

POLAR PASTURES

VILHJALMUR STEFANSSON

Fifth Paper in the "War or Peace?" Series

IN the November number of the FORUM Edward Murray East advanced the theory that agriculture is not likely to be improved sufficiently to keep ahead of the world's increase in population. Mr. Stefansson in this article takes issue with that view and suggests at least one vast unexploited source of food. The bearing of this paper on the subject of war or peace is evident if, as Henry Pratt Fairfield stated in September, the fundamental urge to war is land hunger. Havelock Ellis and Frederick Adams Woods have also contributed to this series, which will be continued in forthcoming numbers of the FORUM. The object of the articles is not to advance any single solution of this most pressing of all contemporary problems, but through a symposium of scientific opinion, to arrive at its kernel.

PREVIOUS contributors to the FORUM's series on War or Peace have argued that land hunger leads to war and that, inasmuch as agriculture cannot be greatly improved, the control of population is the only solution. I do not see how their general conclusion can be avoided, but am, nevertheless, unable to agree that the results will come in just the manner argued, for just those causes or even approximately as soon as they say.

My own travels in the tropics, and association with others who know more than I, do not lead me, for instance, to agree with Mr. East when he says in the November FORUM that, "Some see the possibility of rapid conquest of the tropics. Perhaps. But those who know the tropics are not among the number." On the contrary, I find that those who, in my opinion, know the tropics best differ most from Mr. East.

I rather deplore also Mr. East's crediting (by implication at least) to the charming and youthful Haldane the first widely noticed suggestion that practically unlimited food can be made out of the air, — unlimited because the food, after being eaten, will be later decomposed into the elements from which it was originally made, and can thus be used over again. That very thing was clearly outlined by Winwood Reade in his widely read *Mar-*

tyrdom of Man, a book published about twenty years before Mr. Haldane was born. It may not have been new even then.

Nor do I know anything which leads me to approve the offhand way in which Mr. East dismisses various other factors involving especially the elements of method and time. For instance, some very good first-hand authorities on the productivity of the ocean maintain that, acre for acre, the farming of the sea will produce as much food as the farming of the land, when you allow, as Mr. East does, for certain portions of the land being unproductive. If you cut that estimate by three, you still double the world's food supply, thereby postponing Malthusian world starvation by a century.

And if I am a little disappointed in finding the tropics, the ocean, and the manufacture of artificial food given such short shrift by my fellow neo-Malthusians, I am still more disappointed in the entire omission of other subjects, and am even a bit annoyed to find among the missing my own pet Friendly Arctic. The Arctic is by no means the stoutest of the contenders against Malthus, but it is at least interesting as the newest recruit to the forces of defense.

The authorities on world food supply do not agree whether population is going to increase so fast that starvation will result; but they do agree that we are going to run short of meat. This paper concerns itself with one stopgap in the dike we are building against that particular calamity.

Optional vegetarianism may come about in any country through religious taboo, sentiment, or the growth of an opinion that vegetables are more wholesome or in some respect better than meat. But compulsory vegetarianism must come in any country whenever population begins to press on food supply, unless wealth and a good transportation system permit an importation of meat from other lands. For it is wasteful to produce meat in any land capable of producing vegetables that can be directly eaten by man. It is extravagant to feed corn to a hog and then eat the hog. Five men or more can live on corn-bread or corn-meal mush for every one who can live on the pork which the pig makes out of the corn. There is similar waste when you feed clover to a cow and then drink the milk and eat the beef. For several men could have lived on the potatoes that might have been raised on

the clover land that produced only the equivalent of one man's diet in beef and milk. But it is not economically wasteful to raise stock on land that is incapable of producing cereals, vegetables, or fruits, for such lands would lie waste if not used for grazing.

It is, then, a fundamental principle that whenever it is impracticable or impossible to import food, a nation is driven steadily toward vegetarianism as its population increases. The extent of meat eating in a country that has as many people as it can feed, is, therefore, measured by two things, — the number of pigs, chickens, or similar animals that can be fed on slops and offal, and the number of animals that can be produced on lands which for some reason (drought, cold, etc.) are unsuitable for farming.

Since we are not, for the moment, considering an eventual shortage of all foods, but only an eventual shortage of meat, it is beside the mark to discuss here the probabilities of food being manufactured out of the air. For even if you could make imitation beef and turkey, there would still be on our earth for a number of centuries a lot of people who, for conservatism if nothing else, would prefer the real meat to the best substitute that Muscle Shoals could produce.

