteria, a time sequence of development and research must be envisioned. With this in mind, let us take a look at some of these products.

POTATOES

Potatoes appear to be high on the priority list for further development. Knowledge in this area of Alaska vegetable farming is relatively well advanced. There are a number of successful growers already in the industry. There seems to be adequate land for growing this crop; some limitations are land infested with scab and skinspot. Machinery and storage facilities are more highly developed in this area and a somewhat effective marketing arrangement utilizes a brokerage system.

In evaluation for the direction of future development, processed potatoes are not expected to replace the fresh market entirely, but in other states the processed product has taken over a large share of the market. It has been found that varieties presently grown for the fresh market here are suitable for processing. The only processing facility in the state at present is the potato chip plant at Anchorage. Rigid specifications of potatoes for a chipper plant require particular culture and storage of special varieties. As a result of research at the Alaska Experiment Station, suitable varieties and knowledge of how to produce them for chippers have been developed but there had not been an outlet for such production until the chipper plant at Anchorage opened in June of 1967. Two growing seasons are required to build up enough seed stock to plant required acreage for a chipper market. Thus the seasons of 1968 and 1969 are mainly concerned with building up a seed supply of potatoes with the special requirements for processing as chips. The need then is to examine production economies and determine weak spots in the system.

French fry potatoes, the largest outlet for processed potatoes, is a product that can be warehoused for a considerable period of time. There is quite an urgency for research on french fries.

CABBAGE

Even though potatoes are high on the list of priorities for further development, one of the most promising produce enterprises in Alaska is the cabbage. With cabbage breeding research, the Experiment Station has developed two new varieties which have two particular advantages. First, they are long-standing in the field and can be harvested over a long period of time without splitting.

Further, they remain marketable after several months in storage.

With adequate storage facilities, local cabbage can be marketed until about February 1. At that time, imported cabbage has become very competitive. However, local cabbage should find ready acceptance in this market because cabbage is a relatively low cost, but high freight item. Most of the research plans, therefore, are to be aimed at cabbage storage capacity and management as well as plant growth. Increased financing will be necessary to upgrade the storage aspect of the industry.

LETTUCE

Lettuce is a crop which Alaskan agriculture specialists describe as having a substantial probability for rapid development. Storage is an important marketing factor for this product also. Research that has been done indicates that lettuce may be stored in Alaska long enough to market local lettuce through January 1 without too much difficulty, thus tripling the marketing season. Because of the difficulty of shipping lettuce into the state, the demand for locally grown lettuce is strong. The price structure, especially during the fall and early winter, favors the local product. Even though local lettuce is now competitive in spite of labor requirements, further research is needed on culture and harvesting of lettuce to reduce the heavy burden of hand labor.

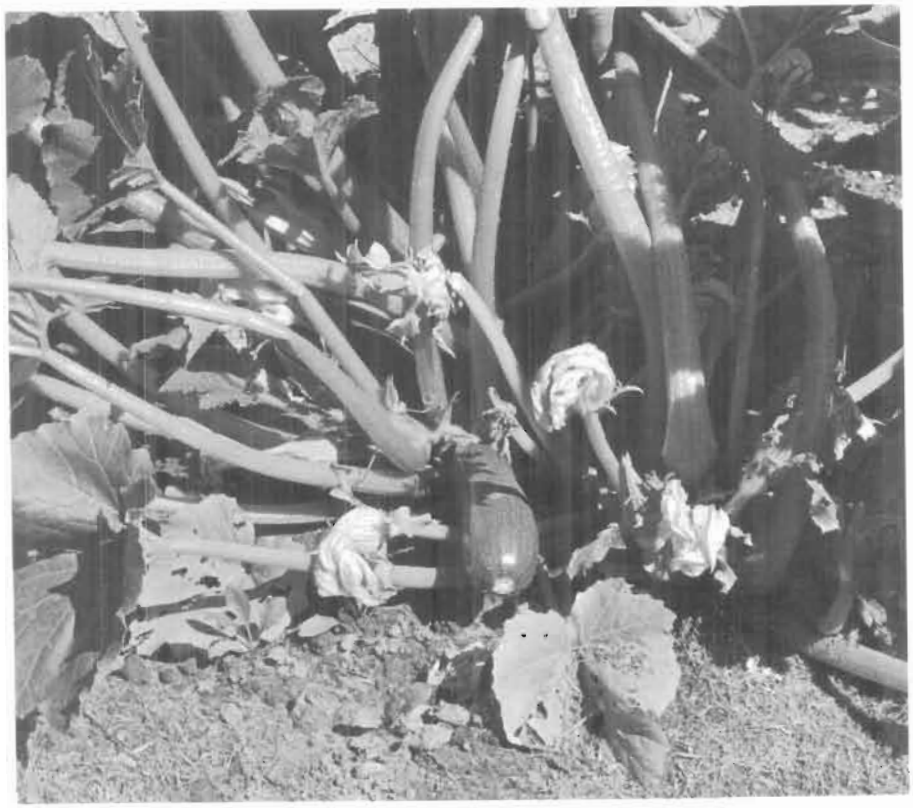
To enhance the state's lettuce production then, more research is needed on storage and handling systems, so essential to its marketing advantage. The study would be in the nature of amount of storage space required and the costs involved. This would concern current varieties screened by the Experiment Station and the growers themselves as well as newer varieties. Investigations on the suitability of other types of lettuce such as leaf, stem, butter, head and romaine should be made. Research is also needed in the area of disease control during the storage period as well as in control of quality factors such as pink rib. Increased acreage and marketing systems are also musts.

CARROTS

As with lettuce, disease in the field is not as great a problem with carrot production in Alaska as troublesome storage diseases. Carrots have the advantage of exceptionally good flavor and texture and they can be stored for several months. However, the carrot crops generally lack the quality of several other vegetables that produce well in Alaska. Alaskan carrots are not always graded to the standard of imported carrots and, consequently, Alaska packaged carrots are frequently less attractive. Research done at the Experiment Station shows that some varieties are much better in appearance than others. Thus, future research needs are reduction of hand labor in weeding, thinning and harvesting. As with the other vegetables, new varieties, especially from northern Europe, should continuously be screened for use in Alaska.

PEAS

Peas have only recently come to the forefront of Alaska agriculture marketing. This was primarily due to a pilot pea processing plant and resultant market testing of the frozen peas during 1968. This project shows great promise if it can be combined with freeze processing of other vegetables for volume processing and resultant exporting of the products. (There exists an inadequate local market to support such an expensive operation). Market channels for this new product are completely undeveloped. Market research is necessary on consumption patterns.



Further Research Should Improve Squash Gardening

TOMATOES

There are few tomato growers in Alaska and fewer still who are really knowledgeable about commercial greenhouse tomato production, a highly specialized enterprise. Most tomatoes in Alaska are grown in greenhouses. Research at the Station on varieties and production techniques shows that high yields of good quality tomatoes can be produced. The Station has developed and released a new tomato variety, "Early Tanana," which will produce good yields of a small fruit outdoors. It ripens quite well in the Tanana Valley, but not so well in cooler areas.

Research is needed on cheaper methods of greenhouse construction. It seems, though, that managerial ability of the greenhouse enterprise has been the

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Cauliflower Is Hard to Grow, But It Can Be Done

limiting factor for success. Research is also needed on the economics of production during cold weather. Artificial light is essential for any greenhouse crop enterprise during the short winter days. Special marketing channels, knowledge of grade requirements and suitable containers for air shipment will be high priority studies when production increases.

