

NON-FICTION

John Muir

Cruise of the Revenue-Steamer Corwin

A PUBLIC DOMAIN BOOK

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NON-FICTION

THE
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HOUSE OF REPRESENTATIVES
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R E V E N U E - S T E A M E R C O R W I N

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**NOTES AND MEMORANDA: MEDICAL AND ANTHROPOLOGICAL;
BOTANICAL; ORNITHOLOGICAL.**

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1883.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

IN RESPONSE TO

*A resolution of the House of Representatives transmitting the observations and notes made during the
cruise of the revenue-cutter Corwin in 1881.*

MARCH 3, 1883.--Referred to the Committee on Commerce and ordered to be printed.

TREASURY DEPARTMENT, *March 3, 1883.*

SIR: I have the honor to acknowledge the receipt of resolution of the House, dated March 3, 1883, requesting that the Secretary of the Treasury furnish, as soon as convenient, to the Speaker of the House copies of documents in the possession of the Treasury Department containing observations on glaciation, birds, natural history, and the medical notes made upon cruises of revenue-cutters in the year 1881.

In reply, I transmit herewith the observations on glaciation in the Arctic Ocean and the Alaska region, made by Mr. John Muir; notes upon the birds and natural history of Bering Sea and the northwestern region, by Mr. E. W. Nelson; and medical notes and anthropological notes relating to the natives of Alaska and the northwestern Arctic region, made by Dr. Irving C. Rosse.

All these notes were made upon the cruise of the revenue-cutter Corwin in 1881.

Very respectfully,

H. F. FRENCH,
Acting Secretary.

Hon. J. W. KEIFER,
Speaker of the House of Representatives.

BOTANICAL NOTES ON ALASKA.

BY

JOHN MUIR.

BOTANICAL NOTES.

BY JOHN MUIR.

INTRODUCTORY.

The plants named in the following notes were collected at many localities on the coasts of Alaska and Siberia, and on Saint Lawrence, Wrangel, and Herald Islands, between about latitude 54deg and 71deg, longitude 161deg and 178deg, in the course of short excursions, some of them less than an hour in length.

Inasmuch as the flora of the arctic and subarctic regions is nearly the same everywhere, the discovery of many species new to science was not to be expected. The collection, however, will no doubt be valuable for comparison with the plants of other regions.

In general the physiognomy of the vegetation of the polar regions resembles that of the alpine valleys of the temperate zones; so much so that the botanist on the coast of Arctic Siberia or America might readily fancy himself on the Sierra Nevada at a height of 10,000 to 12,000 feet above the sea.

There is no line of perpetual snow on any portion of the arctic regions known to explorers. The snow disappears every summer not only from the low sandy shores and boggy tundras but also from the tops of the mountains and all the upper slopes and valleys with the exception of small patches of drifts and avalanche-heaps hardly noticeable in general views. But though nowhere excessively deep or permanent, the snow-mantle is universal during winter, and the plants are solidly frozen and buried for nearly three-fourths of the year. In this condition they enjoy a sleep and rest about as profound as death, from which they awake in the months of June and July in vigorous health, and speedily reach a far higher development of leaf and flower and fruit than is generally supposed. On the drier banks and hills about Kotzebue Sound, Cape Thompson, and Cape Lisbourne many species show but little climatic repression, and during the long summer days grow tall enough to wave in the wind, and unfold flowers in as rich profusion and as highly colored as may be found in regions lying a thousand miles farther south.

OONALASKA.

To the botanist approaching any portion of the Aleutian chain of islands from the southward during the winter or spring months, the view is severely desolate and forbidding. The snow comes down to the water's edge in solid white, interrupted only by dark outstanding bluffs with faces too steep for snow to lie on, and by the backs of rounded rocks and long rugged reefs beaten and overswept by heavy breakers rolling in from the Pacific, while throughout nearly every month of the year the higher mountains are wrapped in gloomy dripping storm-clouds.

Nevertheless vegetation here is remarkably close and luxuriant, and crowded with showy bloom, covering almost every foot of the ground up to a height of about a thousand feet above the sea--the harsh trachytic rocks, and even the cindery bases of the craters, as well as the moraines and rough soil beds outspread on the low portions of the short narrow valleys.

On the 20th of May we found the showy *Geum glaciale* already in flower, also an arctostaphylos and draba, on a slope facing the south, near the harbor of Ounalaska. The willows, too, were then beginning to put forth their catkins, while a multitude of green points were springing up in sheltered spots wherever the snow had vanished. At a height of 400 and 500 feet, however, winter was still unbroken, with scarce a memory of the rich bloom of summer.

