THE SONG AND SONG-FLIGHT OF THE ALDER FLYCATCHER

BY ROBERT A. MCCABE[1]

THE song of the Alder Flycatcher (*Empidonax t. traillii*) is well known but little understood—known in the sense that it is recognized, not understood in the sense that the meaning of song in relation to behavior and ecology is difficult to interpret. I cannot claim complete understanding, but the following is an attempt toward that end.

The main objective of this paper is to describe and discuss the song of the Alder Flycatcher from a physical point of view. A secondary objective is the describing of a hitherto unrecorded song-flight. The psychological aspects of the species' singing, particularly those relating the song to the breeding cycle, I hope to discuss in a later paper, when the entire ecology and nesting picture will also be given.

What is the song of the Alder Flycatcher? Peterson (1947: 152) describes it thus: "The regular song in New York and New England is a three-syllabled *wee-bê-o* with a hoarse burry quality, the accent on the middle syllable. The Ohio bird contracts this into a sneezy *fitz-bew* or *'witch-brew'* as distinctly different as that of any other two species of the genus. Possibly collecting would prove that subspecific differences existed." I came in recent years to associate the latter description with the song of the Alder Flycatcher in Wisconsin. This, however, may be more psychological than real. I have never heard the song *wee-bê-o*.

In the summer of 1943 I began a study of Alder Flycatcher ecology. The area used for study was a 40-acre plot of brushy marsh on the west shore of Lake Wingra in the University of Wisconsin Arboretum at Madison. The chief herbaceous cover was sedge (*Carex* sp.), aster (*Aster* sp.), goldenrod (*Solidago* sp.), sunflower (*Helianthus* sp.), joe-pye weed (*Eupatorium purpureum*), and nettle (*Urtica procera*). The woody cover was mainly elderberry (*Sambucus canadensis*), red osier dogwood (*Cornus stolonifera*), and willow (*Salix* sp.).

Allen W. Stokes and Arnold S. Jackson, Jr. worked with me in 1944. They

[1] This is Journal Paper No. 19 of the University of Wisconsin Arboretum. I gratefully acknowledge the field assistance rendered by Arnold S. Jackson, Jr., Allen W. Stokes, and James B. Hale. Appreciation is also extended to Roger T. Peterson for critical reading of the manuscript and to Margaret B. Hickey for editing it. Others to whom I am indebted for helpful suggestions are J. J. Hickey, Ernst Mayr, Klaus Patau, Marie S. McCabe and Patricia Murrish. This study was financed in part by a University of Wisconsin research fund established in memory of the late Charles W. Bunn.

spent part of the following nesting season in Maryland and California respectively, and both voluntarily sent word back to me that the *Empidonax traillii* songs they had been hearing sounded exactly like those they had heard in Wisconsin. On examining the phonetic descriptions of Alder Flycatcher song as presented in the literature, I was unable to detect any agreement on the song from the standpoint of geographic location. Table 1 presents a number of these

TABLE 1

PHONETIC EXPRESSIONS OF ALDER FLYCATCHER SONG

SONG	AUTHORITY	LOCALITY
Eastern: three syllables—*phe-bé-o* type		
Jee-je-ut	Hausman (1946)	Massachusetts
Ee-zee-e-ŭp	Chapman (1937)	Washington, D. C.
Che-beé-u	Minot, in Forbush (1927)	Massachusetts
Che-bée-u	Nice (1931)	Oklahoma
Wee-bé-o	Peterson (1947)	New England-New York
Wit-ti-go	Widmann, in Butler (1897)	Indiana
Eaze-we-up	Howell (1932)	Florida-Alabama
Midwestern: two syllables—*fitz-bew* type		
Whip-whew	Breckenridge, in Roberts (1932)	Minnesota
Fitz-bew	Peterson (1947)	Ohio
Sweet-cheeuu	Trautman (1940)	Ohio
Pit-too	Gibbs, in Barrows (1912)	Michigan
Greadeal	Miller, in Forbush (1927)	Massachusetts
Grea-deal	Silloway (1897)	Massachusetts
Re-péal	Hyde (1939)	New York
Tick-weeah	Saunders (1935)	New York
Not classified		
Qui-deé	Hoffman (1904)	New York
Pree-pe-deer	Cooke, in Bailey (1908)	Western U. S.
Kee-wing	Coues (1903)	?
Raiz-wee	Bent (1942)	Massachusetts
Becky-weer	Sutton, in Todd (1940)	Pennsylvania

descriptions, some of which resemble each other, while others are singularly distinctive.