RADISHES

The demand for local radishes is strong, but local producers seldom provide a steady supply. Scheduling planting for continuous supply requires more precision than growers are accustomed to using. Research at the Experiment Station has shown that radishes grown under cool conditions are larger and of much milder flavor than imported ones. Also, those grown in cooler areas do not become soft and can be stored for a period of time if the tops are removed. Varieties have been screened and varietal recommendations are available from the Experiment Station.

The major problem of producing radishes in Alaska is lack of irrigation and mechanization. Also, root maggot control with chemicals must be attained for successful cropping.

RHUBARB

Rhubarb grows profusely in Alaska and is winterhardy, but it is not plentiful in market channels. It receives low priority for research at this time. Proposed research would determine what volume the market could accomodate and encourage production to fulfill that demand. Rhubarb appears to be an ideal plant for processing investigations as it freezes well and the juice is useful for flavoring and coloring candy and jellies, and for making wine. The Experiment Station has evaluated varieties and selected seedlings. Research will be necessary on control of cutworms, curculio damage and botrytis.

CAULIFLOWER & BROCCOLI

Cauliflower is not the easiest crop to grow and market at top quality. Very little locally produced cauliflower reaches the market. The Experiment Station has screened a number of varieties and some work has been done on fertilizers, irrigation, root maggot control and other cultural techniques.

Broccoli is similar in market and research status in Alaska farming, although the local demand for broccoli is about 50 percent less than that of cauliflower. Strong development of these crops must await the growth of a processing industry.

CORN & SQUASH

A breakthrough in the area of corn production in the state is a new technique of growing corn through plastic which absorbs the sun rays and holds their warmth in the cool soil areas. New varieties developed also enhance the potential of corn crops in the state.

Squash is also a possible crop for exactly the same reasons. Research emphasis in this direction could add to Alaska's self-sufficiency in a few other warmer weather vegetables as well.

To date, this is the extent of the work done and that planned for the future on the more economically feasible vegetable crops in Alaska. However, there are several other vegetables for which there is a strong demand and for which production could well develop.

In addition, a number of vegetables have been studied to a lesser degree in Alaska. Although these are not necessarily important to the state at the present time, they may gain importance in the future and limited research now could be extremely valuable later. This, of course, is one of the intangible benefits of scientific endeavor.

A Look at Ornamentals:

Alaskans Have a Wide Use For Grass, Flowers, Bedding Plants

Agricultural experts place cut flowers, bedding plants, house plants, woody plants and turf all in the same category. And they call this category "ornamentals."

Alaska has a wide use for ornamentals, yet relatively little research is spent in this area. The Experiment Station has an intense program planned for the study of ornamentals and believes a substantial nursery industry will someday develop to satisfy not only the Alaskan markets, but also outside markets for certain products.

A Variety of Markets

Ornamentals already serve a variety of markets within Alaska. Turf, of course, is used extensively by homeowners. It is also used in the landscaping of commercial and public building lots, parks and recreation areas, campsites and trailer sites, highway right-of-ways, and airfields. Bedding plants and woody plants are also used in many of these same places.

Cut flowers, including that corsage you wore to the Governor's Ball, are mostly confined to what the Experiment Station refers to as the "special events" market. House plants are potted plants, generally confined to use indoors and thus have a limited market. Their aesthetic value, of course, justifies their existence.

Since there is such diversified use of these ornamentals, it stands to reason that Alaska should take a closer look at its own potential to produce for its own market. Peonies and asters, for example, can be grown in Alaska without the disease problems which plague outside growers. Thus, it would stand to reason that Alaska would be better off to use its own products, rather than run the risk of introducing a foreign disease by going outside to purchase its ornamentals.

One of the biggest breakthroughs achieved by the Experiment Station was the development of Nugget bluegrass. This turf - - which is a direct result of the Experiment Station's studies - - is something every homeowner has been seeking for years: it's grass that grows in Alaska. And, wow, does it grow. There is obviously a tremendous market for this product, yet at this point the grass is so expensive, it's barely feasible for covering large areas. This gives the Experiment Station another challenge: how to lower the cost of this precious seed.

An Alaskan Development

The example of Nugget bluegrass, however, is a prime example of the type of plant which can be developed specifically for Alaska. It simply takes time and research to come up with the right combination.

Since most of the ornamentals now being used in Alaska have been selected for more southern environments, it's quite evident that further research within the state will be required to perfect these plants.

Ironically, though there is a tremendous market for good, Alaska-oriented ornamentals, very little direct research is being done in this field. In fact, most of the work is being accomplished on a somewhat casual and incidental basis. This isn't exactly what the Experiment Station wants, but under the circumstances, it's just about all the station can do.

The variety testing of some bedding plants at the Station in Palmer is a good

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Information contained in this article was supplied by the Commodity Committee on Ornamentals of the University of Alaska Agricultural Experiment Station, W. W. Mitchell, chairman.

The lilac is one form of ornamental which grows well in Alaska. Here, a bumble bee sips the pollen from a lilac flower. The bush is located near the Matanuska Valley Experiment Station and is a good example of a plant which is used for two purposes — research and aesthetics.

illustration of the type of research being done on the development of ornamentals. Bedding plants have been used in landscaping around the Station and these plantings serve as demonstration plots which have received increased attention from tourists and other visitors.

A Part-Time Effort

As a result, one supplier has reported an increase in demand for ornamentals in these plots. These plantings certainly have a few advantages. They can be studied over long periods of time and their durability with regard to Alaska weather can be evaluated. But since there is no full-time effort given to these plants, it takes years to make any significant determinations.

The Experiment Station staff feels the need for research in the field of ornamentals is two-fold. They believe that plants which have been screened, selected and propagated under Alaskan conditions will be best adapted for growth in the state. Further, they are seriously concerned about the risk of importing sources of trouble by bringing plants into Alaska from other parts of the U.S. and the rest of the world. They believe that stock which is propagated and maintained in Alaska will be free of pests which so far have not gained a foothold here.

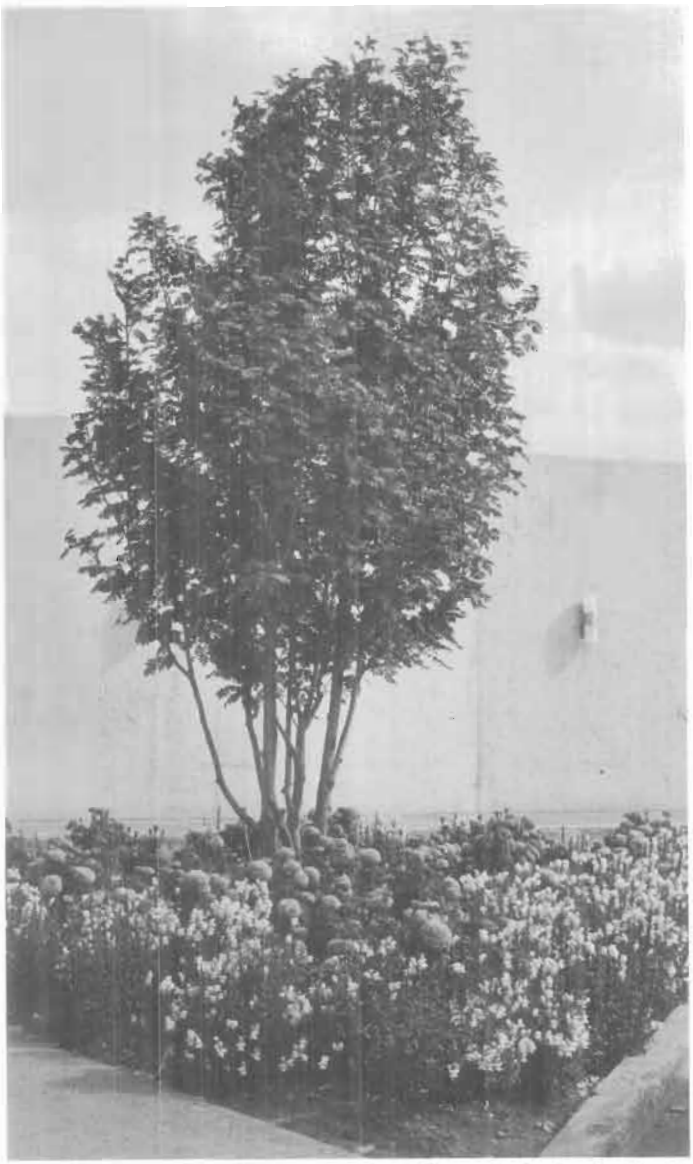
All-Alaskan Plants

Further research by the Experiment Station could help in developing ornamentals which would be totally Alaskan, thus eliminating the chance of bringing in outside problems.

