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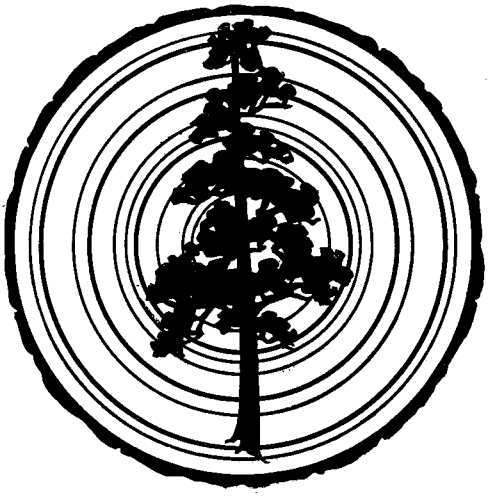

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YUKON RIVER SPRUCE GROWTH

J. L. GIDDINGS, JR.

The curves and tabulations presented here are those of groups of spruce trees growing at about fifty-mile intervals along the Yukon River. The Circle group (CIR) is the easternmost, and the Nulato group (NHS) is the last westward on the river itself, although a Norton Bay group (DAR) is added to lengthen the east-west span of the transect. These data supplement the author's 1943 article, "Some Climatic Aspects of Tree Growth in Alaska" (TRB 9:26-32), and help to explain some of the notes therein on climatic response in ring records. The location of each group is the same

