

Ecological notes on the butterflies of the Churchill Region of Northern Manitoba

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Abstract.—The Churchill Region, substantially a tundra-taiga ecotonal community, consists of numerous geobotanical zones. This area's butterfly fauna includes at least 23 permanent breeding residents of various affinities, along with a number of casual, stray, or migrant species. Resident butterflies are discussed in terms of habitat zonation and distribution; observations are also made on aspects of the biology, ecology, and behavior of some of these species.

The butterfly fauna of the Churchill-Fort Churchill area is probably better known than that of any other subarctic location in north-central Canada. Masters (1971), in addition to reporting on his own activities during 1969 and 1970, presented data accumulated from other collections, published records and field notes, covering 15 separate seasons at Churchill. Included were the collecting expeditions of G. Shirley Brooks (1939-44 and 1946); Charles D. Bird, James Chilcott, and Alexander B. Klots (1951 and 1952); Frank H. and Paul Chermock (1961 and 1963); Vern Harper (1933); H. Elliot McClure (1936); and Cecil McCullough (1970). Ferris (1974) reported the occurrence of two previously uncollected species at Churchill. Collecting trips to the Churchill area have also been undertaken by A. E. Brower (1969) and C. S. Quelch (1968), among others. In addition, James Ebner maintained a collector in the area for several seasons during the mid-sixties.

In view of the amount of sampling done in the immediate vicinity of Churchill-Fort Churchill, it seems likely that few additions will be made to the area's faunal list. The biology, ecology, behavior, and zonal distribution of this area's butterflies have, however, received much less attention. Realizing that there is still much field work to be done in these areas, the present paper deals with habitat zonation in particular and notes certain observations relative to the biology, ecology, and behavior of some Churchill butterflies.

During the period 20 June to 20 July, 1974, the authors conducted ecological studies in this region. Many different collecting sites were visited, weather permitting. Not only were geographically separated locations sampled, but in attempt was made to note the species component of each particular plant community. Adult behavior and nectar sources were noted.

In addition to our observations, information from correspondence has been gained from A. E. Brower, John Ebner, Alexander B. Klots and C. S. Quelch. Mr. Quelch provided field notes prepared by Charles Bird on the joint collecting activities of Mr. Bird, James Chilcott, and Alexander B. Klots when they worked for the Canadian Northern Insect Survey in 1952 at Churchill. Those papers dealing with Churchill butterflies by the Chermocks (1968), Masters (1971), and Ferris (1975) have been drawn upon and acknowledgement of these sources is made here without subsequent mention.

Description of the Region

The specific area covered in this paper includes coastal tundra areas west of Christmas Lake Esker, west to Eskimo Point on the west bank of the Churchill River, and south to the vicinity of Warkworth Lake, which is situated in the taiga zone (Fig. 1).

Topography

The topography of the Churchill region has its origin in several geologic events. Over 600 million years ago, during the Precambrian Era, the Churchill quartzite was formed in an unstable basin known today as the Churchill region. Later, metamorphic pressures of the crust formed several geosynclines in this same area. Erosion reduced these geosynclines greatly and in the Ordovician period shallow seas laid down white dolomite muds and coral reefs upon the remaining geosynclinal ridges.

Pleistocene glaciation was the next geologic event that influenced the topography. Hudson Bay was formed from the melt waters of the retreating Wisconsin ice sheets. Additional waters from the south found their way to the early Hudson Bay by erosion of the geosynclines formed in the Precambrian past. The observer today finds the Churchill River flowing through such an erosion path. As ice retreated, planed off quartzite boulders along the bay have risen together with sand and gravel beaches, and glacial deposits of moraines and low eskers remain as major topographical features. Most of the soil is poorly drained and insulating permafrost remains as evidence of a colder past (Scoggan, 1959).