The program should be a continuing one involving constant screening and selection from existing stocks and testing of newer releases. Advance testing of new releases from outside growers would be a valuable service to potential users and growers in Alaska.

Some of the finest ornamentals have been produced through breeding programs, which are a part of any comprehensive ornamentals research effort. In such a program for Alaska, crosses could be attempted between cultivars and cultivars and related native species.

In conjunction with this work a much more extensive program is needed in the collection and screening of native materials as possible ornamentals. This



Flowers Are Used Extensively for Aesthetic Purposes, Particularly by Government Offices

includes both woody and perennial and annual herbaceous material. Horticulturists visiting the state for the 1968 annual meeting of the NC-7 Plant Introduction committee were impressed with the possibilities of Alaska's native flora. This program would include, as well, work with materials that could be applied to roadside plantings, both for soil stabilization and beautification purposes.

Other Research Needs

Other research needs would include methods of propagation and means of maintaining stock from year to year, both in the dormant state and as actively growing plants in the greenhouse. It remains to be determined whether greenhouse operations are feasible on a year-round basis or only on a part-time basis.

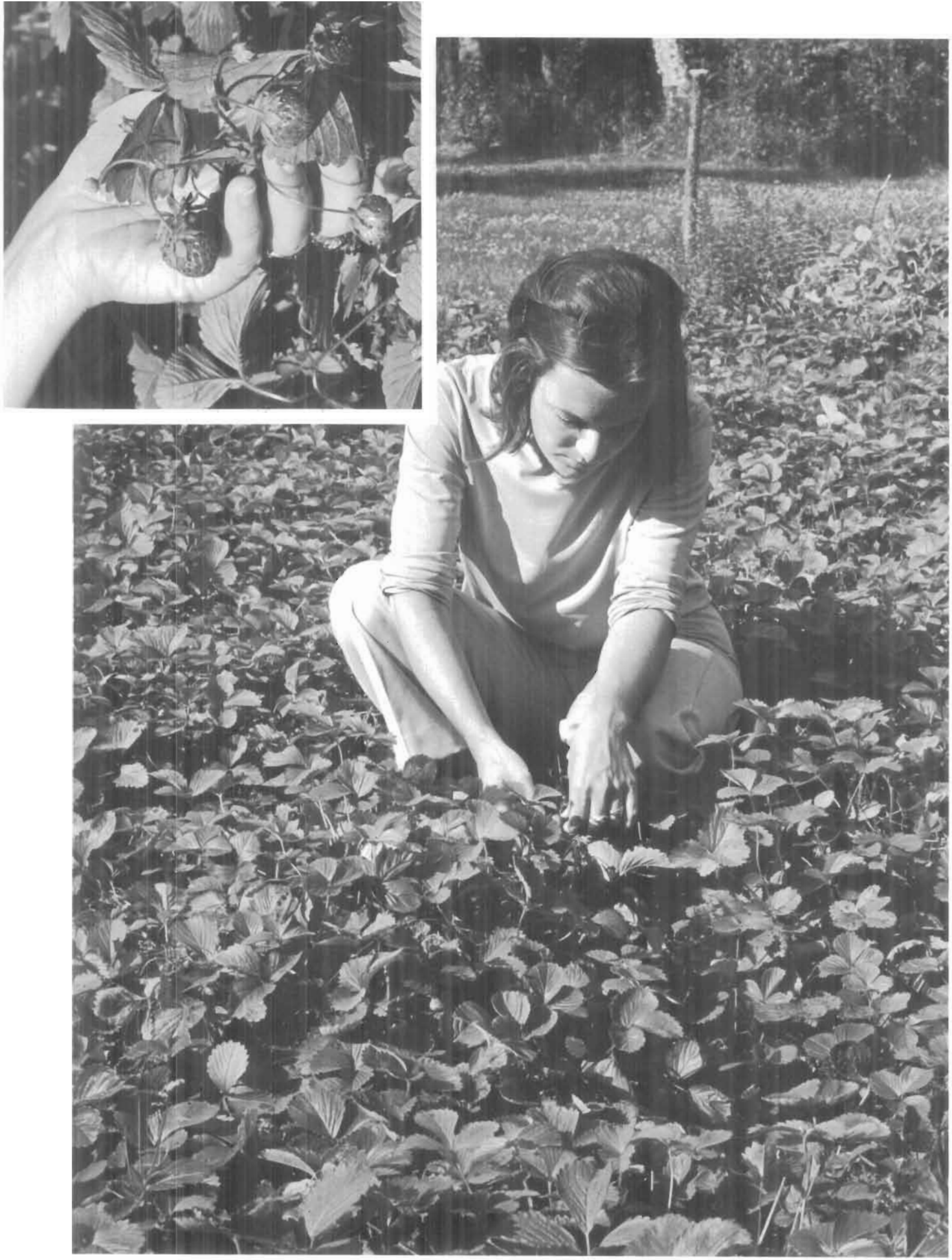
Research on culturing and management could provide information of particular value to landscaping needs and design. For instance, definite recommendations would be forthcoming on plants adapted to lowland sites vs. upland sites and shaded areas vs. sunlit areas, and on plants that need a start indoors vs. those that can be seeded directly outdoors. Some of this has been done and is known, but more needs to be done and the information organized and made available to the public.

Turf research has borne fruit, but considerably more needs to be done. There is an urgent need for research on turf management and maintenance under Alaskan conditions. Variety testing is an ever continuing need. No single strain of grass can be expected to perform well throughout Alaska, which is characterized by a diversity of environments. An area of turf research that has not yet been investigated or tried commerically in Alaska is that of growing sod for transplanting. Sod growing has proved to be a commercial success in other parts of the country. It would appear to be only a matter of time before it is tried in Alaska.

Wanted: Horticulturist

But presently no one actually has a fulltime job of researching in the field of ornamentals.

It appears one of the biggest advances that could be made in this area would be the placing of a fulltime horticulturist at the Station who would devote all his work to ornamentals. This would open the door to the comprehensive type of program the Experiment Station has been dreaming of.



Strawberries Grow Well in Most Parts of Alaska and Are a Favorite With Everyone

Small Fruit Development:

Air Freight Business May Open New Outside Market for Alaska

Domesticated and wild small fruits provide Alaskans with food and relaxation. Wild berries of some kinds are found from one end of the state to the other under extremely varied conditions of climate and soil. In remote areas of Alaska, berries provide a much needed source of vitamins and nutrients not otherwise available.