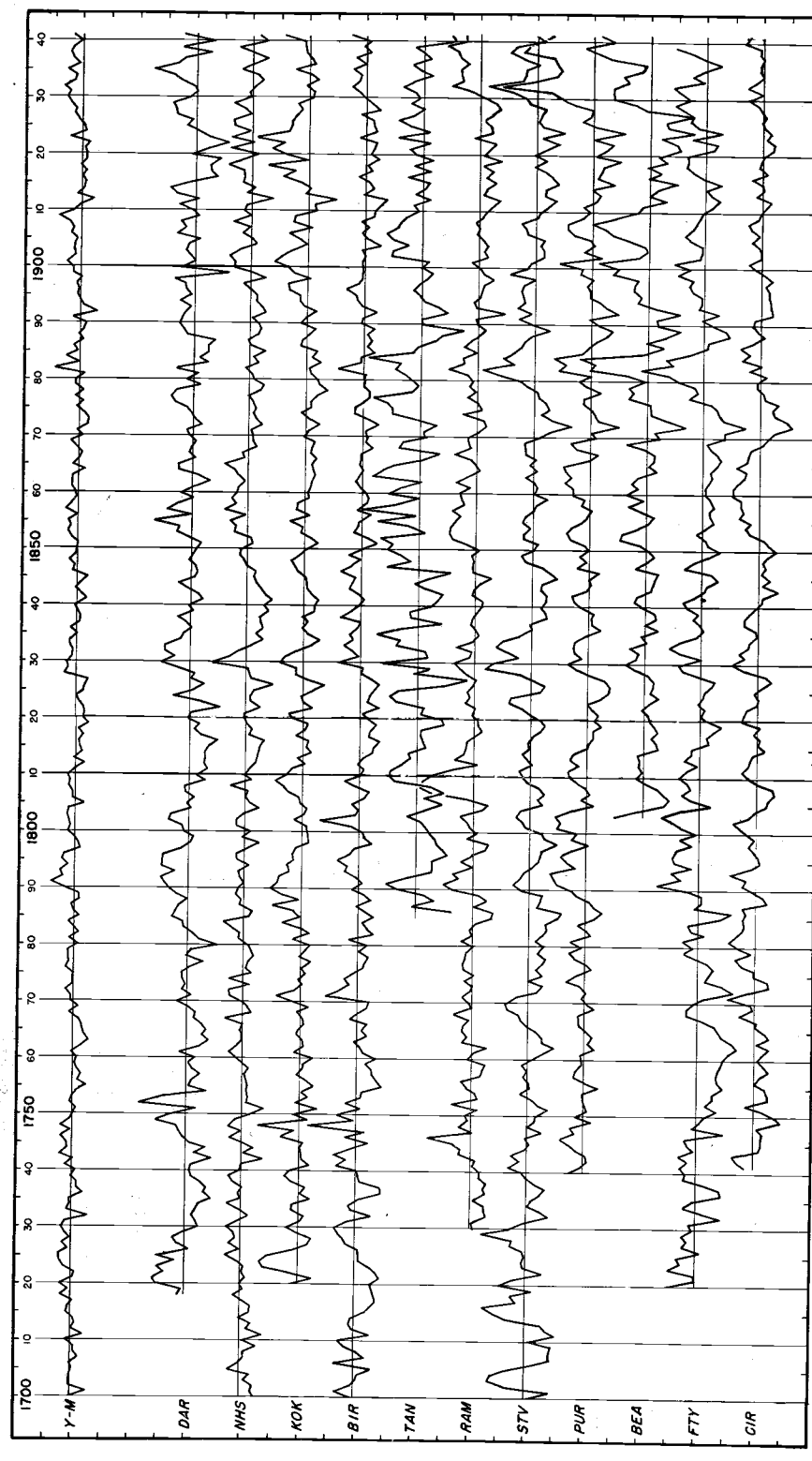

Fig. 1. Yukon River Transect. Reading upwards: CIR to NHS are points at approximately 50-mile intervals east-west along the river; DAR is west of NHS on Norton Bay; Y-M is a mean of the Yukon River and the Mackenzie River Delta chronologies. All curves are standardized.

Yukon River Spruce, 11 Groups.
Ring-Widths in Per Cent of the Growth Trend

A.D.	0	1	2	3	4	5	6	7	8	9
1700	91	91	108	120	104	110	109	77	83	83
1710	107	62	86	88	114	109	110	92	105	91
1720	125	102	100	123	121	127	100	115	112	124
1730	113	103	76	92	103	89	77	74	92	106
1740	106	110	97	115	98	104	124	93	125	99
1750	102	79	113	93	89	82	91	91	88	90
1760	89	94	77	88	86	90	94	105	120	100
1770	108	121	102	91	109	96	95	93	113	103
1780	92	115	95	102	109	87	79	109	89	101
1790	125	136	127	121	104	111	107	96	81	94
1800	97	114	129	126	103	85	95	97	110	119
1810	123	115	101	108	101	90	86	93	88	80
1820	95	102	90	105	104	93	74	80	103	120
1830	144	116	121	129	113	111	98	98	105	96
1840	97	93	95	94	98	86	90	113	108	108
1850	100	98	116	123	119	125	105	125	116	106
1860	111	113	111	116	113	117	98	101	106	109
1870	93	89	61	82	103	98	103	117	101	105
1880	111	117	151	123	141	103	105	98	87	77
1890	101	107	76	96	106	106	114	115	101	111
1900	120	130	113	113	101	111	128	122	132	112
1910	101	98	74	103	99	86	103	94	111	86
1920	104	96	80	114	80	103	111	106	105	120
1930	119	125	148	123	120	127	111	119	128	143
1940	110	124	—	—	—	—	—	—	—	—

Mackenzie River Spruce, 5 Groups.
Ring-Widths in Per Cent of the Growth Trend

A.D.	0	1	2	3	4	5	6	7	8	9
1700	114	52	97	90	104	87	96	98	110	108
1710	116	96	115	98	82	109	100	105	133	119
1720	117	95	92	107	121	109	115	120	94	99
1730	123	119	66	123	103	124	86	114	95	102
1740	88	113	102	130	122	120	117	115	119	115
1750	103	110	98	112	103	71	95	84	101	105
1760	102	116	99	61	77	75	81	82	99	83
1770	104	94	127	114	96	108	131	127	108	118
1780	95	105	92	100	113	96	126	104	97	87
1790	113	147	116	137	122	138	130	90	110	110
1800	126	108	94	103	122	84	120	119	113	103
1810	102	89	73	106	78	97	106	84	109	80
1820	83	74	88	87	97	86	97	61	140	113
1830	95	104	96	97	115	89	125	95	86	104
1840	113	80	95	118	98	86	132	105	126	104
1850	107	106	112	116	110	114	99	120	112	103
1860	106	116	117	107	66	104	108	95	103	122
1870	97	125	117	91	81	114	90	102	93	116
1880	111	73	139	82	115	108	121	96	118	116
1890	83	121	66	95	96	108	95	105	98	119
1900	109	124	111	115	125	109	110	111	112	130
1910	128	106	86	115	97	106	96	93	95	100
1920	81	99	95	129	110	95	105	126	120	119
1930	139	118	121	113	103	130	104	118	119	91
1940	93	108	—	—	—	—	—	—	—	—

