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Research Study Report

RER-18

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A VEGETATION TRANSECT OF THE THULE PENINSULA

Ronald A. Nelson  
1st Lt QMC

Regional Environments Research Branch

7-83-01-005A

April 1958

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## ABSTRACT

Vegetation of the Thule Peninsula was sampled along a 16-mile transect between Thule Air Base and Camp Tuto. The general vegetation is small and sparse. Grasses and sedges, found in marshy areas, are the largest plants; most of the trees and other plants are less than five inches high. The vegetation may be used in an emergency for fuel, food, and insulation by individuals or small groups; it is of no value for providing opportunities for cover or concealment.

## A VEGETATION TRANSECT OF THE THULE PENINSULA

### Introduction

The purpose of this study is to describe the vegetation of the Thule, Greenland area in terms of its military significance. More complete botanical lists are available (for example, Porsild 1957), but to the military planner who has not visited the area, such lists have little meaning.

Because time for investigation was limited, the study was conducted along the 16-mile road from Thule Air Base to Camp Tuto. At intervals of one mile the investigators collected vegetation samples on both sides of the road for a distance of approximately 50 yards, gathering a sample of each species found in a six-foot wide strip.

### Analysis of the Vegetation Transect

Almost all of the surface of the Thule Peninsula consists of glacial deposits, rocks of various sizes, and thin, unconsolidated soils. At least half of this surface supports no vegetation whatsoever; and, largely as a result of the additional limitations of the severe climate, the existing vegetation is sparse and stunted. Even the tallest plants are seldom over five inches high, except for the abundant grass and sedge growth in marshy depressions near Thule Air Base. These marshy areas range in size from a few square feet to approximately an acre. Also near the Air Base, on piles of dirt pushed up by earthmoving equipment, are concentrations of particular species such as the arctic poppy (Papaver radicum).

Between the Air Base and the Ivnaq River, a distance of about six miles, the surface is made up of rubble-covered slopes. On the rocky soil of this area the most common plants are the arctic rose (Dryas integrifolia), purple saxifrage (Saxifraga oppositifolia), arctic poppy (Papaver radicum), arctic willows (Salix arctophila & arctica), arctic heather (Cassiope tetragona), arctic diapensia (Diapensia lapponica), bladder-campion (Melandrium sp), mustard (Braya purpurascens), and various mosses, lichens, and grasses. The rose, though stunted and dwarfed, has delicate white flowers blooming singly among matted gray leaves.

In the Ivnaq River Valley there is a concentration of grass and sedge. The river, which in June is approximately 50 yards wide and from six inches to two feet deep, marks the beginning of meadow-like growth which seems to be common in and near stream courses on the outwash plains in this area. The surface of the outwash plains is less rubbly than that along other sections of the transect, and the meadows resemble those at high elevations in the mountains of the continental United States.

On the boulder-strewn slopes between the Ivnaq River and the Icecap, the vegetation is as stunted and scattered as that below the river, but here the lichens and mosses are more prominent. Each boulder has on its lee side a brownish-gray or black lichen growth which contrasts sharply with its windward side, which is worn smooth by the erosion and polishing action of the prevailing easterly winds. All of the species collected, except the Carex sp., are represented in this area.

Stone rings or stone polygons, irregularly shaped ground patterns in which large rocks or boulders form a ring around the finer materials in the center, are prominent near Camp Tuto. These stone rings, caused by frost action, range in diameter from about four to ten feet. Figure 4 is a schematic diagram showing a typical arrangement for the plants in a stone net. It may be noted that the vegetation from one stone ring to the next is very similar, although it is possible that in some of the oblong rings there may be a central strip of moss, grass, and herbs in addition to the usual scattered plants. Moss, common among the rocks of the polygons, provides a moisture-holding mat for the growth of other plants.

In general, the vegetation in the Camp Tuto area is smaller and sparser than that along the rest of the transect.

#### Military Significance of the Vegetation

The principal significance of the vegetation of the Thule Peninsula lies in its sparseness and small size. The dwarfed plants can provide neither cover nor concealment, and the vegetation is so sparse that it has little effect on the surface color. The dominant ground color is earth brown (10YR 3/2 in the Munsell Book of Color). The area appearing as green (7.5GY 5/6) is very small and does not warrant any change in camouflage color on account of vegetation. Strips of green color, however, may be useful in flat-top nets for camouflaging gun emplacements or field fortifications (FM 5-20A). It should be mentioned that the boulders do provide some cover, and the dark ground colors in combination with the low angle of the sun have a limiting effect on visibility.

