# THE ORIGIN OF DRIFTWOOD ON NUNIVAK ISLAND, ALASKA

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During the summer of 1952, a series of Swedish increment borings were collected from driftwood logs at various points along the coast of Nunivak Island, Alaska. The purpose of the sampling was to determine, if possible, the source of the spruce logs which have drifted ashore on the island, and to provide information to aid the study of northern ocean currents.[1]

The first studies on the origin of Alaskan driftwood were carried out by Giddings.[2] His main interest was in crossdating the various driftwood structures along the Bering Sea coast and the Arctic Ocean, but he noted also that the source of driftwood could be determined, an idea which was discussed in a 1952 driftwood study.[3] In 1951, Oswalt published a paper on the origin of driftwood at Hooper Bay, Alaska in which he demonstrated the crossdating of thirteen samples with Giddings' Series A driftwood master plot and one with the Series B master plot.[4] He was able to determine also that one driftwood sample came from the Stevens Village area on the Yukon River, and another probably from Nulato, also on the Yukon. In the course of their studies, both Oswalt and Giddings have stressed the necessity of developing chronologies for other Alaskan rivers comparable to that developed by Giddings for the Yukon.[5]

Living tree chronologies have been defined for much of interior Alaska and the Yukon River proper,[6] the forested area of Seward Peninsula,[7] the Kobuk River,[8] and the Copper River.[9] During the summer of 1953, Oswalt collected living tree samples from below McGrath on the Kuskokwim River to the limit of spruce growth in the vicinity of Bethel, a distance of approximately four hundred miles.[10]

The problem of collecting an adequate number of driftwood borings on Nunivak Island is more complex than it is for certain areas of the Bering Sea coast. The north coast of the island receives a small deposit of driftwood while the swift currents that run between the island and the mainland prevent the deposit of many logs along the east coast. It is only to the south along the shores of Cape Mendenhall that sizeable amounts of driftwood are to be found, and these do not compare in number with the vast tangle of drift logs to be found in the Norton Sound area and elsewhere along the south Bering Sea coast.

A total of one hundred and eleven samples were secured from various locations on Nunivak Island, of which fifty were chosen on the basis of

[1] The driftwood borings which are the basis of this paper were collected while the writer was conducting an archaeological survey of Nunivak Island. The survey was sponsored by the Arctic Institute of North America with funds from the Office of Naval Research and by the University of Alaska. The writer wishes to express his thanks to Mr. and Mrs. Robert Gibson, Alaska Native Service teachers at Mekoryuk, for their co-operation during the field season and to Mr. Wendell Oswalt who read the manuscript and offered many valuable suggestions.

[2] J. L. Giddings, Jr., *Univ. of Ariz. Bull.* 12: *Univ. of Alaska Publ.* 4, 1941, pp. 40-48, pp. 79-83, Table 2, Giddings, *Geog. Rev.* 33: 326-27, 1943.

[3] Giddings, *Proc. of the Amer. Philosophical Society* 96:130-142, 1952.

[4] W. Oswalt, *Tree-Ring Bull.* Vol. 18, 1951, pp. 6-8.

[5] Ibid., p. 8, Giddings, 1952, pp. 140-141.

[6] Giddings, 1941, pp. 12-28; Oswalt, *Tree-Ring Bull.* 16: 26-30, 1950.

[7] Giddings, 1941, p. 32; Giddings, *Tree-Ring Bull.* 18: 2-6, 1951.

[8] Giddings, *Tree-Ring Bull.* 9: 2-8, 1942.

[9] Oswalt, *Tree-Ring Bull.* 19: 5-10, 1952.

[10] Oswalt, *Anth. Papers of the Univ. of Alaska* 2: 203-214, 1954.