During a few short excursions along the shores of Ounalaska Harbor and on two of the adjacent mountains, towards the end of May and beginning of October we saw about fifty species of flowering plants--*Empetrum*, *Vaccinium*, *Bryanthus*, *Pyrola*, *Arctostaphylos*, *Ledum*, *Cassiope*, *Lupinus*, *Zeranium*, *Epilobium*, *Silene*, *Draba*, and *Saxifraga* being the most telling and characteristic of the genera represented. *Empetrum nigrum*, a *Bryanthus*, and three species of *Vaccinium* make a grand display when in flower and show their massed colors at a considerable distance.

Almost the entire surface of the valleys and hills and lower slopes of the mountains is covered with a dense spongy plush of lichens and mosses similar to that which cover the tundras of the Arctic regions, making a rich green mantle on which the showy flowering plants are strikingly relieved, though these grow far more luxuriantly on the banks of the streams where the drainage is less interrupted. Here also the ferns, of which I saw three species, are taller and more abundant, some of them arching their broad delicate fronds over one's shoulders, while in similar situations the tallest of the five grasses that were seen reaches a height of nearly six feet, and forms a growth close enough for the farmer's scythe.

Not a single tree has yet been seen on any of the islands of the chain west of Kodiak, excepting a few spruces brought from Sitka and planted at Ounalaska by the Russians about fifty years ago. They are still alive in a dwarfed condition, having made scarce any appreciable growth since they were planted. These facts are the more remarkable, since in

Southeastern Alaska lying both to the north and south of here, and on the many islands of the Alexander Archipelago, as well as on the mainland, forests of beautiful conifers flourish exuberantly and attain noble dimensions, while the climatic conditions generally do not appear to differ greatly from those that obtain on these treeless islands.

Wherever cattle have been introduced they have prospered and grown fat on the abundance of rich nutritious pasturage to be found almost everywhere in the deep withdrawing valleys and on the green slopes of the hills and mountains, but the wetness of the summer months will always prevent the making of hay in any considerable quantities.

The agricultural possibilities of these islands seem also to be very limited. The hardier of the cereals--rye, barley, and oats--make a good vigorous growth, and head out, but seldom or never mature, on account of insufficient sunshine and overabundance of moisture in the form of long-continued drizzling fogs and rains. Green crops, however, as potatoes, turnips, cabbages, beets, and most other common garden vegetables, thrive wherever the ground is thoroughly drained and has a southerly exposure.

SAINT LAWRENCE ISLAND.

Saint Lawrence Island, as far as our observations extended, is mostly a dreary mass of granite and lava of various forms and colors, roughened with volcanic cones, covered with snow, and rigidly bound in ocean ice for half the year.

Inasmuch as it lies broadside to the direction pursued by the great ice-sheet that recently filled Bering Sea, and its rocks offered unequal resistance to the denuding action of the ice, the island is traversed by numerous ridges and low gap-like valleys all trending in the same general direction, some of the lowest of these transverse valleys having been degraded nearly to the level of the sea, showing that had the glaciation to which the island has been subjected been slightly greater we should have found several islands here instead of one.

At the time of our first visit, May 28, winter still had full possession, but eleven days later we found the dwarf willows, drabas, crizersons, saxifrages pushing up their buds and leaves, on spots bare of snow, with wonderful rapidity. This was the beginning of spring at the northwest end of the island. On July 4 the flora seemed to have reached its highest development. The bottoms of the glacial valleys were in many places covered with tall grasses and carices evenly planted and forming meadows of considerable size, while the drier portions and the sloping grounds about them were enlivened with gay highly-colored flowers from an inch to nearly two feet in height--*Aconitum Napellus*, L. var. *delphinifolium* ser. *Polemonium coeruleum*, L. *Papaver nudicaule*, *Draba alpina*, and *Silene acaulis* in large closely flowered tufts, *Andromeda*, *Ledum* *Linnaea*, *Cassiope*, and several species of *Vaccinium* and *Saxifraga*.

SAINT MICHAEL'S.