The local vegetation also is useless for construction of temporary shelters; in some spots enough sod may be available for construction of shelter walls, but its inherent dampness makes it difficult to work with. Emergency use can be made of the vegetation for purposes of insulation.

For survival, certain of the plants are very useful. The stems, leaves, and larger roots may be eaten for nourishment; even the lichen contains some food value. The arctic willows (Salix arctica and Salix arctophila) are rich sources of ascorbic acid or vitamin c. Dried labrador tea (Ledum groenlandicum) may be brewed into a hot beverage.

Fuel is in large enough supply from local sources for immediate needs of individuals or small groups of people. The willow and the arctic white heather (Cassiope tetragona) may be collected and burned for heating and cooking. Moss and peat may be used for heating if dry, but when burned wet cause a smudge rather than providing heat. This smudge may be useful, however, for emergency signaling purposes.

### Conclusions

Botanical lists for the Thule Peninsula include many species which were not collected along this transect. This may be attributed to the relatively small area from which collections were made and to the fact that some species do not appear every year in the Thule area. All of the species that were collected, however, had general arctic distribution and were not limited to the area from which they were collected.

The sampling method used for this study was the most satisfactory in relation to the situation. The actual conditions of vegetation size, distribution, color, and season of growth were ascertained through the transect and thereby answered the objective of the study.

A complete mapping of species for the Thule Peninsula is a project that would be of value to the Army and botanists alike in that it would show the natural vegetation conditions prevailing in each sub-area on a typical arctic desert peninsula. It would also be a useful addition to the studies of the vegetation of Greenland such as those conducted at Disko Island, Peary Land, Sondrestrom Fjord, and Southern Greenland, which are listed in the Arctic Bibliography. The statements of military significance of the vegetation in the Thule Peninsula are applicable to nearly all the coastal areas of Greenland, except Southwestern Greenland, where small clumps of short trees may be found. These studies are especially useful for their discussions of method, plant distribution, and plant description.

### Descriptions of Plants Collected

The plant specimens collected along this transect are now located in the Regional Environments Research Branch herbarium and are available for inspection. These are:

Alopecurus alpinus L.: A medium-sized foxtail grass with a short rootstalk. It is a common, widespread arctic grass that grows where abundant moisture is available, usually near seashores. It is found in all parts of the high latitude Arctic. If fertilized and cultivated it could provide good grazing.

Braya purpurascens Bunge: A species of mustard with a stout taproot. It is a freely branching plant with fleshy leaves and flower petals that are white or pale purple. It is a variable species found on calcareous clay and gravel barrens in the high latitude Arctic.

Cassiope tetragona D. Don: This arctic white heather is a coarse dwarf shrub with dark green, leathery leaves. It is restricted to places where snow accumulates in winter. Where abundant it is a good source of fuel owing to its high content of resin. It grows in all parts of the arctic.

Ledum groenlandicum Oeder: The common name of this aromatic, much branched decumbent or ascending dwarf shrub is Labrador tea. It has dark green, leathery leaves and small, white, spicy flowers. It is common in relatively wet dwarf shrub or moss-lichen heaths or on sunny cliffs and ledges in restricted areas of the arctic.

Salix arctophila Cockerell: An arctic willow which is always prostrate, with brownish-green barked branches that tend to turn black in drying. The leaves are dark green above and paler beneath. The catkins are large and usually stiffly erect. It thrives in rather wet mossy tundra, and is widely distributed in the eastern North American arctic.

Salix arctica Pall.: This arctic willow is a decumbent often matted shrub with trailing, smooth branches and variously shaped leaves. The leaves are dull green above and slightly paler beneath. Catkins appear with the leaves. It is the most northerly of the willows and the only one found north of the 80th parallel. It grows in moist, stony or gravelly places usually where snow accumulates in winter.

Dryas integrifolia M. Vahl: The arctic rose is a low dwarf shrub with short horizontal rooting branches, grayish-green leaves, and solitary white flowers. It is a pioneer species on calcareous, gravelly, and rocky barrens in North America.

Papaver radicum Rottb.: Arctic poppy is a perennial herb with pale yellow or white milky juice. Its leaves form rosettes at the end of short branches. The flowers are borne on slender, arched stems that nod when budding. Petals are yellow or white, and the seeds are small and numerous. This plant is widespread in arctic North America.

