THESIS

A FOREST PLANTING PLAN FOR CENTRAL KANSAS

by

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'08.

A Forest Planting Plan for Central Kansas.

In 1896 the U. S. Dept. of Forestry submitted to the Experiment Station at the Kansas State Agricultural College, the following plan for a forest planting. The planting was made in accordance with this plan on the old college farm, two miles west of Manhattan, Kansas. It embraced eight different species of forest trees, numbered as follows:

Iron wood	99
Burr Oak	99
Cherry	367
Douglas Spruce	558
Norway Spruce	467
Bull Pine	657
Scotch Pine	745
Jack Pine	2940

In the investigation which follows we first note that all of the deciduous varieties and practically all others, with the exception of the Scotch and Jack pines, are extinct. Therefore, we shall study the data concerning the plat and develope our conclusions from the stand point of these two latter species in admixture. The absence of most species from the plat may be explained by their natural inability to meet the soil and climatic conditions imposed upon them or their failure to compete with the pines. It would seem in the case of the pinus ponderoso, however, that its extinction would not be expected. It is known to be well adapted to this soil and locality and its rate of growth and its similarity should insure its tolerance of the above two species.

Early records of the plantings prove that the Bull pine never made a thrifty start, and it is probable that the roots became damaged in shipment, the young trees being very susceptible to

drying. To some extent this may have been a factor in eliminating other species of the plat. However, especially as regards the deciduous stock, their failure was probably due to their inability to compete with the pines. In any event, the reasons for choosing such species in the given proportions are not obvious. We can see no reason for placing such a tree as the Iron Wood in the plan at all.

In planting, the ground was plowed deep and the seedling trees set out by hand. The Scotch pines were evenly distributed, being contained in alternate rows. The roots were puddled to prevent excessive drying. The soil is comparatively shallow, being about two feet in depth and somewhat inferior to that of surrounding areas. It is a silt loam of glacial origin, underlaid by a bed of limestone, disintegrated to a sufficient extent to allow some entrance of roots.

The forest is of the upland type and its situation upon a large hill with the accompanying conditions of soil and climate are well fitted for it. The slope insures excellent drainage, yet is not so sloping as to induce washing away of the forest floor. The planting covers 1.12 acres and is protected on the east, south, and west by previous plantings.

The trees have reached the small pole stage and have uniformly straight and symmetrical poles. The height is also uniform, showing better in this respect than the diameter. The trees are of a distinctly gregarious nature. Almost the entire area is uniformly thick, the trees standing about three to four feet apart each way in the row, with the exception of a small plat in the

northern part where the planting is considerably thinned. Here the trees have expended more energy on the lateral branches and at the same time have allowed vegetation to spring up.

The canopy is of the single type, but because of the closeness of the trees and their thick foliage, more than three fourths of the ground is shaded. This condition leads to the formation of an excellent forest floor. There is no undergrowth and the ground is covered with a layer of needles and twigs. This forms an effective conserver of moisture and prevents any washing of the soil. Another result of this shading is the dying of the branches to a distance of about one-half the trunk height. The process of self pruning has begun, although, as yet, to a very slight extent.

In studying this plat it is our purpose to inquire into the toleration of the Scotch and Jack pines in mixture, and to make a comparison of their respective growth. Other comparisons regarding self pruning, appearance, or similar points of interest, will also be noted.

In every case the diameter of the tree was taken by means of calipers and is fairly accurate. The height was measured by means of a sliding standard, and because of the height of the trees and the difficulty of working about the interlocking branches, may be considered as a good approximation, only We submit, in full, the data collected, arranged in such a way that results pertaining to any particular row may be referred to in subsequent investigations.

Scotch Pine

Row	Height ft.	Diameter in.	Row	Height ft.	Diameter in.	Row	Height Ft.	Dia. in.
A 1	9	1.6	A 5			A 8	18.5	2.8
	6.5	1	A 6	17.5	2.7		11	1.2
	7.5	1		17	2.2		18	3.2
	14.	2.3		13	1.6		15	1.4
A 2	15.	3		21.5	3.2		16	2
	14	2		15.5	1.8		20.5	2.7
	12	1.6		8.5	2		20	2.8
	15.5	2.4		11.5	2.8		18.5	3
	17	3.2		11	1.8		15	1.8
	9	1.3		13.5	2.2		16.5	2.7
	11	2.5		10	1.5		19	2
	7.5	1		16	3.7		20	3.8
	11	2.2	A 7	19	3.8		18.5	2.8
	7	9		18	3.3		16	2.4
	9.5	1.5		16	1.7		17	3
	12	2.4		21	3.4		21	4
	8.5	1.3		12.5	1.2		16.5	2.8
A 4	19	4		16	2.2		16.5	3
	21.5	3.2		15.5	2.5		18	3.5
	16	2.4		17.5	2.4		16	3.2
	15.5	2.5		19	3.2		17	3.6
	11	1.5		13	1.2		16.5	2.8
	13.5	3		17	2.8	B 1		
	13.5	2.3		14.	2.	B 2	15	2.2
	12	2		18	3.3		18	2.6
	14	2.9						