In discussing the question of subspecific differences with Roger T. Peterson in 1947 he told me that he had collected birds using the *fitz-bew* and others using the *wee-bé-o* song. Later when these skins were analyzed on a taxonomic basis by Dr. J. W. Aldrich, the birds were separated morphologically into two distinct groups. If the differences are so striking, perhaps the case for *Empidonax traillii alnorum* should be investigated more closely by the taxonomists. *Alnorum* was made synonymous with the nominate race in the last A.O.U. *Check-List* (1931, pp. 208 and 389).

As a further check on song differences, I sent a song-analysis questionnaire to a number of ornithologists in strategic geographical areas. Despite the courteous and generous response from this group, the results shed no light on whether or not there were two distinct song-areas within the range of the Alder Flycatcher. The questionnaire asked which of ten phonetic descriptions listed sounded most like the Alder Flycatcher song in the area with which the observer was most familiar. Space was also given for any new interpretations and attendant remarks. Twenty-nine ornithologists received the questionnaire. Twenty-seven answered it, but seven could offer no information. The remaining 20 indicated no clear-cut unanimity of opinion. For example, Robert Arbib circulated his questionnaire among members at a meeting of the Linnaean Society of New York City. The following interpretations resulted: *fitz-bew*, 11; *wee-bé-o*, 3; *greadeal*, 2; and *sweet-cheeuu*, 1. These data are from an eastern state in which *wee-bé-o* or *phe-bé-o* is said to be predominant (Peterson, *loc. cit.*). In seven instances the observer to whom a questionnaire was sent recorded two or more songs for the Alder Flycatcher, and in seven other cases an entirely new phonetic description was presented. These results, while not surprising, led me to think that the questionnaire measured the descriptive ability of the ornithologist rather than any regional difference in the song of the bird (a fault of the questionnaire).

In Wisconsin the Alder Flycatcher song is more than just *fitz-bew*. A prefix which sounds to me like *creet* precedes the *fitz-bew*. This note is sung just as loudly as the second part. When the birds are at the peak of their singing, the song is *creet* (pause) *fitz-bew*. Sometimes two *fitz-bews* are given in succession, following the *creet*. The only other author to suggest this *creet* as part of the full song is Trautman (1940: 296), who describes the song as *sweet-cheeuu*.

The song *re-péal* (Hyde, 1939: 155) or *grea-deal* (Miller, in Forbush, 1927: 355; Silloway, 1897: 106) is also sung by Wisconsin birds. In my experience this song was usually heard at a distance but seldom heard as described when the observer was close by, except when the bird was greatly excited. This could be coincidence, but I am inclined to believe it is a matter of phonetic distortion caused by distance between the observer and the singing bird.

In general, I believe this species may have two songs or even three, but our knowledge of the song is so limited that we cannot with certainty classify it as to geographic region, season, age classes, social behavior, and other factors that might alter its pattern.

The call note of the Alder Flycatcher is a half-chirped, half-whistled *wheet* which, although given rather sharply, is a clear, melodious note. There is virtually no difference of opinion or interpretation among ornithologists as to the sound of this call. During this study, my co-workers and I referred to the calling as "whipping". When excited, the Alder Flycatcher contracts the call note so that it sounds like *whip!* It is described by Bendire (1895: 310) as *huip*,

huip. "Whipping" usually precedes the onset of song in both morning and evening, and is the note that is most apt to call one's attention to the bird when the observer is approaching the nest.

