BOTANY

Propose Sub-Arctic Colony

IF YOU do not like crowds or hot weather, pastoral life in the sub-Arctic may be just the thing for you.

There is no reason why the Canadian sub-Arctic, a land of caribou moss and scrubby trees roughly extending from the 50th to the 55th parallel, could not support a population of some 100,000 persons, Prof. Jacques Rousseau told SCIENCE SERVICE. Today, he estimates, there are about 15,000 persons, including the native Indians and Eskimos.

"We can grow plants in the sub-Arctic, although we have done little research on the problem as yet," the Canadian botanist said. The soil is generally good, with permafrost appearing only in scattered spots. On the average during the growing season, there is a maximum of 18 hours of sunlight. This can mean three months growth in one month, Prof. Rousseau explained.

No plants of economic importance are found now in the sub-Arctic, he explained. A possible exception is the cranberry-like lingonberry which could be exported. Man would have to create the desired plants through breeding and selection from plants now being cultivated. Crops probably never would be exported from the sub-Arctic. However, by growing their own food plants, the inhabitants would save the cost of bringing in their fruits and vegetables, often done by plane now.

Prof. Rousseau sees little hope of domesticating wild animals found in the region. The yak, and animals of that type, might adapt to the sub-Arctic, however. He foresaw a kind of yak-cow as contributing to the sub-Arctic farmer's food needs.

Most of the temperate zone plants could be adapted to the farmer's garden, Prof. Rousseau said. Cabbages could be grown in 50 to 60 days, corn in 55 days. He sees no hope for growing wheat, however. Greenhouses would have an important place in the garden.

A community of lava rock houses clustered around the general store, church and school with greenhouses, small gardens and a yak in every yard—this is the sub-Arctic of 1980.

Prof. Rousseau described the Canadian Arctic and sub-Arctic plant life to scientists attending the 9th International Botanical Congress. He has made some nine exploratory surveys of the region, several of them a "first look" at the land.

In concluding his lecture to the botanists, Prof. Rousseau pointed out that it impossible to consider any plant association without referring to man. Man is always the main species in the biological association, even in the Arctic.

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DEMOGRAPHY

Need Better Agriculture

SEAWEED and algae are not the miracles that will dampen the fuse on the "O-bomb," "O" for overpopulation, that is now threatening to explode.

Neither will turning tropical jungles or barren deserts into farmlands provide enough food for the millions of people. The main hope for feeding them will come from increasing future plant productivity per unit area throughout the world.

This is what Dr. E. C. Stakman, plant pathologist at the University of Minnesota, told scientists at the Botanical Congress.

"Plants hold the basic patents on which depends man's earthly existence," he said. Because of this, "Botanists are among the most important people in the world, for it is they who are the explorers, the interpreters and the reformers in the plant kingdom."

During the ten-day conference, he pointed out, the world population will be increased by "another Montreal." Close to 1,300,000 more persons will need to be fed.

Right now there are many serious problems and difficulties in using foods such as seaweed and algae. Cost, engineering, methods of cultivation are some of the unknowns. It is doubtful, Dr. Stakman indicated, that the pressing urgency of feeding 45,000,000 new mouths a year can be met by these crops. There are some prospects, but few certainties, that substantial areas of new lands can be provided for agriculture, the American botanist said.

Birth control, which many persons advocate as an answer to overpopulation, is not only difficult to implement, it does not answer to present overpopulation problem.

However, there are three basic ways in which agricultural productivity can be increased: 1. breeding and selecting better plants; 2. improved plant nutrition; 3. improved plant protection. With research directed to these fields, significant increases in food production can be achieved in a relatively short time, Dr. Stakman said.

The past has already shown what can be done with "breeding, feeding and protection," he pointed out.

Strains of corn and wheat, bred especially to survive drought, disease and other catastrophies, have virtually doubled yields and made it possible to grow crops in supposedly unsuitable regions. Adding micronutrients to the soil can increase crop yields many times, As an example, Dr. Stakman said that the addition of one pound an acre of ammonium molybdenate to soil that had been fertilized increased the yield of one kind of clover ten times.

The best-bred and best-fed crop will be useless for food if it is not protected to insure that the increased yield will be maintained from year to year. Even in the U. S., the botanist said, yields from important economic crops will vary greatly.

In the underdeveloped countries, where maintaining the food supply is almost always a precarious endeavor, an unforeseen storm or insect plague can be disastrous. These countries, Dr. Stakman suggested, might do well to devote some 75% of their research funds to preventing or alleviating the physical hunger of the people.

"There is need for experimentation to determine when and where the facts and principles revealed by research can be applied to the solution of the food problem," he said. International institutes to study basic and regional botanical problems related to the food problem could help.

Research devoted to food production on a scale comparable to a single atomic energy research laboratory and installation is what we need, Dr. Stakman said. This is the service that botanists can render to society.

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PHOTOGRAPHY

Air-Living Fungus Can Plague Photographers

A PLANT that can live on air is causing camera "bugs" a lot of trouble.

How a tiny fungus can live on the glass in camera lenses, causing clouding of the lens, was described to scientists at the Botanical Congress.

The fungus, which has the formidable name *Aspergillus glaucus var. Tonophilus*, is apparently unique in its ability to thrive on glass and metal surfaces that are perfectly clean, said Dr. T. Ohtsuki of Ochanomizu University, Tokyo, Japan. In more than 15 years of research on the problem, the Japanese botanist has been unable to find another fungus, even among very closely related species, that can live on air.

In his experiments, Dr. Ohtsuki said, he soaked pieces of glass in chrom-sulfuric acid, thus freeing the glass from all organic substances. The fungus grew only when the relative humidity was between 60% and 95%; it will never grow when it is more than 95%. Dr. Ohtsuki explained that the fungus spores can germinate and grow "to some extent" by using its own stored nutrients. However, there are usually minute dust particles and other organic substances on lenses of optical instruments that supply the fungus foods needed for further growth. Tiny drops of water are exuded along the tiny-thread-like hyphae. The water also contains acids such as oxalic acid, citric acid and acetic acid which probably corrode glass. Iron is also rusted by the fungus. It is remarkable, Dr. Ohtsuki said, that the microscopically observed outline of the rust bears a "striking resemblance" to the fungal mycelium.

The Japanese researcher told SCIENCE SERVICE that he has developed a "fuming substance," a chemical which he has patented, that will keep the fungus off glass or metal for ten years. It will not harm the lens system of a camera, for example, but will eliminate the need for periodic cleaning of the lens, which is an expensive process.

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