Scotch Pine

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row.	Height ft.	Dia. in.
B 2	16	1.9	B 4	18.5	3.2	B 7		
	17	2.2		15	1.6	B 8	18	2.6
	18	2.5		18.5	3.6		18	1.6
	19	3.4		18	2.1		17.5	2.1
	19	3		20	4		19	4
	18	3.1		18.5	2.6		18	3.4
	17.5	2.8		20	3.2		17	1.7
	16	2.4		19	4		18	3
	20	3.3		19	3.1		17	2.5
							17.5	2.5
	18	2.3		12	1		16	2.5
	18	2.1		17.5	1.2		10	1.3
	16	1.7		18	2.5		19	2.8
	16.5	2.2		20	3.4		9.5	1.2
	17	2.3		19	3.1		19	3.2
	19	3.1		20	3.8		22	4.6
	15.5	1.7		19	4.5		19	3.0
	18	3.6		22	4.6		18.5	3.4
	11	1.1		18	2.7		20	3.6
	17.5	3.1		18	3.1		14	8.0
	17	2.2	B 5	14	1.8		18.5	2.2
	17	1.6	B 6	18	2.6		8.	1.5
	18.5	4.2		17.5	2		18	2.8
	18.5	4.0		18	2.1		16	2.5
B 3				18.5	2.6		10	0.8
B 4	18	2.2		20	4.2			
	11	1.1		21	4.4			

Scotch Pine

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
C 1			C 3			C 4	15	1.3
C 2	18	3.3	C 4	15	2.4		18.5	3
	18	3.3		20	3.1		7	5
	20.5	3.2		20	2.6	C 5		
	18.5	2		19.5	3	C 6	18.5	3
	19	2.2		20	2.2		17	3
	18.5	4.1		15	1.2		17.5	3.1
	17.5	3.6		14	1.2		10	1
	18	3.3		11	.5		20	3.7
	8	1.1		19	3.6		10	1.2
	17.5	2.1		19	3.1		11	1.3
	18.5	3.1		17.5	2		17.5	2.6
	17.5	2.1		19	2.8		8	
	18	2.1		17	2.7		15	1.6
	18	2.3		19.5	4.1		16	2.4
	20	4.2		18	2.3		19	2.7
	18	2.6		16.5	2.7		12	1.5
	7.5	.5		18	2.7		19.5	3.5
	16.5	2		16	1.7		19.5	2.2
	17	1.6		16.5	.8		14	1.7
	5.5			20	2.7		16.5	2.1
	15.5	2.1		19.5	3.7		16	1.7
	20	2.6		19	3.		17.5	2.2
	20	3		16	3.1		19	2.2

Scotch Pine

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
C 6	19	3.1	D 2	18	3.3	D 4	15	1.3
	19	4.5		16.5	2.6		18	4.
C 7				17.5	2.4		18.5	4.2
C 8	18	3		16	1.7		16.5	2.1
	18.5	3.2		15	1.6		18	2.4
	16.5	1.7		16.5	2.		10	1.1
	19	2.8		18.5	2.5		17	3.6
	17.5	2.4		17.	2.1		17.5	2.5
	16	1.8		17.5	3.		10	1.8
	17	2.3.		17	2.	D 5		
	18.5	3		19	3.2	D 6	15	2.6
	19.5	3		20	3.2		15	2.
	16	2.2		19.5	3.8		15.5	2.1
	14	1.7		17.5	2.5		10.5	1.
	18	2.6		19	3.7		16.	2.5
	18.5	2.5	D 3				19.5	4.
	16.5	2.2	D 4	20	3.5		17.5	1.8
	15	1.		18.5	4.1		18.5	3.3
	18.5	2.5		15	1.4		17.5	3.2
	17.	2.1		10	1.2		11.	.6
D 1				12	1.			
D 2	16.5	3.2		17.5	2.2		17.5	3.
	19	5.		12	1.1		18.5	2.8
	16	2.5		18	2.8		16.	2.2
	13	2.		19	3.7		19	3.1