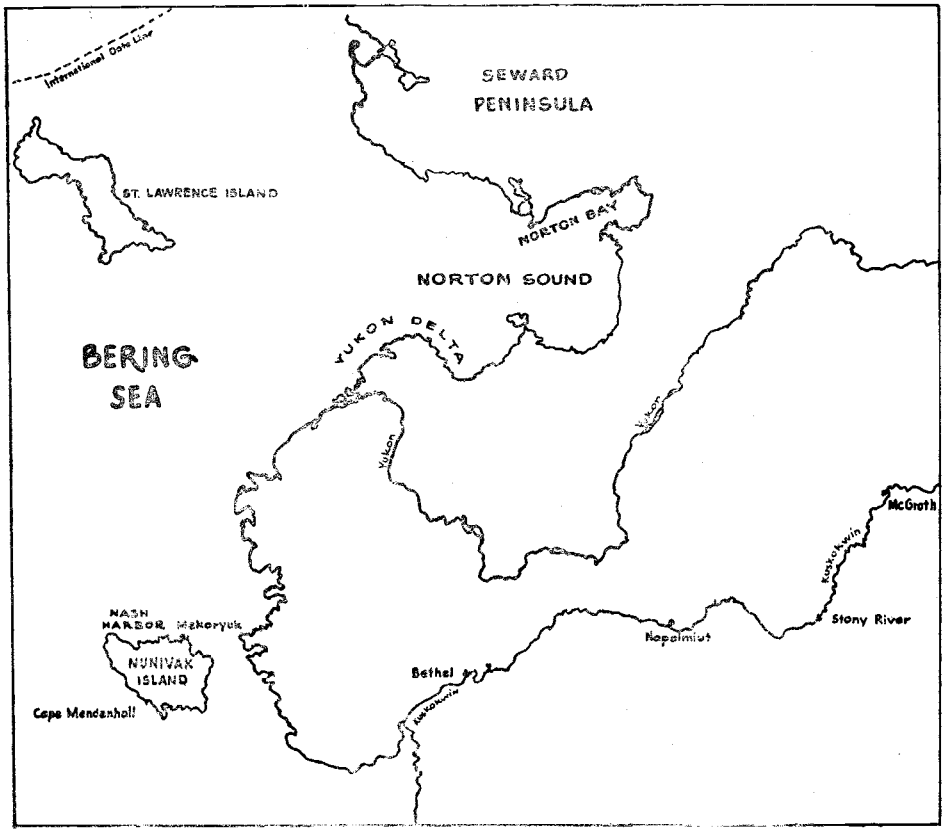


FIGURE 1. Map of the Bering Sea coast of Alaska. Scale: 1" equals 50 miles.

growth sensitivity for skeleton plotting and comparison with the river chronologies. Of the fifty specimens used, thirty came from the Cape Mendenhall region, nine from Nash Harbor and vicinity, and eleven from the area around the villages of Mekoryuk, both located on the north coast of the island (see Figure 1). Some of the Mekoryuk samples are from logs probably brought up from the south side by the Eskimos as driftwood is scarce around the village and almost always has to be obtained from great distances.

The fifty samples plotted were first compared with Giddings' Series A and then the Series B master plots.[11] No crossdating could be determined from the comparison. The plots were then compared with the ten groups of Oswalt's Kuskokwim chronology,[12] and four dated as follows:

| *Nunivak Island Driftwood Number* | *Number of Rings* | *Outer Ring* | *Closest Group Comparison* |
|---|---|---|---|
| 1 | 185 | 1900 | II, IV |
| 2 | 210 | 1944 | II, IV |
| 3 | 210 | 1933 | II, IV |
| 4 | 189 | 1929 | II, IV |

It should be noted that in most cases the end dates listed do not represent the outermost ring of the tree, as all sampled logs had been stripped of their bark and they may have lost a few outer rings due to weathering. The four dated samples were measured in hundredths of a millimeter and the results plotted.

[11] Giddings, 1941, Figs. 13-19.
[12] Oswalt, 1954, Fig. 2.

It can be seen that all four of the Nunivak drift specimens crossdate most closely with the Kuskokwim Groups II and IV, from McGrath and Swift respectively. A mean of the dated samples is shown in Figure 2 together with the plots of Kuskokwim Groups II and IV. The Nunivak mean is presented in a scale three-fifths that of the two Kuskokwim Groups. The individual year-by-year group averages are recorded in Table 1. Although the Nunivak samples show a pronounced growth curve, the agreement in the first hundred years is quite good. The dated specimens show the greatest amount of sensitivity during the first eighty years of their growth.

The consistently small rings in Oswalt's Kuskokwim River series are A.D. 1793, 1802, 1809, 1826, 1885, 1910, 1912, and 1949.[13] With the exception of 1949, which is later than the end date of any of the Nunivak samples, key signatures surrounding these dates are present in all the dated Nunivak samples. The 1783 faint latewood ring,[14] which is often indistinguishable in the Kuskokwim River spruce,[15] is absent from the Nunivak samples.

In addition to the crossdating with Groups II and IV, each of the dated samples show a lesser amount of agreement with other Kuskokwim groups. All show a limited amount of crossdating with Group III (Vinasale). NI-3 and NI-4 show some agreement with Group V (Stony). NI-2 compares favorably with Group I (Herron-Castle). It is interesting to note that all of the crossdating is with Groups I to V which are up-river groups. This may be due to the fact that, although there are trees along the lower river, they are scattered and the likelihood of their contributing heavily to the amount of coastal drift is not great. Along the upper Kuskokwim River, however, particularly above Napaimiut, tree-growth is heavier and the river banks are less consolidated and are more apt to cave in during high water, thereby increasing the chances that coastal drift could come from this area. Thus it can be stated that probably all four of the dated Nunivak samples came from the upper Kuskokwim River, most likely somewhere between Stony River and McGrath.