As the natives become less nomadic, it becomes more important to know how to cultivate these small fruits in order to provide a constant and accessible supply for their diets.

Most homeowners are potential small fruit growers and seek answers to the problems of culture and to a knowledge of adapted varieties.

The kinds of small fruits of particular concern to Alaskans are the strawberry, raspberry, cranberry, lingonberry, blueberry, currant, gooseberry, elderberry, cloudberry and bearberry, most of which have some species that are indigenous to Alaska.

Wild berries are not only a source of satisfaction and food to the citizens of the state but also are a tourist attraction. Efforts to preserve and maintain them are justified if only from the standpoint of conserving the naturally developed plants indigenous to Alaska.

A major public concern is the development of a sound commercial industry for certain of the small fruits. A potential exists due to:

- Present unfilled state markets.
- Future market increases which will result from population growth.
- Favorable environmental factors including; suitable climate, lower incidence of diseases, and minimum insect infestations.

These positive vectors can be exploited and developed through research effort to provide small fruits for an export market.

Production of nursery plants for the stateside small fruit industry is possible through the utilization of Alaska's unique and "clean" environment to supply disease and insect free planting stock to growers in southern latitudes.

The indigenous small fruits represent a genetic pool providing new sources of earliness, hardiness and other characteristics which are in demand by small fruit breeders of Alaska and the world. Orderly collection programs are needed to catalog and make available these genetic diversities for Alaska and the nation.

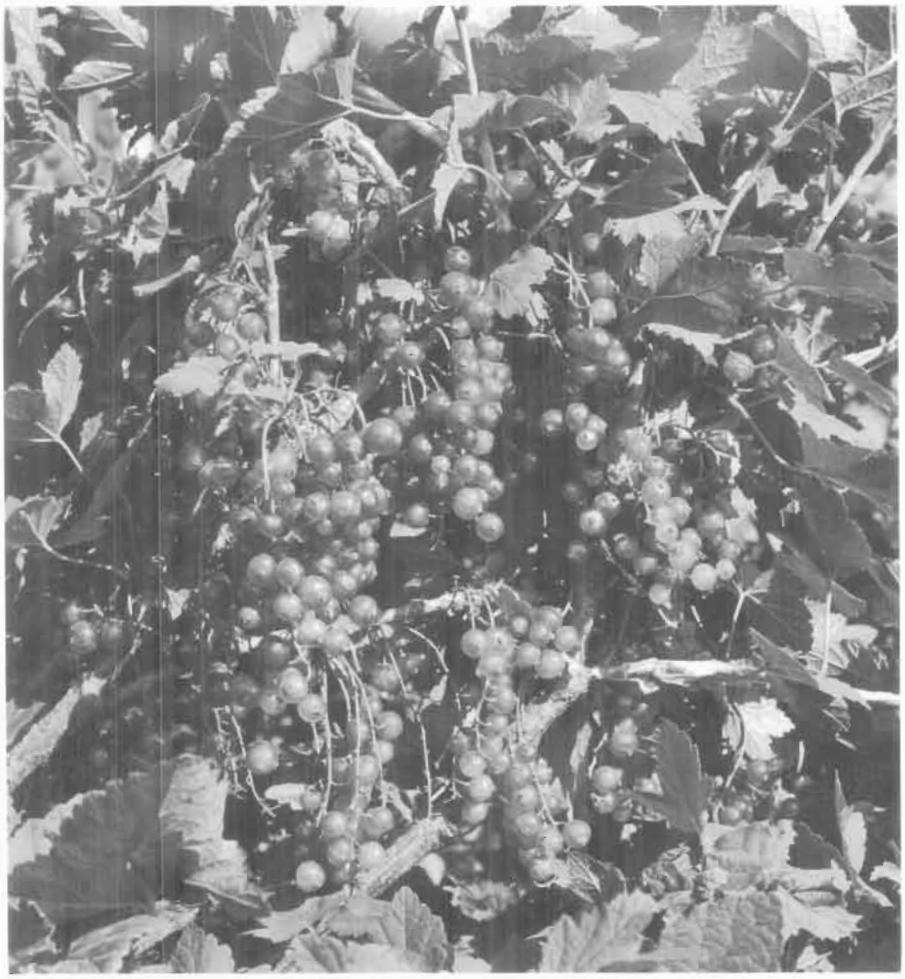
A considerable research effort by the Alaska Agricultural Experiment Station is justified both for the development of a small fruits industry and for the gratification of Alaskan homemakers by furnishing them with acclimated fruit and nursery plants.

Information contained in this article was supplied by the Commoduty Committee on Small Fruit of the University of Alaska Agricultural Experiment Station, D. H. Dinkel, chairman.

STRAWBERRIES

The strawberry is widely adapted and is the most extensively grown small fruit in the United States. It is estimated that commercial and home crops in the U. S. have an annual value of approximately $90 million. Although no commercial acreage exists in Alaska, the strawberry is grown in home gardens and two wild species are found. In most areas of Alaska, varieties grown commercially in the other states are not hardy. Plant breeding efforts in Alaska have produced improved hardy varieties by hybridizing the native species with domesticated kinds. The new varieties are hardier, but further progress on quality and disease resistance is needed.

It is estimated that approximately 40 acres of commercial production is needed in addition to home grown strawberries to satisfy the current annual consumption of strawberries in the



Currants Grow Extremely Well in Alaska Under Proper Care

state of Alaska, and this will increase to 60 acres by 1985. The possibility of Alaska production of fresh fruit for stateside markets increases in feasibility each year due to the rapid development of air freight. For example, in 1961, California, the nation's largest producer of fresh strawberry fruit, shipped approximately 1% of its fresh fruit by air freight. In 1966, 24% was shipped by air. Failure by Alaska to invest in research, with the objective of developing varieties and cultural practices capable of producing high quality strawberries that can be shipped, could result in the loss of an excellent opportunity.

Research effort should be accellerated to determine if Alaska's unique disease and insect free environment can be used to produce disease and insect free nursery plants for stateside commercial fruit growers. The commercial acreage of strawberries in the United States is about 70,000 acres, which is replaced by new plantings every two to three years. At least 23,000 acres of commercial berries are planted each year. It requires 15,000 - 30,000 plants per acre. These plants wholesale at $20 - $30 per thousand. It requires 2,500 - 5,000 acres to produce the annual replacement plants for the commercial acreage, and represents a $10 million annual nursery plant business. The potentially lower production costs due to less insect and disease control may give Alaskans an economic advantage for producing these plants. The strawberry plants are a light, high value commodity, a factor which should overcome the freight barrier experienced by some other Alaskan crops that could be grown for out-of-state markets.

RASPBERRIES

Current annual consumption of raspberries in the state would require only about 10 acres of commercial raspberries. These are in addition to home grown berries for which demand for planting stock is difficult to estimate. The United States has about 60,000 acres of cultivated raspberries that require an annual replacement of 6,000 acres per year. Normal replacement requires 2,000 plants per acre providing a national market for about 12 million plants for replacement of commercial acreage. The production of raspberry plants is at least a $1.7 million business at the wholesale rate of $140 per thousand.

CRANBERRIES, LINGONBERRIES, BLUEBERRIES

The cultivated cranberry that is grown commercially in more southern latitudes of the U. S. is not grown in Alaska. Indigenous to Alaska are several close relatives of the cranberry that include the lingonberry which occurs on dry, rocky or peaty soils, and the mossberry, which occurs in some acid bogs in Alaska. Many areas are found in Alaska with conditions of climate and soil similar to that where the cranberry is grown commercially. Also several species of low bush blueberries are indigenous to Alaska, but no information is available about the suitability of these or commercially grown varieties when cultivated.