Scotch Pine

Row	Height ft	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
D 6	18	2.4	D 8	16	3.8	E 2	16	1.6
	12	1.1		15	1.8		10	1.4
	18	2.		10	1.6	E 3		
	15	1.6		16	3.6	E 4	12	2.7
	16	1.6	E 1				14	1.
	19	2.3	E 2	15.5	2.6		18	1.9
	20	3.9		18	3.3		18	2.
							22	4.8
D 7				17	3.1		18.5	3.8
D 8	19.5	3.7		18.5	3.4		16	1.5
	20	4.5		18.5	3.5		18	2.4
				10	1.8		19	2.8
	16.5	1.8		18.5	4.3		17	1.6
	16.5	2.1		16	2.1		18	3.
	18	2.4		18	3.		17	2.
	18	2.6		18	2.9		19.5	3.8
	17	1.6		10	1.4		17	1.8
	18	2.1		18.5	3.2		18	4.3
	18.5	2.2		17	2.3		15	2.7
	18	2.7		11	1.3		16	2.
	19	3.1		19.5	3.3		17.5	3.5
	19	3.3		10.	1.		18	3.3
	18	2.1		17	1.9		17	2.8
	17	1.6		17	2.		19	3.
	18.5	4.1		17.5	2.8		11	3.3
	20	4.3						

Scotch Pine

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
E 6			E 8	22	5.5	F 2	8	2.1
E 7	17.5	2.8		16	1.7		16	2.5
	15	2.		15	1.4		15	2.6
	16	2.2		17	1.4		18	3.1
	16.5	3.		17.5	2.1		18	4.3
	7.	1.2		18.5	2.7		18	3.6
	16	2.		18	2.		16	2.1
	8	1.6		19	2.6		18.5	3.4
	18	2.3		18.5	2.		17.5	3.
	9	1.		17.5	3.		16.5	2.7
	18	2.8		18	2.4		18	3.4
	10	1.		19	3.7		18.5	2.8
	16	2.		16	1.4		18.5	2.8
	19	3.8		18.5	3.7		20	4.2
	16	2.		17	3.4		17.5	3.
	10	1.1		18.5	4.	F 3		
	17	2.3		19.	4.			
	14	1.6	F 1					
	18	3.2	F 2	15	2.			
	18	2.1		10	2.6			
	15	1.3		9	1.7			
	18	2.8		15.5	2.7			
	19	3.6		15	2.7			
E 7				17	4.2			

Jack Pine.

Row	Height	Diameter	Row	Height	Diameter	Row	Height	Diameter
A 2	17.5	4.	A 6	14.	2.1	A 7	16.5	2.4
A 2	15.5	2.5		10	1.6		18.5	2.8
A 2	15.	2.6		4			15	1.3
A 2	13.	2.5		7	.8		18	3.2
A 3	18.	3.1		12	1.8		18	2.7
	16.5	2.	A 7	15.5	2.3		16	2.2
	19.5	3.3		10	1.4		18.5	2.5
	19.5	3.1		16	2.1		18	2.8
	17.5	2.5		12.5	1.1		18	3
	17.	2.4		19.5	3.1		20	4
A 4	15.5	2.2		20	3.2		17	2.3
	19.	3.		18	3.4		19	2.7
	20.	3.4		19	2.7		18	3
	17.	2.8		17	2.3		18.5	3
	16.	2.6		18	3.5		16	1.9
A 5	18.5	2.2		19	3.9	A 8	17	2.8
	16.	1.7		18	3		15	1.8
	18.	2.5		19	2.5		17.5	2.7
	17.5	2.7		18.5	1.9		18	2.3
	16.	2.1		19	3.3		19	3.2
A 6	19.5	3.8		19	2.4		17	2.4
	17.	1.6		19.5	3.1		13	1.6
	19.5	3.3		18	3.3		17	2.9
	20.	3.2		18	2		16.5	3.3
	17.	1.6		18.5	2.8		18	3.9
	16	2		16.5	1		17	2.8
	9	1		19	3.		17.5	2.4

Jack Pine.