With all the well-watered and irrigable lands growing cereals, fruits, and vegetables for direct use, and with the semi-arid lands yielding their smaller but considerable crops under the coaxing of the dry farmer, there remain for meat production extensive areas in the tropics and in the temperate zone. But these are not very fruitful. Few lands too dry for wheat will support more than twenty-five head of cattle per square mile, half of them will produce less than half of that amount, and some will fall as low as one steer per square mile. Then there are areas (not as large as many suppose but still considerable) that will produce no meat at all, either because there is not moisture enough for the growth of any edible vegetation, or, more commonly, because no water can be found for the stock to drink.

The earliest civilizations of the world arose in or near tropical deserts, and we are long habituated to the idea that they can be forced or coaxed into productivity. More recently we have found that some, at least, of the dry deserts of the temperate zone can be subdued. But until the last few years we have assumed that the

“frozen deserts” of the far north were unconquerable, and many still omit them from their estimates of the world’s ultimate fields of production.

The problems of the “frozen deserts”, even if they were not different in themselves, would be different to us in being unknown. Throughout the history of our civilization, the South has been the land of the past, the North the land of the future. Our earliest records show how the ancient civilizations crept northward from the upper Nile to the lower Nile, and then to Crete, Greece, and Rome, until now even England, the Scandinavian countries, and Russia are civilized. During this entire history of the northward march of civilization, men have in each stage been unwilling to believe that the country to the north of them would ever be valuable or highly civilized. A study of Europe from Greece to England will show Americans that their own recent under-valuation of Alaska is only history repeating itself.

The folly of the American purchase of Alaska was one of the unquestioned beliefs of the generation just passing, although the wisdom of it is equally unquestioned by our own generation. Alaska was called “Seward’s Folly”, and most of it was supposed to be covered most of the year by ice and snow. Some of the absurd beliefs of that time are not quite dead among thoughtless newspaper readers, even now. We could see that last winter when the dog drivers carrying the diphtheria serum from Nenana to Nome, through a forest from roadside hotel to roadside hotel, were represented in the newspapers as traveling across an unbroken and silent wilderness of snow and ice. And the press, even so recently, assumed that the serum was being carried through cold weather incomprehensible to New Yorkers, when the fact is that the temperatures recorded on the journey resembled those of Lake Placid and Saranac, New York, which are health resorts.

Until recently, too, the public has misunderstood the summer heat of Alaska as much as the winter cold. The United States Weather Bureau had been recording temperatures around ninety degrees in the shade, and sometimes ninety-five and even one hundred in the shade, every year for thirty years at Fort Yukon, within the Arctic circle in Alaska; and still most readers were either surprised or incredulous when they learned that President Harding and his party in 1923 suffered from the ex-

treme heat when they got to Fairbanks, just south of the Arctic circle.

However, the battle is now won with regard to Alaska, for both the United States Government (Department of Education) and private owners are bringing to the United States reindeer beef from the Arctic prairies of Alaska. It is being sold in New York restaurants, and one of the companies has an office on Pine Street.

It is no new thing in the true history of the world, but it is new in the sphere of our ideas, that we have in the Arctic and sub-Arctic the largest and potentially most productive permanent grazing lands in the world. But we must remind ourselves that by "permanent" we mean a grazing land which, so far as we can see at present, is not likely to be converted hereafter to the production of vegetables that are directly eaten by man.

We estimate that north of the line of probably successful wheat production we have 200,000 square miles in Alaska, nearly 2,000,000 square miles in Canada and the Arctic islands, and nearly 3,000,000 square miles in northern Europe and northern Asia. This means more than 3,000,000,000 acres, or nearly twice the area of the United States. Some of it is densely forested and some of it lightly, but in the main it is a grazing land. A part lies south of the Arctic circle; even north of the circle the variety of plants is far greater than most realize, — at least 30 ferns, 250 lichens, 330 mosses, and 760 flowering plants. Of course, it is only a small number of these plants that are edible by animals. But still they form, in the aggregate, the largest supply of animal fodder available in the world on "permanent" grazing land.

At present we have only one domestic animal that is suitable for eating this vegetation and turning it into meat and other valuable by-products, such as milk and leather. This is the domestic reindeer of the Old World. There is no means of telling how long it has been domestic. Our ancestors of the Stone Age in Europe ate reindeer. It is generally supposed these were hunted, but some authorities believe that they were tame. What we do know is that the reindeer was domestic in northern China two or three centuries after Christ. King Alfred the Great tells us in his Chronicles (about 890) that in his time the people of Norway owned and handled reindeer.

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No one knows to the nearest million how many domestic reindeer there may be in northern Siberia. Over vast areas there are herdsmen each of whom is ignorant of the numbers of his own flocks. It is considered in some parts that a reindeer owner is not well-to-do unless he has ten thousand head. In Finland, Sweden, and Norway, the herds are much smaller, and a man is thought prosperous if he owns several hundred.