The region about Saint Michael's is a magnificent tundra, crowded with Arctic lichens and mosses, which here develop under most favorable conditions. In the spongy plush formed by the lower plants, in which one sinks almost knee-deep at every step, there is a sparse growth of grasses, carices, and rushes, tall enough to wave in the wind, while *Empetrum*, the dwarf birch, and the various heathworts flourish here in all their beauty of bright leaves and flowers. The moss mantle for the most part rests on a stratum of ice that never melts to any great extent, and the ice on a bed rock of black vesicular lava. Ridges of the lava rise here and there above the general level in rough masses, affording ground for plants that like a drier soil. Numerous hollows and watercourses also occur on the general tundra, whose well-drained banks are decked with gay flowers in lavish abundance, and meadow patches of grasses shoulder high, suggestive of regions much farther south.

The following plants and a few doubtful species not yet determined were collected here:

<i>Linnaea borealis</i> , Gronov.	<i>Oxytropis podocarpa</i> , Gray.
<i>Cassiope tetragona</i> , Desv.	<i>Astragalus alpinus</i> , L.
<i>Andromeda polifolia</i> , L.	<i>frigidus</i> , Gray, var. <i>littoralis</i> .
<i>Loiseleuria procumbens</i> , Desv.	<i>Lathyrus maritimus</i> , Bigelow.
<i>Vaccinium vitis-idaea</i> , L.	<i>Arenaria lateriflora</i> , L.
<i>Arctostaphylos alpina</i> , Spring.	<i>Stellaria longipes</i> , Goldie.
<i>Ledum palustre</i> , L.	<i>Silene acaulis</i> , L.
<i>Nardosmia frigida</i> , Hook.	<i>Saxifraga nivalis</i> , L.
<i>Saussurea alpina</i> , Dl.	<i>hieracifolia</i> , W. and K.

Senecio frigidus, Less.
 palustris, Hook.
 Arnica angustifolia, Vahl.
 Artemisia arctica, Bess.
 Matricaria inodora, L.
 Rubus chamae morus, L.
 arcticus, L.
 Potentilla nivea, L.
 Dryas octopetala, L.
 Draba alpina, L.
 incana, L.
 Entrema arenicola, Hook?
 Pedicularis sudetica, Willd.
 euphrasioides, Steph.
 Langsdorffii, Fisch, var. lanata, Gray.
 Diapensia Lapponica, L.
 Polemonium coeruleum, L.
 Primula borealis, Daly.

Anemone narcissiflora, L.
 parviflora, Michx.
 Caltha palustris, L., var. asarifolia, Rothr.
 Valeriana capitata, Willd.
 Lloydia serotina, Reichmb.
 Tofieldia coccinea, Richards.
 Armeria vulgaris, Willd.
 Corydalis pauciflora.
 Pinguicula Villosa, L.
 Mertensia paniculata, Desv.
 Polygonum alpinum, All.
 Epilobium latifolium, L.
 Betula nana, L.
 Alnus viridis, Dl.
 Eriophorum capitatum.
 Carex vulgaris, Willd, var. alpina.
 Aspidium fragrans, Swartz.
 Woodsia Iloensis, Bv.

GOLOVIN BAY.

The tundra flora on the west side of Golovin Bay is remarkably close and luxuriant, covering almost every foot of the ground, the hills as well as the valleys, while the sandy beach and a bank of coarsely stratified moraine material a few yards back from the beach were blooming like a garden with *Lathyrus maritimus*, *Iris sibirica*, *Polemonium coeruleum*, &c., diversified with clumps and patches of *Elymus arenarius*, *Alnus viridis*, and *Abies alba*.

This is one of the few points on the east side of Bering Sea where trees closely approach the shore. The white spruce occurs here in small groves or thickets of well developed erect trees 15 or 20 feet high, near the level of the sea, at a distance of about 6 or 8 miles from the mouth of the bay, and gradually become irregular and dwarfed as they approach the shore. Here a number of dead and dying specimens were observed, indicating that conditions of soil, climate, and relations to other plants were becoming more unfavorable, and causing the tree-line to recede from the coast.

The following collection was made here July 10:

Pinguicula villosa, L.
 Vaccinium vitis Idaea, L.
 Spiraea betulaeifolia, Pallas.
 Rubus arcticus, L.
 Epilobium latifolium, L.
 Polemonium coevuleum, L.
 Trientalis europaea, L. var. arctica, Ledeb.
 Entrema arenicola, Hook.
 Iris sibirica, L.

Lloydia serotina, Reichemb.
 Chrysanthemum arcticum, L.
 Artemisia Tilesii, Ledeb.
 Arenaria peploides, L.
 Gentiana glanca, Pallas.
 Elymus arenarius, L.
 Poa trivialis, L.
 Carex vesicaria, L. var. alpigma, Fries.
 Aspidium spinulosum, Sw.

