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The Durability of Fence Posts

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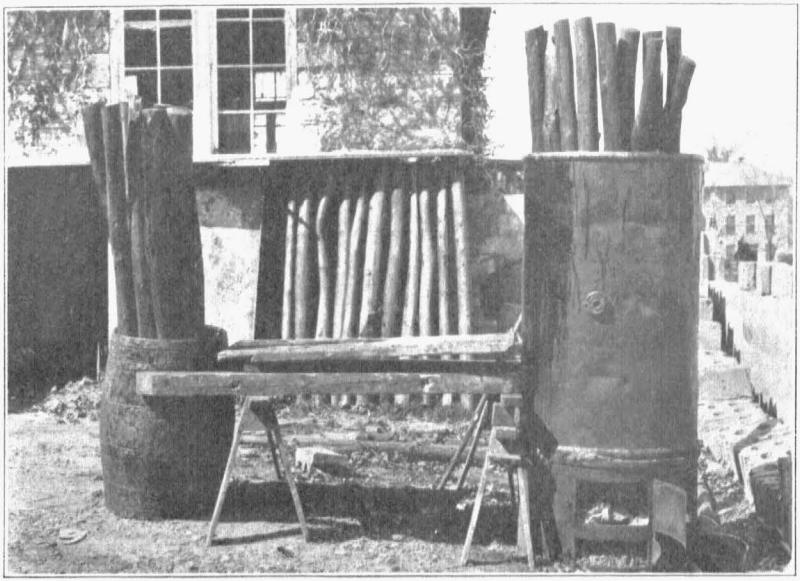

Fig. 1.—Equipment used in giving posts the double tank treatment.

In the fall of 1913 an experiment to determine the durability of fence posts was started by the forestry department of the Missouri Experiment Station. This project was under the direction of Ernest C. Pegg and annual inspections and reports were made by him until the fall of 1921 when the experiment was transferred to the agricultural engineering department. This experiment was well planned and worked out and some valuable data will be available when it is completed. It was thought, however, that some timely inference might be drawn at this time.

The purpose of the experiment was threefold. First, to determine the life of common varieties of wood used as fence posts. Second, to determine the effect of different treatments on the serviceable life of posts. And third, to determine the causes of decay and if possible to discover the best means of retarding it.

Twenty-seven common varieties were used and the posts of each variety were given seven different kinds of treatment. The three rows of posts

under Series A were given no treatment except seasoning. These posts were set in the ground to a depth of 18 inches. Posts in Series B were the same as in A with one exception. They were tamped in the holes with screened gravel. All posts in Series C were charred for about 36 inches up from the lower end. In Series D the posts were peeled and the lower 36 inches of the posts were painted with carbolineum. The carbolineum was heated and the one coat was given. Posts in Series E were peeled and the lower 36 inches given a two-coat treatment of hot creosote. Series F posts were given the double tank treatment; two hours with the lower end to a height of 36 inches submerged in hot creosote. Posts were removed from this and quickly submerged to the same depth in cold creosote. Series G was the same as F except the posts were kept in each treatment for five hours instead of two.

Fig. 2.—Arrangement of posts in seven series to determine serviceable life of each twenty-seven varieties of wood.

The posts were set on the lowlands south of Hinkson creek on the north side of a steep hill. The grass and weeds grow among the posts each year. All these conditions have a tendency to increase the rate of decay of the posts.

COMPARISON OF VARIETIES

The results of the experiment to date show that the varieties divide themselves into four classes so far as their serviceable life as fence posts is concerned. The posts in each class are named in the order of their freedom wfrom decay in this experiment as a whole.

First Class.—White Cedar, Catalpa, Osage Orange, Black Locust.

Second Class.—White Walnut, Honey Locust, White Oak, Red Oak, Black Oak, Ironwood.

Third Class.—Black Walnut, Hickory, Sassafras, Black Ash, Hackberry, Red Elm, White Elm, Dogwood.

Fourth Class.—Willow, Redbud, Kentucky Coffe Bean, Birch, Basswood, Cottonwood, Sycamore, Sugar Maple, Persimmon.

The results to date show that there is a great difference in the effect of the treatments on different varieties of wood. Black walnut, willow, hickory, ironwood elm and ash varieties seemed to be effectively preserved by the open tank treatment with creosote while many other varieties are not preserved to any extent by this treatment.

COMPARISON OF TREATMENTS

The comparisons in the following table are made between the posts receiving no treatment and those receiving the treatments designated by Series B, C, D, etc.

TABLE 2.—COMPARISON OF UNTREATED POSTS WITH THOSE RECEIVING VARIOUS TREATMENTS.

	No. of varieties compared	Av. life In A	In B. C. etc.	% of increase
Series A compared to Series B.	16	3.9	4.2	1.
Series A compared to Series C.	13	3.3	3.	—1.
Series A compared to Series D.	10	3.9	5.	25.6
Series A compared to Series E.	15	3.3	3.6	9.
Series A compared to Series F.	6	3.6	6.8	89.
Series A compared to series G.	5	3.	8.	166.

It will be noted that neither the practice of setting in gravel nor charring the posts has been of any value in the varieties which have failed to date. Comparing the brush treatments with carbolineum and with creosote, we find the carbolineum has been a little more effective in the varieties which have failed to date, showing an increase in case of the carbolineum of 25% and 9% increase in life when painted with creosote.

The five-hour treatment is seen to be by far the more effective, almost trebling the life of the posts in the varieties which have failed to date.

A homemade treating plant can be made by placing a brick firebox and placing on this a sheet-metal drum at least 4 feet high and at least 3 feet in diameter. If this could be built on the edge of a bank it will make the work of treating posts much less difficult. A damper should be provided for the firebox as it is desirable to control the fire very closely. The creosote expands to almost double the volume when heated as it is filled with gases and steam from the sap in the posts.

