FORESTS IN THE SAND HILLS

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THE weary traveler passing through the uninteresting sandhill region in western Nebraska on the Billings Branch of the Burlington Railroad is astonished after hours of gazing at bare sandhills, occasional sod ranch houses, and groups of cattle, to see before him green hills covered with evergreen trees. There is a rush to the south side of the train, a series of questions, and then a sign looms in view:

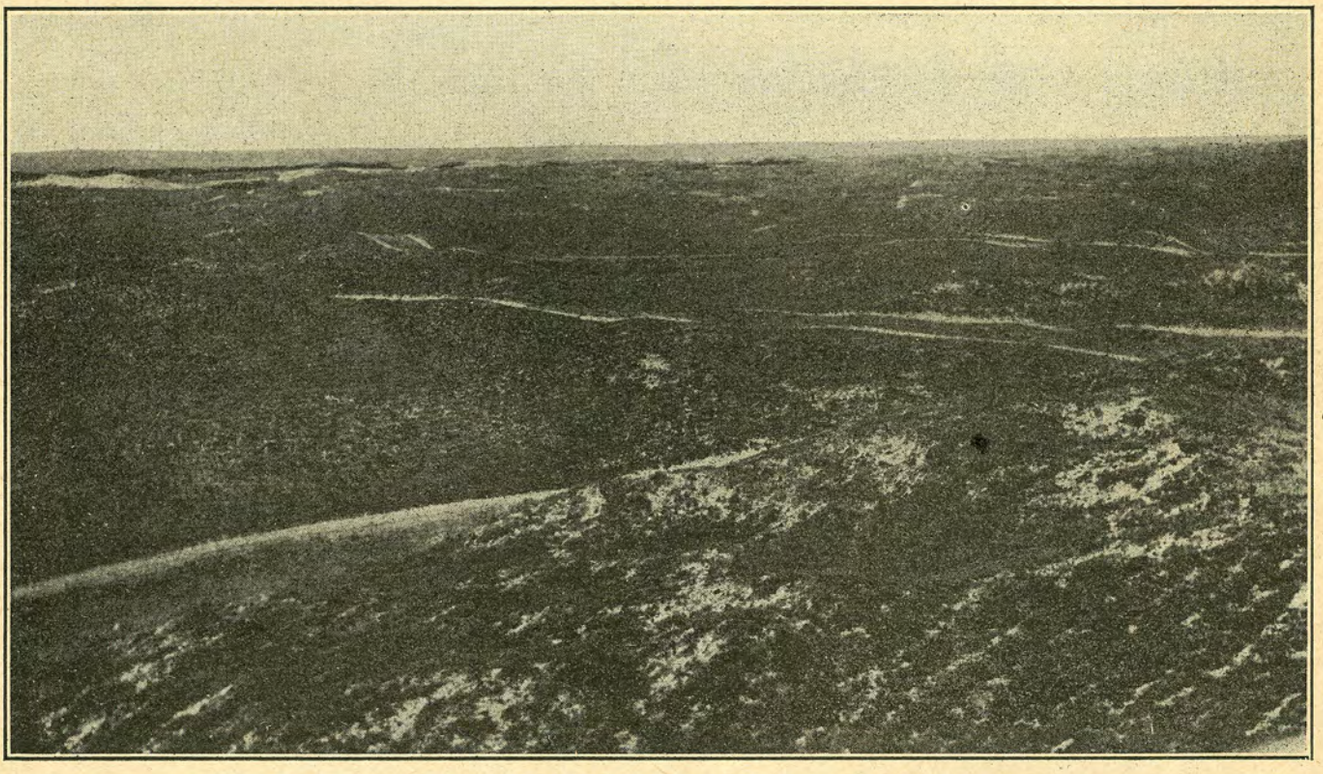
"Bessey Nursery,
Nebraska National Forest."

Are those trees natural growth; were they planted; what kind are they; why should we have a forest in these desolate hills, etc? For years a greater part of western Nebraska was known as the Great American Desert. A few ranchers occupied the river valleys and lower lying land close to lakes where they could cut enough hay to winter their cattle, which grazed in the adjacent hills. Other parts of the hills were used by herds of long horned cattle that were trailed across country from Texas and then sold in the fall at Missouri River markets. But this business proved unprofitable and twenty years ago there was very little use of the sandhills.