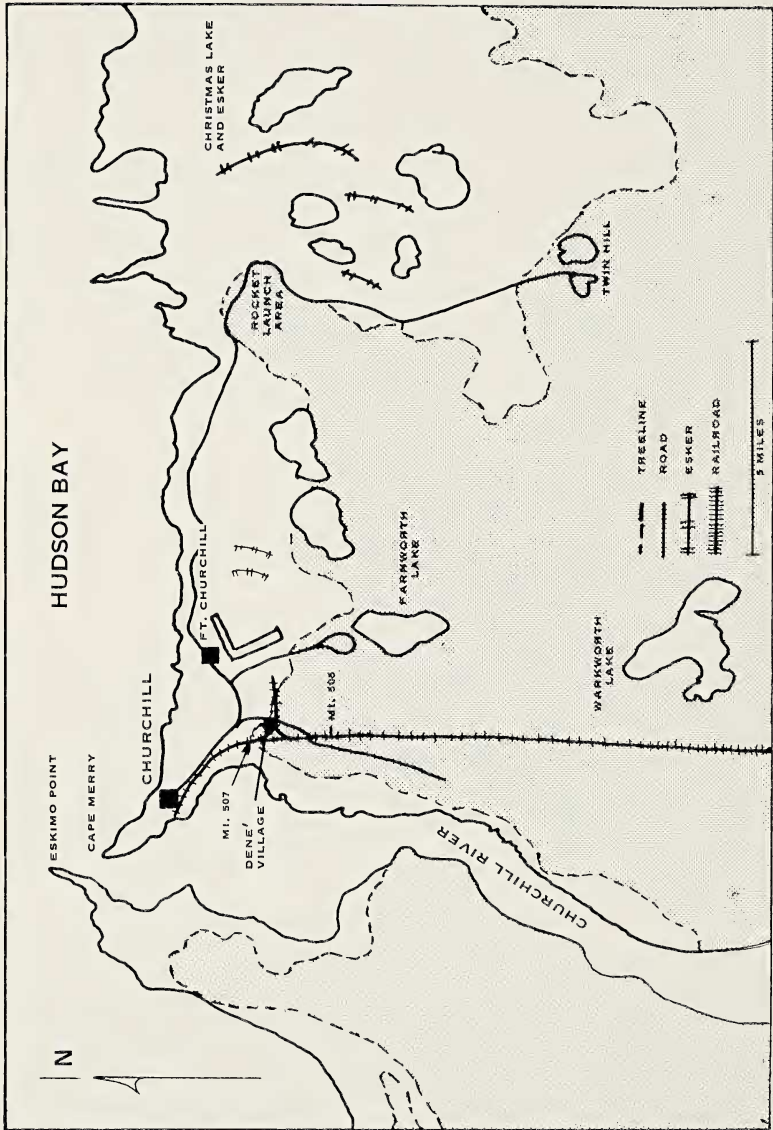


Figure 1. Map of the Churchill Region. Shaded portion represents the taiga biome.

Habitat Zonation

The Churchill region is very interesting from the standpoint of habitat zonation in that much of the region consists of an interface between two major terrestrial biomes, the tundra and the taiga. It is thus possible to observe the manner in which butterflies utilize this tension zone. Certain species may remain tied to their specific habitat requirements, be they climax tundra situations or closed spruce forests; others may exhibit a tolerance in the utilization of a broad range of habitats offered in the area.

Continental tundra reaches south to Churchill principally as a result of the cooling effect of Hudson Bay, the waters of which remain at near freezing temperatures even during the warmest parts of summer. A narrow belt approximating climatic conditions of the true arctic thus extends almost continuously around the south end of Hudson Bay, including most of coastal Manitoba, far northern coastal Ontario, and western coastal Quebec.

In the Churchill area there is a parallel zonation between treeline and the coast and, although irregular, treeline is generally 2-5 miles inland. "Treeline" is not always a clearly defined ecological feature; in many areas south of treeline are small patches of tundra, and north of treeline, notably in protection situations, it is not unusual to find areas of spruce and occasional tamarack. Ecological conditions of the true arctic are most closely approximated on exposed ridges in the area. In spite of variation in topography and vegetation at different sites, the following zones and dominant plants are generally present (Ritchie 1956; Scoffan 1959; and observations by the authors):

Zone

- | | |
|--|---|
| 1. Beach Meadow on Sandy Soil: | <i>Elymus arenaris</i> , <i>Carex maritima</i> , <i>Arenaria peploides</i> . |
| 2. Coastal Flats: | <i>Puccinellia</i> spp., <i>Carex</i> spp., <i>Plantago maritima</i> , <i>Chrysanthemum arcticum</i> . |
| 3. Coastal and Tundra Shrub Thicket on Ridges: | <i>Alnus crispa</i> , <i>Salix</i> spp., <i>Betula glandulosa</i> . |
| 4. Heath and Heath-Meadow on Quartzite Outcrops and Rocky Beach Ridges: | <i>Juniperus communis</i> var. <i>depressa</i> , <i>Poa</i> spp., <i>Carex</i> spp., <i>Polygonum viviparum</i> , <i>Saxifraga tricuspidata</i> , <i>Dryas intergrifolia</i> , <i>As-tragalus alpinus</i> , <i>Empetrum nigrum</i> , <i>Rhododendron lapponicum</i> . |
| 5. Moss-Hummock Tundra on Wet Peat Flats: | <i>Sphagnum rubellum</i> , <i>Andromeda polifolia</i> , <i>Poa</i> spp., <i>Oxycoccus microcarpus</i> . |

