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## Forestry in Iowa

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## FORESTRY IN IOWA.

BY B. SHIMEK.

A paper on forestry in Iowa might be condensed in the form of a paraphrase of the schoolboy's essay on "Snakes in Ireland,"—"there is no forestry in Iowa,"—at least none in practice, though the need of the practical application of its principles may be seen in every township of land in the state.

Fifteen or twenty years ago the total forest area of Iowa probably exceeded the area covered by the original native groves which sheltered the first settlers who saw in them the only hope of future happy homes. The restriction of prairie fires, the removal of the larger trees and the general artificial improvement of the conditions under which plants grow, all tended to extend the native groves beyond their original bounds, and it appeared for a time as if a large part of the state might ultimately be clothed with forest growth. But the population of the state, and the value of its lands, increased at a remarkable rate, for the experiment of the settlers who first ventured out upon the prairies and who reaped rich harvests in return, proved eminently successful.

Iowa lands were rapidly taken up, and there was a revulsion of sentiment against the timber and in favor of the prairie. Even the hilliest, poorest land was regarded as more valuable for agricultural purposes and pasture than for timber, and the groves rapidly disappeared, and are still disappearing, in many sections, to be replaced by poor pastures or still poorer farms, while comparatively less effort has been made to extend the artificial groves on the prairies. The temptation to destroy the original groves was increased by the fact that, while the legislature made

provision for encouraging the planting of trees on the prairies, nothing was done to tempt land owners to preserve the native groves upon their lands. To add to the destruction a succession of dry seasons drained the wet lowlands which had formerly been used for pastures, and they became the richest farming lands. The cattle were turned into the groves, to which their presence proved fatal even where the owners did not assist in the process of clearing. The original groves were for the most part upon the slopes adjacent to streams. When they were cleared away the leaf mould and fine soil, and even much of the harder subsoil, were washed from the exposed surfaces into the streams. The trees no longer conserved moisture and the springs disappeared; the rains swept the bare hillsides, the waters rapidly descending into the flooded streams during every rain storm or thaw; and the streams were choked up with the materials carried from the storm-swept barren slopes. Splendid groves have thus been replaced by worthless farms from which even the mortgage cannot be raised. That this is not the creation of idle fancy is known to every one who has lived and observed in the eastern and southern portions of the state during the past twenty-five or thirty years. Abundant examples may be found along the Iowa river above Iowa City, and along every larger stream in the state.

In the meantime the settlers on the prairies realized to some extent that that which had been regarded as an obstacle was in reality a blessing. They missed the shade, the companionship and the protection of the trees which in their eastern homes they had regarded as obstructions. They planted groves for windbreaks, gave some attention to improved methods of tree culture and persuaded the legislature to enact laws encouraging the planting of trees. Everywhere in the prairie portions of the state more or less interest was manifested in the cultivation of forest trees. Many of the first efforts were wholly or in part unsuccessful. It soon became apparent that many of the methods of tree culture practiced in the east failed in

Iowa, and evil prophets declared that these failures were sufficient evidence that the causes which left the original prairies treeless would operate to keep them so notwithstanding the efforts of man to the contrary. Experience has since shown that trees may be successfully grown in any part of our state, but this is sometimes accomplished at such great comparative cost, and the results are sometimes so uncertain, that there are still those who think that tree planting, excepting on a very small scale, cannot be successfully undertaken in this state.

This raises again a question of profound interest to our people. Not only the material interests of the state, but in a large measure the health and happiness of its citizens, are at stake. If it is true that it is not worth while to try to grow trees in Iowa, then some of our citizens are wasting money, time and energy in the attempt, and the effort to build up pleasant, well-protected, healthful homes in a large part of the state must result in disappointment and disaster. If, on the other hand, trees may be successfully grown in our state,—if it can be shown that the obstacles to success in that direction can be overcome,—then, as citizens of the state, we are not doing our duty if we fail to attempt to awaken public conscience to a realization of the fact that we are guilty of a crime against posterity when we permit the splendid opportunities which are now within easy reach to slip by unnoticed and unused. Forests are not made in a day. Whatsoever we do in this direction is largely for posterity's sake, though we ourselves may reap some of the fruits of our labor.