KOTZEBUE SOUND.

The flora of the region about the head of Kotzebue Sound is hardly less luxuriant and rich in species than that of other points visited by the Corwin lying several degrees farther south. Fine nutritious grasses suitable for the fattening of cattle and from 2 to 6 feet high are not of rare occurrence on meadows of considerable extent and along streambanks wherever the stagnant waters of the tundra have been drained off, while in similar localities the most showy of the Arctic plants bloom in all their freshness and beauty, manifesting no sign of frost, or unfavorable conditions of any kind whatever.

A striking result of the airing and draining of the boggy tundra soil is shown on the ice-bluffs around Escholtze Bay, where it has been undermined by the melting of the ice on which it rests. In falling down the face of the ice-wall it is well shaken and rolled before it again comes to rest on terraced or gently sloping portions of the wall. The original vegetation of the tundra is thus destroyed, and tall grasses spring up on the fresh mellow ground as it accumulates from time to time, growing lush and rank, though in many places that we noted these new soil-beds are not more than a foot in depth, and lie on the solid ice.

At the time of our last visit to this interesting region, about the middle of September, the weather was still fine, suggesting the Indian Summer of the Western States. The tundra glowed in the mellow sunshine with the colors of the ripe foliage of vaccinium, empetrum, arctostaphylos, and dwarf birch; red, purple, and yellow, in pure bright tones, while the berries, hardly less beautiful, were scattered everywhere as if they had been sown broadcast with a lavish hand, the whole blending harmoniously with the neutral tints of the furred bed of lichens and mosses on which the bright leaves and berries were painted.

On several points about the sound the white spruce occurs in small compact groves within a few miles of the shore; and pyrola, which belongs to wooded regions, is abundant where no trees are now in sight, tending to show that areas of considerable extent, now treeless, were once forested.

The plants collected are:

Pyrola rotundifolia, L. var. pumila, Hook	Saxifraga tricuspidata, Retg.
Arctostaphylos alpina, Spring	Trientalis europaea, L. var. arctica, Ledeb.
Cassiope tetragona, Desr	Lupinus arcticus, Watson.
Ledum palustre	Hedysarum boreale, Nutt.
Vaccinium Vitis Idaea, L.	Galium boreale, L.
Uliginosum, L. var. mucronata, Hender	Armeria vulgaris, Willd, var. Arctica, Cham.
Empetrum nigrum	Allium schaenoprasum, L.
Potentilla, anserina, L. var	Polygonum Viviparum, L.
biflora, Willd	Castilleia pallida, Kunth.
fruticosa	Pedicularis sudetica, Willd.
Stellaria longipes, Goldie	verticillata, L.
Cerastium alpinum, L. var. Behringianum. Regel	Senecio palustris, Hook.
Mertensia maritima, Derr	Salix polaris, Wahl.
Papaver nudicale, L	Luzula hyperborea, R. Br.

CAPE THOMPSON.

The Cape Thompson flora is richer in species and individuals than that of any other point on the Arctic shores we have seen, owing no doubt mainly to the better drainage of the ground through the fissured frost-cracked limestone, which hereabouts is the principal rock.

Where the hill-slopes are steepest the rock frequently occurs in loose angular masses and is entirely bare of soil. But between these barren slopes there are valleys where the showiest of the Arctic plants bloom in rich-profusion and variety, forming brilliant masses of color--purple, yellow, and blue--where certain species form beds of considerable size, almost to the exclusion of others.

The following list was obtained here July 19:

Phlox Sibirica, L.	Potentilla biflora, Willd.
Polemonium humile. Willd.	nivea, L.
coeruleum, L.	Draba stellata, Jacq. var. nivalis, Regel.
Myosotis sylvatica, var. alpestris.	incana, L.
Eritrichium nanum, var. arctioides, Hedu.	Cardamine pratensis, L.?
Dodecatheon media, var. frigidum, Gray.	Cheiranthus pygmaeus, Adans.
Androsace chamaejasme, Willd.	Parrya nudicaulis, Regel. var. aspera, Regel.