Exactly 1,280 reindeer were brought into Alaska from Siberia by the United States Government between 1892 and 1902. The largest single herd of their descendants now numbers about 17,000, and the aggregate in Alaska is given at 350,000. This means that since their introduction the herds have been doubling every three years.

Reindeer need no barn to shelter them nor hay to feed them. They are as native and comfortable at Point Barrow, the north tip of Alaska, three hundred miles beyond the Arctic circle, as the longhorn cattle were in Texas seventy-five years ago. An adult reindeer is no more likely to be frozen by the cold or stifled by a blizzard than a cow is to die of sunstroke or to be drowned in a spring shower. If you think it is strange that reindeer do not freeze to death, just consider how strange it is that fish do not drown. Any animal is safe and comfortable as long as it is in its normal native environment. This does not mean, of course, that no natural conditions ever kill reindeer, but only that they are in no greater average danger in their home lands than most other animals are in theirs.

Since reindeer meat is delicious, and cheap to produce on the lands north of the wheat belt, it seems at first sight as if we had nothing to do but allow the herds to double and double again until there are enough of them to eat all the Arctic and sub-Arctic vegetation and turn it into meat. The trouble with that easy assumption is that, so far as we know at present, reindeer will not prosper except where they have certain kinds of food.

In summer, reindeer seem to prefer to live mainly on green grasses, although they do a good deal of browsing on half a dozen or a dozen kinds of brush. But when winter comes, they try to live mainly on lichens. It is thought possible by some that if forced to do so they could subsist on grass, but probably they would become so thin on this diet that the cows would be weakened and a

good many of them and their young would die at the calving season in the spring. It is even possible they might not be able to live on the grass at all, in winter, if they had nothing else.

Therefore, it would seem that the number of reindeer that can be supported in the Arctic and sub-Arctic lands is limited by the amount of lichens. It is my own estimate that for every ton of lichens and mosses in the Arctic, there are at least ten tons of grasses, sedges, and similar plants. This would mean that there is ten times as much summer feed as winter feed. But it really means more, for most grasses replace themselves annually while the lichens require anything from five to ten years for replacement. It is for this reason that the United States Government grazing experts have estimated that Alaska north of the tree-line will support permanently only about twenty or twenty-five head of reindeer per square mile. If we are going to utilize the northern grazing lands to the full, we must discover some animal that will take up the slack left by the reindeer, — that will eat grasses the year round, instead of only in summer as reindeer do.

We have such an animal in the misnamed musk ox. It is not an ox (even the males are not, and certainly the cows could not be), and it has no musk. No one seems to know who gave the name or why. A better selling label must be devised, now that it is intended to place the meat on the market. The alligator pear sells much better as an avocado; shaddock would not have sold at all, so we called it grapefruit. In our case, no one has been able, as yet, to think of anything better than to replace "musk ox" by "ovibos." That is the name by which it is now known to scientists, and comes fairly logically from the Latin *ovis* for sheep and *bos* for cattle. The ovibos is approximately a sheep-cow. They might be looked upon either as sheep four times as large as any you ever saw, or else as cattle with a coat of wool.

It would seem obvious that the sheep would be more valuable if it were three times as big as it now is. Similarly, the cow would be more valuable than now if she kept all her other good qualities and produced wool in addition. It would, then, seem at least possible that the ovibos, since it combines most of the merits of both, would be better than either of them for use in Texas or England. But not even the ovibos, were it twice as good as either cow or sheep, could permanently hold its own in those countries against

wheat or potatoes, because of the insistent necessity that vegetable production shall replace meat production wherever that is possible.

We concern ourselves in this article with the ovibos only as an animal which may coöperate with the reindeer in turning into meat and hides (and in this case also wool) all the billions of tons of edible fodder that now go to waste on the Arctic and sub-Arctic plains. In a book called *The Northward Course of Empire*, I have already dealt fully with all aspects of the situation. Here we can only take up a few of the points briefly.

The meat of the ovibos is so much like beef that you would have to be as expert in judging meats as wine tasters are in judging wine, or you would be unable to decide between two roasts or steaks as to which was domestic beef and which ovibos. The color is the same, and the texture and flavor are the same.

Whether ovibos meat could be brought cheaply to New York or London is already answered by the reindeer trade. A reindeer can now be raised anywhere in Alaska, driven to a seaport for butchering, and the meat shipped in good condition to New York, all for a selling price of ten cents a pound. Later when the quantity increases, all costs will be greatly reduced. The like would apply to the ovibos.

