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PLANKTON COLLECTIONS FROM THE YUKON  
AND MACKENZIE RIVER SYSTEMS\*FRANK F. HOOPER  
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LEGENDS AND USES OF PLANTS ON THE  
WEST COAST OF GREENLANDCECIL HOUGHTON  
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During the summer of 1944, while stationed at an isolated Army weather outpost in Greenland, I made a collection of plants which is now in the Carleton College Herbarium. Having the opportunity to live near and work with the Greenland Eskimo for nearly two years I was able to ascertain how important the vegetation of his habitat was to him.

This paper is based on this collection of plants and on my observations during that time. The collection was gathered in the Egedesminde District of the West Coast of Greenland which is located off the coast on an archipelago. The location of the town of Egedesminde is  $69^{\circ} 44'$  North Latitude,  $53^{\circ} 20'$  West Longitude. The town, one of Greenland's largest, has four hundred people and is located about two miles from the island on which our weather station was situated.

These barren skerries, one hundred and seventy miles north of the Arctic Circle are either bleak, basaltic, precipitous rocks or are low, rounded gneiss or granite hills protruding above the surface of the Arctic Ocean in sharp contrast to the green-tinged white icebergs. These glaciated hills are solid rocks of pre-Cambrian and Recent ages. The plants which do grow on these desolate islands are found in the morainic, alluvial, and wind blown deposits hanging on the bare gneiss. The three climax formations which give this region its general vegetational aspect are the heath, the fjaeldmark, and the bog, with the heath being the most predominant of the three. Wherever there is a small hollow or even a horizontal area on a slope, and everything in Greenland is up or down, solifluction is retarded and the heath association establishes itself. These formations are usually closed.

In the Arctic it is a fight between the plants and their climate and environment rather than a competition between plants. The adventitious plants which may be found in certain localities are sel-

dom able to survive in many other places. There are some slopes and valleys which could be called verdant. The bogs having the advantage of accumulating residual soil may become ankle deep in mosses and other small plants. Since this is far north of the timber line there are no trees except some small dwarfed willows and aspens. The landscape appears barren, but the minute inches-high plants give the countryside multi-shades of green, dotted with delicate pastel blossoms.

If I should include a list of the indigenous species which are found on the West Coast of Greenland, between  $69^{\circ}$ - $71^{\circ}$ , a true flora-belt, it would include about two hundred and fifty-two species. The only other part of Greenland which would surpass it in richness and variety is the southernmost part of this largest of all islands, between  $60^{\circ}$ - $62^{\circ}$  where two hundred and ninety-two indigenous species have been found. The numerous weeds which now and then find their way from Europe or America to Greenland are not included in this number; they lead but an ephemeral existence.

The climate is definitely the limiting and determining factor in Greenland for both man and plant. The climate is oceanic rather than Arctic and is considerably influenced by the warm Irminger Current. The mean temperature for the month of July, the warmest month, although it sometimes has blizzards, is  $49.5^{\circ}$  F. Killing frosts are rare or absent during June, July and August. To compensate for the short summer the sun stays above the horizon day and night for more than two months. During the winter the temperature rarely goes lower than  $25^{\circ}$  below zero. The Föhn winds sometimes partially blow the snow off the slopes. Due to the combination of a marginal soil productivity and an extreme climate the vegetation has xerophile character.

The snow or Firnline of Greenland's West Coast has been estimated between 2500 and 3000 feet high. This of course limits the progress of plant life up the sides of mountains. The terrifically high winds, at times of hurricane force have a scythe-like effect on the growth of plants. An average of 25 to 40 inches of precipitation falls in many parts of Greenland.

My trips by foot and boat in the summer-time and by dog sledge in the winter-time gave me the opportunity to observe and collect these plants which make this country of barenness beautiful. Actually there are only two months during which plants can be collected while there is flowering and fructification in progress, July and August.

The entire collection of specimens of flora of Greenland's West Coast was named by a Greenland Eskimo boy, Knud Kleist Johannson. He gave me the Danish and Eskimo names for all the plants. This clever lad, seventeen years old, is one of the intelligent sons of Greenland whom the Danes have educated. He will go to school in Denmark and become a boat builder or a school teacher.

Knud is also a gifted artist and has a collection of Greenland flora which would do justice to any university herbarium.

It must be admitted that vegetation plays a very small part in the life of the Eskimo. His diet consists mainly of fish and animal flesh, codfish in the summer and seal meat and walrus meat in the winter. The paucity of the fruits, leaves and roots offered by nature and the few weeks during which they are obtainable make the plant kingdom secondary in importance. However, plants are represented in the folklore of the Eskimo; and several of the species of vegetation do furnish food, clothing, shelter and heat for the native of Greenland.