- 6. Sedge Meadow Tundra on Flooded Peat Flats:** *Eriophorum scheuchzeri*, *E. augustifolium*, *Carex* spp., *Scirpus caespitosus*.
- 7. Sedge Meadow Tundra on Dry Sand Flats:** *Carex* spp., *Poa arctica*, *P. glauca*, *Arctostaphylos rubra*, lichens.
- 8. Treeline Shrub Thicket:** *Betula glandulosa*, *Alnus crispa*, *Salix* spp., *Myrica gale*, *Ledum groenlandicum*.
- 9. Open Spruce-Tamarack Forest:** *Picea glauca*, *P. mariana*, *Larix laricina*, *Betula glandulosa*, *Cladonia alpestris*.
- 10. Closed Spruce Forest on Hummocky Peat:** *Picea mariana*, *Larix laricina*, *Habenaria hyperborea*, *Eriophorum vaginatum*.
- 11. Closed Spruce Forest on Elevated Flats and Ridges:** *Picea glauca*, *Ledum groenlandicum*, lichens.

In Figure 2 are illustrated diagrammatically the relationships of the major plant communities, topographical features, and butterfly communities.

Resident butterfly species

Hesperia comma manitoba (Scudder) Collection Dates: 29 VI-20 VII

Distribution: Zone 10 principal; Zones 4, 8, 9, 11 occasional or rare.

Records available to the authors indicate that *H. comma* is strictly biennial in even-numbered years. It is highly sporadic in its occurrence; during most even-numbered years it is only occasionally encountered but during some it may be fairly common. The greatest proportion of specimens has been captured in areas south of treeline, especially in zone 10. Isolated captures are recorded in such diverse habitats as zones 4, 8, 9, and 11. In addition to the vicinity of Dene' Village, *comma* has been found near Warkworth Lake.

During 1974, this butterfly was relatively common in an area along the railroad tracks between Mile 505-507, including the spur track in the immediate vicinity of Dene' Village. During the period 7-15 July, 45 specimens were collected and many more observed. *Comma* was most often encountered on, or flying above, the crushed granite track bed. It is interesting to note that nearly half of the individuals collected were either in copula, or were netted during aerial mating maneuvers. Courting pairs were observed to ascend rapidly to a height of 30-40 feet, descend to near ground level, and then repeat the procedure up to several times. Upon completion of courtship behavior, mates either separated or began copulation.

Pyrgus centaureae freija (Warren)

17 VI-14 VII

Distribution: Zones 9, 10 principal; Zones 5, 8, 11 occasional or rare.

Pyrgus centaureae is a denizen of moist situations within the taiga zone. It is also occasionally found in moist treeline associated willow thickets and in closed spruce-tamarack forests on dry elevated places. It is sometimes encountered on the tundra, again in association with moist willow thickets.

This butterfly is only moderately common in collections of the Churchill area. It may be more frequent than collections indicate because of its difficulty to collect. *Centaureae* has a rapid darting flight and when it does alight, it generally does so only momentarily. The dappled light of a spruce forest and a grey-green sphagnum moss background contributes to its inconspicuous nature. *Centaureae* was not observed at flowers.

Pieris napi (Linnaeus) ssp. 16 VI-15 VII

Distribution: Zones 8, 9, 10 principal; Zones 3, 4, 5, 11 occasional or rare.

Napi can be found in nearly all moist tundra and taiga habitats but it is most common in zones 8, 9, and 10, particularly in association with willows. The authors noted this butterfly especially in wet willow areas between Mile 505-507 of the railroad and along drainage courses on the tundra. Males were observed patrolling a broad area while females were noted in close association with willow thickets.

Colias hecla hecla Strecker (T.L. Churchill) 21 VI-6 VIII

Distribution: Zone 4 principal; Zones 5, 6 occasional or rare.

Colias hecla is the rarest and most ecologically restricted species of its genus to be found in the region, being almost exclusively found in relatively lush tundra meadows on well-drained coastal or low tundra ridges. There have been a few captures additionally in sedge meadow situations on moist peat flats. The authors have found no records of this butterfly for the taiga zone. Ferris (1974, p. 257) misquotes Masters (1971, p. 8) when reporting the occurrence of *hecla* below treeline.

Churchill represents the southern end of *hecla*'s distribution on the west coast of Hudson Bay and, judging from its rarity, its ecological requirements are only marginally met in the immediate Churchill-Fort Churchill area. It may well be more abundant on several ridges east of the Rocket Launching (Christmas Lake Esker and Knights Hill), where its habitat is extensive and virtually undisturbed.

As is the case with many arctic *Colias*, *hecla* has a strong and swift flight.

Colias gigantea gigantea Strecker 17 VI-14 VII

Distribution: Zones 3,5,6,8,9,10 principal; Zones 1,2,4,7,11 occasional or rare.