There is, however, no warrant, either in the results of scientific research or in the practical experience of tree-growers, for the statement that trees cannot be successfully grown in this state. We are on the border-line between the comparatively moist east and the dry west. The conditions favorable to the growth of forests are not at their best here, it is true,—neither are they at their worst. The treeless condition of a large part of the state was no doubt due to a combination of causes.\*

\*See writer's discussion of this subject in Proc. Iowa Acad. Sci., Vol. VII, pp. 47 *et seq.*

Not one of these causes was of itself sufficient to produce our treeless prairies, and not one of them is entirely proof against the influence of man. Prairie fires have long since ceased to be a serious menace; the evil effects of lack of moisture are in part overcome by modern methods of surface cultivation, and will grow less as the forest area is increased; extremes of temperature lose much of their terror if mulching is practiced; the force of winds is broken by groves and tree-borders, and by judicious attention to topography; and soils may be improved by cultivation and by the use of fertilizers. If the tree-grower gives heed to all this, and if he takes further precautions by selecting hardy native or acclimated stock, preferably very small or grown from the seed in order that the roots may not be disturbed, and protects his trees against cattle and other domestic and native animals, he will have success. However, all this requires intelligent care, time and patience, and naturally suggests the question: "Does it pay?" It is safe to say that as a money making investment which will bring early returns it is not a success.\*

The writer believes that as an investment for one's children it does pay, but few people think far enough in advance, or can afford to let a part of their capital lie idle during their own lives for that purpose. There are, however, immediate returns which the tree planter himself lives to enjoy. Trees add to the beauty of our surroundings. Nothing can equal the charm of those native groves which formed, and in limited areas still form, natural parks, and nothing has so overcome the appalling monotony of our prairies as the groves set out by men yet living.

But other immediate benefits result from growing trees whether in artificial or native groves. They act as wind-breaks against both the cold blasts of winter and the leveling storms of summer, and thousands of homes in Iowa are made habitable only by their presence. They serve to equalize temperature, as groves and their imme-

\*For illustration see paper by Elmer Reeves, read before the Iowa Park and Forestry association in December, 1901, and published in its first proceedings.

diatc vicinities are uniformly cooler in summer and warmer in winter.\*

They conserve the moisture of the soil. The fine leaf-mould which naturally accumulates in groves forms a sponge which greedily takes up the water which falls as rain or snow, and this is later given off by springs. Rapid evaporation is prevented, but instead the trees pump up water from the more thoroughly saturated soil and throw it off gradually into the air through the leaves, thus supplying moisture for the local summer showers which are the salvation of our crops. Forests cannot be classed with the general causes which determine the precipitation of abundant rains in the spring and fall, but their effect upon local showers is consistent with scientific observations upon the physiological activity of trees and green plants in general, and cannot be successfully questioned. It is absurd to state that growing crops replace groves in all the good work accomplished in the direction of conserving moisture. Crops are left upon the ground during only a portion of the season. Moreover, they appear so late in the season that they cannot aid in the retention of that moisture which results from melting snow, or which is precipitated in the early rains. Crops cannot therefore, conserve moisture to the same extent, though in kind their work is like that of all green plants.

Forests prevent erosion. In the roughest timbered country even the lightest leaf-mould on the steepest slopes is practically undisturbed by torrents of rain, and the waters which are drained from such surfaces are clear, since they carry but little eroded material. As quickly as the forest is cleared the spongy surface soil is washed away, and even the harder sub-soils are washed out. The result is noticeable along all of our larger streams which have been deprived in large part of their bordering native groves. The material which is being washed from the exposed slopes is choking up our streams, and sandbars and mudbars are rapidly increasing.

\*For results and data of observations on effect of forests on temperature and moisture, see *Forest Influences*, Bulletin No. 7, Forestry Div., U. S. Dept. of Agr., 1893; and 11th Ann. Rep. Agr. Ex. Sta., Univ. of Wis., pp. 292-326, 1895.

The benèficent influence of groves upon winds, temperature, moisture and erosion are felt not alone by him who plants or protects trees—they are shared by the entire community. In view of this fact, and in view of the fact that as an immediate money-making investment tree-planting does not pay, some encouragement ought to be given by the state to those who use their lands and money for the preservation and propagation of trees. Laws, of course, will not make trees grow, neither will they teach men how to give intelligent care to them. But laws can be so framed that men will be encouraged to undertake the work of increasing our forest areas without being fined by a tax for efforts which are bringing benefits to the entire community without corresponding adequate material returns to those who are making them.