A high percentage of questions asked the horticulturists in Alaska are concerned with the possibility of cultivating the cranberry, lingonberry and the blueberry. Such culture demands intensive application of agricultural technology and generous supplies of capital for successful development; therefore, it is likely that development can result only through institutionally supported research.

Market demands for cranberries, blueberries and lingonberries within the state of Alaska, with its limited population, are low. The potential of commercial industry will depend upon development in competitive world markets. Low insect and disease occurrences within the Alaskan environment, coupled with mechanization and Alaska's favorable soil and climate conditions could provide a favorable competitive situation for rather large export markets.

MISCELLANEOUS SMALL FRUITS

Large commercial acreages of small fruits such as currant, gooseberry, and indigenous kinds such as elderberry, cloudberry, bearberry and serviceberry probably will never exist in Alaska even though they thrive and produce abundantly. Nevertheless, improved varieties and cultural information is demanded by the public. One or two successful

small businesses have developed to process and sell wild berry products, and this type of business may expand slightly.

TREE FRUITS

No commercial tree fruit production is visualized in Alaska for the near future. Development of these fruits will probably be entirely for a backyard demand. Development of hardy adapted kinds of tree fruits and cultural practices has only been started, though past work suggests considerable potential for improvement. The demand for these fruits will be generated by their value for aesthetic gratification.

Local demand for Alaskan adapted and grown nursery stock of small fruit and tree fruit is difficult to determine and evaluate, just as is the demand for knowledge on these subjects. Estimates based on the number of expected households in the state in 1985 demonstrate that even if these estimates are high by magnitude of 10 times, there will be considerable business for the Alaskan growers to serve. Whether Alaskan growers develop this industry or not, there is need to provide improved varieties and cultural practices for home use.

RESEARCH NEEDS

The research needs are predicted on the theory that little or none of the proposed industries can develop without knowledge supplied by research, due to the advanced technology and capital required to provide it. To provide all the answers necessary in determining the actual feasibility of the proposed industries within a period of 10 or 20 years would require more research in terms of science man years (SMY's) than can possibly be provided by this state.

Tentative research priorities should be established until preliminary knowledge on most of the subjects can be acquired on which more accurate priorities, based on future world and state markets can be established. To wait for the actual market demand would be unwise, since some other commodity or area may fill the needs because of the foresight of individuals in other areas.

The research effort in Alaska in small fruit and tree fruit should be increased immediately by at least two additional horticulturists and soon have enlarged research effort from pathology, entomology, economics, and agricultural engineering specialists.

It is reasonable to expect that since the entire nation will benefit from research in small fruit by improved varieties, improved techniques in hardiness and a better fruit industry, some support to this goal should be given by the U.S.D.A. Negotiations for federal support of small fruit work should be initiated soon.

High Bush Cranberries, right,. Flourish in Alaska. Crab Apples Are Only an Experiment Now

Red Meat Possibilities:

Vast Research Program Necessary Before this Industry Can Boom

Alaska is the sort of place where a rancher could conjure up images of herds of fat animals standing belly deep in the state's abundant grasslands. And, to be sure, this dream could someday be reality, but a great deal of time and research must be spent before such a situation could exist here.

Problems Abound

A number of physical and economic problems now face the red meat industry in Alaska. Research is needed to evaluate resources and production systems most suited to Alaska's widely differing rangelands. Slaughter house and feeding system development must be coupled with research on the production system. And all of this work must be directed toward products which show the greatest competitive potential in Alaskan markets.

Promising but diverse rangeland lies in the State's Interior valleys, island locations and on the Kenai and Alaska Peninsulas. The red meat industry would include production of beef and veal, lamb and mutton, hogs and reindeer. Estimated instate consumption of red meat would indicate a market for some 35,000 beef animals, 65,000 hogs and perhaps a thousand lambs at present. Lack of consumption data and market development makes an accurate estimate of the potential reindeer market impossible. The Alaska Crop and Livestock Reporting Service estimates some 190 livestock producers in the state.

Even though the industry may now be reaching a threshold or takeoff stage in the slaughter sector, research, technology, capital, service institutions and transportation aspects remain in a critical stage of underdevelopment. The state of the slaughter sector is due to increasing slaughter house availability and capacity along with the impending federal state meat inspection program.

Ninety-three precent of the beef cattle are loçated on the lower Kenai Peninsula, Kodiak and adjacent islands and on islands in the Aleutian Chain. Most of the sheep are located on Umnak and Unalaska Islands far out on the Aleutian Chain. About 63 percent of the hogs are located in the Matanuska Valley and 31 percent in the Tanana Valley. Reindeer are located on the Seward Peninsula and Nunivak Island. There is limited overlap of types of livestock in the various areas.

Beef cattle numbers have continued to increase in almost every year since records were started in 1954, reaching 5,700 head in 1968. Sheep numbers have increased from some 9,200 head in 1954 to some 27,000 in 1968. The Jan. 1 hog inventory has fluctuated from 600 to 1,400 head in the same time span. Data has not yet been obtained regarding reindeer numbers and potential slaughter. Productivity is low compared to livestock inventory numbers. Beef slaughter for 1967 amounted to some 893,000 pounds, pork slaughter accounted for 130,000 pounds and mutton and lamb accounted for an additional 38,000 pounds. Reindeer slaughter, while not generally included in the domestic red-meat slaughter, accounted for some 614,900 pounds of red-meat for the Alaska market. Slaughter of dairy cattle, mostly in the Matanuska Valley, accounted for about 40 percent of the carcass beef.

Expansion Possibilities

Certain factors of a general nature for evaluating potential for growth of a livestock industry give indications of expansion possibilities. These include

Information contained in this article was supplied by the Commodity Committee on Red Meat of the University of Alaska Agricultural Experiment Station, W. E. Burton, chairman.

the animal feed supply, consumer demand for red meat, marketing and processing facilities and general enthusiasm and interest of producers in the area. Further, research is necessary in Alaska to evaluate geographic location of potential livestock production and priorities in these areas of type of livestock. Institutions critical to industry development should be reviewed in terms of type of livestock and geographic area. In all areas, there needs to be an adequate body of knowledge, technology, and experience related to the scope of development particularly as it applies to Alaska. There is a definite lack of knowledge for basing additional basic and applied research on each type of livestock.

Livestock in Alaska face some pretty rough weather situations as shown in photo above where cows are feeding in a snow-covered field. Below are sides of beef taken from steers raised in Alaska.