Gigantea is common and can be found in all habitat zones. It is, however,

most abundant in moist areas where its foodplant *Salix reticulata* occurs. Klots (in Howe, 1975) reports observing this butterfly ovipositing on *S. reticulata* in late July at Churchill. Eggs were secured and larvae reared into third instar diapause in August.

In tundra environments with considerable relief, *gigantea* is most often encountered flying along ridge bases, at an interface between moist tundra flats and the ridge face. This interface area frequently affords a luxuriant growth of willows and numerous wild flowers; it, in many ways, resembles snowbed communities of the true arctic (see Porsild, 1964, p. 6). Oosting has observed similar flight behavior in *C. hecla* and *C. thula* (Hovanitz) on the North Slope and Seward Peninsula, Alaska. This topographical feature, in addition to providing a "flyway", affords some relief from the almost constant winds which characterize treeless regions.

A somewhat similar habitat is utilized by *gigantea* for patrolling flight in the taiga zone. Open linear areas within the spruce-tamarack forest (creek beds or the railroad right-of-way, for example) provide a "flyway". Both males and females appear to frequent these openings in equal numbers, although females tend to be much less active than males. When alarmed, *gigantea* exhibits its very strong and swift flight.

Gigantea is an avid flower visitor, being especially fond of the brightly colored reddish-purple and yellow flowers of *Pedicularis flammea* and *P. labradorica*, respectively. Individuals were also noted on *Chrysanthemum arcticum*.

Colias palaeno chippewa Edwards

24VII-13 VII

Distribution: Zones 3-6, 8-10 principal; Zones 1,2,7,11 occasional or rare.

This species is the most common and ubiquitous *Colias* in the region. It is most abundant in brushy areas where its food plant *Vaccinium (caespitosum* and perhaps *uliginosum*) occurs and it appears to reach maximum population densities in spruce-tamarack forests (zones 9 and 10). *Palaeno* uses open linear areas within the taiga for a flyway but, unlike *gigantea*, it seems to have less preference for the tundra flat/ridge base interface habitat.

The authors observed this species taking nectar from *Pedicularis flammea*, *P. labradorica*, *Chrysanthemum arcticum*, and the dandelion, *Taraxacum lacerum*.

Colias nastes moina Strecker (T.L. Churchill)

26 VI-13 VIII

Distribution: Zone 4 principal; Zones 1,2,3,5,7,8,9 occasional or rare.

Nastes experiences marked population fluctuations and is generally uncommon or rare in collections. Population densities affect the ecological distribution of this species. In years when population densities

are at a maximum, there is expansion into normally unoccupied habitats; when population densities are low, "optimal" habitats appear to be utilized. During most years *nastes* is restricted to lush climax tundra meadows on well drained ridge tops and occasionally it is found in open spruce-tamarack forests, some 7-10 days prior to its emergence on the tundra. On rare occasions *nastes* can experience a "population explosion", being found in nearly every available habitat north of treeline, excepting very moist or permanently inundated tundra flats.

During 1974, the authors located a very large colony of this species immediately north of Churchill (Windy Point). Over 300 specimens were collected in less than 7 hours during the period 18-20 July, with no apparent effect on population densities.

Nastes is an active butterfly; both sexes can be observed taking nectar from flowers, including *Oxytropis campestris*, *Astragalus alpinus* and *eucosmus*, *Hedysarum mackenziae*, and *Saxifraga caespitosa*. Females are somewhat less active than males, being found in association with the larval foodplant *O. campestris* (see Klots in Howe, 1975). Males typically patrol a broad area, pausing occasionally to obtain nectar.

This species exhibited a behavior not noted in other butterflies of the region, that of remaining active until shortly before sunset. On July 18 in particular, individuals were noted to be on the wing until 9:00 P.M. (CDT). This behavior was again observed on the 19th and 20th. Temperatures on all days (July 18-20) remained at a rather balmy 60-70°F, no doubt contributing to this unusually prolonged activity.

Plebejus optilete yukona (Holland)

9-5 VII

Distribution: Zone 10 principal; Zones 9, 11 occasional or rare.

This species was first collected at Churchill by Ferris in 1973 (Ferris, 1974) and it has since established itself in principally closed spruce forests from approximately Mile 505-507, including the area along the spur track south of Dene' Village. It is difficult to imagine that *optilete* has, until recently, been overlooked by collectors. This leads one to assume that it is an introduction from farther south, perhaps via the railroad from Gillum.

Optilete has a weak flight and seems to seek sunlit openings within the forest, particularly saturated mud along road and creek banks. The authors have found *optilete* to behave similarly in the Yukon and central Alaska.