Row	Height	Diameter	Row	Height	Diameter	Row	Height	Dia.
A 8	19	3.6	B 1	21	3.2	B 1	16.5	2.4
	17.5	1.4		19	3.4		18.5	2.8
	20	2.7		18	2.1		18	2.8
	19	3.2		19	3.4		18.5	2.6
	19	3.8		18	2.4		15	1.5
	19	2.3		15	2.		12	1.2
	19.5	2.5		15.5	2.5	B 2	18	3.6
	18	2.3		19	2.8		20	3.1
	20	3.1		19.5	2.9		18.5	3.2
	13	1.2		15.5	1.7		19	3.5
	18.5	2.3		15	1.		15	1.
	19	2.4		17	1.8		18.5	3.5
	18	2.3		19	3.		17	2.5
	18	2.2		16.5	2.		15.5	2.
	18	2.8		11	1.		18.5	3.3
	20.5	3.1		16	2.1		19	3.8
	17.5	3.1		17	2.2		17	2.1
	15	1.6		17.5	2.3		16.	2.
	20	3.5		17.5	2.5		19.5	3.5
	18	3.4		19	2.5		18	2.7
	17.5	2.9		18.5	2.7		17.5	2.1
	15.	3.		14	1.7		19	3.
B 1	19	3.5		17	2.3		18	2.5
	10	1.5		16.5	2.3		17.5	2.1

Jack Pine.

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
B 2	16	1.8	B 3	18.5	2.6	B 4	17.5	2.
	18.5	3.		17.5	2.		19	2.7
	18	2.7		18	2.2		19.5	3.3
	18.5	3.6		16	1.6		19	3.1
	18.5	2.7		18	4.		17.5	2.6
	14	1.3		17.5	2.6		18.[illegible]	2.3
	17.5	2.3		18	3.1		18	2.6
	18	2.8		19.5	3.1		19	2.8
	10	1.3		18.5	3.1		19.5	3.1
	16.5	1.8		11	1.4		18	2.6
B 3	16	2.		15.5	1.6		18.5	3.3
	18	2.3		20	3.		16	2.2
	17.5	2.4		18	2.2		20	2.8
	18.5	2.6		19	2.2		16.5	1.7
	17.[illegible]	2.6		18	2.3		16.5	2.
	18	2.7		18	2.8		19	3.
	17.5	2.5	B 4	20	3.8		18.5	3.2
	19.5	3.7		17.5	2.8		16.5	2.2
	18.5	3.1		11.[illegible]	1.1			
				18.5	3.3			
	17.5	4.		15	1.3			
	18.5	4.6		19	2.8			
	16.5	2.		15.5	1.1			
	19	3.1		18	2.4			
	18.5	2.7		10	1.			
	15.5	1.7		15	1.1			

Jack Pine.

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
B 5	18	3.2	B 5	15	1.7	B 6	17	1.7
	18.5	3.		16.5	2.3		17.5	2.6
	17	1.8		18.5	2.2		16.5	2.1
	19	2.7		18	2.1		17.5	2.3
	16	1.7		17	2.		18.5	3.3
	18.5	2.3		18.5	3.		18	2.7
	19	3.2		19	3.4		18	3.1
	19	2.2		19.5	3.		18	2.8
	16.5	1.3	B 6	20	4.1		17	1.7
	16.5	2.		20	3.6	B 7	18.5	3.
	18.5	2.4		18.5	2.6		19	2.3
	17.5	2.6		18	2.		17	2.1
	19	3.6		17.5	2.2		19	2.2
	18.5	3.1		20	3.3		18.5	2.5
	20	2.8		20.5	4.		16	1.6
	21	2.6		19.5	3.7		18	2.3
	13	2.		17	2.4		19	3.
	17	1.8		19.5	3.1		19.5	4.3
	19	2.5		19	3.4		18	2.55
	18.5	2.7		20.5	2.2		15	1.1
	19	2.9		20	3.2		14	1.2
	17.5	2.5		19	3.1		19.5	3.3
	18.5	2.8		19	2.5		17	2.1
	19	3.4		18	2.3		18.5	2.8
	17	2.7		19.5	2.7		15.5	1.5