Our state is at present wholly without forestry laws. The old law, which has been on the statute books for about a quarter of a century, was omitted by the last code commission, one of the commissioners objecting to it because of the frauds which were practiced under it. Amendment and not repeal should have been the remedy. Experience proved that this old law was weak in many respects. No restrictions were placed on the kinds of trees to be planted, with the result that perhaps 90 per cent of the trees planted in the prairie sections of the state were undesirable cottonwoods, box elders, soft maples and willows. The law did not sufficiently define the care that should be taken of the trees, and the result was a widespread neglect of the groves. It provided an exemption of \$100 per acre for ten years for forest trees, and \$50 per acre for five years for fruit trees. No encouragement was offered for the protection of the forest trees after the ten years had passed, with the result that in many places the old groves were cut away and new ones were set out. The law should have provided not only for the planting of new groves, but for the care and protection of old artificial and native groves. The exemption was sufficiently large to tempt some men owning unim-

proved prairie lands to perpetrate fraud. This could have been avoided by proper restrictions. Notwithstanding its defects, however, the law was a blessing to the prairie sections of the state. Thousands of acres of artificial groves which owe their existence to this law, have completely changed the prairie landscapes of Iowa, and the results amply justified the existence of the law notwithstanding the occasional frauds. It is, however, high time that the comparatively worthless trees of most of these groves be replaced by trees whose ultimate value is much greater, and that steps be also taken to restore at least in part the original forests of the state. It cannot be expected that very much of the land whose value reaches \$100 per acre will be used for forestry purposes, but there is much land, probably 15 per cent of the total area, in this state which is worthless for agricultural purposes but will grow trees, and this should be used for that purpose. It is not, however, to be expected, for the reasons herein enumerated, that much of this poorer land will be so used unless some substantial recognition is given to the owners,—such as release from the burdens of taxation.

The Iowa Park and Forestry Association has recently approved a bill which will be submitted to the Twenty-ninth General Assembly which seems to meet the objections made to the old law, and it is here presented for approval. It is believed that this is at least a step in the right direction, and should be encouraged.

#### A BILL

For an act to encourage the planting of forest and fruit trees in the state of Iowa.

*SECTION 1. Be it enacted by the Twenty-ninth General Assembly of the State of Iowa:*

That on any tract of land in the state of Iowa the owner or owners may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one nor more than five acres in area, or both, and that upon compliance with the provisions of this act such owner or owners shall be entitled to the benefits hereinafter set forth.

*SEC. 2.* A forest reservation shall contain not less than two hundred growing forest trees on each acre. If the area selected is an original forest containing the required number of growing forest trees, it shall be accepted



as a forest reservation under the provisions of this act. If the area selected is an original forest containing less than two hundred forest trees to the acre, or if it is an artificial grove the owner or owners thereof shall have planted, cultivated and otherwise properly cared for the number of forest trees necessary to bring the total number of growing trees to not less than two hundred on each acre, during a period of not less than two years, before it can be accepted as a forest reservation within the meaning of this act.

SEC. 3. Not more than one-fifth of the total number of trees in any forest reservation may be removed in any one year, excepting in cases where the trees die naturally.

SEC. 4. The ash, black cherry, black walnut, butternut, catalpa, coffee tree, the elms, hackberry, the hickories, honey locust, locust, mulberry, the oaks, sugar maple, European larch and other coniferous trees, and all other forest trees introduced into the state for experimental purposes, shall be considered forest trees within the meaning of this act. In forest reservations which are artificial groves, the willows, box elder, soft maple, cottonwood and other poplars, shall be included among forest trees for the purpose of this act when they are used as protecting borders not exceeding two rows in width around a forest reservation, or when they are used as nurse trees for forest trees in such forest reservation, the number of such nurse trees not to exceed one hundred on each acre.

SEC. 5. The trees of a forest reservation shall be in groves not less than four rods wide.

SEC. 6. A fruit tree reservation shall contain not less than ninety fruit trees on each acre, growing under proper care, and may be claimed as such for a period of five years after planting.

SEC. 7. The cultivated varieties of apples, crabs, plums, cherries, peaches and pears shall be considered fruit trees within the meaning of this act.

SEC. 8. Whenever any tree or trees on a fruit tree or forest reservation shall be removed or die, the owner or owners of such reservation shall, within one year, plant and care for other fruit or forest trees, in order that the number of such trees may not fall below that required by this act.

SEC. 9. Cattle, horses, mules, sheep, goats and hogs shall not be permitted to pasture upon a fruit tree or forest reservation.

SEC. 10. Forest reservations fulfilling the conditions of this act shall be assessed on a taxable valuation of one dollar per acre.

Fruit tree reservations shall be assessed on a taxable valuation of one dollar per acre for a period of five years from the time of planting.

In all other cases where trees are planted upon any tract of land, without regard to area, for shade or ornamental purposes, or for windbreaks, the assessor shall not increase the valuation of such property because of such improvements.

SEC. 11. If the owner or owners of a fruit or forest reservation violate any provision of this act within the two years preceding the making of an assessment, the assessor shall not list any tract belonging to such owner or owners as such reservation for the ensuing two years.