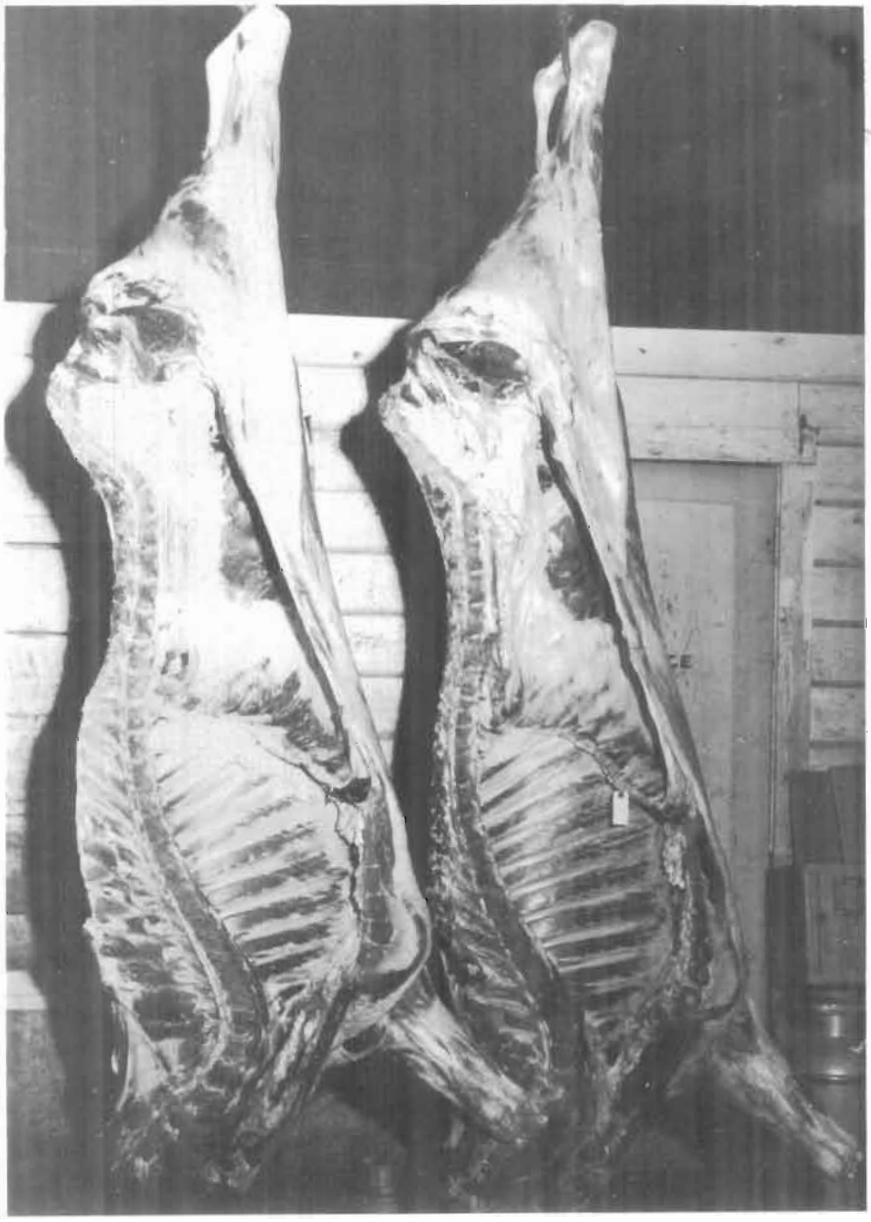
Work in Kodiak

Early in the history of Agricultural Experiment Station research, considerable work was done with beef cattle and, to a limited degree, with sheep at the Kodiak station. A herd of Galloway cattle was maintained for breeding and crossing purposes. Several research efforts included Mongolian Yak, hogs, dual purpose cattle and sheep. During the past decade, efforts have been minimal. In recent years, some effort has been directed to veal production, dairy beef nutrition, preliminary efforts in range research and some forage and grain production research that may have limited geographic transferability. Very limited economic research efforts have been directed to ranch research, other than preliminary industry development policy research.

Beef, Swine Study

Projected research projects center around beef and swine research with emphasis on the latter. Capital facility requests have gone out for a swine research facility at College, while a beef research facility has not yet been included in capital needs budgets of the University of Alaska.

Within these two areas priorities have been determined. In swine research, the top priority is in engineering, which would be the preliminary and environmental engineering layout research. Other priorities would be in animal husbandry for actual planning and development of the swine research pro-



gram, and economics for swine management planning. By the time hogs are being produced, the full compliment of the integrated research staff effort would include an agronomist, food technologist and soils scientist in addition to those starting the program. All would not be full time. Using the figure of $60,000 plus per science man year (SMY) indicates a $360,000 research budget needed along with certain projected operating costs. The projected research budget falls in the range of 3.25 to 3.75 percent of potential hog industry by 1985.

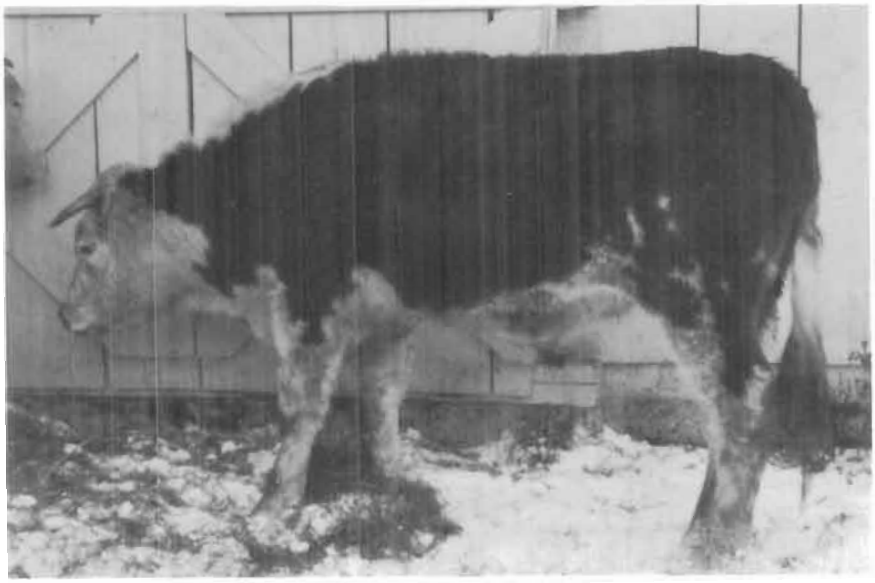
As for beef research, it has been recognized in Experiment Station discussions that certain aspects of range, husbandry and economics research can be carried out on an interim basis by contracting for cooperative participation, land use and certain services with local ranchers. A five-year time span is expected from the time of initiation of a capital needs program to functional completion of a beef research center.

This program is estimated to need over 9 SMY compared to between 5 and 6 in the swine program. It would include experts in the field of economics, animal husbandry, range management, forage production and management, grain production and management, engineering, soil science, weed control and food technology.

Once a site location, center and research functions are fully determined, a first priority would be an accelerated and expanded range management research effort. This would go along with husbandry fields of genetic selections and progeny evaluations and economic areas of ranch organization and management policy. Aspects of engineering, forage and grain production and food technology would be expanded or initiated prior to development of research in each ranching area.

Using a figure of about $60,000 per SMY would result in a $585,000 research budget along with certain project operating and overhead costs.

In both the swine and beef research programs, there would be on-site location of the critical core of the scientific team with some work contributed by scientists at other University sites. In organizing these programs, the Experiment station planners assume that research knowledge and technological innovation would be directly transferable to other potential production areas of the state in the case of swine; and in the case of beef research, transferable not only in Alaska but to other northern areas.



The two Herefords pictured at left from the Rainwater Ranch in Homer were used in a feeding experiment during 1968. The experiment was one of many which are conducted all the time to determine the effects of various feed and environment situations on livestock in Alaska.

The Soil Picture in Alaska

Anybody who knows anything about farming in Alaska knows you can grow a big cabbage in the Matanuska Valley. It's been a proven fact for years.

But the Matanuska Valley has not always been as productive as it is today. In fact, the soil in the Valley was one time very poor and it was only through research and development programs that the right fertilizer was found and applied, furnishing excellent soil for growing.

This same approach could be used throughout Alaska. It should be taken wherever there exists a sizable market for fresh produce since the cost of vegetables to the consumer could be reduced considerably by eliminating transportation overhead.