as indicated on the map (Figure 1) of the earlier article. Other points of correlation with the earlier article are the following:

The Fort Yukon group (FTY) is made up of seven trees growing within ten miles of the village of Fort Yukon, and is not strictly from one stand of spruce, as are all of the other groups.

The Rampart group is designated by the letters RAM instead of RAMN.

The Cape Darby group (DAR) is substituted for the Koyuk group (KNB), with which it is almost identical in trend, because it is longer and better defined ("The Forest Edge at Norton Bay, Alaska," TRB 18:2-6, 1951).

The curves of Figure 1 are standardized by removal of growth trend from a curve of the averaged measures of each group with the exception of the Circle group and the Beaver group (CIR and BEA), the measures of each tree of which were separately standardized and then averaged.

It is perhaps well to say again that spruce growth patterns change along the Yukon River with changes of mean temperature of the growing season, and that crossdating between the upper and the lower river trees is almost nonexistent at the river edge. An average of the ten Yukon River curves shown here is therefore an average of something more than the mean June-July temperature, which the Cape Darby curve most nearly approximates. We do not yet know whether most of this relates to temperature or to a combination of climatic factors. Nevertheless, there seems to be some hope of capturing an overall climatic effect in the broadest possible average of measures, and the Yukon-Mackenzie curve (Y-M) is included at the top of Figure 1. In this, the eleven standardized groups from the Yukon River and Norton Bay have been averaged, and this average was combined with a mean of five standardized spruce groups from the Mackenzie River delta region ("Mackenzie River Delta Chronology," TRB 13:26-29, 1947). The two averages were given equal weight.

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NOTES ON KOTZEBUE DATING

JAMES W. VANSTONE

During the summers of 1940, 1941 and 1947 J. L. Giddings, then of the University of Alaska, conducted archaeological and dendrochronological investigations along the Kobuk River and at the mouth of Hotham Inlet.[1] Apart from its value for the reconstruction of culture in an area where no previous work has been done, the archaeology of the Kobuk River sites is of particular interest because these are the first series of sites in the north to be accurately placed in time by an application of the dating methods of dendrochronology.

Giddings has divided the Kobuk River into lower, middle and upper sections, in which are located the five major sites. Ambler Island, located in the upper river section, has been dated at 1750 A.D.; Ekseavik, dated at 1400 A.D., and Ahteut, at 1250 A.D., are farther west in the middle river section. The two lower river sites on Kotzebue Sound are referred to as Old and Intermediate Kotzebue and are dated at 1400 A.D. and 1550 A.D. respectively.[2]

During the summer of 1951 the author carried on further excavations in the Old and Intermediate Kotzebue sites with the aid of a grant from the University of Pennsylvania. A total of eight houses were excavated and a quantity of well preserved wood was collected from most of the houses. The purpose of this paper is to show that this wood can be dated in terms of Giddings' Kobuk River chronology.[3]

Figure 1 shows the measured ring-widths of four logs from Kotzebue houses compared with Giddings' Kobuk-Kotzebue chronology. Two of the curves illustrated (KZ-1 and KZ-4) represent logs from the same house. The other two are from different houses. All measurements are in hundredths of a millimeter, but KZ-4 is presented in a scale four-fifths that of the other three because of a greater variation in the ring-widths.

Giddings has pointed out that sensitivity in his material is higher than the average over short periods of time and that these intervals of increased sensitivity occur about seventy years apart in the Kobuk chronology. Such periods center around the following signatures: 1912-1922, 1742-1751, 1534-1543, 1358-1365 and 1205-1219.[4] It will be noticed that the curves illustrated show marked sensitivity between 1350 and 1370 with 1358, 1361 and 1365 being the narrowest rings in each curve. In addition, three of the author's Kotzebue curves show a less well defined area of sensitivity between the years 1265 and 1295.