Place the posts in the tank and pour in creosote to a depth of 24 inches. Leave the posts in the hot creosote for two to five hours. Remove the posts from the hot bath and place them to the same dept in cold creosote. The condsensation of the moisture and the cooling of the gases in the heated posts draws in the cold creosote and gives much better penetration.

Plot showing arrangement of posts in series and rows, also showing the serviceable life of the posts that have already failed.

Row	Variety	Series A			B			C			D			E			F			G			H		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
0	Soft Maple.....	.....			.....			.....			.....			.....			.....			.....			s	s	s
1	White Cedar....	s	s	s	s	s	s	s	s	x	s	s	s	s	s	s	s	s	s	s	s	s	.....		
2	White Walnut...	s	6	s	7	s	s	5	s	s	s	s	s	7	s	s	s	s	s	s	s	s	.....		
3	Black Walnut...	8	8	8	8	8	7	s	4	8	s	s	s	8	s	s	s	s	s	s	s	s	s	s	s
4	Hickory.....	4	4	3	x	x	x	3	4	4	s	s	8	4	7	3	s	8	s	s	s	s	s	s	s
5	Willow.....	3	2	2	3	3	2	2	2	3	4	4	4	2	3	3	s	s	s	s	s	s	s	s	s
6	Cottonwood.....	3	3	4	3	3	4	3	2	3	4	4	4	3	3	4	s	8	8	8	8	8	s	s	s
7	River Birch....	3	2	4	4	5	5	3	3	4	x	x	x	x	x	x	8	8	8	8	8	8	.....		
8	Ironwood.....	5	3	3	3	4	4	3	2	4	s	7	s	4	3	4	s	s	s	s	s	s	.....		
9	White Oak.....	8	8	4	7	x	x	5	8	8	8	8	8	8	8	8	s	s	8	s	s	8	s	s	s
10	Red Oak.....	4	3	3	4	s	5	s	3	7	7	8	s	4	4	4	s	8	8	s	s	s	.....		
11	Black Oak.....	3	3	3	6	4	3	3	4	3	s	7	7	5	4	x	s	s	s	8	s	s	.....		
12	Slippery Elm...	6	x	x	x	x	x	x*	x*	x	x*	x	s	x*	x*	x	x	6	x	x*	x*	x*	s	s	s
13	White Elm.....	4	4	4	4	4	3	4	3	3	8	7	s	4	4	4	s	s	s	8	8	8	.....		
14	Hackberry.....	3	3	4	x	x	x	2	2	x	5	5	4	3	3	3	8	6	6	s	s	s	.....		
15	Osage Orange...	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	.....		
16	Sassafras.....	8	5	8	8	4	8	s	8	8	6	8	6	s	s	s	s	s	s	s	s	s	.....		
17	Sycamore.....	2	2	2	2	2	2		4	5	4	4	4	2	2	2	8	8	8	8	8	8	s	s	s
18	Red Bud.....	s	s	s	s	4	4	3	3	s	8	5	s	8	4	s	s	s	s	8	s	s	.....		
19	Ky. Coffee Bean	4	7	8	s	8	s	7	5	s	8	8	x	8	8	x	8	8	s	8	s	s	.....		
20	Honey Locust...	6	5	5	s	s	s	6	6	6	s	s	s	8	8	s	s	s	s	s	s	s	.....		
21	Black Locust...	s	s	s	s	s	s	s	8	s	s	s	s	s	s	s	s	s	s	s	s	s	.....		
22	Sugar Tree.....	3	3	4	3	3	3	3	3	4	4	3	4	4	3	4	5	5	5	6	6	s	.....		
23	Basswood.....	2	2	3	2	2	2	2	3	2	2	2	4	2	2	2	5	4	5	8	s	8	.....		
24	Dogwood.....	3	3	3	3	3	4	3	3	3	5	s	4	3	4	4	6	s	s	s	s	s	.....		
25	Persimmon.....	2	3	3	3	3	3	2	2	3	3	4	3	3	3	4	8	8	s	8	8	8	.....		
26	Black Ash.....	4	4	5	5	5	4	3	6	5	5	6	7	4	4	4	s	s	s	s	s	s	.....		
27	Catalpa.....	s	s	s	s	s	x	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	.....		

Legend: s—still serviceable. x—no post at beginning of experiment. Numerical—indicates serviceable life of post that has already failed. *—indicates that since beginning of experiment a steel post has been set in this position.

THE COST

It costs about 4 cents a post for the two-hour treatment and 8 cents for the five-hour treatment. This includes creosote, fuel and labor. The following table, while it is made up partly of estimates, is a fairly reliable indication as to the cost of the different classes of posts in the fence over a period of 25 years.

TABLE 3.—COMPARATIVE COST OF POSTS OF THE FOUR CLASSES OVER 25-YEAR PERIOD.

Class	First cost	Treatment	Setting and fastening fence (est.)	Life of service (est.)	Total cost
First	35c (1 post)	8 c	7 c	25 yrs.	50 3
Second ..	39c (1 9/16 posts)	18.5c	11 c	16 yrs.	62.5c
Third ...	36c (2 posts)	16 c	14 c	12.5 yrs.	66 c
Fourth ..	27.7c (2 7/9 posts)	22.2c	19.5c	9 yrs.	69.4c

It will be noted that three of the fourth class posts could be purchased for the price of one of first class variety but the treatment and replacement in the fence line during a period of 25 years brings the total cost to practically 70 cents a post in the fence as compared to 50 cents a post where one post of the first class is used.