About that time a movement, led by Dr. Charles E. Bessey, Dean of the Botany Department of the University of Nebraska, was started to utilize a portion of these sandhills for the purpose of raising timber for the prairie states. This was shown to be practicable from the growth made by a plantation of jack, Scotch and yellow pine established in 1891 on Bruner Brothers' ranch in Hot County, Nebraska, by the Federal Division of Forestry. It was felt that the production of timber and the grazing of cattle might be carried on together, as in much of the mountain country, and the land would thus be put to a higher use. Nebraska has almost as small a forest area as any state in the Union and large quantities of material are needed anually for use on ranches and on the excellent farms in the eastern part of the state.

Accordingly, in 1902, after an examination of the land in this region by forest experts, an area of 206,000 acres was set aside by Presidential Proclamation—0.4 of 1 per cent of the total area of the state, reserved for raising timber.

In 1903 the first plantation was established with jack pine seedlings pulled from the forests of Minnesota. These trees now range from 20 to 25 feet in height and forest conditions prevail, the grass having been shaded out and replaced by a litter of pine needles, and the lower limbs of the trees are falling off. A comparison with the jack pine plantations in Holt County, previously men-



VIEW FROM LOOKOUT TOWER, NEBRASKA FOREST

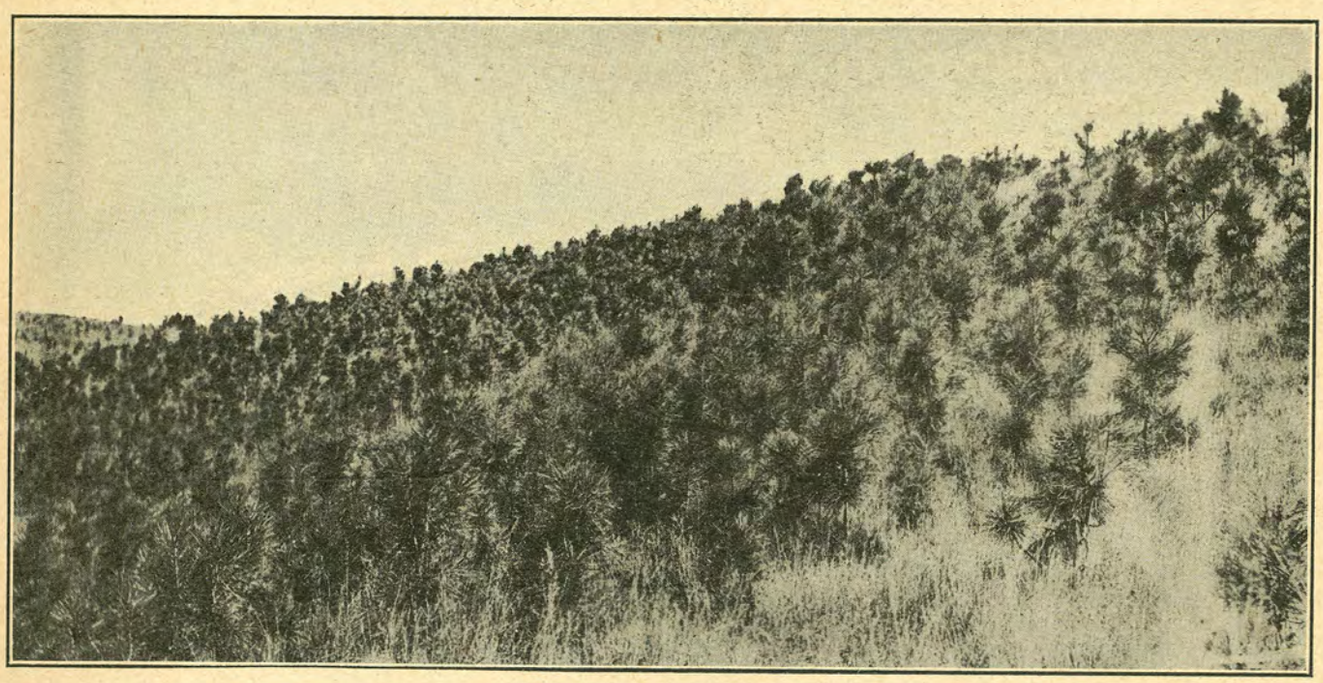
This shows the system of fire breaks, the nature of the country, and yellow pine planted in 1914 in the foreground, with older planting in the distance. The plantations are divided into units of about 160 acres each.