Unfortunately, soil conditions over much of the state are not conducive to plant development and thus, without some sort of fertilizer, many regions simply cannot serve as farming areas.

The area around Kenai is a fine example. The soil there is very poor, but the Experiment Station at Palmer has a whole greenhouse full of soil samples from Kenai which it is studying to see just what it would take to make the soil fertile.

Soil Samples under Study from Kenai Peninsula

The need for this type of research is critical. Good soil is a basic ingredient to good produce. It's every bit as important as water.

A concentrated program of soil science is becoming more and more necessary as the demand for home-grown crops increases. More forage and grain is needed to feed an expanding livestock population.

Soil is a touchy material. A mixture which might look good to the amateur gardener could very well be impossible for growing vegetables.

Alaska's soil is particularly hard to categorize because it covers such a wide region. A fertilizer which might make soil fertile on the Panhandle, for instance, would probably have little effect on soil in the Arctic. Special fertilizer must be developed for each area and this fertilizer can only be determined through analysis of soil samples.

Alaska Dairy Cows Enter 'Beauty Contest'

– Continued from Page 6

primary importance in dairy cattle selection. Type classification is not a substitute for lactation performance, it must be considered on its own merits.

However, a cow's productive life will continue only as long as she can assume her place in the milking line and in the yard and field. When her udder degenerates because of faulty conformation, inheritance for high production will only hasten the complete degeneration of her mammary system and she will leave the herd.

When her feet and legs break down and she can no longer move easily from place to place without pain, this will also affect her ability to produce milk and force her from the herd before her time.

In similar fashion, each descriptive type characteristics has some bearing on the cow's ability to produce and reproduce year after year in a commercial dairy operation. Functional type is important to the cow and to the dairyman, not from any false appreciation of beauty for the sake of beauty, but from the possession of the minimum characteristics required to get the job done.

How do the University Holsteins compare with the Holstein breed throughout the United States? The results were disappointing, reflecting perhaps the isolation of these two herds from the major segments of the dairy industry. The results are objective, however, and do reveal strengths and weaknesses within both herds.

Weaknesses in functional types will be considered in selecting sires for use in the Matanuska herd, always accepting the necessity of selecting for high milk production. The dairy herd at College is engaged in a long term dairy cattle breeding project in which sires are selected solely on the basis of production.

The type information will serve as a base line to determine the effect of single trait selection, milk production, on associated characteristics.

Land Development Requires Research

The June, 1969, acreage in cultivated crops represents less than four percent of that which is conservatively estimated to be available in Alaska. Obviously, a tremendous potential exists here for the growth of adapted agricultural and forest crops.

The emphasis on additional research is to be aimed toward a more precise determination of practical plans for utilization of various existing climatic characteristics. This indirectly includes soil conditions.

Significant in plant growth are rainfall, growing degree days and length of the growing season. Weather stations around the state keep close track of these three factors.

Rainfall figures are collected from April through August; most areas of the state receive between six and eight inches of rain annually during this period. Regions which fall into this category include Eagle (in the Upper Yukon), Fairbanks and Galena (in the Central Yukon), Big Delta, the Kenai Peninsula, Allakaket (in the Upper Koyukuk) and the Matanuska Valley.

Warm weather, which is critical for the growth of many plants, is most prevalent in the Interior with Fairbanks, Fort Yukon and Eagle recording about twice as many days with temperatures in the 70-degree and over range as stations in Southcentral Alaska.

Length of growing season has been critical with many crops and records show that Matanuska, Big Delta, Galena, Holy Cross and Kasilof (on the Kenai Peninsula) are all about equal in this category. Eagle, Fort Yukon and Fairbanks experience growing seasons about 20 days shorter and Ketchikan and Kodiak are considerably longer.

As for hostile soil conditions, some areas in Alaska are underlain with permafrost and often poorly drained sites are more acid than most crops will tolerate.

A typical Matanuska Valley silt loam can store about 3.5 inches of soil moisture (per foot of said depth) which the plant can use. This oversimplified explanation shows that a foot of soil could contain only enough moisture for 23 days of crop growth assuming it were saturated at the beginning of the period.

There are, however, soil conditions suitable for growing in practically every region of the state. In the Upper and Central Yukon, a broad strip of good soil extends from Eagle to Circle Springs, narrowing and continuing through Stevens Village and Rampart. Another area of tillable soil is located in the Ruby area and extends toward Galena.

In the Lower Yukon, a narrow band of soil suitable for agricultural purposes extends to the southwest from Koyukuk toward Anvik.

One of the largest blocks of potentially tillable soil occurs in the Susitna River Basin, extending north from Cook Inlet to Curry and then narrowing but continuing to Cantwell.

Kodiak, while offering favorable climatic conditions, does not offer much in the way of tillable soil because of a volcanic eruption in 1912 which covered the island with volcanic ash.

For the future, existing weather records need a more intensive study with particular emphasis on areas where the better soils predominate. Instrumentation is needed to determine accurately the effect of elevation on the growth of agricultural crops and additional observation stations are needed in some promising areas where gaps in coverage now exist.

Consideration should also be given to more intensive ecological and climatological studies in the Kenai Peninsula and Kodiak Island areas.

Climate Data From Around Alaska

Area & Station	Rainfall Apr-Aug (inches)	Days* 70° or over	Htng* Deg Days 35°	Grwg Deg Days (Apr-Aug) 32°	40°	Length of* Grwg Season 28°	32°
Matanuska Valley							
M.A.E.S.	7.57	28	2840	2875	1731	138	108
Upper Yukon							
Eagle	6.24	52	6626	2795	1753	103	81
Ft. Yukon	3.17	47	8872	2879	1878	113	90
Central Yukon							
Fairbanks	7.06	57	6078	2950	1874	117	89
Galena	7.45	29	6792	——	——	133	119
Lower Yukon							
Holy Cross	8.42	25	3873	2643	1602	132	105
Lower Kuskokwim							
Aniak	10.62	18	4889	2432	1390	121	81
Central Kuskokwim							
McGrath	9.23	29	6179	2688	1655	129	106
Susitna River							
Talkeetna	12.38	36	3420	2750	1647	118	87
Big Delta							
Big Delta	8.01	35	5589	2895	1826	136	116
Kenai Peninsula							
Kasilof	6.88	11	2740	2502	1389	131	95
Homer	8.00	3	1753	2277	1163	145	109
Upper Koyukuk							
Allakaket	7.33	39	7389	2400	1440	93	59
Kodiak							
Kodiak	21.00	4	661	2490	1336	185	160
Southeastern							
Ketchikan	154.00	27	18	3294	2070	237	190
Copper River							
Chitina	3.98	—	4538	2650	1612	——	——
Strelna	——	—	4747	2384	1400	——	——
Copper Center	4.24	—	4823	2385	1400	——	——

** Total Annual Accumulation*

How Can You Help Agriculture In Alaska?

Earlier you were asked to consider what you as a citizen could do to further agricultural development. Now, we'd like to make a couple of suggestions:

See that financing is made available for farming on the same scale as for any other type of business. We're not talking about subsidies or gifts. By definition, a successful farm is one that returns a profit after paying ***all*** expenses, including reasonable interest charges. In the older farming areas, the banker is happy to see the farmer walk in the door. But no one wants to loan money to someone he doesn't know for a business he doesn't understand. Our banks may need some encouragement to get started out in this unfamiliar business. Besides, it costs more to start a new farm than it does to keep an old one going and perhaps the state may have to help out directly for a while. It is not for us to say how this should be done but remember, "It takes money to make money."