Potentilla sp.: These are tufted, perennial herbs, freely branching and often covered by remains of former year's leaves. Flowering stems are erect and may have one or more branches. The flowers may be solitary or in groups with yellow petals. Some species are circumpolar.

Saxifraga oppositifolia L.: Purple saxifrage may be densely or loosely matted with condensed or trailing branches. The leaves are scale-like and leathery; flowers are usually dark purple with widely spreading tips. The plant, found circumpolar in the arctic, grows on dry, rocky slopes and ledges. This is by far the most abundant of the species observed along the transect.

Diapensia lapponica L.: A perennial dwarf shrub forming firm hemispherical tussocks. The stems bear evergreen, yellowish green leaves. The flowers are solitary on stiff flower stalks. It grows on rocky ledges and in gravelly places in eastern North America.

Melandrium sp.: A perennial herb called bladder-campion that has strong tap roots. The leaves are mostly basal and the flower stems are erect and slender. The flower petals are an inconspicuous white to pale pink or purple. These herbs grow on relatively dry, stony, or gravelly barrens or on the gravel of fresh moraines. The distribution is general throughout arctic North America.

Carex sp.: A sedge with mostly triangular stems. The tiny flowers are borne in the axils of the scale-like leaves. The distribution of the various species is restricted to wet areas.

Poa sp. L.: Several species of bluegrass are found on the Thule Peninsula. It is circumpolar, and prefers relatively dry habitats.

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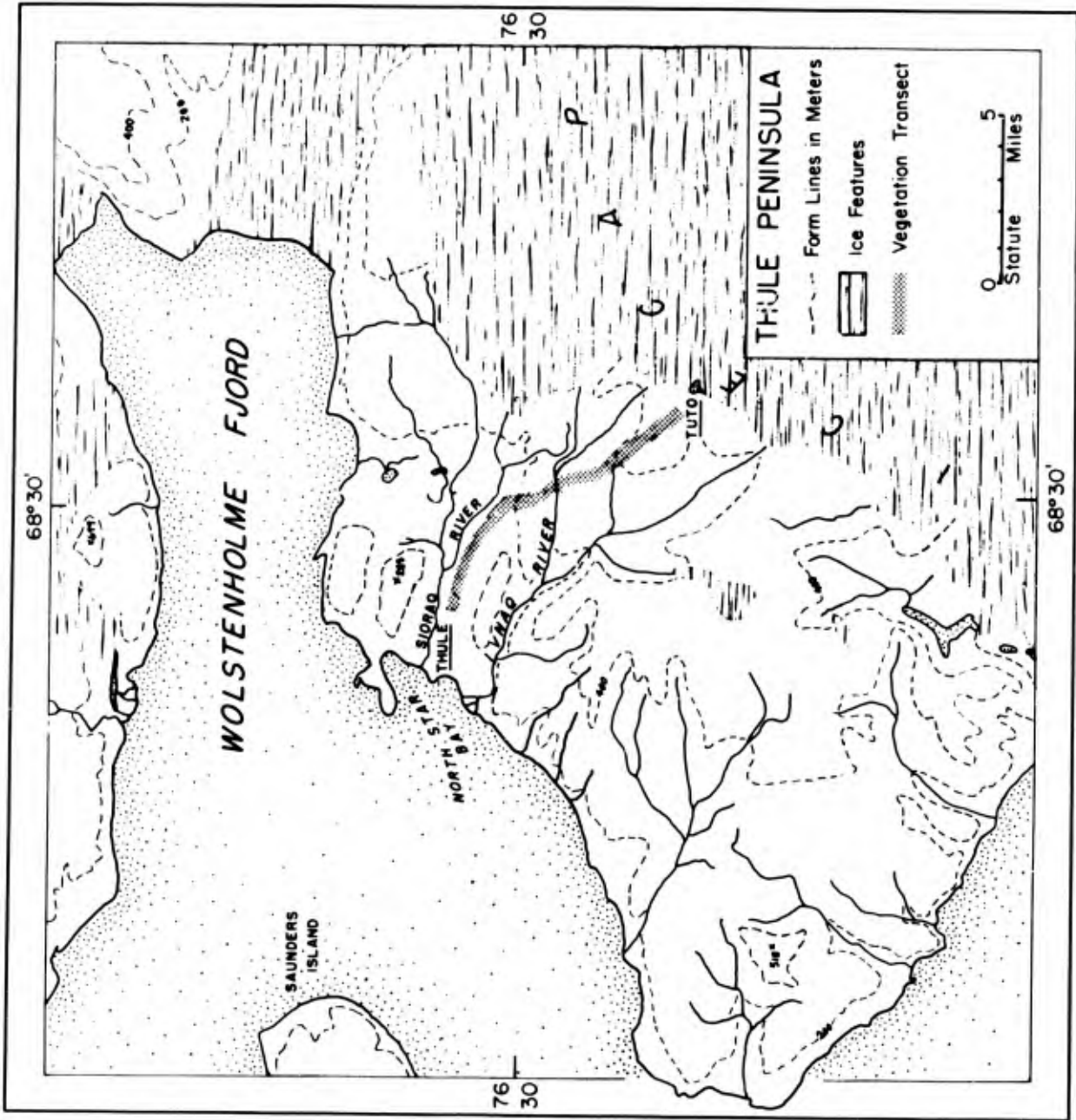