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[1] J. L. Giddings, *Tree-Ring Bull.* 9:2-8, 1942 and 14:26-32, 1948; *American Antiquity,* 10:113-134, 1944; ms.
[2] *Op. cit.,* 1948 and ms.
[3] The author is grateful to Mr. Wendell Oswalt of the University of Alaska for advice during the preparation of this paper.
[4] *Op cit.,* 1948, p. 32.

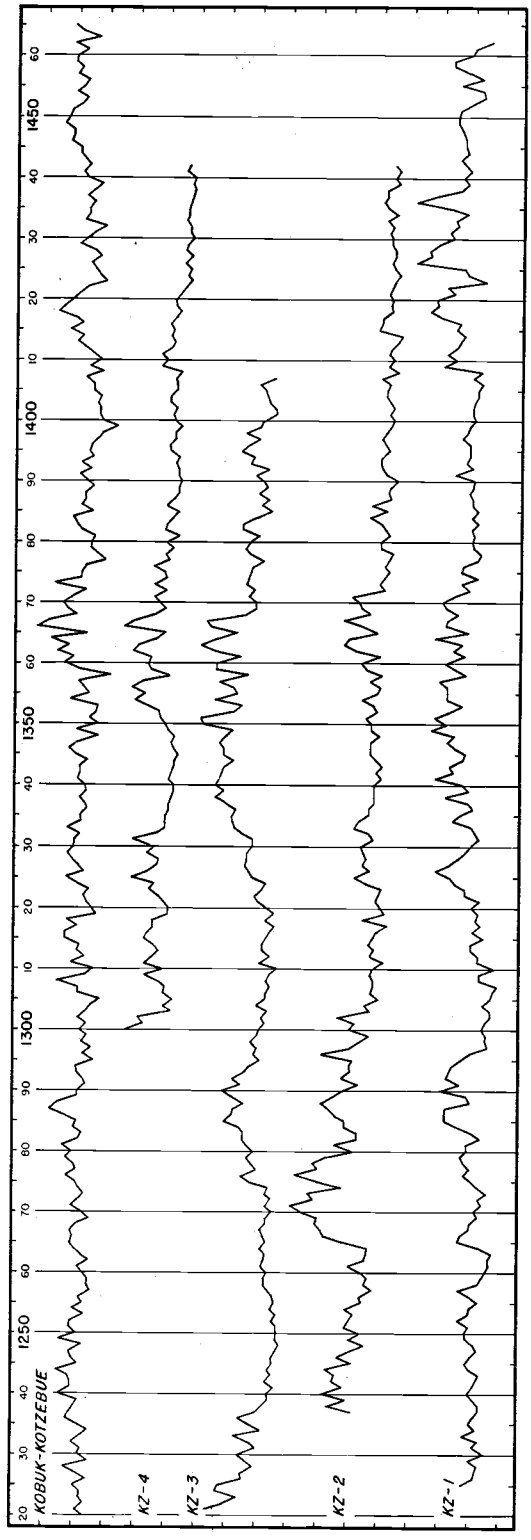

Fig. 1. Crossdating between four house logs from Kotzebue and the Kobuk-Kotzebue master chronology.

A total of twenty-nine dated logs were obtained from nine houses at the Kotzebue sites. Taken together, they represent a chronology extending from the year 1177 to 1571. The bark and near bark dates are listed below by the individual house:

H-1	H-3	H-4	H-5*	H-6	H-8	H-9	H-10	H-12*	H-13
1476	1315	1437	1351nb	1569	1409		1500	1396	1408
1508	1372	1438	1354	1571nb	1427nb		1515nb		1409
	1395	1486			1443				1370
	1442	1489			1453nb				1384
					1462				1423
									1430
									1435

*These houses were not excavated.

The curves which are illustrated represent the logs with the longest and most sensitive records. They show the clearest correlation with Giddings' Kobuk-Kotzebue chronology.

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