Anemone narcissiflora, L.	Hedysarum borealis, Nutt.
multifida, Poir.	Oxytropis podocarpa, Gray.
parviflora, Michx.	Cerastium alpinum, L. var. Behringianum, Regel.
parviflora, Michx. var.	Silene acaulis, L.
Ranunculus affinis, R. Br.	Arenaria verna, L. var. rubella, Hook, f.
Caltha aserifolia, Dl.	arctica, Ster.
Geum glaciale, Fisch.	Stellaria longipes, Goldie.
Dryas octopetala, L.	Artemisia tomentosa.
Polygonum Bistorta, L.	Pedicularis capitata, Adans.
Rumex Crispus, L.	Papaver nudicaule, L.
Boykinia Richardsonii, Gray.	Epilobium latifolium, L.
Saxifraga tricuspidata, Retg.	Cassiope tetragone, Desr.
cernua, L.	Vaccinium uliginosum, L. var. Mucronata, Hender.
flagellaris, Willd.	vitis idaea, L.
davarica, Willd.	Salix polaris, Wahl, and two other species undetermined.
punctata, L.	Festuca Sativa?
nivalis, L.	Glyceria, ----
Nardosmia carymbosa, Hook?	Trisetum subspicatum, Beauv, var. Molle, Gray.
Erigeron Muirii, Gray, n. sp.	Carex variflora, Wahl.
Taraxacum palustre, Dl.	vulgaris, Fries, var. Alpina, (C. rigida, Good).
Senecio frigidus, Less.	Cystoperis fragilis, Bernt.
Artemisia glomerata, Ledt.	

CAPE PRINCE OF WALES.

At Cape Prince of Wales we obtained:

Loiseleuria procumbens, Desr.	Tofieldia coccinea, Richards.
Andromeda polifolia, L. forma arctica.	Armeria arctica, Ster.
Vaccinium Vitis Idaea, L.	Taraxacum palustre, Dl.
Androsace chamoejasme, Willd.	

TWENTY MILES EAST OF CAPE LISBOURNE.

Lychnis apetala, L.	Oxytropis campestris, Dl.
Androsace chamoejasme, Willd.	Erigeron uniflorus, L.
Geum glaciata, Fisch.	Artemisia glomerata, Ledb.
Potentilla nivea, L.	Saxifraga escholtzii, Sternb.
biflora, Willd.	flagellaris, Willd.
Phlox Sibirica, L.	Chrysosplenium alternifolium, L.
Primula borealis, Daly.	Draba hirta, L.
Anemone narcissiflora, L. var.	

CAPE WANKEREM, SIBERIA.

Near Cape Wankerem, August 7 and 8, we collected:

Claytonia Virginica, L.?	Chrysanthemum arcticum, L.
Ranunculus pygmaeus, Wahl.	Senecio frigidus, Less.

Pedicularis Langsdorffii, Fisch.
 Chrysosplenium alternifolium, L.
 Saxifraga cernua, L.
 stellaris, L. var. cornosa.
 rivularis, L. var. hyperborea, Hook.
 Polemonium coeruleum, L.
 Lychnis apetala, L.
 Nardosmia frigida, Hook.

Artemisia vulgaris, var. Telesii, Ledeb.
 Elymus arenarius, L.
 Alopecurus alpinus, Smith.
 Poa arctica, R. Br.
 Calamagrostis deschampsoides, Trin.?
 Luzula hyperborea, R. Br.
 spicato Desv.

PLOVER BAY, SIBERIA.

The mountains bounding the glacial fiord called Plover Bay, though beautiful in their combinations of curves and peaks as they are seen touching each other delicately and rising in bold, picturesque groups, are nevertheless severely desolate looking from the absence of trees and large shrubs, and indeed of vegetation of any kind dense enough to give color in telling quantities, or to soften the harsh rockiness of the steepest portions of the walls. Even the valleys opening back from the water here and there on either side are mostly bare as seen at a distance of a mile or two, and show only a faint tinge of green, derived from dwarf willows, heathworts, and sedges chiefly.

The most interesting of the plants found here are *Rhododendron Kamschaticum*, Pall., and the handsome blue-flowered *Saxifraga oppositifolia*, L., both of which are abundant.

The following were collected July 12 and August 26:

Gentiana glauca, Pall.
 Geum glaciale, Fisch.
 Dryas octopetala, L.
 Aconitum Napellus, L. var. delphinifolium, Ser.
 Saxifraga oppositifolia, L.
 punctata, L.
 coespitosa, L.
 Diapensia Lapponica, L.

Rhododendron Kamschaticum, Pall.
 Cassiope tetragona, Desv.
 Anemone narcissiflora, L.
 Arenaria macrocarpa, Pursh.
 Draba alpina, L.
 Parrya Ermanni, Ledeb.
 Oxytropis, podocarpa, Gray.

HERALD ISLAND.