One of the most romantic legends told by the Greenlander concerns the origin of the largest island off the coast of Greenland, Disco Island. Disco Island is a remote and out of the way island off the western coast of Greenland about thirty miles northwest of the Egedesminde district. This island is botanically by far the best known locality in Greenland. There are many floristic characteristics which distinguish Disco Island from the adjacent parts of West Greenland. On the southern coast of this island there is a remarkably large southern flora contingent. Due to its fine harbor, its accessibility, and its location as the headquarters of the Royal Inspector of Danish North Greenland, Disco has become the most frequently visited locality of Greenland. In addition to the Danish and Eskimo travelers, nearly all the North-Polar Expeditions through the Davis Strait have stopped here. Most of these expeditions have collected plants here. All the botanists have been astounded by the richness of the collections which could be made on Disco.

The Eskimo explains the origin of Disco Island by telling the following legend. Once upon a time there dwelt in the village in southwestern Greenland a mighty hunter who was also a powerful sorcerer. Each day as he went to hunt polar bear or seal he had to walk around the island to reach the sea which lengthened his trip considerably. He grew tired of that and decided to tow the island away, which was not too difficult for him for he possessed great magical powers. He pulled a hair from his head, attached one end of it to the island and the other to his long narrow skin-covered kayak and headed northward. The magician paddled with all his strength and moved swiftly north along the coast until he was almost halfway up Greenland's western shore. He was passing Nugsuak Peninsula when an old woman who was a rival magician spied him. She laughed aloud to see him puffing so hard at what should have been an easy tow—the island is only about seventy miles long and sixty-five miles wide, with only a few mountains on it more than six thousand feet high. Her ridicule broke the charm. The hair parted and the island settled to rest in its present

position. As proof that the story is true Disco retains to this day its southern climate and vegetation.

At any rate, Disco needs explaining. It contains warm springs as well as glaciers, orchids as well as Arctic lichens as though nature had accidentally misplaced some southerly island two hundred miles north of the Arctic Circle. Today, in the summer, a colorful oriental rug-like vista greets the eye of the air traveler passing over Disco Island. Army pilots stationed in Greenland would go miles off their course to have the privilege of seeing this enchanting ice capped, flower banked island in the iceberg-filled coastal waters of Greenland. The effect is that of perpetual snows and ice preserving the pastel colors of the delicate flowers of Disco for the colorful ethereal Northern Lights which, during the winter months turn the midnight sky into a canopy of boreal spectrum beauty.

The Danes have realized the wonderful opportunity offered by Disco Island for botanical research. Near the town of Godhavn (Good Harbor) the Danes have established an Arctic research station. One of the greatest botanists of our time, Dr. Morten Pederesen Porsild inaugurated this laboratory in 1898 and still lives in Greenland as the scientist in charge of the Arctic Station. He has become the leading authority on Greenlandic legend and life.

Nature has painted the summer landscape of the mountainous slopes on Greenland's coasts and islands with soft merging pastel colors. The hard rocks are covered by lichens and mosses making travel treacherous after a rain. The fjældmark is otherwise barren of plants except for these low forms. The heath is luxuriant in its scattered banks of flowers and dwarf-like Lilliputian trees. The bog is soft and moist with deep mosses forming a muskeg-like underfooting. Some valleys have been fortunate in receiving a scant soil in which grasses struggle for existence. As the sun's rays caress the face of the earth in the summer and autumn, layers of colors are agitated and fused one with the other.

There are many decorative plants in Greenland which have beautiful flowers fit for any girl's corsage or suited for the centerpiece of a king's table. Most attractive are white star-like avens resembling roses, *Arnica alpina*, and *Rhododendron lapponicum*. In the glacial deltas and on the heath can be found some of the most beautiful flowers, such as *Dryas integrifolia*, *Sibbaldia procumbens*, *Saxifraga stellaris*, *Saxifraga comosa*, *Saxifraga rivularis*, *Saxifraga cernua*, *Saxifraga tricuspidata*, *Habenaria hyperborea*, *Habenaria albida*, and *Corallorrhiza trifida*. In addition to these beautiful purple, red, and white flowers there are the plummy cotton grass and the deep green low-growing mosses and lichens. Nature has created its own rock garden here in the Arctic, often back-dropped with a sky painted with streamers of color or blasts of snow borne on the biting winds.

The Eskimo has learned that some of the plants can be used in

his day by day impoverished life. Indirectly he is, of course, dependent on plant life for his existence. The animals, such as caribou, eat the grasses; the seal eat some of the aquatic plants; the ptarmigan and ducks eat the berries of the many fructifying plants; sheep are raised on the grass of Southern Greenland.