Jack Pine

Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.	Row	Height ft.	Dia. in.
B 7	15.5	1.1	B 8	17	3.	C 1	18.5	4.1
	19.5	3.		19	3.2		16.5	1.7
	14.5	1.5		17.5	3.		15.5	2.1
	19.5	3.2		16.5	2.1		15	2.3
	18.5	3.		15	1.4		16	2.4
	20	4.		20	4.5		17	2.7
	18	2.3		19.5	3.		21	3.5
	18.5	2.5		18.5	2.6		19	3.
	18.5	3.		17	2.		18	3.8
	18.5	3.2		19.5	3.7		17	2.1
	19	3.7		18	2.5		18.5	3.
	16.5	2.2		19	2.7		20	3.5
	19	3.5		18.5	2.8		17	2.1
	19.5	3.4		18.5	2.6		15.5	1.1
	18	3.1	C 1	18	3.5		18	2.2
	18.5	2.5		18	3.2		18.5	2.5
	18	3.		18	2.8		19.5	2.7
	[illegible]	[illegible]		11	8.		19.5	2.6
B 8	19.5	2.2		16	3.2		16	1.7
	18	2.2		16	1.7		11	1.
	18	2.5		19	3.		15	1.7
	15	1.		20	4.			
	19	3.1		19	3.1			
	18	3.2		18	3.1			
	15.5	1.4		19	4.1			

Jack Pine

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
C 2	19	3.2	C 2	19	2.5	C3	17	2.6
	17	2.1		19.	2.7		16.5	2.
	17.5	2.8		20.	4.		18.5	3.2
	20	2.6		16.	1.5		18.	2.4
	20	3.4		9	5.		15	1.4
	18.5	3.		18.5	2.7		18.5	4.2
	17	2.7		20.	4.		10	.8
	17.5	2.		21	3.5		17	2.
	18.5	3.		21	3.3		18	2.5
	18	3.2		18	3.3		19	3.7
	17.5	2.6		18	3.1		18.5	2.
	17	2.3		19.5	3.7		19	2.7
	18.5	3.	C 3	12	1.5		17	1.7
	18	3.2		15	3.2		18	3.1
	16	2.3		17.5	1.6	C 4	17	3.5
	19	3.3		19	2.3		18	2.
	21	4.		19.5	3.1		17.5	2.
	21	3.2		19	2.2		20.5	3.2
	20	3.7		20	2.8		17	1.7
	17	1.8		19.5	3.1		19	2.6
	16.5	1.5		18.5	2.7		16.5	1.5
	19	3.3		17	1.5		18.5	3.6
	18	2.1		17	3.		19	3.2
	17	2.		10	6.		18.5	2.1
	15.5	1.1		17	3.		18	3.2
				18	2.7			

Jack Pine

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia in.	Row	Hgt. ft.	Dia. in.
C 4	18.5	2.3	C 5	18	2.6	C 5	17	2.1
	17.5	3.6		17.5	1.7		17.5	2.3
	18.5	2		18	2.2			
	17.5	2.		11	.6	C 6	18	3.2
	17.5	2.5		18.5	2.7		17	3.
	18.5	3.2		16	1.7		18.5	4
	18.5	2.8		18.5	2.1		17.5	3.6
	18.5	3.4		18	3.7		16.5	1.5
	18.	3		18	3.2		18.5	3.7
	15	1.2		18.5	3.3		18	2.4
	18.5	3.5		18.5	3.6		18.5	2.5
	15	2.4		18	3.5		16.5	2.
	19	3.4		18.5	3.2		16	1
	17.5	2.6		18	3.5		18	3
	17.5	2.5		18	2.3		15	2
	18.5	3.7		19	3.3		19	3
	18.	2.		18	2.5		19	2.2
	18.5	3.1		17	1.3		18.5	3.
	18	2.1		18.5	3.5		18.5	3
	16	1.7		18.	2.5		18.	3
	17	2.2		18	2.6		17	2
C 5	18	3.4		18.5	3.		17	2.5
	18.5	3.		17.5	1.4		18	2.1
	18.5	3.7		18	2.8		19.5	2.1
	18	3.6		18.5	2.7		20	3.7
	17	3.2		17.	2.			

Jack Pine

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia in.	Row	Hgt. ft.	Dia. in.
C 7	18.5	3.5	C 8	18	2.6	D 1	16	2.8
	18	2.2		19	3.3		17	3.2
	16	1.6		15	1.2		16	2.8
	15.5	1.6		19.5	3.7		18.5	3.6
	18	2.3		18.5	2.7		16.	1.7
	17	2.		18	3.3		9	1.
	16.5	2		18	2.1		16	2
	18	3.1		18.5	3.2		15	1.2
	17	2.3		20	3.4		17.5	2.1
	18	1.7		18.5	3.7		17	2.5
	18	2.8		18	2.5		18	3.5
	17.5	2.7		10	.7		16	1.2
	18	2.7		18	2		18.5	2.4
	18	3		18.5	3.3		17.5	2.8
	18.5	4		18	2.5		18.	2.7
	18	2.2		19	3.2		17.5	2.
	17.5	2.3		17	2.5		18	2.7
	15	2.		18.5	4.6		18.5	2.3
	17	2.2		19.	3.3	D2	16	2.5
	19	3.2		18	2.6		18	3.3
	16	1.4		17.5	3.2		18.5	2.6
	15.5	2.3		18.5	4.2		15	2.2
	18	3.1					18.5	3
	12.5	2.1					16.5	2.1
							18.	3.2