Plebejus aquilo lacustris Freeman

26 VI-19 VII

Distribution: Zone 4 principal; Zone 7 occasional or rare.

Aquilo is uncommon to rare in collections of the Churchill region.

Records available to the authors indicate that it is restricted to dry tundra meadows on the rocky ridges between Fort Churchill and Eskimo Point. *Aquilo* may be frequent at times but its small size and light grey ventral scaling render it highly inconspicuous when it is resting on a grey lichen-covered rock or on a grey-green tundra meadow background. *Aquilo* generally flies close to the ground and can be very difficult to follow visually when alarmed.

Most individuals are encountered in very dry, rock strewn meadows; occasionally this species is observed at moist sand. One male was observed taking nectar from *Parnassia kotzebuei*.

Glaucopsyche lygdamus (Doubleday) ssp. 22 VI-15 VII

Distribution: Zones 4, 9, 10, 11 occasional; principal zone undetermined.

The authors collected 2 males and 4 females of this poorly known member of Churchill's fauna. *Lygdamus*, along with *Boloria freija* (Thunberg) and *Erebia rossii ornata* Leussler, is the first species on the wing in June. Two freshly emerged males were collected on 22 June in the vicinity of Mile 505. Two additional specimens were captured in the taiga zone, one female was taken at Mile 507 on 25 June and another female was found on 15 July at the same location. Parshall secured an additional female on 26 June in a dry treeline situation SE of Fort Churchill.

Oosting noted a female at Cape Merry, also on the 23rd of June. This individual was observed sunning itself on a black lichen-covered rock at approximately 7:30 PM (CDT). It appeared to be very lethargic and flew to another spot only when closely approached. After reaching a "safe distance", a sun-oriented position, with wings open against the rock, was again assumed.

Boloria frigga saga (Staudinger) 17 VI-1 VIII

Distribution: Zones 3,5,8,9,10 principal; Zones 1,2,4,6,7,11 occasional or rare.

This is the most common *Boloria* in the region and is nearly ubiquitous in its distribution. Maximum abundance is realized in wet willowy areas in both tundra and taiga situations. Males of this species frequently patrol willow thickets while females remain somewhat less active. Both sexes visit flowers on occasion, particularly the pink flowers of *Rubus arcticus*.

Boloria polaris stellata Masters (T. L. Churchill) 20 VI-28 VII

Distribution: Zones 5, 6, 7 principal; Zones 2, 3, 4, 8, 9 occasional or rare.

Polaris is another species of the true arctic whose southern most collecting station on the west coast of Hudson Bay is in the Churchill area. This butterfly is most often collected on moist tundra flats.

All published records for this species have been from odd-numbered years and the authors failed to find this species in 1974, as expected. John Ebner (*in litt.*) reports, however, that he has received specimens from Churchill which were collected on even-numbered years (1968 & 1970). While *polaris* does not then appear to be strictly biennial in odd-numbered years, there are at least very pronounced odd-even year fluctuations.

Boloria freija (Thunberg) ssp.

10 VI-15 VII

Distribution: Zones 9, 10, 11 principal; Zones 1-5, 7, 8 occasional or rare.

When spring finally comes to the forested areas south of Churchill, in early to mid-June, *freija* begins full emergence. The authors were amazed at how abruptly the flight season begins at Churchill; particularly was this noted in regard to *freija*. When the authors first arrived on 20 June, the taiga was devoid of butterflies. One specimen of *freija* was taken on 21 June after a full day in the field under sunny skies, and on 22 June nearly 100 specimens were collected in 3 hours. The peak flight period of *freija* appears to last less than one week in the taiga zone.

This species is rather uncommon in collections of the area, probably because most collectors arrive after its principal flight in the taiga zone. Although *freija* is distributed in all but permanently inundated *Eriophorum* flats, it is only abundant south of treeline. Within zone 9 *freija* is generally distributed, while in closed forests it frequents sunlit openings. *Freija* is uncommon in dry tundra sites and only occasional in other tundra environments.

A large concentration of *freija* was found on the elevated peat-covered moraine, immediately east of Mile 505. The ridge top is largely open (disturbed) spruce forest with a ground cover of the depressed and much branched Bilberry, *Vaccinium caespitosum*. Females of *freija* were observed fluttering over this plant and close observation revealed that the *Vaccinium* was indeed being utilized as an oviposition substrate. On dry tundra flats, females of *freija* were observed flying slowly over the matted Bearberries, *Arctostaphylos rubra* and *alpina*; these individuals were not observed ovipositing, however. *Vaccinium caespitosum* has not been demonstrated to be the larval foodplant of *freija* in the Churchill region, but it should be strongly suspected as such.