In enumerating the plants which the Eskimo utilizes one's list is short. The Army Arctic Information Center made a complete study of plants which could be used in case of an emergency in the Arctic. It was found that the Eskimo might use more than he does if he only knew their properties. In the Arctic, so long as a plant part looks edible and can be chewed it is safe for human consumption. One need never worry about eating poisonous berries or plants. There are no poisonous mushrooms growing above the timberline. But mushrooms do grow in many parts of the boreal region and can be eaten with complete safety. Lichens likewise have great food value and are relatively abundant. The only adverse effect one can experience from eating lichens is a bitter taste in the case of some species. This can be eliminated by adding some baking soda to the water in which they are boiled. After boiling, they should be dried and powdered. When needed this powder can be soaked over night. The resulting jelly mixed with flour can be baked into a nourishing biscuit.

When summer brought the plants out, the American soldiers were asked not to pick the dandelions. The Egedesminde Colony Manager wished to give the plants a chance to grow throughout his district in order to give the Eskimos an added food source.

Various species of seaweed are available for food. One should take precautions not to gather old dead seaweed. Eskimos seldom eat either lichens or seaweed and thus miss rich foods abounding in vitamins.

Great quantities of berries are collected from low growing shrubby plants. *Vaccinium uliginosum*, *Vaccinium Vitis-Idaea*, and *Myrtilus uliginosa* var. *microphylla* grow in the luxuriant heath growth or on the drier bogs. The Eskimo collects great quantities of the berries, eating some himself and selling the rest to the Danish families of Greenland. These berries are delicious but they last only about two weeks through the summer months. The dried berries that chance to remain on the bushes during the winter months are also eaten. The berries are also used for dyeing hides which are made into gloves, trousers, and kameeks.

Certain plants offer tuberous foods. If one has the patience to dig and collect them, enough may be gathered in a half hour for a meal. *Pedicularis hirsuta* and *Pedicularis lanata* grow in poor and open heath away from other plants. They are easily located as they flower and fruit abundantly. The large strongly yellow colored roots of *Polygonum viviparum* are sometimes eaten by the natives. My friend, Knud Kleist Johannson, explained to me that these roots con-

tained vitamin C. The Danes are sincerely trying to have the natives make the most of what nature offers them.

The most important food plant for the Eskimos is *Archangelica officinalis* common on rich grassy slopes. The largest and most conspicuous plant in Greenland, it is much coveted by the natives who eat its young stems and leaves raw. They often undertake long and troublesome journeys to collect this prize, called Kvan in the Scandinavian countries. The Eskimo being unable to pronounce foreign words perfectly changed Kvan to Kuáneq, plural Kuánit. The Kvan has an important place in the life of the Eskimo, as is indicated by the many place names derived from it. The Greenlanders often make a distinction between the taste of the Kvens from the different localities, some being acrid and others sweet. It seems that the "male" Kvens are the more palatable.

The native drink of Greenland, seldom prepared since the introduction of coffee, is a tea made from *Matricaria Chamomilla*. The beverage made from "flores Chamomillae" is also used as a medicine.

There are several resinous plants growing in the Arctic which furnish a source of heat for the natives. During the late summer the Eskimo women go on short trips with their children and cut the matted heather plants which they pile up in large sod-like clusters. These are then stacked in four foot piles to dry. If a freezing rain saturates these heaps of peat, the natives will have a very cold house in the winter. Fortunately, there are a few lignite coal mines in Greenland, two of which are on Disco Island. A third may soon be worked on the mainland. The traditional storybook seal oil lamp is very seldom used at present except in the northern outposts of Greenland near Thule. Where the seal oil lamp is used for heat and illumination moss had to be gathered to make a wick for the lamp. The concave kidney shaped stone lamp is filled with the oiliest of all oils — seal oil, and a wick is improvised by placing moss along the upper edge of the receptacle.

The Eskimo recognizes one plant, the heather, *Empetrum nigrum*, as providing both food and fuel. It is widely distributed over Greenland, without southern limit and supposedly without northern limit. The berries are commonly gathered and eaten and the plant is dried for fuel.

There are a few other plants which furnish the bulk for the stacks of fuel. *Cassiope tetragona* grows in the heath and not too wet bogs up to the approaches to the snow fields. Next in importance to *Empetrum*, it is also collected by the women and carried on their backs to high, well drained ground near their homes to dry out. One plant, *Betula nana*, which may be called an Arctic tree, forms "birch-heath." It is used for fuel by the natives as are *Salix glauca*, *Salix arctophila* and the evergreen *Phyllodoce coerulea* with blue flowers.