On Herald Island the common polar cryptogamous vegetation is well represented and developed. So also are the flowering plants, almost the entire surface of the island, with the exception of the sheer crumbling bluffs along the shores, being quite tellingly dotted and tufted with characteristic species. The following list was obtained:

Saxifraga punctata, L.?
 serpyllifolia, Pursh.
 sileniflora, Stemb.
 bronchialis, L.
 stellaris, L. var. comosa, Poir.
 rivularis, L. var. hyperborea, Hook.
 hieracifolia, Waldst & Kit.
 Papaver nudicaule, L.

Draba alpina, L.
 Gymnandra Stelleri, Cham. & Schlecht.
 Stellaria longipes, Goldie, var. Edwardsii T. & G.
 Senecio frigidus, Less.
 Potentilla frigida, Vill.?
 Salax polaris, Wahl.
 Alopecurus alpinus, Smith.
 Luzula hyperborea, R. Br.

WRANGEL ISLAND.

Our stay on the one point of Wrangel Island that we touched was far too short to admit of making anything like as full a collection of the plants of so interesting a region as was desirable. We found the rock formation where we landed and for some distance along the coast to the eastward and westward to be a close-grained clay slate, cleaving freely into thin flakes, with here and there a few compact metamorphic masses that rise above the general surface. Where it is

exposed along the shore bluffs and kept bare of vegetation and soil by the action of the ocean, ice, and heavy snow-drifts the rock presents a surface about as black as coal, without even a moss or lichen to enliven its sombre gloom. But when this dreary barrier is passed the surface features of the country in general are found to be finely molded and collocated, smooth valleys, wide as compared with their depth, trending back from the shore to a range of mountains that appear blue in the distance, and round-topped hills, with their side curves finely drawn, touching and blending in beautiful groups, while scarce a single rock-pile is seen or sheer-walled bluff to break the general smoothness.

The soil has evidently been derived mostly from the underlying slates, though a few fragmentary wasting moraines were observed containing traveled boulders of quartz and granite which doubtless were brought from the mountains of the interior by glaciers that have recently vanished--so recently that the outlines and sculptured hollows and grooves of the mountains have not as yet suffered sufficient post glacial denudation to mar appreciably their glacial characters.

The banks of the river at the mouth of which we landed presented a striking contrast as to vegetation to that of any other stream we had seen in the Arctic regions. The tundra vegetation was not wholly absent, but the mosses and lichens of which it is elsewhere composed are about as feebly developed as possible, and instead of forming a continuous covering they occur in small separate tufts, leaving the ground between them raw and bare as that of a newly-ploughed field. The phanerogamous plants, both on the lowest grounds and the slopes and hilltops as far as seen, were in the same severely repressed condition and as sparsely planted in tufts an inch or two in diameter, with about from one to three feet of naked soil between them. Some portions of the coast, however, farther south presented a greenish hue as seen from the ship at a distance of eight or ten miles, owing no doubt to vegetation growing under less unfavorable conditions.

From an area of about half a square mile the following plants were collected:

<i>Saxifraga flegellaris</i> , Willd.	<i>Senecio frigidus</i> , Less.
<i>stellaris</i> , L. var. <i>cornosa</i> , Poir.	<i>Potentilla nivea</i> , L.
<i>sileneflora</i> , Sternb.	<i>frigida</i> , Vill.?
<i>hieracifolia</i> , Waldst. & Kit.	<i>Armeria macrocarpa</i> , Pursh.
<i>rivularis</i> , L. var. <i>hyperborea</i> , Hook.	<i>vulgaris</i> , Willd.
<i>bronchialis</i> , L.	<i>Stellaria longipes</i> , Goldie, var. <i>Edwardsii</i> T. & G.
<i>serpyllifolia</i> , Pursh.	<i>Cerastium alpinum</i> , L.
<i>Anemone parviflora</i> , Michx.	<i>Gymnandra Stelleri</i> , Chain & Schlecht.
<i>Papaver nudicaule</i> , L.	<i>Salix polaris</i> , Wahl.
<i>Draba alpina</i> , L.	<i>Luzulu hyperborea</i> , R. Br.
<i>Cochleria officinalis</i> , L.	<i>Poa arctica</i> , R. Br.
<i>Artemisia borealis</i> , Willd.	<i>Aira caespitosa</i> , L. var. <i>Aretica</i> .
<i>Nardosmia frigida</i> , Hook.	<i>Alopecurus alpinus</i> , Smith.
<i>Saussurea monticola</i> , Richards.	