Quite by accident during the summer of 1943 an entirely new singing performance of the Alder Flycatcher was observed, which to my knowledge has not been reported in the literature. One evening in early June while checking the late-season Woodcock (*Philohela minor*) *peenting* in a section of marsh adjacent to the Alder Flycatcher study area, I stopped at a listening post on the east edge. It was about 8:30 p.m. (C.S.T.); the sun had set and it was almost dark. After a few minutes the last Song Sparrows (*Melospiza melodia*), Meadowlarks (*Sturnella magna*), Long-billed Marsh Wrens (*Telmatodytes palustris*), Henslow's Sparrows (*Passerherbulus henslowii*), and Yellow-throats (*Geothlypis trichas*) stopped singing and the marsh was momentarily quiet. Presently, as if by signal, several Alder Flycatchers nearby began to call, then broke into full song. Like a wave the singing spread to all sections of the 200-acre marsh, where a short while before no Alder Flycatcher was singing. This in itself was spectacular. As I listened I could hear the call note, the jumbled song used when chasing (*weet-weet-whee—fitz-bew*, given rapidly), and the familiar territory song (*creet*—pause—*fitz-bew*). There was also a variation of the last song which appeared to be coming from a considerable distance above the highest (6–8 feet) bushes used as singing perches. Upon a series of subsequent visits I found this to be a *flight-song*, part of the normal breeding behavior. During the nesting seasons of 1943 through 1947, I studied this song and its accompanying flight in some detail.

The song-flight is preceded by a series of loud calls (*wheet-wheet*, etc.) which become shorter and follow each other more and more rapidly until it seems as though they could be given no faster. Then in the same rapid tempo the bird calls *creeet, fitz-bew* over and over, in all about 8 to 12 times. At about the time the calling becomes accelerated, the bird takes off from its song-perch and spirals skyward in an erratic zig-zag flight. The bird appears to be fluttering rather than flying, and reaches a height of from 30 to 50 feet above the marsh floor. At this point the singing stops and the bird dives silently down to the original singing perch or to a nearby bush, from which point it may continue to sing. In many instances the bird proceeds from the nearby bush to its original perch by silently flying back just over the top of the vegetation.

In Silloway's (1897: 109) sketch of the Alder Flycatcher he says of this bird's flight habits, "Even out under the clear dome, with the blue bending over them so invitingly, they never seek to rise above their accustomed limits, and their sallies from the weed tops and low bush-heaps are never far or high." This, it seems to me, illustrates that the word "never" is usually ill-chosen in describing bird behavior, and that this exception (the song-flight) to what Silloway thought inflexible behavior is all the more interesting.

The song-flight seldom carries a bird beyond its territorial boundaries and

usually covers less than 60 feet laterally. From a 25-foot tower placed in the center of the study area I made observations on the heights, distances covered, and song behavior of individual pairs. This tower facilitated complete coverage of the marsh, for at that height song-perch locations could not be confused. Also it made the estimation of heights of the song-flights more accurate and served as a blind for other behavior observations.

About 350 song-flights were heard by my co-workers and me during the study, but only 20% were actually seen. We found it impossible to tell which bird will go into a song-flight, or when it will occur, so one cannot always be in a position to see the flight. In many instances the evening song may begin or end with a song-flight. Song-flights on any one evening generally occur shortly after the birds begin their song period, although I have seen at least one song-flight by moonlight at the very end of an evening song period. A single bird may perform as many as six times during an evening, but two song-flights were more generally the rule. Also, not all birds perform song-flights on a given evening; in fact on certain evenings only the call is used by some birds. The reason for this interchange of expression is not known. In any one evening or morning less than 25% of the birds singing performed song-flights.

In southern Wisconsin, singing begins almost as soon as the birds arrive in spring, which is about May 10, and lasts until about August 10. The birds leave for the south shortly thereafter. Detailed studies of the song-flight in relation to certain environmental factors were made in 1944 and 1947. In general there was no correlation with any weather factor that was obvious in the field. The duration of song was used as the base datum for comparing with weather phenomena. There was no significant difference between the mean duration of song in the two years (1944, 37.0 $\pm$ 1.63 min.; 1947, 39.2 $\pm$ 2.76 min.). No correlation was found between duration of song and temperature at start of song, difference in barometric pressure between 12:30 and 6:30 p.m. on any one day, wind velocity and amount of available sunshine on any one day. However, when plotting the minimum temperature against duration of song, a statistically significant inverse correlation was realized (r value = -0.538). What ecological meaning this has, if any, is not clear, especially in view of the fact that minimum temperatures normally occur in the two hours before dawn of each day. This low point is then about 14 hours before evening song begins. The mean number of flight-songs which I heard per evening during the two years studied was 3.7 $\pm$ 2.3. The number of songs per day was not comparable because no consistent number of listening posts was used during the song periods. There was, however, a very definite correlation between the starting and stopping of song with the solstice (longest day), which will be discussed later.