Figure 1

**SCHEMATIC PROFILE OF A THULE - TUTO ROAD  
VEGETATION TRANSECT JUNE 1957**

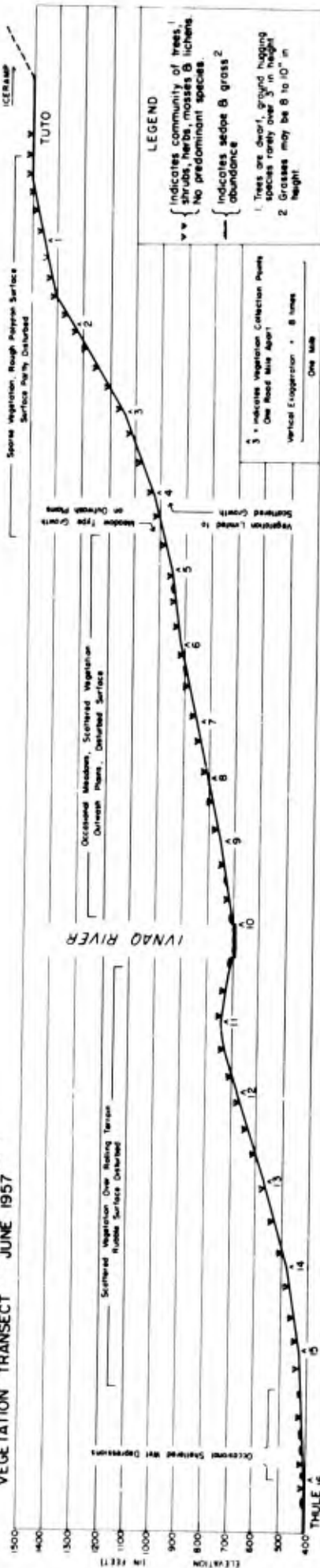
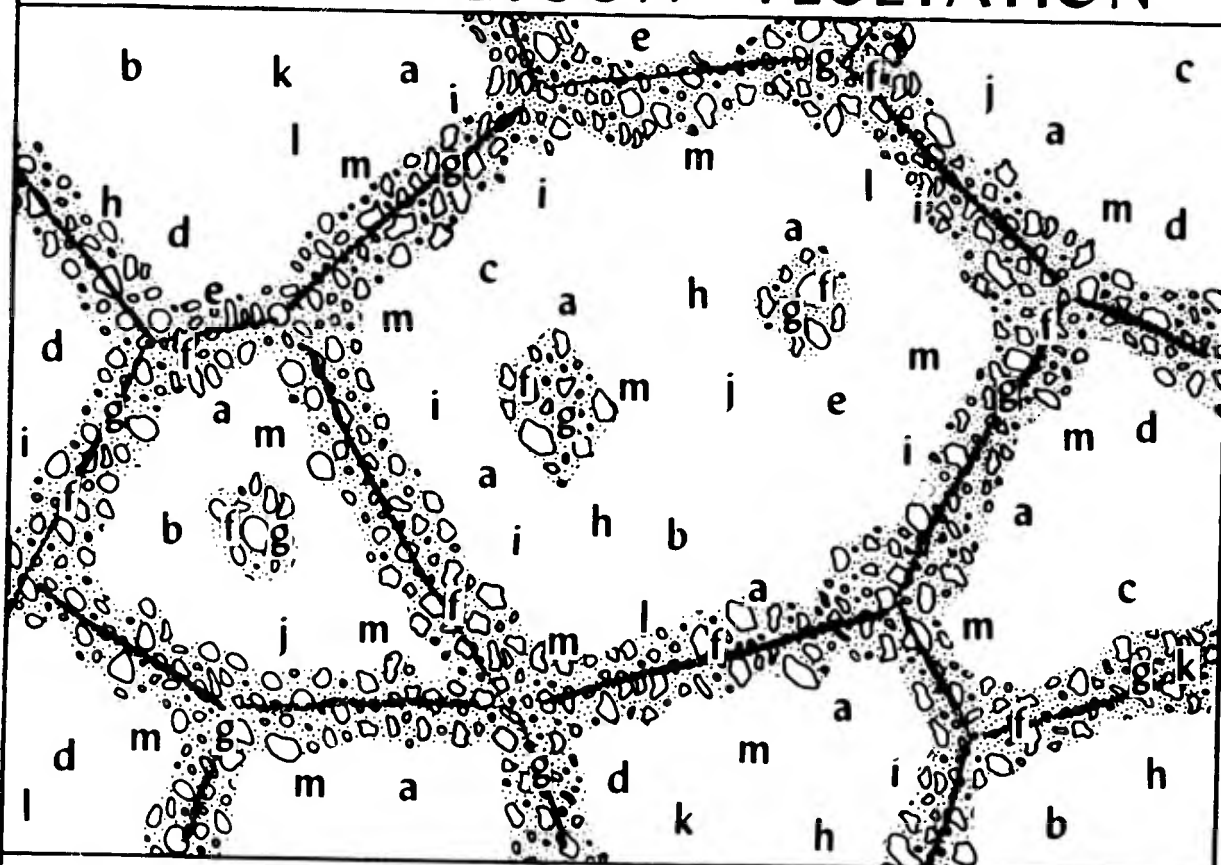