JACK PINE PLANTATION

Established in 1911 in Nebraska Forest. The rows of jack pine are now rapidly closing. Yellow pine planted in 1911 in the foreground.

tioned, indicates that three or four posts can be cut from each tree twenty-five years after planting. If 800 trees per acre reach maturity out of 1,500 planted and posts are worth four cents each on the stump, receipts from the sale of the posts would amount to $128. Assuming a cost of $16.00 per acre for planting and that it costs 15 cents annually per acre for protection on this intensively managed tract and compounding these costs for the period, net receipts of $89.00 result, or $3.56 per acre annually for each year of the life of the stand. This is a much higher return than can be secured from this land when used for grazing cattle.

In 1903 a nursery was started near Halsey, which now has an annual output of from one and a half to two million trees. Western yellow pine (*Pinus ponderosa*) and jack pine (*Pinus divaricata*) are the most successful trees for this region, many others having been tried out and found not suited. Seed is sowed in the nursery in beds four feet wide and the little trees grow here for two years. Then they are transplanted or set out in nursery rows for another year's additional growth before they are ready to plant in the hills.



YELLOW PINE PLANTED IN 1909

A high survival has resulted and the trees are making a wonderful growth. This is also in Nebraska Forest.

The success of the work near Halsey resulted in Nebraska people requesting Congress to establish a nursery and to extend forestation work to the Niobrara Division of the Forest. A site was secured on the

Niobrara River and in 1915 ground was broken for nursery purposes. The work here will be rapidly pushed along the same lines as at Halsey.

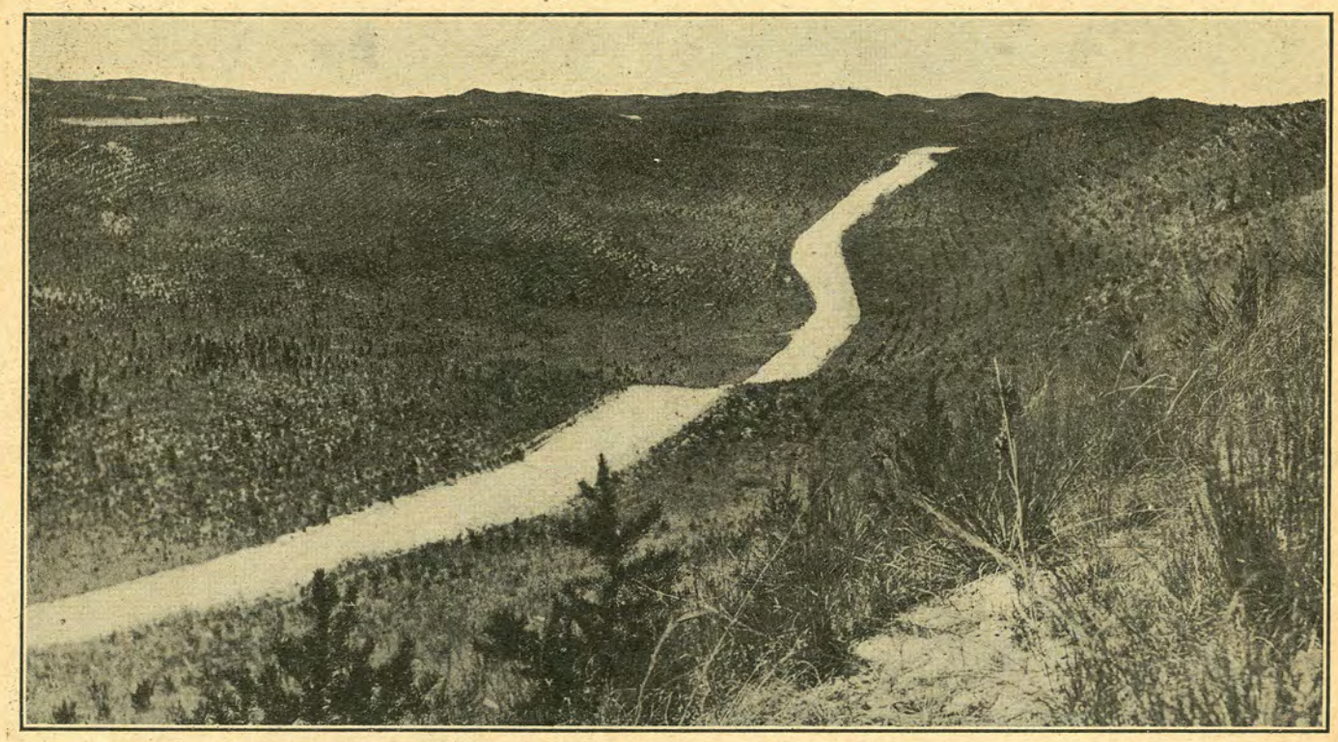
The trees are dug in the spring and hauled immediately to the planting site. Temporary camps are established throughout the hills. A barn accommodating forty horses, a mess house in which fifty men can be fed, and bunk houses accommodating twelve men each, are built in sections so that they can be moved conveniently every four years. Wells, 100 to 150 feet deep, must be sunk for water. One section (640 acres) is planted annually and the camps are arranged so as to be centrally located.