It must be remembered that the Alaska reindeer country is nearly the most inaccessible part of the Arctic. Suppose the meat were being produced in Baffin Island instead, or in Labrador. The open season of navigation would be the same in length and the distance by water would be less than one-quarter of that from Nome to New York or London via Panama. Similarly, meat could be brought from Archangel or ports on the White Sea to London much more cheaply than reindeer is now being brought from Alaska to New York. Even in New York, Russian and Siberian reindeer could undersell Alaskan, so far as transportation is concerned.

We count on developing the reindeer and ovibos industries throughout all the lands north of the wheat belt. At first sight it appears a difficulty that large interior sections are at present not tapped by railways. But we are not assuming that Arctic ranching will develop any faster than to keep step with the world's need for more meat. The world's need for more petroleum, more

copper, and so forth will also be increasing. These minerals and many others are known to be abundant in the northern grazing lands, and there is, therefore, no reason to suppose that railways will not spread to those districts, exactly as they have gone to other inland districts for other commodities in the past.

In the question of whether the ovibos can be domesticated, we come to a problem in animal psychology. The issue is fundamental, in the sense that many people who are supposed to be authorities hold one opinion, and many others the opposite. You hear on one hand that certain specified wild animals cannot be domesticated in less than a thousand generations, and on the other that any animal becomes as domestic in one generation as in a thousand.

Those who say that real domestication is not possible except after thousands of generations, cannot show you an experiment where a thousand generations have failed; but those who affirm that one generation is enough have many triumphs to which they can definitely point. Perhaps the most numerous recorded successes are with an animal analogous to the ovibos in the sense of being a native of the Arctic, the caribou. Caribou differ from reindeer only in our use of the word. They are the same beast with different names. We call them, for mere convenience, reindeer if they are domestic and descended from domestic antecedents; but we call them caribou if they are either wild or known to be descended from ancestors that were wild only a few generations back.

It happens nearly or quite every year, wherever both occupy the same country, that caribou are incorporated into reindeer herds. In northeastern Siberia it is common knowledge that these incorporated caribou become within their lifetime as tame as the domestic reindeer that are similarly treated, while the calves of wild caribou born in the domestic herds are as tame from birth as the calves of the domestic stock.

In Alaska, Mr. Carl J. Lomen, the president of a reindeer company that owns about seventy thousand head, has investigated the tameness of "wild" caribou in his herds. He has found that the "wild" caribou are a little tamer on the average than those originally domestic. This he explains by saying that in their nature there is no difference, but that animals known to be wild

or of wild ancestry are subject to special attention from people, and are therefore more often approached, examined, and handled. This is what makes them tamer than the "tame". The general deduction from this and many similar cases is that domestication becomes complete in one generation, and that the tameness of any animal depends on how much and how kindly it is handled. That is not denying that a domesticated wild animal may be vicious. They may prove as vicious, for instance, as Jersey bulls are after thousands of generations of intimate relations with man.

But suppose that the ovibos were as permanently vicious as some insist. He would even then certainly be no worse than the half-wild cattle with which the cowboys of fifty years ago used to deal successfully. Indeed, he could not be half so troublesome, for his build is clumsy, his legs are shorter, and his horns are not so sharp.

For the present we have not much to say about the quality of ovibos hide. We have used it in the North for harness, for boots, and for boats. It is not quite as good for any of those uses as the most preferred leather. It should take its place in the market eventually somewhere between sheepskin and cowhide.

But the wool is an important thing to consider. This has been studied lately at the greatest textile research institution in the world, that of Leeds University in England. In 1920 I secured some ovibos wool from Captain Henry Toke Munn, who had it from North Devon Island, and to that I added some that had been brought by our Arctic expedition of 1913-1918 from Melville Island. About forty pounds were placed in the hands of Professor Alfred F. Barker who made, with his assistants, a two-year study of it. The report is now in the hands of the Canadian Government for printing. We summarize it here.

The soft native brown of ovibos wool is at present so fashionable a color that nothing better can be desired; but, should the fashion change, the wool can be bleached economically without injury to the fibre and can be dyed any color desired. It is softer than cashmere, has approximately the heat-retaining power of merino, and good wearing qualities.

But commercially the most important of all the qualities of ovibos wool is that it will not shrink. This unique merit, when

added to the many others, should make it the most prized of all the world's many types of wool.