Figure 2



# SCHEMATIC DIAGRAM OF STONE POLYGON VEGETATION



## Legend


a	<i>Alopecurus alpinus</i>	e	<i>Dryas integrifolia</i>	i	<i>Poa</i> sp
b	<i>Braya purpurascens</i>	f	Lichen sp	j	<i>Potentilla</i> sp
c	<i>Cassiope tetragona</i>	g	Moss sp	k	<i>Salix arctica</i>
d	<i>Diapensia lapponica</i>	h	<i>Papaver radicatum</i>	l	<i>Melandrium</i> sp
	Boulder Rubble	m	<i>Saxifraga oppositifolia</i>		

Figure 4



Figure 5: Lichen growth on lee side of rocks.



Figure 6: Sedge growing in sheltered wet depression.



Figure 7: *Saxifraga oppositifolia*, Moss, and *Poa* spp  
growing among rubble near icecap.



Figure 8: Stone polygon, vegetation-rimmed.

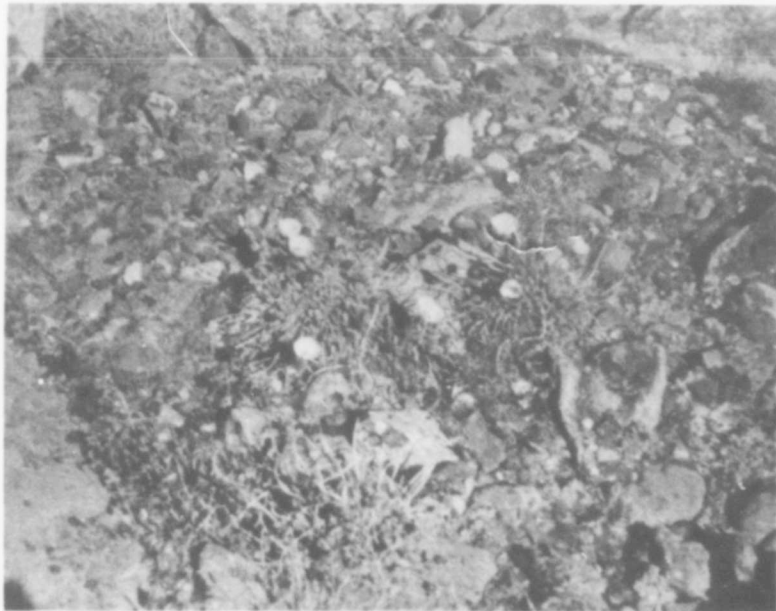


Figure 9: *Papaver radicum* or Arctic Poppy  
growing on rubble polygon surface.



Figure 10: *Salix arctica* or Arctic Willow  
showing catkin development.

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