SEC. 12. It shall be the duty of the assessor to secure the facts relative to fruit and forest reservations by taking the sworn statement, or affirmation, of the owner or owners making application under this act.

Sec. 13. It shall be the duty of the county auditor in every county to keep a record of all forest and fruit tree reservations within his county.

SEC. 14. The secretary of the Iowa State Horticultural Society shall be state forestry commissioner, without salary. It shall be his duty to promote the objects of this act, and he shall have power to appoint deputies without salary for each county, or group of counties, who shall assist him, and who shall make an annual report to him of forestry matters and of the operations of this act, within their respective territories.

(NOTE.—This bill was subsequently passed by the House, and was favorably reported by the Senate committee on horticulture, but did not receive a constitutional majority in the Senate.)

## ANALYSES OF CERTAIN CLAYS USED FOR MAKING PAVING BRICK FOR CEDAR RAPIDS.

BY C. O. BATES.

The following analyses were made several years ago for Mr. E. P. Boynton, the city engineer of Cedar Rapids. The clays were taken from four companies in Des Moines; each having their plant in a different part of that city.

	Silica $\text{SiO}_2$ .	Alumina $\text{Al}_2\text{O}_3$ .	Iron Oxide $\text{Fe}_2\text{O}_3$ .	Lime $\text{CaO}$ .	Magnesia $\text{MgO}$ .	Total alkalis $\text{Na}_2\text{O}$ O and $\text{K}_2\text{O}$ .	Hydroscopic mois- ture $\text{H}_2\text{O}$ .	Ignition loss $\text{H}_2\text{O}$ , $\text{CO}_2$ S. etc.	
C-0	55.25	25.60	5.52	1.75	1.49	1.79	3.27	5.07	99.74
C-1	53.08	24.93	9.00	.94	1.84	1.19	3.29	5.73	100.00
C-2	61.18	21.69	5.88	.51	1.92	1.96	1.27	5.01	99.42
C-3	68.60	18.93	6.12	.25	.68	.74	1.80	2.80	99.92
C-4	65.62	16.83	8.64	.42	2.00	1.66	.60	4.10	99.87
C-5	51.35	27.38	6.60	1.45	2.62	2.34	2.81	5.42	99.97
C-6	58.42	20.04	7.80	1.68	2.67	1.56	2.39	5.40	99.96
I-1	55.98	25.65	5.88	.74	1.83	1.95	3.72	3.73	99.53
I-2	81.79	10.25	3.24	.52	.57	1.75	.58	1.27	99.97
I-3	68.50	88.45	5.28	1.19	1.42	1.27	.88	2.82	99.81
I-4	52.88	24.27	11.28	.52	2.05	1.92	3.46	3.28	99.64
I-5	66.73	20.28	3.24	.70	.90	1.46	1.70	4.92	99.93
I-6	64.60	20.25	6.72	1.20	1.02	1.33	1.14	3.74	100.00
I-6 $\frac{1}{2}$	64.82	21.00	5.76	.42	2.48	2.11	.33	3.10	100.02
I-7	57.25	22.50	7.92	.90	2.28	1.41	3.88	3.62	99.76
I-8	53.05	25.92	8.76	1.00	2.73	1.29	2.70	4.40	99.85
D-1	70.29	15.18	7.32	.80	1.72	1.49	1.02	2.18	100.00
D-2	59.18	21.63	9.00	1.06	1.85	1.52	1.95	3.80	99.99
D-3	64.60	19.20	7.68	1.02	1.37	1.25	.92	3.95	100.01
D-4	64.41	20.43	5.88	.34	1.71	1.90	1.27	3.93	99.77
D-5	63.23	24.52	5.28	.32	.99	1.16	1.75	2.55	99.80
D-6	76.01	11.94	5.40	1.57	1.04	1.80	.65	1.41	99.82
D-7	67.76	14.46	8.52	1.16	2.36	1.24	.67	3.53	99.70
D-8	55.56	21.33	10.56	1.59	2.94	2.38	.97	4.65	99.98
F-1	70.23	15.68	7.44	.47	1.50	1.28	1.50	1.82	99.90
F-2	69.89	17.68	5.64	1.05	1.68	1.15	.85	1.97	99.91
F-3	58.92	21.45	8.40	.98	2.90	2.49	.57	4.15	99.84
F-4	50.38	27.25	11.54	.96	2.93	1.65	1.45	3.62	99.73
F-5	62.70	21.32	5.88	.16	1.77	1.15	2.12	4.90	100.09
F-6	64.31	17.64	7.68	1.12	2.40	1.15	.42	5.47	99.93
F-7	64.03	20.73	6.72	.36	2.57	1.30	.42	3.50	99.60