I suspected that on cloudy evenings song might begin earlier and last longer, but the data did not support this suspicion. This much I can say: the two longest song periods in 1944 occurred on cloudy days. Purchon (1948: 149) found a

similar situation in song frequency of the European Barn Swallow (*Hirundo r. rustica*) in relation to weather. He states "Above a certain threshold it appears that weather had no effect on song frequency—the best day for song was one of the 5 worst days for weather." Cloudy days are no better than clear days for daytime singing; actually the most voluble daytime singing I have ever heard occurred on a clear day in bright sunlight.

Both in 1944 and in 1947 the last song period of the season was very short. This appeared to be an abrupt tapering off.

It was evident, after listening to Alder Flycatcher singing for several weeks, that there was a certain daily regularity about it. At the suggestion of the late Aldo Leopold, who had done considerable work (unpublished) on the relation of bird song to light intensity, I kept records of the beginning and cessation of song. To test this regularity, I plotted the time of song beginning and cessation against the sunset curve (Fig. 1). It is obvious by simple inspection that beginning of song follows the sunset curve. It is probably controlled by a light-intensity factor. This observation is not new. A number of writers have observed the same phenomenon, particularly Craig (1943: 92–93) who worked on a closely related species, the Wood Pewee (*Contopus virens*). In 1944 and in 1947 the time of song beginning followed the slope of the sunset curve downward from late June to early August. In 1944 it followed the upswing toward the solstice.

Certain individuals may occasionally "jump the gun," so that beginning of song as here used is taken to be the time at which singing becomes continuous in all sections of marsh under observation. Actually I experienced little difficulty in assigning a time to the start of song since the birds usually started together.

Song cessation is probably *not* directly controlled by a light factor because evening song usually ends after it is completely dark to the human eye, and probably to the eyes of flycatchers as well.

Evening civil twilight,[2] which ends when the center of the sun is 6° below the horizon, was also plotted in the above mentioned figures. In no case was song cessation recorded before the end of civil twilight in either year. Interesting also is the fact that in both years song always started before the end of civil twilight, but in only two instances in 28 did song begin before the onset of civil twilight, namely sunset (see Fig. 1).

Cessation of song may be caused by fatigue, as was also postulated by Haecker (1924: 724), Wright (1912: 327), and Craig (1943: 96) for other species. I believe, however, that if we accept the hypothesis that a given light intensity stimulates song, then that same stimulation must fade, irrespective of whether the bird is physically able to respond or not. What I measured here was in effect the onset of the stimulation, its result, and the time at which the response

[2] "If the sun is much lower ordinary outdoor, civil operations are impracticable without artificial light" (Nautical Almanac, 1941).