Jack Pine

Row	Hgt. ft.	Dia in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
D 2	18	2.7	D3	17.5	2.5	D 4	18.5	4.3
	19	4		18.5	3.		18.5	3.2
	18	2.1		18	2.3		18.5	4
	18	3.5		18.5	3.4		18	4.1
	17.5	2.2		17.5	1.7		18	3.5
	16	2.6		18	2.2		16	2.
	15	2.7		17.5	2.		18	2.7
	10	1.2		18.5	3.9		17	3.
	19	3.2		16	2.6		11	1.7
	15	2		17	3.5	D 5	17	2.5
	10	1.8		17	3.2		17	3
D 3	9	1.3	D 4	18	3.		19	4.
	18.5	3		18.5	2.7		17	2.1
	19.	3.3		18.5	3.		18.5	4.
	18	3		18.5	3		15.5	1.5
	19	3.3		17.	2.6		16	1.1
	17.5	2.5		17.5	3.4		18	2.7
	17	1.8		18.5	3.3		17	1.5
	18	2.8		14	1.8		16.5	1.5
	16	1.8		17	1.6		18	3.
	18	2.3		18	3.		18.5	3.1
	18.5	2.6		16.5	2.5		18.5	3.3
	18	2.8		18.5	2.2		18.	2.6
	18			16.5	2.		19	3.
	18	2.					19	2.5
				18	2.7		18	2.

Jack Pine.

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
D 6	15	2.8	D 7	18.5	3.8	D7	17.5	3.
	18	4.		14	1.3		15	2.8
	17	3.1		18	2.1	D 8	18	3.2
	11	2.		19.5	3.1		18	2
	17	3.2		18.5	4.1		18.5	3
	18	4.2		18.5	2.5		15	2.7
	18	2.7		19	3.2		18.5	2.6
	18	3.2		18.5	2.8		19.	3.1
	16	2.1		19	2.7		19.5	3.1
	16.5	1.7		19.5	2.8		19	3.6
	18.5	3.6		19	2.6		16.5	1.1
	18	3.2		19	3.7		18.5	3
	19	2.2		19.5	4.1		19	3.6
	18.5	2.2		18	2		18.5	3.3
	18.5	3.		18	3.1		17.5	2.
	18	2.6		19.	2.6		17	1.8
	18.5	2.6		18.5	2.6		18	2
	16.5	1.6		19	3.7		18.5	2.7
	18.5	3.2		17.5	2.5		18	2.1
	17.5	1.8		17	2.2		18	2.1
	19	3.5		10	.8		18.5	2.
	18.5	3.2		17.5	2.5		18.	3
	18	2.6		18.5	3.4		18	4.2
	18	2.1		14	1.2		17.5	2.5
	19	3.6		18.	4.3		18.5	4.2
	10	1.3		17	2.7		18.5	4.2
							17.5	3.7
							17.	2.7
							18.	3.8
							16	3.

Jack Pine.

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
E 1	15	3.3	E 1	18	1.8	E 3	20	4.
	19	3.7		19.5	3.1		19	2.6
	14	2.2		20	3.5		19.5	2.7
	15	2.1		19	2.9		16	1.2
	18.5	3.		20	4.		19	2.7
	18.	3.5	E2	18	3.2		19	2.9
	18.5	2.8		17.5	3		17	1.7
	18.	2.7		19	3.6		18.5	3.
	17	2.5		19	3.6		19	2.5
	18.5	3.5		19	3.2		19	3.1
	19	3.5		17	3.5		18.5	3.2
	18	2.8		10	1.		16	2
	13	1.		18	2.4		17.5	2.3
	19.5	3.5		19	3.1		18	2.8
	18.5	2.9		17.5	2.		18.5	3.1
	18	3.3		16.5	1.4		18.5	3
	19	4.4		20	3.5		18.5	4
	19	2.7		17	2.2		18	3.1
	19.5	2.9		18.5	3.2		17	2.2
	19	2.8		19	2.6		18	2.6
	18	2.4		17.5	2.5		18	3.1
	17	1.6		18.5	2.4		17	2.
	18.5	2.5		19	3.1		19	2.4
	20	3.		18.5	3.		17	1.5
	19	3.2					18	2.4

Jack Pine.