The trees are planted in furrows, a side hill or reversible plow being used for this purpose. A machine called a trencher, which consists of a V-shaped piece of iron attached to a plow beam, follows the plow and makes a slit in the middle of the furrow into which the roots of the trees are placed. The planter closes the slit with a thrust of his foot. A crew of six planters will set from twelve to fifteen thousand trees per day. About 35 horses and 45 men are used in the average camp during the planting operation. In addition about fifty men are employed at the nursery digging trees, transplanting, sowing seed, etc. The spring operation lasts from a month to six weeks.

Approximately 3,500 acres have been planted successfully at a cost of about $16.00 per acre. From 1,500 to 1,800 trees are set per acre. At present survivals of fifty to sixty per cent can be expected in the driest season, while under favorable conditions ninety per cent of the trees will live. Losses have been caused by drought, pocket gophers and fires. The pocket gophers bury the small trees with the dirt they push out from their runways and also eat the roots of the larger trees.

To protect the plantations from fires they are divided by fire lines into units of about 160 acres. These consist of two plowed strips—a rod wide—placed from 100 to 150 feet apart. In the fall the grass between the plowed strips is burned off. This system has proved very effective and there have been no fires in the plantations since 1910.

The remnant of Nebraska's once large herds of deer are to be found on this forest. Frequently they are to be seen taking advantage of the shelter afforded by the young forest. Thus the future forest, located in the midst of a treeless country, will be a game refuge, a future playground for people in the prairie country, and a source of timber.



LOOKING DOWN ALONG THE FIRE LINE

Jack pine, established in 1913, to the right of the fire line; yellow pine, established from 1907 to 1909, to the left of the fire line. Nebraska Forest. A few single fire lines have been constructed for use in back firing or for stopping ground fires.

PLANTING TREES IN FARM GULLIES

PLANTING trees in farm gullies is a reclamatory measure advocated by the Forest Service of the United States Department of Agriculture. The results are of two-fold advantage, as not only are the trees valuable in themselves but their presence stops the gully erosion. In the north Atlantic and mountain states and in the Mississippi Valley the locust is well adapted for this use as it has a large root system, grows rapidly and makes one of the most lasting woods for fence posts. The little trees may be dug up in locust thickets or obtained from commercial nurseries.

In other sections the native shortleaf pine is one of the best varieties for reclaiming gullies as it exerts even when young a marked influence in holding the soil. When set out in gullies, its growth is fairly rapid and in a few years it forms a complete protective cover.