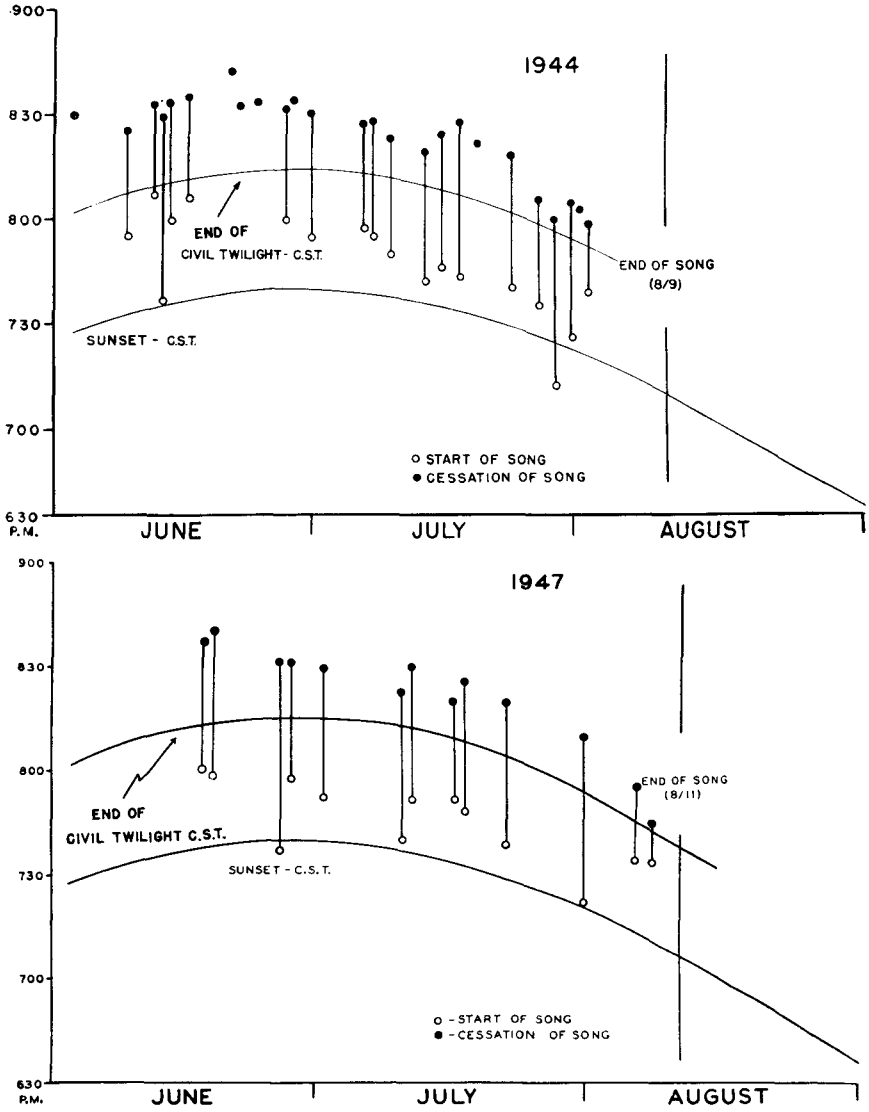

FIG. 1. Alder Flycatcher evening song in relation to sunset and the end of civil twilight in 1944 (above) and 1947.

was completely dissipated. Nothing in my observations suggested augmentation of the stimulus or acceleration of the response due to further changes in light intensity once the point of active response is reached. Craig (1943: 101) states of the Wood Pewee: "It may be that the ending of the song is influenced by a change in illumination." In the case of the Alder Flycatcher there is no visible

change in illumination during the last third of the song period since it occurs in the darkness after civil twilight. Furthermore the evening song of the Alder Flycatcher in a marsh starts and reaches maximum intensity rather abruptly, and stops in the same fashion. This abrupt response would seem to indicate that a given light intensity rather than "changes of illumination" is the stimulating agent. What that light intensity is in foot-candles or how it is modified by environmental factors I am not prepared to say.

Craig (*op. cit.*) also infers that intraspecific stimulation to song may not occur (p. 101). I am of the opinion that an individual bird may cause others in adjoining territories to continue in song when they might normally have been quiet. This was particularly evident at the close of the song period on any one evening. In numerous cases the persistent bird "coaxed" its neighbors into song and the group continued their roundelay for three to five minutes after the bulk of the marsh was silent.

The song and song-flights also occurred during the crepuscular period in the morning, but a seven-day trial period of investigation showed that there was less activity at that time (i.e., fewer birds in song, fewer song-flights, etc.). There was no clear-cut cessation of song, as singles and groups of two and three birds would occasionally sing intermittently late into the morning. It is interesting, however, that seasonal song stopped within a two-day period both evening and morning in 1944 and 1947.

Summary

The existence of two distinct songs of the Alder Flycatcher, one eastern (*phe-bê-o*), and the other midwestern (*fitz-bew*), is beclouded by the fact that there is no unanimity of opinion among ornithologists on this geographic segregation of song. The disagreement may result from factors human rather than avian.

In Wisconsin the Alder Flycatcher appears to have added an extra syllable to the *fitz-bew* song, making it *creet* (pause) *fitz-bew*. Phonetic descriptions of Alder Flycatcher song by various writers are listed. The phonetic description of the call note, *wheet*, is generally accepted by ornithologists.

This bird performs a song-flight which carries it 30–50 feet above the marsh. During the performance the *creet, fitz-bew* is repeated in rapid succession 8–12 times. This song and flight take place late in the day and continue until after dark. Song generally starts after sunset, and the time of starting and stopping varies in direct relation to the time of sunset. The onset of daily song is probably controlled by a light-intensity factor; cessation probably is not, inasmuch as it is totally dark (after civil twilight) when the singing stops.

No correlation was found between measurable weather conditions and recorded aspects of song.