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
E 3	16.5	1.8	E 4	18.5	3.6	E 5	18.5	3.
	17.	2.3		18	3.6		17.5	2
	18	3.		18	3.1		18.5	2.4
	14	1.5		18	2.9		18.5	3.5
	12	1.2		18.5	3.4		19	2.7
	17	3.1		18	3.3		18	2.8
E4	20	4.2		19	5.4		19	3.7
	18.5	2.6	E5	18.5	3.8		19	3.6
	18	2.5		8	1.		19	3
	19	2.7		18	4.4		18.5	2.8
	19.5	3.		9	.6	E 6	10	2.
	19	4.		18	3.2		17.5	4.5
	15	1.2		18.5	3		17	3.4
	19.5	3.4		10	1		17	2.2
	18.5	3.3		18	3.7		10	1
	16.5	1.3		18.5	4.3		16	2.1
	18	2.5		18	2.7		17	2.2
	18.5	2.3		18.5	4.1		18.5	3.7
	19	3.7		19	3.1		18	2.4
	18	2.6		18	3.3		18.5	3.8
	18.5	3		19	3.3		18.5	3.2
	18.5	2.9		16	1.5		19.	3.1
	18	1.9		18.5	3		18.5	3.4
	18.	2.2		17.5	3.1		18.5	3.7
	18.5	4.7		11	1.3		18.5	4.

Jack Pine.

Row	Hgt. ft.	Dia. in.	Row.	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
E 6	17	2.1	E 7	10	.6	E 8	19	3.1
	16.5	1.7		19	2.9		19	3.2
	18	2.8		18	2.9		17	1.7
	18.5	2.9		19	3.6		19	3.7
	19	2.4		16.	1.3		19	4
	18			19	3.2		18.5	2.6
	17.5	2.1		18	2.6		18	2.6
	19	2.5		19	3.		10	.5
	18.5	3.3		18.5	2.7		19	3.2
	17.5	3.		18	2.2		18	2.3
	19	1.3		18.5	2.3		19	2.8
	18	3.1		17	2.		18.5	3.1
	18.5	2.4		18.5	3.3		17	2.
	18.5	2.3		18.5	2.2		18	3
	17.	2.6		18	3		18	3.1
E 7	18.5	2.8		18	2.8		19.5	3.8
	18	3.		18	3		15	1
	19	2.3		15	2.6		18.5	4.2
	19	3.5		17	3		19	3.2
	18	2.4		16.5	2.3		18	2.7
	19.5	1.8	E 8	10	2.1		18	3.3
	19	3.7		19	3.7		18.5	4
	18	3.1		20	3.3		19	3.5
	17	3		18	1.8		18	2.
	18.5	1.5		18.5	2.7		17.5	2.8
	17.5	3.3						
		2.4						

Jack Pine.

Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.	Row	Hgt. ft.	Dia. in.
E 8	18	2.8	F1	18	2.7	F 2	18	2.4
	16.	2.5		17.5	2.3		18	2.
F 1	16	2.1		18.5	3.1		18	2.1
	18	3.2		18	2.2		18	2.2
	18	3.5		18	2.3		19	2.8
	17	2.4		18.5	2.8		10	1.
	18	2.5		18.5	3.		18.5	3.5
	18	4.1		18.5	3.2		17.5	3.3
	17	2.4		18	2.9	F 3	17	4.3
	18.5	3.4		19	3.1		18	3.3
	19	3.8		19.5	3.9		15	2.2
	18	2.5		19	2.8		16.5	3.
	11	1		19	2.7		17	3.
	18.5	3.6	F 2	18	4		16.5	2.8
	11	1		17.5	2.8		18	3.5
	17.5	1.8		17.5	3.4		15.5	2.5
	18	2.8		18	3.3		17	3.
	17.	2.3		15	1.2		14	2.3
	18	3.1		16.5	2.4			
	18.5	3.5		14	1.7			
	17.5	2.4		16	1.7			
	18.5	3.1		18.5	3.1			
	18	3.		18	2.9			
	18.5	3.1		18	2.6			
	19	3.4		15	1.5			

Summary.