Boloria titania boisduvalii (Duponchel)

1 VII-9 VIII

Distribution: Zones 3, 8, 9, 10 principal; Zones 2, 4, 5, 6, 11 occasional or rare.

After other *Boloria* have passed peak abundance, *titania* becomes the most noticeable member of its genus to be found in both tundra and taiga environments. Like its relatives, *titania* is widely distributed in the region. The authors found this species to be most common along the flowery right-

of-way of the railroad, particularly in the vicinity of Dene' Village.

Boloria eunomia tricularis (Hubner) 23 VI-9 VIII

Distribution: Zones 3, 8-10 principal; Zones 1, 2, 4-7, 11 occasional or rare.

Boloria eunomia can be found in all habitats offered in the region but is most common in zones 8, 9, and 10, especially along the railroad right-of-way. Moist willowny areas at the base of elevated ridges also support good colonies of this butterfly.

Both sexes visit flowers avidly. Nectar sources include *Ledum decumbens*, *Loiseleuria procumbens*, *Dryas intergrifolia*, *Rubus arcticus*, *Taraxacum lacerum*, and *Chrysanthemum arcticum*.

Oeneis taygete taygete Geyer 26 VI-15 VII

Distribution: Zones 4, 5/7 principal.

Oeneis taygete has been variously reported from Churchill in the past and, while there are undoubtedly valid specimens, most records appear to be based on misdetermined specimens of *Oeneis polixenes* (Fabricius). In 1974 the authors collected specimens which were tentatively identified as *taygete*; subsequent genitalic dissections proved them to be this species and, although variable, Churchill specimens agree very well with material from Fort Chimo, Quebec, both in facies and in genitalic characters.

All of the individuals encountered during the 1974 season were collected in moist tundra meadows, particularly on the south-facing slopes of the rocky ridge immediately east of Fort Churchill. *Taygete* was also found to frequent moist grassy margins of dry sand flats (low eskers) in an area approximately 1 mile east of the above-mentioned ridge.

Taygete, like its relatives *Oeneis polixenes* and *O. melissa semplei* Holland, is difficult to capture when alarmed. All three species are observed to orient their bodies in a manner which minimizes the shadow cast by the sun—an action which, in combination with their cryptic coloration, makes these animals much less visible to predators.

Oeneis jutta (Hubner) ssp. 20 VI-15 VII

Distribution: Zones 5 (in association with spruce), 9, 10 principal; Zones 6, 8 occasional or rare.

Masters (1971) proposes the existence of two subspecies of *O. jutta* in the region. *O. jutta alaskensis* Holland supposedly flies principally in even-numbered years and is found in to wet tundra habitats. *O. jutta ridingiana* Chermock & Chermock, he asserts, is a denizen of the taiga zone, perhaps occurring on the tundra in association with clumps of spruce. This subspecies is to be found in principally odd-numbered years. It is further

suggested that the odd and even year populations differ in phenotypic characteristics.

During 1974 the authors found *jutta* only in the taiga zone, particularly in association with hummocky black spruce forests (zones 9 & 10). Although suitable tundra habitats were checked for this species, no individuals were encountered. Collecting records available to the authors from other even-numbered years (particularly those of Klots, Bird, and Chilcott, 1952) indicate a taiga zone or treeline distribution for *jutta*. These data seriously conflict with the model proposed by Masters and, while by no means conclusive, they point out the need for a careful study of the situation.

Oeneis melissa semplei Holland

12 VI-2 VIII

Distribution: Zones 4, 7 principal; Zones 1, 2, 5, 9 occasional or rare.

Melissa has rather restricted habitat requirements, occurring principally in dry tundra meadows. The authors found this species to frequent particularly the dry meadows on low sandy eskers which are occasional on tundra peat flats in the region (a low esker generally rises some 3-5 ft. above the tundra flats). Dry ridge-top meadows likewise provide a principal habitat for *melissa*.

A low esker formation on the peat flats 1 mile SE of Fort Churchill was found to support a good colony of this species. Individuals of *melissa* exhibited a marked preference for the dry meadow on this sand formation; when alarmed, some individuals would fly a short distance onto wet peat tundra but in a short while they would again return to the dry meadow habitat. On windy days, *melissa* appeared to confine its flight activities to the protected lee side of the esker formations.

Melissa, like other *Oeneis*, was not observed at flowers.

Oeneis polixenes polixenes (Fabricius)

12 VI-2 VIII

Distribution: Zones 3-6, 9 principal; Zones 1, 2, 7, 8 occasional or rare.

Oeneis polixenes is the most common and widespread member of its genus. It can be observed in every tundra habitat but is most abundant in moist areas. Wet, open spruce-tamarack forests at and somewhat south of treeline also support good numbers of this species.