Morning song also occurs but it is less vigorous and less regular. In 1944 and

1947 seasonal song was ended both in the morning and in the evening within a two-day period (August 9, 1944 and August 11, 1947).

LITERATURE CITED

BAILEY, F. M.
1908 Handbook of birds of the western United States. Houghton Mifflin Co., Boston.
Barrows, W. B.
1912 Michigan bird life. *Special Bull., Dept. Zool. and Physiol. Mich. Agric. Coll.*, Lansing.
Bendire, C.
1895 Life histories of North American birds with special reference to their breeding habits and eggs. *Special Bull. U. S. Natl. Mus.* 2., Washington, D. C.
BENT, A. C.
1942 Life histories of North American flycatchers, larks, swallows and their allies. *U. S. Natl. Mus. Bull.* 179.
BUTLER, A. W.
1897 The birds of Indiana. Twenty-second annual report, Indiana Dept. Geology and Natural Resources, Indianapolis.
CHAPMAN, F. M.
1937 Handbook of birds of eastern North America. D. Appleton-Century Co., New York City.
COUES, E.
1903 Key to North American birds. Vol. 1. The Page Co., Boston.
CRAIG, W.
1943 The song of the Wood Pewee, *Myiochanes virens* Linnaeus: A study of bird music. *New York State Museum Bull. No.* 334, Albany.
FORBUSH, E. H.
1927 Birds of Massachusetts. Vol. 2. Mass. State Dept. of Agric., Boston.
HAECKER, V.
1924 Reizphysiologischer über den Abendgesang der Vögel. *Arch. ges. Physiol.*, 204: 718–725.
HAUSMAN, L. A.
1946 Field book of eastern birds. G. P. Putnam's Sons, New York City.
HOFFMANN, R.
1904 A guide to the birds of New England and eastern New York. Houghton Mifflin Co., Boston.
HOWELL, A. H.
1932 Florida bird life. Coward-McCann, Inc., New York City.
HYDE, A. S.
1939 The ecology and economics of the birds along the northern boundary of New York State. *Roosevelt Wildl. Bull.* Vol. 7, No. 2.
NICE, M. M.
1931 The birds of Oklahoma. Revised Edition. University of Oklahoma Press, Norman.
PETERSON, R. T.
1947 A field guide to the birds. Houghton Mifflin Co., Boston.
PURCHON, R. D.
1948 The nesting activities of the swallow. *Proc. Zool. Soc. London*, 118: 146–170.
ROBERTS, T. S.
1932 The birds of Minnesota. Vol. 2. Univ. of Minnesota Press, Minneapolis.
SAUNDERS, A. A.
1935 A guide to bird songs. Appleton-Century Co., New York City.

SILLOWAY, P. M.
1897 Sketches of some common birds. Editor Publishing Co., Cincinnati.
TODD, W. E. C.
1940 Birds of western Pennsylvania. University of Pittsburgh, Pittsburgh.
TRAUTMAN, M. B.
1940 The birds of Buckeye Lake, Ohio. *Univ. Mich. Mus. Zool. Misc. Publ.* 44.
WRIGHT, H. W.
1912 Morning awakening and even-song. *Auk*, 29: 307–327.

DEPARTMENT OF WILDLIFE MANAGEMENT, UNIVERSITY OF WISCONSIN, MADISON

FOUNDER

Reuben Myron Strong was born in West Allis, Wisconsin, in 1872. Graduated from Oberlin College in 1897, he later received A.M. and Ph.D. degrees from Harvard. He was a member of the Department of Zoology at the University of Chicago from 1903 to 1914 and served as Chairman of the Department of Anatomy at Loyola University Medical School from 1918 until his retirement in 1946. Since that time he has been Research Associate in Anatomy at the Chicago Natural History Museum.

Dr. Strong was the first Treasurer of The Wilson Ornithological Club; was Vice-President from 1894 to 1901; and President from 1920 to 1921. He became an Associate of the American Ornithologists' Union in 1889, a Fellow in 1949. He has published extensively on animal coloration, genetics, neurology, ossification of the skeleton, comparative anatomy and bird behavior. He is, however, best known for his "A Bibliography of Birds," a three-volume work on the ornithological literature of over twenty languages.

In a recent letter he wrote: "I have kept well and have been out every day for work. I have had a good deal of skating, which the cold weather has made possible." Of such stuff are Founders made!