Row	Scotch Av. Ht.	Scotch Av. D.	Jack Av. H.	Jack Av. D.	S & J Av. H.	S & J Av. D.	J in Sep. rows. Av. H.	J in Sep. rows. Av. D.
A 1	9.2	1.47			9.2	1.47		
2	11.4	2.56	15.2	2.90	13 3	2 73		
3			17 9		17 9	2 73	17.9	2.73
4	15.1	2.65	17 5	273	16 3	2 72		
5			17 2	280	17 2	2 24	17 2	2 24
6	14.1	2 31	13 7	2 24	13 9	2 19		
7	16.6	2 50	17 6	2 07 2 62	17 1	2 56	17 6	2 62
8	16.5	2 75	17 7	2 67	17 1	2 71		
B 1			16 3	2 31	16 3	2 31	16 3	2 31
2	17.	2 58	17 4	2 60	17 2	2 59		
3			17 6	2 64	17 6	2 64	17 6	2 64
4	18.	2 87	17 3	2 43	17 6	2 65		
5			17 9	2 44	17 9	2 44	17 9	2 44
6	19.	2 96	17 2	2 80	18 1	2 88		
7			17 9	2 39	17 9	2 39	17 9	2 39
8	15.8	3 52	17 9	2 60	16 8	3 06		
C 1			17 3	2 85	17 3	2 85	17 3	2 85
2	15.4	2 51	18 2	4 20	16 8	2 35		
3			16 8	2 60	16 8	2 60	16 8	2 60
4	17.	2 20	17 8	2 61	17 4	2 40		
5			17 8	2 69	17 8	2 69	17 8	2 69
6	15.	2 40	18 8	2 61	16 4	2 50		
7			17 1	2 43	17 1	2 42	17 1	2 43
8	17.3	2.30	17 8	2 90	17 5	2 60		

Row	Scotch Av. H.	Scotch Av. D.	Jack Av. H.	Jack Av. D.	S. and J. Av. H.	S. and J. Av. D.	J. in Sep. rows. Av. H.	J. in Sep. rows. Av. D.
D 1			16.6	2 36	16 6	2 36	16.6	2.36
2	17.2	2.70	16 4	2 60	16 8	2 65		
3			17 4	2 61	17 4	2 61	17 4	2 61
4	15.7	2 44			16 5	2 64		
			17 3	2 84				
5					17 6	2 55	17 6	2 55
			17 6	2 55				
6	16 4	2 33			16 8	2 52		
			17 2	2 72				
7					17 6	2 79	17 6	2 79
			17 6	2 79				
8	17 3	2 75			17 6	2 80		
			17 9	2 86				
E 1					18 1	2 57	18 1	2 57
			18 1	2 57				
2	14 8	2 48	17 7	2 76	16 2	2 62		
3			17 6	2 55	17 6	2 55	17 6	2 55
4	17 0	2 31	18 3	3 50	17 6	2 90		
5			17 0	2 75	17	2 75	17	2 75
6	15.	2 17	17 7	2 73	16 3	2 45		
7			17 7	2 62	17 7	2 62	17 7	2 62
8	18	2 75	17 7	2 82	17 8	2 78		
F 1			17 7	2 80	17 7	2 80	17 7	2 80
2	15 7	2 92	17 0	2 44	16 3	2 68		
3			16 4	2 99	16 4	2 99	16 4	2.99
	366.5	58.43	717.8	112.99	724.1	104.36	265.1	54.53
G.T.Av.	15.9	2.54	17.1	2.62	16.6	2.42	17.4	2.59

Discussion of Data.

After taking the average in both height and diameter of each row and arranging in a table of summary, we see from a glance at the grand total the following facts:

1. The Jack pines of the whole area have made a greater growth in height by 1.5 feet or almost ten per cent total height.

2. The comparative difference in diameter is not so marked, being only .08 inches or about three per cent of average diameter.

3. There is no marked change in rate of growth between rows containing only Jack pines and the mixed rows. The difference of .6 feet in height is caused by the proportion of Scotch to Jack in the mixed rows which was about 1 : 2.

3. The difference between the diameters of the pure and mixed rows is not as great as would be expected, being .07 inches or just .01 inch less than the differences between all Scotch and all Jack taken separately.

From observation it was difficult to notice any advantage of either specie over the other, each apparently being of equal vigor and perfectly tolerable.

Self pruning was seen to be progressing more rapidly in the case of the Scotch, the dead branches being much more brittle and easier of removal.

Present conditions considered, the planting may be considered a success, though the same cannot be said of the plan as a whole, and we attribute the results more to the accident

of two good species well distributed rather than to any virtue of the original plan.

J. E. Brock
J. L. Smith
1908.