Since there are few trees in Greenland, little wood is burned. Driftwood coming from Siberia and Canada is found by the native occasionally, but is used in making dog sledges and umiads (women's boat) and kayaks. A few willows and aspens in southern Greenland reach up to fifteen feet. In the Arctic these diminutive trees are dwarfed by wind, weather, and latitude to only a few inches in height. They struggle for an existence, but instead of growing vertically they are forced by the elements to crawl horizontally over the rock surface.

Plants furnish a small but very important part of the Eskimos' clothing. Many of the grasses, some reaching up to two or three feet, are used as an inner-sole for the two-layer sealskin kameek. The Eskimo calls the hay "Ivik." The most important article of clothing in the Arctic is the knee-high boot, the kameek, and the most important part of this is the inner-sole made of straw. It furnishes support, protection and warmth for the feet. The grasses from which these inner-soles are formed are gathered from the moist hill slopes, glacial rivulets, and the edges of thickets where they form extensive dense carpets.

*Calamagrostis langsdorfi*, because of its length, delicacy, and toughness of its straw, is valued as the best material for inner-soles. Due to its pliability it is used from Egedesminde southwards for the making of domestic industrial objects, such as trays, baskets, and caps. Other grasses used for both purposes are: *Elymus arenarius*, *Carex rariflora*, and *Poa glauca* found in basalt and sandstone formations and in soil around settlements and along the sandy shores of rivers. Associated with *Elymus arenarius* is *Alopecurus alpinus*. It is used in southern Greenland as green fodder and hay for the sheep. Throughout Greenland the grass forms by its web roots a compact turf or sod which the people use in making their low native sod houses. Very few Greenland Eskimos have ever seen an ice igloo, although the word for "house" in Eskimo is "Igdloo." The native sod houses are being supplanted by wooden houses; the wood is imported from Denmark and Canada. Sod houses are more suitable for Arctic living than wooden houses, also they are cheaper and easily constructed.

#### ADDITIONAL REMARKS

A few plants occur on the Nunataqs (mountain peaks which protrude above the ice cap or glaciers). *Cerastium alpinum* has been found with expanded flowers in April, a month before it appeared in the lowlands, on the top of nunataqs. The pubescence on the leaves seems to be its fur coat. Because of its white flower the Eskimo calls it the Kakortuad.

One of the most beautiful flowers in Greenland is *Epilobium lactiflorum* which is called "niviarsiak" (girl) by the natives. It has a beautiful orchid-like purple flower.

*Ledum palustre* has leaves which are shaped like the natives'

boat, the kayak. Therefore, he has given the plant the name, "Kajaussat," meaning "like a kayak."

The birds of the Arctic eat the spore heads of *Equisetum arvense* which is fittingly called Nerdlrup Nerissagssai (food of the birds) by the Eskimos. The reindeer eat *Salix uva-ursi*.

The most romantic, although useless, plant which grows in the Arctic is the yellow-green *Lycopodium selago*. The plant is a trailer and branches in a way to resemble the human hand. The Eskimo calls it the "kivigtut agssait" which means "ghost's hand." The Eskimo legend claims that this plant is the result of a ghost's hand imprint on the rocks. The Kivigtut, or ghost, of Greenland is supposedly the spirit of a man who has been jilted by his sweetheart or has been ostracized by his people. Instead of committing suicide he puts his few belongings in a little sack slung over his shoulder and disappears in the hills. Instead of dying, he continues to roam, in ectoplasmic form, over the hills to come back to the settlement only at night to haunt his former friends. The Eskimo mothers tell their children about the Kivigtut if they wish to get them in at night. He is the "bogie man" of Greenland.

We can conclude by reiterating that plants play a small but important part in the existence of the Eskimo. In spite of the fact that there are few plants in Greenland, and these small and available for only a short period of time, the Eskimo really utilizes them to the fullest extent. He makes the best of everything God has given him. However, there are a few plants which the Eskimo should learn to use for food. It is amazing that the diet of the native is mostly meat and fish.

One might ask if it were not possible to have cold frames, hot beds, and greenhouses in Greenland. The answer is affirmative. Already the Danes have shown the Eskimo how to build cold frames and given him seeds. Even as far north as two hundred miles above the Arctic Circle vegetables are grown: radishes, parsley, cress, spinach, lettuce, carrots, and even tomatoes. Our army unit had a greenhouse at our weather outpost and it furnished all these vegetables, in addition to flowers to brighten our pine board dining table. There is one drawback to having greenhouses in the Arctic and that is the scarcity of soil. If plants could be grown in water through a simple method of hydroponics which an Eskimo could master, there would be no difficulty at all in overcoming this handicap.

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