If we accept the opinion of the grazing experts of the United States Department of Agriculture as applied to Arctic Alaska, and extend its implications to the rest of the northern world, we may assume that the Arctic grasslands are capable of supporting about 100,000,000 reindeer, equal in meat-producing power to 200,000,000 or 250,000,000 sheep. That is a lot, but by no means enough to meet the shortage which will come when all the arable grasslands of the various tropical and sub-tropical countries are turned into the production of cereals, fruits, and vegetables. If there were no other meat in the world than reindeer, steaks would be as rare as quail, if not as rare as caviar.

In the reindeer estimate we are assuming that the North can support, the year round, only the number of animals that will find enough lichens to eat in winter. That leaves for the ovibos a surplus of grasses, sedges, and the like that would feed five or six times as many head of them as there are reindeer, or, let us say, 500,000,000 ovibos, equal in meat-producing power to 2,000,000,000 domestic sheep.

There are said to be 1,800,000,000 people in the world to-day. If the population increases at the rate estimated by the average statistician, we would expect to have, say, 3,000,000,000 a hundred years from now. Not any sooner than that could we breed up five hundred million ovibos. With 100,000,000 reindeer we could butcher 25,000,000 per year, giving us about 5,000,000,000 pounds of reindeer beef. The corresponding estimate would give us, say, 50,000,000,000 pounds of ovibos meat. If we assume next that the sub-tropical and tropical countries that are too dry for farming might produce twice as much meat again, we would have 100,000,000,000 more pounds. Then there might be some meat as a by-product of dairies that would be kept in well-watered farming countries for reasons of conservatism or good health, and doubtless some more meat produced to satisfy the rich, as strawberries are now cultivated in hothouses. Altogether a 300,000,000,000 pound production of all meats in the world seems a liberal estimate for the year 2025 A.D. That would mean that a strictly per capita distribution would give each of our descendants that year a daily ration of, say, five ounces of meat, and only two or three

ounces in 2125. Then will the meat eaters bless the vegetarians, of whom there should be by that time a goodly number, considering the efficacy of their present propaganda. In that propaganda lies our only hope that any meat-desiring great-grandchildren of ours will be able to get their fill of meat whenever they are willing or able to pay for it. Whatever they get will come chiefly from the lands of the South that are too dry for wheat and the lands of the North that are too cold for wheat.

It will be said by those who are trying to hurry the Malthusian doom upon us, that my offer of fifty billion pounds of Arctic beef per year is only a twenty day ration for a three billion population, if they lived on meat only. In that they are quite right. But I have offered so far only what can be produced on the prairies north of the wheat belt. Turn into meadow the forests north of the same line, as our forefathers have done with the woods of Michigan and Germany, and you double or treble the ground. On much of that cleared land, too, rye and potatoes and many other things can be produced. All these potentialities of the North have been neglected by most of our statisticians-in-a-hurry.

With it all, tropical development, sea farming, and many other things are better safety valves than the Arctic. In the chemists we have assurance beyond them all. They will make food for us out of the air and the Malthusian doom will be averted. But (except for wars, famines, or birth-control) a more gruesome tragedy will come a few centuries or millenniums later when our globe is at last compelled to hang out the sign of "Standing room only". For the astronomers give us no hope that we shall ever be able to colonize the planets or the stars.

CANADA, U. S. A.?

WHY NOT?

ASKS Mr. Seitz, who seems to believe that our British neighbor is merely waiting for an invitation to become a part of us. "The lure is strong," he says, "and we will all welcome Our Lady of the Snows."

WHY SO?

Retorts Mr. Gibbs. Just because the United States is drunk with prosperity is no reason why Canada should follow suit. Having shown evidence of thrift, courage, and a capacity for spiritual self-expression, it is entirely possible that she may prefer to determine her own future, despite the hospitality of Mr. Seitz and the brass bands of Wall Street.

I—CANADA COMING?

DON SEITZ

VISITING the thriving city of Toronto not long ago, I was taken on a sightseeing tour by a Canadian friend of long standing. In the course of the interesting trip about the handsome, well-made town, we took in the new \$50,000,000 harbor, equipped with docks and breakwaters, but devoid of shipping. Posted in a bit of greensward, with their muzzles pointed toward Rochester, was a battery of ancient guns.

"Waiting for us to come?" I asked amiably.

"Yes," he said. "You know you didn't behave very well the last time you were here."

I recalled that our raiders had burned the place during the War of 1812, and dropped the subject. He was silent for some moments as we rode along the beautiful prospect, and then inquired, in a tone lowered so that the chauffeur could not hear: "When is the United States going to take over Canada?"

No thought was further from my mind than this. I was amazed, but replied: "Not until Canada wants to come."

"Well, it will have to come soon. Canada cannot carry on much longer alone."

To an outsider, the offhand thought in response to this would be to regard it as unduly pessimistic, but is it? Having elected to