Of the four dated Nunivak drift samples, three (NI-2-4) were collected in the Cape Mendenhall area while one (NI-1) came from the region around Nash Harbor on the north coast of the island. Since there is a general northerly flow of ocean currents from the southeastern Bering Sea region through the Bering Strait,[16] it is not surprising to find the

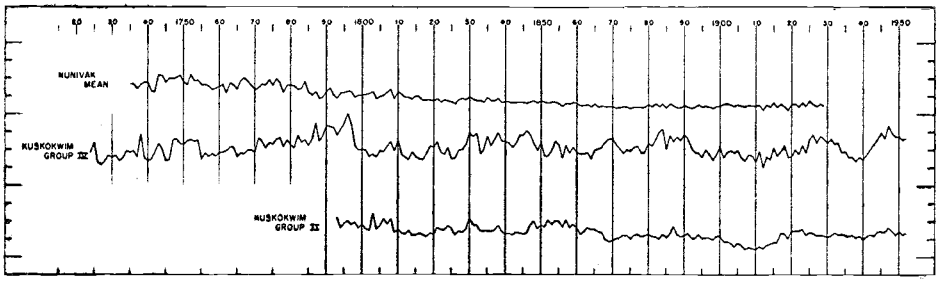


FIGURE 2. Crossdating between the dated Nunivak samples and Kuskokwim Groups II and IV. The graphically represented measurements are in one-hundredths of a millimeter.

[13] *Ibid.*, p. 207.
[14] Giddings, 1941, p. 72.
[15] Oswalt, 1954, p. 207.
[16] E. C. LaFond, *Arctic* 7: 100, 1954.

TABLE 1. Mean Ring-Widths of Dated Nunivak Island Driftwood Samples.

| | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1730 | — | — | — | — | — | 42 | 42 | 35 | 41 | 44 |
| 1740 | 44 | 32 | 31 | 54 | 53 | 44 | 50 | 48 | 51 | 54 |
| 1750 | 44 | 41 | 55 | 46 | 47 | 42 | 42 | 39 | 34 | 36 |
| 1760 | 39 | 42 | 29 | 43 | 41 | 34 | 47 | 51 | 46 | 39 |
| 1770 | 34 | 37 | 43 | 40 | 48 | 40 | 49 | 43 | 30 | 40 |
| 1780 | 40 | 39 | 34 | 36 | 46 | 30 | 26 | 32 | 22 | 23 |
| 1790 | 31 | 37 | 26 | 22 | 29 | 30 | 32 | 31 | 23 | 26 |
| 1800 | 26 | 27 | 28 | 31 | 21 | 24 | 26 | 30 | 35 | 21 |
| 1810 | 31 | 27 | 23 | 23 | 21 | 25 | 24 | 18 | 19 | 19 |
| 1820 | 18 | 21 | 16 | 19 | 18 | 17 | 14 | 20 | 22 | 20 |
| 1830 | 24 | 20 | 18 | 18 | 16 | 23 | 18 | 18 | 22 | 16 |
| 1840 | 17 | 17 | 15 | 16 | 16 | 16 | 15 | 17 | 18 | 16 |
| 1850 | 18 | 17 | 15 | 17 | 17 | 15 | 11 | 15 | 14 | 16 |
| 1860 | 15 | 12 | 12 | 13 | 10 | 14 | 10 | 11 | 10 | 10 |
| 1870 | 10 | 08 | 09 | 10 | 10 | 08 | 10 | 10 | 09 | 10 |
| 1880 | 13 | 11 | 14 | 11 | 14 | 09 | 15 | 12 | 09 | 09 |
| 1890 | 12 | 10 | 08 | 10 | 13 | 10 | 11 | 10 | 08 | 11 |
| 1900 | 11 | 14 | 15 | 13 | 11 | 13 | 12 | 11 | 13 | 12 |
| 1910 | 12 | 13 | 06 | 13 | 10 | 17 | 10 | 15 | 11 | 06 |
| 1920 | 14 | 15 | 11 | 17 | 11 | 19 | 14 | 11 | 14 | 12 |

greatest amount of driftwood on the south coast of Nunivak Island. Driftwood coming from the mouth of the Kuskokwim and from other rivers south of the island naturally would be deposited in that area rather than on the north coast which would be bypassed by the northward moving driftwood. This may also account for the failure to date any of the Nunivak borings by using the Yukon chronologies. Most of the Yukon drift is deflected northward and does not come near Nunivak Island. It seems almost certain that much Kuskokwim driftwood must be deposited on the shores of St. Lawrence Island and a re-examination of drift and archaeological wood from that island in the light of Oswalt's Kuskokwim series might yield more satisfactory results than have been achieved with St. Lawrence wood in the past.[17]

One point yet to be mentioned concerns the small percentage of datable samples in the Nunivak collection. There are probably two main reasons for this. First of all, the collection is small because of the scarcity of driftwood and this limited the selection in choosing the samples. Secondly, local chronologies expressing microclimatic conditions are lacking from many of the rivers that undoubtedly contribute driftwood to the coast of Nunivak Island. It seems fairly certain that many complex, and at present unknown, factors (e.g. wind and ocean currents) are involved in the movement of driftwood, and these add to the difficulties of dating. Before these difficulties can be overcome, the establishment of more local river chronologies are needed, as well as the collection of more drift samples from the Bering Sea coast.

[17] Giddings, 1941, p. 41.

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