Support a realistic research program. All the financing in the world will not be effective unless farmers know how to use it. Alaska, which probably has more to learn about its environment and methods of dealing with it than any other state in the union, now has 16 agricultural scientists at work and 7 of them are federal employees. Little Rhode Island, which has already been in the farming business for almost 300 years, has 75! The potential which we hope has been revealed in the preceding articles can only be realized with the best seed, the best varieties, the best cultural and technical practices that can be developed.

We all know that Alaska is different from all the other states in the country - from all the other countries in the world. In fact, that is why a lot of us are here. We like it that way! But we cannot expect plants and animals from other regions to thrive here unless treated differently from the way they were in their native environments, and even then they often fail to make the grade.

When you have the time, come around to the experimental farms and see for yourself how plants and animals from Alaska and other regions compare under our conditions. We think you will understand that we cannot depend on others to do our research for us. – *Director Horace F. Drury*

Answering Tomorrow's Questions Today

–Continued from Page 3

of the attributes of a good scientist - the knack of asking the "sixty-four dollar question."

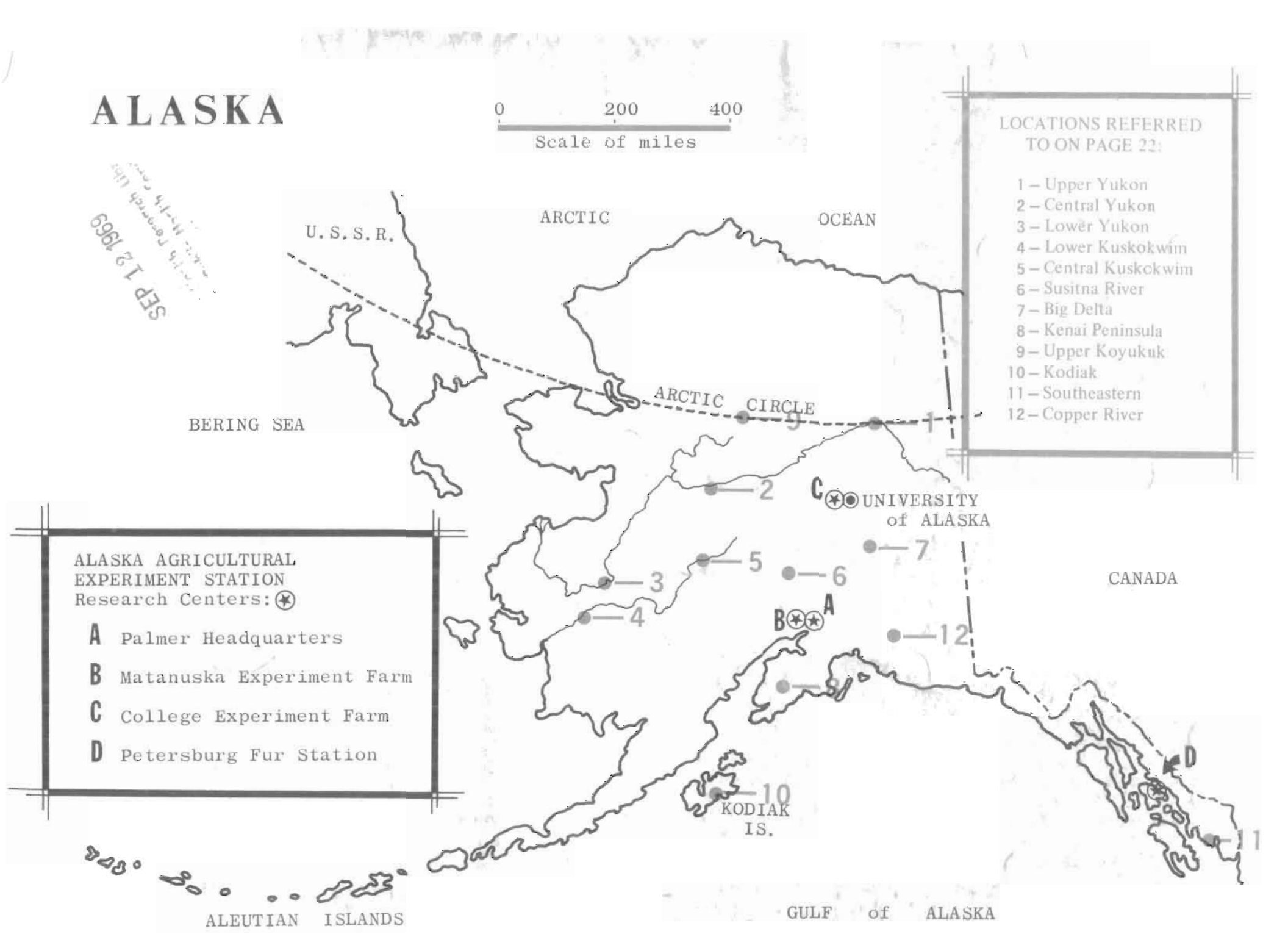
For example, it is doubtful that anyone will ever be able to raise crops on the North Slope. Last year it would have seemed idle curiosity to study plant life north of the Brooks Range, at least from an agricultural standpoint.

Today we badly need to know what plants can be used to heal the trail scars left by the oil explorations. Luckily, Dr. W. W. Mitchell has been collecting plants in this region for several years, just on speculation, and he does know quite a bit about what will grow there. There is a great deal more that is not known about methods of planting, the effects of local conditions on growth, the relative hardiness of different species in disturbed areas, etc. It will take several years to get this information, but at least we have made a start.

Dr. A. L. Brundage has a contented cow with a window in her stomach. Not only can he see what is going on inside, he can also remove samples from time to time with no discomfort to the cow. In this way he is trying to learn how cows digest various components of their diet. This, in itself, is not going to put any more milk in the bucket, but Dr. Brundage is certain that we will be able to do a better job of feeding if we know what happens inside the cow's stomach.

Dr. D. H. Dinkel is trying to find out why exposure to light prevents potato shoots from growing, at least for several months. He has discovered that feeding the plants certain chemicals will overcome this inhibition. And, for some reason, even spinning the tubers in a centrifuge dramatically stimulates growth in the light. What does this mean? He doesn't know yet, but he is sure that some day these pieces of knowledge will fit into the puzzle of how to prolong the storage of potatoes without preventing them from growing when planted, as currently used sprout inhibitors do.

We could go on with other examples. Every scientist on our staff spends a portion of his time trying to outguess nature, as it were, as an investment in knowledge for the future. We want to be more than just trouble-shooters. We want to be creative, and we hope you want us to be that way, too. If you have ever played chess, you know that if you get just one move behind, you have to spend so much time defending yourself that it is almost impossible to catch up. We are trying to stay one step ahead of the game instead.


ALASKA
0 200 400
Scale of miles
LOCATIONS REFERRED TO ON PAGE 22:
1 – Upper Yukon
2 – Central Yukon
3 – Lower Yukon
4 – Lower Kuskokwim
5 – Central Kuskokwim
6 – Susitna River
7 – Big Delta
8 – Kenai Peninsula
9 – Upper Koyukuk
10 – Kodiak
11 – Southeastern
12 – Copper River
ALASKA AGRICULTURAL EXPERIMENT STATION
Research Centers:
A Palmer Headquarters
B Matanuska Experiment Farm
C College Experiment Farm
D Petersburg Fur Station
U.S.S.R.
ARCTIC OCEAN
ARCTIC CIRCLE
BERING SEA
UNIVERSITY of ALASKA
CANADA
KODIAK IS.
ALEUTIAN ISLANDS
GULF of ALASKA