The Churchill population of *polixenes* displays a great deal of phenotypic variation. There appear to be two principal phenotypes, and there is a spectrum of variation in between. Some specimens appear typically ruddy brown; others are much paler grey-brown above and their ventral secondaries often show veins outlined in grey. The latter phenotype resembles *O. taygete* (and is much confused with it), but it is genitically similar to *polixenes*. Careful study will be required to determine whether this variation is entirely individual or whether there are two sibling species involved.

Erebia rossii ornata Leussler (T.L. Churchill) 10 VI-19 VII

Distribution: Zones 5, 6, 9 principal; Zones 1-4, 7, 8 occasional or rare.

Among the *Erebia*, *rossii* is the most abundant and widespread species. Although recorded from all tundra environments, it reaches maximum population densities in wet habitats, including treeline situations where there are wet tundra openings. *Rossii* is the earliest recorded species in the region, but its emergence probably lags behind that of *B. freija* in the taiga zone by a few days.

Erebia disa mancinus Doubleday 25 VI-15 VII

Distribution: Zone 10 principal.

This species appears to be a recent addition to Churchill's fauna. *Disa* was first collected by Ferris in 1973 (one pair) (Ferris, 1974) and in 1974 it was found commonly in closed spruce forests south and somewhat southwest from the railroad switchback area. While collectors may have overlooked this butterfly in the past, it seems more likely that *disa* has been introduced from some point south along the railroad.

Disa has among the most restricted habitat requirements of any butterfly in the region. It is found only in moist, hummocky, closed spruce forests (muskegs). *Disa* occasionally ventures into sunlit openings, but generally it remains within its shaded forest habitat. This species presents a challenge to the collector, for when alarmed, *disa* flies rapidly through even the densest part of the muskeg, virtually disappearing in shadows.

Erebia discoidalis discoidalis (Kirby) 15 VI-10 VII

Distribution: Zones 8-10 principal; Zones 5, 6, 11 occasional or rare.

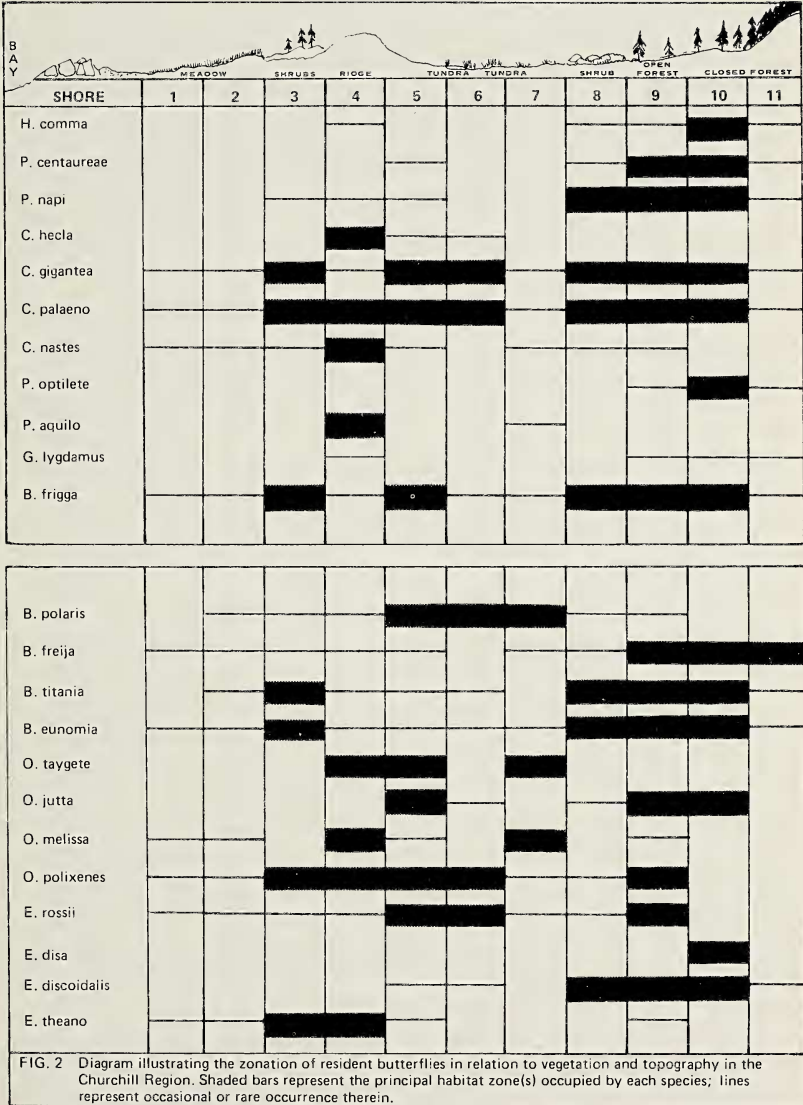
Erebia discoidalis is only moderately common and it appears to prefer moist, boggy situations at and south of treeline. Occasional specimens are taken on wet tundra flats. The authors found this species in particular numbers north of Farnworth Lake.

Discoidalis and *E. disa* were not observed to be on the wing during late afternoon or early dusk; instead they choose the warmest part of the day (10:00 AM-3:30 PM, CDT) for activity.

Erebia theano canadensis Warren (T.L. Churchill) 2-24 VII

Distribution: Zones 3, 4 principal; Zones 1, 2, 5, 9 occasional or rare.

This poorly known member of Churchill's butterfly fauna is extremely local. *Theano* experiences pronounced population fluctuations; in some years it is very rare, in other years it may be uncommon, and in exceptional years it can be locally abundant. The latter was the case in 1974 when, on the 18th and 19th of July, the authors collected nearly 150 specimens and observed many more. The Chermocks found it locally uncommon in the



early sixties and Ferris found several scattered colonies in 1973. Bird, Chilcott, and Klots intensively collected the region in 1952, but found only 5 specimens. John Ebner's collector failed to find it during three successive seasons in the mid-sixties.

Theano is most widely distributed on the tundra, being found especially in very luxuriant, flowery meadows. Colonies have been reported from widely scattered locations, including Fort Prince of Wales (Eskimo Point), the area about H.M.C.S. Churchill, and on the grassy ridges near Fort Churchill. The authors found *theano* to be concentrated in the lush ridgetop meadows immediately northwest of Churchill (Windy Point) during 1974. Its distribution also includes the taiga zone, where it occasionally appears in grassy openings, particularly near Mile 505 and 506.5 (switchback area).

On the tundra, *theano* is observed to be an active butterfly and, in spite of its weak flight, it moves widely within the confines of its meadow habitat. Males are most active, while females spend much time within low willow thickets which border the meadow. Both sexes are observed at flowers, notably those of *Astragalus* ssp., *Oxytropis* ssp., and *Antennaria rosea*. When alarmed, *theano* generally retreats to concealing willow thickets. In the presence of even moderate winds, individuals choose not to fly but instead seek wind sheltered spots.

Other species

The foregoing has dealt with those butterflies which the authors regard as permanent breeding residents of the Churchill region. A substantial number of other species has been recorded from the area. Some are strays or casuals, others may be repeated migrants, and several may be permanent residents which occur in very small numbers. They include: *Papilio glaucus canadensis* Rothschild & Jordan, *Pieris protodice* Boisduval & Le Conte (the occurrence of this species was confirmed when Parshall captured one female on 9 July 1974 near a pile of grain along the railroad), *P. rapae* (Linnaeus), *Colias eurytheme* Boisduval, *Lycaena helloides* (Boisduval)/*L. dorcas* Kirby complex, *Lycaeides argyrognomen scudderii* (Edwards), *Vanessa atalanta* (Linnaeus), *V. cardui* (Linnaeus), *Nymphalis milberti* (Godart), *N. antiopa* (Linnaeus), and *Boloria selene* (Denis & Schiffermuller) ssp.. Masters (1971) or Ferris (1974) can be consulted for details in regard to these species.

The authors collected one additional species not before recorded from the area, *Everes amyntula* (Boisduval). One somewhat worn female was captured by Parshall on 11 July near Dene' Village, and one fresh male was taken by Oosting on 19 July near Windy Point. This species is tentatively regarded as a nonresident, perhaps having found its way to Churchill by railroad.

Summary

With respect to habitat zonation, there are essentially five groups of species to be found in the Churchill region. These species are: (1) exclusively restricted to climax tundra habitats (*C. hecla*, *P. aquilo*, and *O. taygete*), (2) essentially arctic or arctic-alpine in distribution but which can utilize tundra-taiga ecotone or taiga habitats (*C. nastes*, *B. polaris*, *O. melissa*, *O. polixenes*, *E. rossii*, and *E. theano*), (3) species whose distribution is not correlated with treeline (*P. napi*, *C. gigantea*, *C. palaeno*, *G. lygdamus*, *B. frigga*, *B. freija*, *B. titania*, and *B. eunomia*), (4) primarily distributed in the taiga or boreal forest biomes but can utilize taiga-tundra ecotone or tundra habitats (*H. comma*, *P. centaureae*, *O. jutta*, and *E. discoidalis*), and (5) exclusively restricted to taiga zone environments (*V. optilete* and *E. disa*). Notes have also been made on spatial distribution, adult behavior, biology, and nectar source preferences.

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